	NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan & Realization)	**NRIIT/9.1/F-09**

Name of the Program: IV- B.Tech,, Sem-1	**Academic Year: 2020-21**
Branch: ECE	**Year & Semester:IV&II**
Name of the Course: WIRELESS SENSOR NETWORKS	**Regulation: R16**
Course Area/Module: COMMUNICATIONS	**No. of students registered:**
Course Coordinator: Y.ARPITHA **Designation: Assoc.Prof**	**Course Instructors:** **1.** M.Purna Kishore **2.** Ch.Swathi **3.** Y.Arpitha
No. of Lecture Hours per week:6	**No. of Tutorial Hours per week:**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1.	Understand the basic WSN technology and supporting protocols, with emphasis placed on standardization basic sensor systems and provide a survey of sensor technology
2.	Understand the medium access control protocols and address physical layer issues
3.	Interpret key routing protocols for sensor networks and main design issues
4.	Analyze transport layer protocols for sensor networks, and design requirements
5.	Understand the Sensor management ,sensor network middleware, operating systems.
6.	Understand the basic WSN technology and supporting protocols, with emphasis placed on standardization basic sensor systems and provide a survey of sensor technology

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1	Illustrate the familiarity with basic concepts of WSN architectures with some existing applications and to determine its optimization goals.
2	Identify and analyze different topologies and routing algorithms employed in wireless sensor networks like WANETs, MANETs AND PANs
3	Demonstrate the knowledge of different MAC protocols developed for WSN and to understand the necessary scheduling mechanisms.
4	Interpret the design issues of routing protocols for Adhoc Wireless networks and to differentiate them based on classification.
5	Address the key issues and goals in designing the transport layer protocols for Adhoc Wireless networks and to analyze their performance.
6	Apply the knowledge and concepts of various sensor network platforms and tools to analyze the challenges and issues in security provisioning.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Computer networks

COURSE DESCRIPTION:

Wireless sensor networks are pervasive computing systems that consist of sensors embedded in the physical world. These systems have many applications including long-term monitoring of habitats, finding parking spaces in crowded cities, or monitoring the physiology and activity patterns of patients. Wireless sensor networks provide the basis for new computing paradigms that challenge many of the classical approaches to developing distributed and networking systems. This course considers the challenges of developing operating systems, wireless networking protocols, power-management, and middle-ware to support this new type of systems. This course covers important aspects of sensor network communication systems including architecture, management, and policy-awareness service composition.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15
Mid Examination - II	90	15	15
Online Quiz Examination - I	20	10	10
Online Quiz Examination - I	20	10	10
Assignments	50	5	5
Semester End Examination	3H	70	70

COURSE CONTENT (Syllabus):

UNIT I
OVERVIEW OF WIRELESS SENSOR NETWORKS:
Key definitions of sensor networks, Advantages of sensor Networks, Unique constraints an challenges, Driving Applications, Enabling Technologies for Wireless Sensor Networks.
ARCHITECTURES:
Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems andExecution Environments, Network Architecture -Sensor Network Scenarios, Optimization Goals and Figures ofMerit, Gateway Concepts.
UNIT II
NETWORKING Technologies:
Physical Layer and Transceiver Design Considerations, Personal area networks (PANs), hidden node and exposed node problem, Topologies of PANs, MANETs, WANETs.
UNIT-III
MAC Protocols for Wireless Sensor Networks:
Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad HocWireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocolswith reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocolsthat use Directional Antennas, Other MAC Protocols.

UNIT-IV
ROUTING PROTOCOLS:
Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of RoutingProtocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, RoutingProtocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols,Proactive Routing
UNIT-V
TRANSPORT LAYER AND SECURITY PROTOCOLS:
Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of aTransport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP OverAd Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks,
UNIT- VI
SECURITY IN WSNs:
Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.
SENSOR NETWORK PLATFORMS AND TOOLS:
Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.
APPLICATIONS of WSN:
S Ultra wide band radio communication, Wireless fidelity systems. Future directions, Home automation, smartmetering Applications

TEXT BOOKS:
1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI

2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control – Jagannathan Sarangapani, CRC Press

3. Holger Karl & Andreas Willig, “Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

REFERENCES:
1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols, and Applications”, John Wiley, 2007.

2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.

4. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer

5. Wireless Sensor Networks – S Anandamurugan, Lakshmi Publications.

PEDAGOGICAL APPROACH:

1.Classroom Lecture
2. Classroom Tutorials
3. Home Assignments
4. Quizes
5. NPTEL Vedios
6.PPT'S

LESSON PLAN:

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
		UNIT 1 :Overview of wireless sensor networks	
1	1	Introduction	
1	2	Key definitions of sensor networks	
1	3	Advantages of sensor networks	
2	5	Driving applications of sensor networks	
1	6	Unique constrains and Challenges	
1	7	Enabling Technologies For Wireless Sensor Networks.	
		Architectures	
1	8	Single-Node Architecture	
2	10	Hardware Components	
2	12	Energy Consumption of Sensor Nodes	
1	13	Operating Systems and Execution Environments	
1	14	Network Architecture -Sensor Network Scenarios	
1	15	Optimization Goals and Figures of Merit	
1	16	Gateway Concepts.	
		Unit-2: NETWORKING Technologies	
1	17	Introduction	
1	18	Physical layer and Transceiver design considerations	
1	19	PAN (Personal area networks)	

1	20	Hidden node and exposed node problems	
1	21	Topologies of PANs	
1	22	MANETs,WANETs	
		Unit-3 MAC Protocols for Wireless Sensor Networks	
1	23	Introduction	
1	24	Issues of designing MAC protocol for AdHoc wireless networks	
1	25	Design goals of a MAC protocol for AdHoc wireless networks	
1	26	Classification of MAC protocols ,contention based protocols	
1	27	contention based protocols with reservation mechanism	
1	28	contention based protocols with scheduling mechanism	
1	29	MAC protocol that use directional antenna	
1	30	Other MAC protocols	
		Unit-4 :Routing Protocols	
1	31	Introduction	
1	32	Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks	
1	33	Classification of Routing Protocols	
1	34	Table –Driven Routing Protocols	
1	35	On – Demand Routing Protocols Hybrid Routing Protocols	
1	36	Routing Protocols with Efficient Flooding Mechanisms	
1	37	Hierarchical Routing Protocols	
1	38	Power – Aware Routing Protocols	
1	39	Proactive routing, On – Demand Routing Protocols	
1	40	Hybrid Routing Protocols	
1	41	Routing Protocols with Efficient Flooding Mechanisms	
1	42	Hierarchical Routing Protocols	
1	43	Power – Aware Routing Protocols, Proactive routing	
		Unit-5: Transport Layer And Security Protocols	
1	44	Introduction	
1	45	Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks	
1	46	Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks	

1	47	Classification of Transport Layer Solutions	
1	48	TCP Over Ad Hoc Wireless Networks	
1	49	Other Transport Layer Protocol for Ad Hoc Wireless Networks	
		UNIT-6:Security In WSNs	
1	50	Introduction	
1	51	Security in Ad Hoc Wireless Networks	
1	52	Network Security Requirements, Issues and Challenges in Security Provisioning	
1	53	Network Security Attacks, Key Management	
1	54	Secure Routing in Ad Hoc Wireless Networks.	
		Sensor Network Platforms And Tools:	
1	55	Sensor Node , Berkeley Motes	
1	56	Programming Challenges	
1	57	Programming Challenges, Node-level software platforms, State-centric programming	
		Applications of WSN:	
1	58	**S** Ultra wide band radio communications	
1	59	Wireless fidelity systems	
1	60	Future directions, Home automations, Smart metering Applications	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	-	2	-	-	-	-	-	-	3
CO2	2	3	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	2	3	-	1	-	-	-	-	-	-	-	-	2
CO4	2	2	3	-	-	-	2	-	-	-	-	-	-	3
CO5	3	2	3	-	-	-	-	-	-	2	-	-	-	2
CO6	3	2	-	-	-	-	-	1	-	-	-	2	-	2
Total	16	14	11		1		4	1		2		2		14
Average	**2.67**	**2.33**	**2.75**	**-**	**1.00**	**-**	**2.00**	**1.00**	**-**	**2.00**	**-**	**2.00**	**-**	**2.33**

	# NRI INSTITUTE OF TECHNOLOGY Teaching Plan &Realization	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester:**
Name of the Course: Satellite communication	**Regulation: R16**
Course Area/Module: Communication Systems	**No. of students registered: 192**
Course Coordinator: B. Phanindra Kumar **Designation: Assistant Professor**	**Course Instructors:** **1.** A.Sathi Babu, Assistant Professor
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week:1**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

1. To understand the basic concepts, applications, frequencies used and types of satellite communications
2. To Understand the concept of look angles, launches and launch vehicles and orbital effects in satellite Communications.
3. To understand the various satellite subsystems and its functionality.
4. To understand the concepts of satellite link design and calculation of C/N ratio.
5. To Understand the concepts of multiple access and various types of multiple access techniques in satellite systems
6. To understand the concepts of satellite navigation, architecture and applications of GPS.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Analyze & Design different type of differential amplifiers for various applications.
2. Understand thoroughly the operational amplifier characteristics with linear integrated circuits.
3. Design and Construct different circuits for various applications using Operational amplifiers.
4. Analyze and design various active filters using frequency response characteristics.
5. Understand and demonstrate the applications of 555, 565 and 566 IC's
6. Design, Construct and Test the Analog to Digital and Digital to Analog converters.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1.	Electronic devices and Circuits
2.	Electronic Circuit Analysis

COURSE DESCRIPTION:

COURSE OBJECTIVE: This course is intended to introduce to graduates to provide them with a sound understanding of how a satellite communication system successfully transfers information from one earth station to another. The goal of the course is to introduce students to the fundamentals of satellite communication.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15
Mid Examination - II	90	15	15
Online Quiz Examination - I	20	10	10
Online Quiz Examination - I	20	10	10
Assignments	60	05	05
Semester End Examination	180	70	70

COURSE CONTENT (Syllabus):

UNIT I

INTRODUCTION [2] : Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

ORBITAL MECHANICS AND LAUNCHERS [1]: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

UNIT II

SATELLITE SUBSYSTEMS [1] : Attitude and orbit control system, telemetry, tracking, Command and Monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space Qualification.

UNIT III

SATELLITE LINK DESIGN [1] : Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

UNIT IV

MULTIPLE ACCESS [1][2] : Frequency division multiple access (FDMA) Inter modulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple access (CDMA),Spread spectrum transmission and reception.

UNIT V

EARTH STATION TECHNOLOGY [3] : Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS [1] : Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations, System considerations, Operational NGSO constellation Designs

UNIT VI

SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM [1] : Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

Text books

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

References

1. Satellite Communications: Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication – D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004
4. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

PEDAGOGICAL APPROACH:

1. Class room Lectures
2. Class room Tutorials
3. Home Assignment
4. Quizzes
5. Mini Projects

No. of Lectures	Cumulative No. of Lectures	Topic
Unit-I Introduction to Satellite Communication,Orbital Mechanics and Launchers		
1	1	Origin of Satellite Communications
1	2	Historical bag round
2	4	Basic Concepts of satellite communication
1	5	Active and passive satellites
1	6	Introduction to Satellite orbits
2	8	GEO,MEO,LEO Orbits
2	10	Frequency bands for satellite communication
1	11	Applications and Future trends of SC
2	13	Orbital Mechanics
2	15	Introduction to Look Angle determination
1	16	Azimuth angle calculation
2	18	Look Angle related problems
1	19	Orbital perturbations
2	21	Orbit determination
1	23	launches and launch vehicles
2	24	Orbital effects in communication systems performance.
Unit-II Satellite Subsystems		
1	25	Altitude and orbital control systems
2	27	Telemetry, Tracking, Command and monitoring,
2	28	Power systems
1	29	Communication sub systems
1	30	satellite antenna sub systems
2	36	Equipment reliability
1	37	Space qualification
Unit-III Satellite Link Design		
2	39	Basic transmission theory
1	40	system noise temperature and G/T ratio
1	41	Design of down links
1	42	Design of up link
1	43	Design of satellite links for specified C/N
1	44	System design example.
1	45	Related problems
Unit-IV MULTIPLE ACCESS		
1	46	Introduction to multiple access techniques

1	**47**	Frequency division multiple access
1	**48**	Inter modulation and Calculation of C/N.
1	**49**	Time division multiple access
1	**50**	TDMA Frame structure, Examples. DAMA,
1	**51**	Satellite Switched TDMA Onboard processing
1	**52**	Code Division Multiple access (CDMA)
	53	Spread spectrum transmission and reception.
Unit-V Earth Station Technology, Low Earth Orbit and Geo-Stationary Satellite Systems		
1	**54**	Introduction to Earth Station Technology
1	**55**	Antennas
1	**56**	Tracking systems
1	**57**	Terrestrial interface
2	**59**	Introduction low earth orbit and geo-stationary satellite systems
1	**60**	Orbit consideration, coverage and frequency consideration
1	**61**	Delay and Throughput consideration
1	**62**	System consideration
1	**63**	Operational NGSO constellation designs
1	**64**	Orbit consideration, coverage and frequency consideration
Unit-VI Satellite Navigation & The Global Positioning System		
1	**65**	Radio and Satellite Navigation and GPS Position Location principles
1	**66**	GPS Receivers and codes, Satellite signal acquisition
1	**67**	GPS Navigation Message, GPS signal levels
1	**68**	GPS receiver operation, GPS C/A code accuracy
1	**69**	Differential GPS.

	NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B.Tech	**Academic Year: 2020-21**
Branch: ECE	**Year & Semester:**IV/IV B. Tech
Name of the Course: Cellular and Mobile Communications	**Regulation: R16**
Course Area/Module: Communication Systems	**No. of students registered: 182**
Course Coordinator: S.V.Rama Rao **Designation: Associate Professor**	**Course Instructors:** **1. S.V.Rama Rao,** 2. **K. Prathyusha**
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week:0**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

S.No	Course Objectives
1	Understand the basic cellular concepts like frequency reuse, cell splitting, cell sectoring etc...and various cellular systems
2	Understand the different types of interferences influencing cellular and mobile communications.
3	Understand the frequency management, channel assignment and various propagation effects in cellular environment.
4	Understand the different types of antennas used at cell site and mobile.
5	Understand the concepts of handoffs and types of handoffs
6	Understand the architecture of GSM and 3G cellular systems.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

S.No	Course Outcomes
1	Interpret the cellular mobile radio system operation and design concepts, cell splitting and sectoring.
2	Measure Co-Channel and Non Co-Channel interferences and analyze the various mobile radio propagation models and design of antenna system.
3	Estimate the concepts related to frequency management, channel assignment, channel sharing and channel borrowing techniques and signal reflections inflat and hilly terrain.
4	Design the Omni-directional and directional antennas used at cell sites and their synthesis methods.
5	Apply the vehicle locating methods, various handoff and cell splitting techniques and to estimate dropped call rates in cellular systems.
6	Classify FDMA,T DMA and CDMA multiple access schemes. Discuss the basics of 3G cellular systems.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	BASICS OF ANALOG COMMUNCIATIONS
2	BASICS OF DIGITAL COMMUNCIATIONS

COURSE DESCRIPTION:

This course presents the basics of mobile communications that are important for a wireless communications system. It features cellular mobile radio systems, multi-generation cellular systems and a fading channel. It also covers several types of interference, which are interference inside and outside the channel in a mobile radio environment. Subsequently, the course describes cell coverage for signal and traffic, signal reflection in different territories, antennas for various cellular stations and mobile antennas and their analysis. Several methods for controlling frequency and channel assignment are described below. Finally, the concepts of handoffs, dropped calls and cell splitting are analyzed.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90 mins	15	15
Mid Examination - II	90 mins	15	15
Online Quiz Examination - I	20 mins	10	10
Online Quiz Examination - II	20 mins	10	10
Assignment 1	50 mins	5	5
Assignment 2	50 mins	5	5
Semester End Examination	180 mins	70	70

COURSE CONTENT (Syllabus):

UNIT I
CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, uniqueness of mobile radioenvironment, operation of cellular systems, consideration of the components of Cellular system, Hexagonal shapedcells, Analog and Digital Cellular systems.
CELLULAR CONCEPTS: Evolution of Cellular systems, Concept of frequency reuse, frequency reuse ratio,Number of channels in a cellular system, Cellular traffic: trunking and blocking, Grade of Service; Cellularstructures: macro, micro, pico and femto cells; Cell splitting, Cell sectoring.
UNIT II
INTERFERENCE: Types of interferences, Introduction to Co-Channel Interference, real time Co-Channelinterference, Co-Channel measurement, Co-channel Interference Reduction Factor, desired C/I from a normal casein a omni directional Antenna system, design of Antenna system, antenna parameters and their effects, diversityreceiver, non-cochannel interference-different types.
UNIT III
FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Numbering and grouping, setup access andpaging channels, channel assignments to cell sites and mobile units: fixed channel and non-fixed channelassignment, channel sharing and borrowing, overlaid cells.
CELL COVERAGE FOR SIGNAL AND TRAFFIC: Signal reflections in flat and hilly terrain, effect of humanmade structures, phase difference between direct and reflected paths, straight line path loss slope, general formulafor mobile propagation over water and flat open area, near and long distance propagation, antenna height gain, formof a point to point model.
UNIT IV
CELL SITE AND MOBILE ANTENNAS: Sum and difference patterns and their synthesis, omni directionalantennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas,minimum separation of cell site antennas, high gain antennas.
UNIT V
HANDOFF STRATEGIES
Concept of Handoff, types of handoff, handoff initiation, delaying handoff, forced handoff, mobile assignedhandoff, intersystem handoff, vehicle locating methods, dropped call rates and their evaluation.
UNIT VI
DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, multiple access schemes; TDMA,CDMA, OFDMA; architecture of 3G cellular systems.

TEXTBOOKS:
1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Principles of Mobile Communications–Gordon L.Stuber,Springer International 2nd Edt. 2007.

REFERENCES:
1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edition, 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Mobile cellular communication- G.Sasibhushan rao,Pearson Education.
4. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
5. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

PEDAGOGICAL APPROACH:

1.Classroom Lecture
2. PPT
3. Classroom Tutorials
4. Home Assignments
5. Quizzes
6. Group Learning

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
		UNIT I CELLULAR MOBILE RADIO SYSTEMS	
1	1	Introduction to cellular mobile system ,Performance criteria	
1	2	Uniqueness of mobile radio environment	
2	4	Operation of cellular systems	
1	5	consideration of the components of Cellular system, Hexagonal shaped cells	
2	7	Analog and Digital Cellular systems	
		CELLULAR CONCEPTS	
1	8	Evolution of Cellular systems,	
1	9	Concept of frequency reuse, frequency reuse ratio, Number of channels in a cellular system,	
2	11	Cellular traffic: trunking and blocking, Grade of Service;	
1	12	Cellular structures: macro, micro, pico and femto cells;	
1	13	Cell splitting, Cell sectoring.	
		UNIT II INTERFERENCE	
1	14	Types of interferences, Introduction to Co-channel interference	
1	15	Real time Co-channel interference	
1	16	Co-channel measurement, Co-channel Interference Reduction Factor,	
2	18	desired C/I from a normal case in a omni directional Antenna system,	
2	20	Design of Antenna system ,Antenna parameters and their effects	
1	21	Diversity receiver	
1	22	Non-co-channel interference	
		UNIT III FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT	
1	23	Numbering and grouping	
1	24	Setup, access and paging channels	
1	25	Channel assignments to cell sites and mobile units	
1	26	Fixed channel assignment	
1	27	Non-fixed channel assignment	
1	28	Channel sharing and borrowing	

1	29	Overlaid cells	
		CELL COVERAGE FOR SIGNAL AND TRAFFIC	
1	30	Signal reflections in flat and hilly terrain, Effect of human made structures	
1	31	Phase difference between direct and reflected paths	
1	32	Straight line path loss slope	
1	33	General formula for mobile propagation over water	
1	34	General formula for mobile propagation on flat open area	
1	35	Near and long distance propagation antenna height gain	
1	36	Form of a point to point model	
		UNIT IV CELL SITE AND MOBILE ANTENNAS	
2	38	Sum and difference patterns and their synthesis	
1	39	Omni directional antennas	
2	41	Directional antennas for interference reduction	
1	42	Space diversity antennas	
1	43	Umbrella pattern antennas	
1	44	Minimum separation of cell site antennas	
1	45	High gain antennas	
		UNIT VHANDOFF STRATEGIES	
1	46	Concept of Handoff	
1	47	Types of handoff	
1	48	Handoff initiation	
1	49	Delaying handoff	
1	50	Forced handoff, mobile assigned handoff	
1	51	Intersystem handoff	
1	52	Vehicle locating methods	
2	54	Dropped call rates and their evaluation	
		UNIT VI DIGITAL CELLULAR NETWORKS	
2	56	GSM architecture	
2	58	GSM channels	
2	60	Multiple Access schemes	
2	62	TDMA	

2	64	CDMA	
1	65	OFDMA	
1	66	Architecture of 3G cellular systems	

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE FILE – 2020-2021

Name of the Program : B.Tech	**Academic Year : 2020-21**
Branch: Electronics & Communication Engineering	**Year & Semester: IV B.Tech I Sem**
	Regulation : R16
Course Area/Module : Microwaves and Antennas	**No of students registered :**
Course Coordinator : Sk.Abdul Rahaman	**Course Instructors : B.Phanindra Kumar Assistant Professor**
Designation : Associate Professor	**Credits: 3**
Contact Details : 9492119322 Mail id : hairehman@gmail.com	**No. of Lecture Hours per week : 4 No. of Tutorial Hours per week : 1**

PRE-REQUISITES FOR THE COURSE:

Students are assumed to have back ground knowledge on the following topics:

- Types of Signals
- Transmitters
- Receivers
- Analysis of signals
- Filters

Pre-requisite courses:

Signals and Systems, Analog Communications, Electromagnetic Theory, Antennas and Wave Propagation.

COURSE DESCRIPTION:

This course covers the fundamental concepts needed to understand the design and operation of Radar systems for variety of applications. The most important processes for the radar's performance are covered, including propagation and reflection of electromagnetic radiation, the radar equation, waveforms, array antennas, Doppler processing, detection theory and tracking.

COURSE OBJECTIVES:

Students will be able

1.	To derive the basic radar equation and its dependence on various parameters.
2.	To study CW radar system and its application along with FMCW radar system for altimeter applications.
3.	To study Doppler Effect and its applications with respect to pulsed Doppler radar.
4.	To understand moving target indicator and to study its application.
5.	To study and understand the effect of noise on radar signal detection. To study the various types of Radar Receivers and Transmitter systems.

COURSE OUTCOMES:

COURSE NAME: RADAR SYSTEMS (R41043) SEM:7(IV-I) Regulation:R13	
At the end of the course the students shall be able to	
C414.1	Acquire the knowledge to apply and to design required parameters for a RADAR system and derive the RADAR Equation and to calculate Transmitter power.
C414.2	Analyze the working principle of CW and Frequency Modulated Radar and apply the Doppler Effect to the MTI and Pulse Doppler Radar.
C414.3	Design and analyze types of MTI Radars and Pulse Doppler Radar.
C414.4	Design and analyze different types of Tracking Radars with respective parameters.
C414.5	Design and analyze Antennas for Radar Transmitters and Receivers. Derive Matched filter expression and Design phased array antennas.
C414.6	Apply the techniques learned, to choose suitable Microwave devices from the available, for the required application.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90 Min	15	15%
Mid Examination - II	90 Min	15	15%
Online Quiz Examination - I	20 Min	10	10%
Online Quiz Examination - I	20 Min	10	10%
Assignments	60 Min	5	5%
Semester End Examination	180 Min	70	70%

COURSE CONTENT (Syllabus)

UNIT–I:

Basics of Radar: Introduction, Maximum Unambiguous Range, simple Radar range Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Illustrative Problems.
Radar Equation: Modified Radar Range Equation, SNR, probability of detection, probability of False Alarm, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Creeping Wave, Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Illustrative Problems.

UNIT–II:

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, Illustrative Problems.
FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics, FM-CW altimeter, Multiple Frequency CW Radar.

UNIT-III:

MTI and Pulse Doppler Radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Nth Cancellation Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

UNIT –IV:

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Mono pulse Tracking Radar – Amplitude Comparison Mono pulse (one- and two- coordinates), Phase Comparison Mono pulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT –V:

Detection of Radar Signals in Noise: Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation detection and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise, Noise Figure and Noise Temperature.

UNIT –VI:

Radar Receivers –Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers.
Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus parallel feeds, Applications, Advantages and Limitations. Radomes.

TEXT BOOKS :

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Ed., 2007.
2. Radar Engineering and fundamentals of Navigational Aids-G.S.N.Raju,I.K International, 2008.

REFERENCE BOOKS:

1. Introduction to Radar Systems, 3rd edition – M.I. Skolnik, TMH Ed., 2005
2. Radar: Principles, Technology, Applications – Byron Edde, Pearson Education, 2004.
3. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.
4. Principles of Modern Radar: Basic Principles – Mark A. Richards, James A. Scheer, William A. Holm, Yesdee,
5. Radar Engineering – GSN Raju, IK International.

PEDAGOGICAL APPROACH:

Classroom lectures through Chalk & talk
NPTEL video lectures
Power point presentations
Home assignments
Seminars, Classroom Discussions

LESSON PLAN

Academic Year : **2020-2021** **Branch: ECE**
Class& Semester : **IV B.Tech I Sem (R-16)**
Subject : **RADAR SYSTEMS** **Faculty:** Sk.Abdul Rahaman, B.Phanindra Kumar

No. of periods required	Cumulative No. of periods	Topic(s) to be covered
		UNIT-I : Basics of Radar
1	1	Introduction to Radar
1	2	Maximum unambiguous range
1	3	Simple Radar range equation
1	4	Radar block diagram and operation
1	5	Radar frequencies and applications
1	6	Related problems
1	7	**Radar equation**: Prediction of range performance
1	8	Minimum detectable signal
1	9	Receiver noise
1	10	Illustrative Problems
1	11	Modified Radar Range Equation
1	12	Signal to Noise Ratio
1	13	Probability of Detection
1	14	Probability of False Alarm
1	15	Integration of Radar Pulses
1	16	Radar cross section of targets (simple targets-sphere, cone-sphere)
1	17	Creeping wave, Transmitter power
1	18	PRF and range ambiguities
1	19	System losses (qualitative treatment)
1	20	Illustrative problems
	T1	Tutorial

UNIT – II : CW and Frequency Modulated Radar		
1	21	Doppler effect
1	22	CW Radar –Block diagram
1	23	Isolation between transmitter and receiver
1	24	Non-zero IF receiver
1	25	Receiver bandwidth requirements
1	26	Applications of CW Radar
1	27	**Introduction to FM-CW Radar**
1	28	Range and Doppler Measurement,
1	29	Block diagram & Characteristics
1	30	FM-CW Altimeter , Measurement of Errors
1	31	Multiple frequency CW Radar
1	T2	Tutorials
UNIT –III : MTI and Pulse Doppler Radar		
1	32	Introduction
1	33	Principle of MTI Radar
1	34	MTI Radar with Power Amplifier Transmitter
1	35	MTI Radar with Power oscillator Transmitter
1	36	Delay line cancellers – Filter characteristics
1	37	Double Cancellation, N^{th} Cancellation
1	38	Blind speeds , Staggered PRF's
1	39	Range gated Doppler Filters
1	40	MTI Radar parameters
1	41	Limitations to MTI performance
1	42	MTI versus Pulse Doppler Radar
1	T3	Tutorials
UNIT- IV : Tracking Radar		
1	43	Tracking with Radar
1	44	Sequential Lobing, Conical scan
1	45	Radar Amplitude comparison Mono-Pulse (One and Two coordinates)
1	46	Phase comparison Mono-pulse
1	47	Acquisition and Scanning patterns
1	48	Tracking in range
1	49	Comparison of Tracking Techniques
1	50	Tracking with Radar
	T4	Tutorial
UNIT-V: Detection of Radar Signals in Noise		
1	51	Introduction to Detection of Radar Signals in Noise
1	52	Matched Filter Receiver –Response characteristics and

		derivation
1	53	Correlation detection & Detection criteria
1	54	Cross Correlation Receiver
1	55	Efficiency of Non-Matched Filters
1	56	Matched Filter with Non-White Noise
1	57	Noise Figure, Noise Temperature
1	T5	**Tutorial**
UNIT –VI : Radar Receivers		
1	58	Displays – Types
1	59	Duplexer – Branch type and Balanced type
1	60	Circulators as Duplexers
1	61	Introduction to Phased Array Antennas
1	62	Basic Concepts, Radiation pattern
1	63	Beam Steering and Beam Width changes
1	64	Series versus Parallel Feeds
1	65	Applications, Advantages and Limitations.
1	66	Radomes
1	T6	Tutorials
	66	Total

TEXT BOOKS :

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Ed., 2007.

2. Radar Engineering and fundamentals of Navigational Aids-G.S.N.Raju,I.K International,
2008.

Reference books:

3. Introduction to Radar Systems, 3rd edition – M.I. Skolnik, TMH Ed., 2005.
4. Radar: Principles, Technology, Applications – Byron Edde, Pearson Education, 2004.
5. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.
6. Principles of Modern Radar: Basic Principles – Mark A. Richards, James A. Scheer, William A. Holm, Yesdee,
7. Radar Engineering – GSN Raju, IK International.

	NRI INSTITUTE OF TECHNOLOGY	**NRIIT/9.1/F-09**

NAME OF THE PROGRAM:B.Tech	**ACADEMIC YEAR:** 2020-21
BRANCH: ECE	**YEAR & SEMESTER:** IV/I
NAME OF THE COURSE: Optical Communication	**REGULATION:** R16
COURSE AREA/MODULE: Communication Systems	**NO. OF STUDENTS REGISTERED:**185
COURSE COORDINATOR: A.V.Kiranmaie **DESIGNATION:** Associate Professor	**COURSE INSTRUCTOR:** S.V. RAMARAO
NO. OF LECTURE HOURS PER WEEK:06	**NO. OF TUTORIAL HOURS PER WEEK:**01
CREDITS:03	

OBJECTIVES:

Students will be able to:

1. Analyze and design optical communication and fiber optic sensor systems.
2. Understand the properties of optical fiber that affect the performance of a communication link and types of fiber materials with their properties and the losses occur in fibers.
3. Analyze the principles of single and multi-mode optical fibers and their characteristics
4. Working of semiconductor lasers, and differentiates between direct modulation and external electro-optic modulation. Analyze the operation of LEDs, laser diodes, and PIN photo detectors (spectral properties, bandwidth, and circuits) and apply in optical systems.
5. Design the functionality of each of the components that comprise a fiber optic communication system, the models of analog and digital receivers.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1: Understand the overview of optical fiber communication and classify the types of optical fibers, analyze cylindrical fibers using mathematical equations
CO2: Design the optical fibers using various materials and to illustrate various attenuation losses and dispersion models
CO3: Apply splicing techniques on fibers and choose low loss connectors to minimize joint losses
CO4: Analyze different types of optical sources and photo detectors, develop Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies
CO5: Evaluate the power coupled in to optical fibers and analyze signal transmission, receiver operation and error sources of optical fiber
CO6: Design optical system with budget analysis and to classify principles and types of WDM and Measurement of Attenuation and Dispersion, Eye pattern.

PRE-REQUISITES FOR THE COURSE:

1. Engineering physics 2.Analog Communication 3. Digital Communication

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Basic elements of optical fibers transmission link, various parameters of optical fiber
2	Light propagation inside a fiber, fiber materials
3	Loss mechanisms of optical fiber
4	Functioning of various optical source and detectors
5	Power coupling of various optical fibers
6	Design procedures of optical fiber and techniques like wavelength division multiplexing, attenuation and dispersion measurement techniques

COURSE DESCRIPTION:

This course is intended to introduce to graduates an overview of optical fiber communication devices and systems. Topics include sources and receivers, optical fibers and their propagation characteristics, and optical fiber systems. The principles of operation and properties of optoelectronic components, as well as the signal guiding characteristics of glass fibers, are discussed. System design issues include terrestrial and submerged point-to-point optical links

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	-	-	-	-
CO2	3	2	3	2	2	-	-	-	-	-	-	-
CO3	2	2		3	2	-	1	-	-	-	-	-
CO4	2	3	2	2	3	-	2	-	-	-	-	-
CO5	3	2		2	2	-	2	-	-	-	-	-
CO6	-	2	2	2	3	-	-	-	-	-	-	-
Total	-	13	10	13	14	-	5	-	-	-	-	-
Avg.	2.17	2.17	1.67	2.17	2.33	-	0.83	-	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1,2,3,4,5	PSO1,PSO2
CO2	PO1,2,3,4,5	PSO1,PSO2
CO3	PO1,2,4,5,7	PSO1,PSO2
CO4	PO1,2,3,4,5,7	PSO1,PSO2
CO5	PO1,2,4,5,7	PSO1,PSO2
CO6	PO2,3,4	PSO1,PSO2

DEPARTMENT OF ECE
Lecture Plan for the Academic Year 2020-2021

Branch: **B.Tech (ECE)** Name Of Faculty: **S.V.Rama Rao**
Year: **IV Year, I Sem.** (A, B & C) Subject: **OPTICAL COMMUNICATIONS**

Unit/Topic No.	TOPIC NAME	No. of classes required	No. of Cumulative Classes
	UNIT I		
1.1	**Overview of optical fiber communication** - Historical development	1	1
1.2	The general system, Advantages of optical fibercommunications	1	2
1.3	**Optical fiber wave guides-** Introduction, Ray theory transmission,Total Internal Reflection	2	4
1.4	Acceptance angle, Numerical Aperture, Skew rays	2	6
1.5	**Cylindrical fibers**- Modes, V-number, Mode coupling	1	7
1.6	StepIndex fibers	1	8
1.7	Graded Index fibers	1	9
1.8	**Single Mode Fibers-** Cut off wavelength	2	11
1.9	Mode Field Diameter, EffectiveRefractive Index	1	12
1.10	Tutorial 1: Problems on Acceptance angle, Numerical Aperture	1(12+1)	13
	UNIT II		
2.1	**Fiber materials:-** Glass, Halide, Active glass	1	14
2.2	Chalgenide glass, Plastic optical fibers	1	15
2.3	**Signal distortion in optical fibers**-Attenuation	1	16
2.4	Absorptionlosses	1	17
2.5	Scattering losses	1	18
2.6	Bending losses	1	19
2.7	Core and Cladding losses, Information capacity determination, Group delay	2	21
2.8	**Types of Dispersion:-** Material dispersion	1	22
2.9	Wave-guide dispersion	1	23
2.10	Polarization-Modedispersion	1	24
2.11	Intermodal dispersion	1	25
2.12	Pulse broadening in Graded index fiber	1	26
2.13	Tutorial 2: Problems on Signal distortion and dispersion in optical fibers	1(13+1)	27
	UNIT III		
3.1	**Optical fiber Connectors-**Connector types	1	28
3.2	Single mode fiber connectors, Connector return loss	1	29
Unit/Topic No.	**TOPIC NAME**	**No. of Classes Required**	**No. of Cumulative Classes**

3.3	**Fiber Splicing-**Splicing techniques	1	30
3.4	Splicing single mode fibers	1	31
3.5	Fiber alignment and joint loss	1	32
3.6	Multimode fiber joints,	1	33
3.7	Singlemode fiber joints	1	34
3.8	Tutorial 3: Problems on	1(7+1)	35
	UNITIV		
4.1	**Optical sources-** LEDs, Structures, Materials	1	36
4.2	Quantum efficiency, Power, Modulation, Power bandwidth product	1	37
4.3	Injection Laser DiodeModes, Threshold conditions	1	38
4.4	External quantum efficiency, LASER diode rate equations,	1	39
4.5	Resonant frequencies, Reliability of LED&ILD	1	40
4.6	**Optical detectors-** Physical principles of PIN diode	1	41
4.7	Physical principles of APD Detectorresponse time, Temperature effect on Avalanche gain	1	42
4.8	Comparison of Photo detectors, related problems.	1	43
4.9	Tutorial 4: Problems on	1(8+1)	44
	UNIT V		
5.1	**Source to fiber power launching** - Output patterns	1	45
5.2	Power coupling, Power launching	1	46
5.3	Equilibrium NumericalAperture, Laser diode to fiber coupling	1	47
5.4	**Optical receiver operation-** Fundamental receiver operation	2	49
5.5	Digital signaltransmission, error sources	1	50
5.6	Receiver configuration, Digital receiver performance	1	51
5.7	Probability of Error, Quantumlimit, Analog receivers	1	52
5.8	Tutorial 5: Problems on	1(8+1)	53
	UNIT VI		
6.1	**Optical system design -** Point-to- point links-Component choice and considerations	1	54
6.2	Link power budget with example	1	55
6.3	Rise time budget with example	1	56
6.4	**Line coding** in Optical links	1	57
6.5	WDM Necessity and Principles	1	58
6.6	**Measurement** of Attenuation	2	60
6.7	**Measurement** of Dispersion	2	62
6.8	Eye pattern	1	63
6.9	Tutorial 6: Problems on	1(10+1)	64
	Total Number of Hours	64	

TEXTBOOKS:

1. **Optical Fiber Communications** – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. **Optical Fiber Communications** – John M. Senior, PHI, 2nd Edition, 2002.

REFERENCES:

1. **Fiber Optic Communications –** D.K. Mynbaev, S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. **Text Book on Optical Fiber Communication and its Applications** – S.C.Gupta, PHI, 2005.
3. **Fiber Optic Communication Systems** – Govind P. Agarwal, John Wiley, 3rd Ediition, 2004.
4. **Fiber Optic Communications** – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

	NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B.Tech	**Academic Year: 2021-2022**
Branch: ECE	**Year & Semester:4-1**
Name of the Course: Electronic Switching Systems	**Regulation: R16**
Course Area/Module: COMMUNICATION	**No. of students registered: 195**
Course Coordinator: Dr.V.Ramesh Babu **Designation:** PROFESSOR	**Course Instructors:** **1.** Mr.B.Phanindra Kumar **2.** Dr.V.Ramesh Babu
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week:1**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

1.	Evaluate the time and space parameters of a switched signal
2.	Establish the digital signal path in time and space, between two terminals
3.	Evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions
4.	Investigate the traffic capacity of the system
5.	Evaluate methods of collecting traffic data
6.	Evaluate the method of interconnecting two separate digital switches

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO	Description
CO1	Differentiate the basic operating principles of manual and automatic switching systems
CO2	Analyze the operating modes of Stored Program Control Switching
CO3	Analyze the operating modes of Time Division Switching
CO4	Analyze the routing and signaling over Telephone networks
CO5	Evaluate telecommunication traffic in various switching networks
CO6	Summarize Integrated services and examine of various ISDN standards

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Analog Communications
2	Digital Communications
3	Computer Networks

COURSE DESCRIPTION:

Today Communication plays a very important role in society. Traditional Telecommunication exchanges are manually operated due to the revolution in electronics and communication engineering Electronic exchanges are developed.

Electronic Switching Systems performs the operation automatically without man, to avoid telecom traffic. Electronic switching systems provide more facilities to the subscribers like broadband services, FAX et. Origin of today's mobile communication is Electronic switching system.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15%
Mid Examination - II	90	15	15%
Online Quiz Examination - I	20	10	5%
Online Quiz Examination - I	20	10	5%
Semester End Examination	180	75	70%

COURSE CONTENT (Syllabus):

UNIT -I: Introduction: Evolution of Telecommunications, Simple Telephone Communication, Basics of Switching System, Manual Switching System, Major Telecommunication Networks. Crossbar Switching: Principles of Common Control, Touch Tone Dial Telephone, Principles of Crossbar Switching, Crossbar Switch Configurations, Crosspoint Technology, Crossbar Exchange Organization.

UNIT -II: Electronic Space Division Switching: Stored Program Control, Centralized SPC: Standby mode, Synchronous duplex mode, Distributed SPC, Software Architecture, Application Software, Enhanced Services, Two-Stage Networks, Three-Stage Networks, n- Stage Networks.

UNIT -III Time Division Switching: Basic Time Division Space Switching, Basic Time Division Time Switching, Generalizedtime-division Space switch, Basic Time-division time switching: modes of operation, simple problems, Time Multiplexed Space Switching, Time Multiplexed Time division space Switch, Time Multiplexed Time Switching, Combination Switching: Time Space (TS) Switching, Space-time (ST) Switching, Three-Stage Combination Switching, n- Stage Combination Switching.

UNIT IV Telephone Networks: Subscriber Loop System, Switching Hierarchy and Routing, Transmission Plan, Transmission Systems, Numbering Plan, Charging Plan, Signaling Techniques, In-channel Signaling, Common Channel Signaling, CCITT Signaling System no.6, CCITT Signaling System no.7, Packet Switching: Statistical Multiplexing, Local- Area and Wide- Area Networks, Large-scale Networks, Broadband Networks.

UNIT -V: Switching Networks: Single- Stage Networks, Grading, Link Systems, Grades of service of link systems, Application of Graph Theory to link Systems, Use of Expansion, Call Packing, Rearrange-able Networks, Strict- Sense non-blocking Networks, Sectionalized Switching Networks Telecommunications Traffic: The Unit of Traffic, Congestion, Traffic Measurement, A Mathematical Model, Lost-call Systems, Queuing Systems. Problems

UNIT -VI: Integrated Services Digital Network: Motivation for ISDN, New Services, Network and Protocol Architecture, Transmission Channels, User- Network Interfaces, Signaling, Numbering and Addressing, Service Characterization, Interworking, ISDN Standards, Expert Systems in ISDN, Broadband ISDN, Voice Data Integration.

TEXT BOOKS: 1. Telecommunication Switching Systems and Networks- ThiagarajanViswanathan, 2000, PHI.

2. Telecommunications Switching, Traffic and Networks- J. E. Flood, 2006, Pearson Education.

REFERENCES:

1. Digital Telephony- J. Bellamy, 2nd Edition, 2001, John Wiley.

2. Data Communications and Networks- Achyut S. Godbole, 2004, TMH.

3. Principles of Communication Ststems- H. Taub& D. Schilling, 2nd Edition, 2003, TMH.

4. Data Communication & Networking- B. A. Forouzan, 3rd Edition, 2004, TMH.

5. Telecommunication System Engineering – Roger L. Freeman, 4th Ed., Wiley-Inter Science,John Wiley & Sons, 2004.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
UNIT I Introduction			
1	1	Evolution of Telecommunications	
2	3	Simple Telephone Communication	
2	5	Basics of Switching System	
1	6	Manual Switching System, Major Telecommunication Networks	
1	7	Principles of Common Control	
1	8	Touch Tone Dial Telephone	
1	9	Principles of Crossbar Switching	
1	10	Crossbar Switch Configurations	
1	11	Cross point Technology	
1	12	Crossbar Exchange Organization	
UNIT -II: Electronic Space Division Switching			
1	13	Stored Program Control	
3	16	Centralized SPC: Standby mode, Synchronous duplex mode, Distributed SPC	
1	17	Software Architecture	
1	18	Application Software	
1	19	Enhanced Services	
1	20	Two-Stage Networks, Three-Stage	
1	21	Networks, n- Stage Networks	
UNIT -III Time Division Switching			
1	22	Basic Time Division Space Switching	
1	23	Basic Time Division Time Switching,	
1	24	Generalizedtime-division Space switch	
1	25	Basic Time-division time switching: modes of operation	
2	27	Simple problems	
1	28	Time Multiplexed Space Switching	
1	29	Time Multiplexed Time division space Switch	
1	30	Time Multiplexed Time Switching,	

1	31	Combination Switching: Time Space (TS) Switching	
2	33	Space-time (ST) Switching	
1	34	Three-Stage Combination Switching	
1	35	n- Stage Combination Switching	
		UNIT IV Telephone Networks	
1	36	Subscriber Loop System	
1	37	Switching Hierarchy and Routing	
1	38	Transmission Plan	
3	41	Transmission Systems	
1	42	Numbering Plan & Charging Plan	
1	43	Signaling Techniques	
1	44	In-channel Signaling	
1	45	Common Channel Signaling	
2	47	CCITT Signaling System no.6, CCITT Signaling System no.7	
1	48	Statistical Multiplexing	
1	49	Local- Area and Wide- Area Networks	
1	50	Large-scale Networks, Broadband Networks	
		UNIT -V: Switching Networks	
1	51	Single- Stage Networks, Grading	
1	52	Link Systems, Grades of service of link systems	
1	53	Application of Graph Theory to link Systems	
1	54	Use of Expansion, Call Packing	
1	55	Rearrange-able Networks, Strict- Sense non-blocking Networks	
1	56	Sectionalized Switching Networks	
1	57	The Unit of Traffic, Congestion, Traffic Measurement	
1	58	A Mathematical Model, Lost-call Systems, Queuing Systems. Problems	
1	59	Motivation for ISDN, New Services	
1	60	Network and Protocol Architecture	
1	61	Transmission Channels	
1	62	User- Network Interfaces, Signaling, Numbering and Addressing	

1	63	Service Characterization, Interworking	
1	64	ISDN Standards	
1	65	Expert Systems in ISDN	
1	66	Broadband ISDN	
1	67	Voice Data Integration	

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.TECH	**Academic Year: 2020 – 2021**
Branch: ECE	**Year & Semester: IV & I**
Name of the Course: EMBEDDED SYSTEMS	**Regulation: R16**
Course Area/Module: DIGITAL ELECTRONICS	**No. of students registered:**
Course Coordinator: G.SRINIVAS BABU **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** **1.** D.RAVISANKAR **2.** DR.K.PRATHYUSHA
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week: 0**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Introduce the basic concepts of embedded system
2. Understand the various elements of embedded hardware and their design principles
3. Design and develop firmware for embedded systems
4. Understand RTOS and present the fundamental issues in hardware software co design
5. Familiarize with different IDEs for firmware development
6. Implement the embedded systems and discuss the testing tools

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Understand the basic concepts of embedded system
2. Design an approach of an embedded hardware
3. Design various approaches for embedded firmware
4. Design RTOS and discuss fundamental issues in hardware software co design
5. Understand how to integrate hardware and firmware of embedded system
6. Understand the various tools used in implementing the embedded systems

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	COMPUTER ARCHITECTURE AND ORGANIZATION
2	MICROPROCESSORS AND MICROCONTROLLERS

COURSE DESCRIPTION:

The fundamentals of embedded system hardware and firmware design will be explored. Issues such as embedded processor selection, hardware/firmware partitioning, glue logic, circuit design, circuit layout, circuit debugging, development tools, firmware architecture, firmware design, and firmware debugging will be discussed. The Intel 8051, a very popular microcontroller, will be studied. The architecture and instruction set of the microcontroller will be discussed, and a wirewrapped microcontroller board will be built and debugged by each student. The course will culminate with a significant final project which will extend the base microcontroller board completed earlier in the course. Learning may be supplemented with periodic guest lectures by embedded systems engineers from industry.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15
Mid Examination - II	90	15	15
Online Quiz Examination - I	20	10	10
Online Quiz Examination - I	20	10	10
Assignments	60	05	05
Semester End Examination	180	70	70

COURSE CONTENT (Syllabus):

UNIT-I
INTRODUCTION: Embedded system-Definition, history of embedded systems, classification of embedded systems, major application areas of embedded systems, purpose of embedded systems, the typical embeddedsystem-core of the embedded system, Memory, Sensors and Actuators, Communication Interface, Embeddedfirmware, Characteristics of an embedded system, Quality attributes of embedded systems, Application-specific andDomain-Specific examples of an embedded system.

UNIT-II
EMBEDDED HARDWARE DESIGN: Analog and digital electronic components, I/O types and examples, Serialcommunication devices, Parallel device ports, Wireless devices, Timer and counting devices, Watchdog timer, Realtime clock.

UNIT-III
EMBEDDED FIRMWARE DESIGN: Embedded Firmware design approaches, Embedded Firmwaredevelopment languages, ISR concept, Interrupt sources, Interrupt servicing mechanism, Multiple interrupts, DMA,Device driver programming, Concepts of C versus Embedded C and Compiler versus Cross-compiler.

UNIT-IV
REAL TIME OPERATING SYSTEM: Operating system basics, Types of operating systems, Tasks, Process andThreads, Multiprocessing and Multitasking, Task Scheduling, Threads, Processes and Scheduling, Taskcommunication, Task synchronisation, Device Drivers.
HARDWARE SOFTWARE CO-DESIGN: Fundamental Issues in Hardware Software Co-Design, Computationalmodels in embedded design, Hardware software Trade-offs, Integration of Hardware and Firmware, ICE.

UNIT-V
EMBEDDED SYSTEM DEVELOPMENT: The integrated development environment, Types of files generatedon cross-compilation, Deassembler/Decompiler, Simulators, Emulators and Debugging, Target hardwaredebugging, Boundary Scan, Embedded Software development process and tools.

UNIT-VI
EMBEDDED SYSTEM IMPLEMENTATION AND TESTING: The main software utility tool, CAD and thehardware, Translation tools-Pre-processors, Interpreters, Compilers and Linkers, Debugging tools, Qualityassurance and testing of the design, Testing on host machine, Simulators, Laboratory Tools.

Text Books:

1. Embedded Systems Architecture- By Tammy Noergaard, Elsevier Publications, 2013.
2. Embedded Systems-By Shibu.K.V-Tata McGraw Hill Education Private Limited, 2013.

References:

1. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley Publications, 2013.
2. Embedded Systems-Lyla B.Das-Pearson Publications, 2013.

PEDAGOGICAL APPROACH:

1.Classroom Lecture
2. Classroom Tutorials
3. Home Assignments
4. Quizzes
5. Mini Projects

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction to embedded systems	
1	2	Embedded System-Definition, Embedded system versus General computing systems	
1	3	History of Embedded systems, Classification of Embedded systems	
1	4	Major application areas of embedded systems, purpose of embedded systems	
1	5	The typical embedded system-Core of the embedded system, Memory	
1	6	Sensors and Actuators	
3	9	Communication Interface	
1	10	Embedded firmware	
2	12	Characteristics of an embedded system	
2	14	Quality attributes of embedded systems	
1	15	Application-specific embedded system-Washing Machine	
1	16	Domain-Specific examples of Embedded system-Automotive.	
1	17	Analog and digital electronic components	
1	18	I/O types and examples	
2	20	Serial communication devices	
2	22	Parallel device ports	
2	24	Wireless devices	
1	25	Timer and counting devices, Watchdog timer, RTC	
2	27	Embedded Firmware design approaches	
1	28	Embedded Firmware development languages	
2	30	ISR concept, Interrupt sources, Interrupt servicing mechanism	
1	31	Multiple interrupts, DMA	
1	32	Concepts of C versus Embedded C and Compiler versus Cross-compiler	
1	33	Operating system basics, Types of operating systems	
1	34	Tasks, Process and Thread	
1	35	Multiprocessing and Multitasking	
2	37	Task Scheduling, Threads,	
1	38	Processes and Scheduling	

2	40	Task communication, Task synchronization	
2	42	Device Drivers, How to choose an RTOS	
1	43	Fundamental Issues in Hardware Software Co-Design	
2	45	Computational models in embedded design	
1	46	Hardware software Trade-offs	
1	47	Integration of Hardware and Firmware	
1	48	ICE, issues in embedded system design	
1	49	The integrated development environment	
1	50	Types of files generated on cross-compilation	
1	51	Deassembler/Decompiler, Simulators	
1	52	Emulators and Debugging	
1	53	Target hardware debugging	
1	54	Boundary Scan	
1	55	Embedded Software development process and tools	
1	56	The main software utility tool	
1	57	CAD and the hardware	
1	58	Translation tools-Pre-processors, Interpreters	
2	60	Compilers and Linkers, Debugging tools	
2	62	Quality assurance and testing of the design	
2	64	Testing on host machine, Simulators, Laboratory Tools	

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	2	-	-	-	-	-	-	-
CO2	3	2	1	3	1	-	-	-	-	-	-	-
CO3	2	2	3	-	1	-	-	-	-	-	1	-
CO4	3	3	-	3	2	-	-	-	-	-	-	-
CO5	2	2	-	1	2	-	-	-	-	-	-	-
CO6	3	3	2	2	3	-	-	-	-	-	-	2
Total	16	12	8	9	11	-	-	-	-	-	1	2
Avg.	2.6	2	1.3	1.5	1.8	-	-	-	-	-	0.1	0.3

CO INDEX	POs MAPPED	PSOs MAPPED
C416.1	PO1,PO3,PO5	PSO1
C416.2	PO1,PO2,PO3,PO4,PO5	PSO1
C416.3	PO1,PO2,PO3,PO5	PSO2
C416.4	PO1,PO2,PO4,PO5	PSO2
C416.5	PO1,PO2,PO4,PO5,PO11	PSO2
C416.6	PO1,PO2,PO3,PO4,PO5,PO12	PSO2

	# NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Course Handout (Including Teaching Plan &Realization)	

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester: III & II**
Name of the Course: VLSI DESIGN	**Regulation: NRI R18**
Course Area/Module: MICROCONTROLLERS & NETWORKS	**No. of students registered: 200**
Course Coordinator: Sk. Ashraf Ali **Designation: Assoc Professor**	**Course Instructors:** **1. Ch.Swapna** **2. Dr.V.Ramesh babu**
No. of Lecture Hours per week: 6	**No. of Tutorial Hours per week: --**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1.	Use mathematical methods and circuit analysis models in analysis of CMOS digital electronics circuits, including logic components and their interconnects.
2.	Learn the various fabrication steps of IC and come across basic electrical properties of MOSFET.
3.	Apply CMOS technology-specific layout rules in the placement and routing of transistors and interconnect and to verify the functionality, timing, power and parasitic effects.
4.	Understand the design for testability
5.	Know the FPGA architecture and families
6.	The concepts and techniques of modern integrated circuit design and testing (CMOS VLSI).

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.	Understand the properties of MOS active devices and IC Fabrication procedure for PMOS, NMOS and CMOS.
2.	Know three sets of design rules with which NMOS and CMOS designs may be fabricated.
3.	Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.
4.	Analyze the design for testability techniques and understand the chip input and output circuits
5.	Explain the FPGA architecture ,design flow, technologies and
6.	Analyze the VLSI design issues and design trends along with testability process

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Basic electrical properties of MOSFET.
2	CMOS technology.
3	Digital electronics circuits .

COURSE DESCRIPTION:

The course focuses on concepts of VLSI design. The foundation in this course started with the fundamentals of MOSFET, Scaling issues and then gradually focuses on technology nodes and sub-threshold region of operation. Further, this course describes the fabrication process of MOS devices. A detailed overview is given about layout and its design rules of MOS devices. Layout of basic gates is implemented in this course. Understand the design for testability and know the FPGA architecture and Technologies. This course provides the reliability issues of MOS devices. Basically this course drives the student interest towards circuit designing for various

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	**90 mins**	**15**	**15**
Mid Examination - II	**90 mins**	**15**	**15**
Online Quiz Examination - I	**20 mins**	**5**	**5**
Online Quiz Examination - II	**20 mins**	**5**	**5**
Assignment 1	**50 mins**	**5**	**5**
Assignment 2	**50 mins**	**5**	**5**
Class Test 1	**50 mins**	**5**	**5**
Class Test 2	**50 mins**	**5**	**5**
Semester End Examination	**180 mins**	**70**	**70**

COURSE CONTENT (Syllabus):

VLSI DESIGN

Unit-I:

Introduction : Introduction to IC Technology, MOS and related VLSI Technology, Basic MOS Transistors, Enhancement and Depletion modes of transistor action, IC production process, MOS and CMOS Fabrication processes

Basic Electrical Properties Of MOS and Bi-CMOS Circuits: I_{ds} versus V_{ds} Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans, Output Conductance and Figure of Merit, Alternative forms of pull-up, The CMOS Inverter ,Comparison between CMOS and Bipolar technologies, BiCMOS Technology

Unit-II:

MOS and Bi-CMOS Circuit Design Processes: The NMOS Inverter , Pull-up to Pull-down Ratio for NMOS inverter driven by another NMOS inverter. Pass transistor, Pull-up to Pull-down Ratio for NMOS inverter driven by another NMOS inverter through one or more pass transistors.

MOS and Bi-CMOS Circuit Design Rules: MOS Layers, Realization of gates using NMOS, PMOS and CMOS technologies, Stick Diagrams, Design Rules and Layout, General observations on the lambda based Design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µm Double Metal, Double Poly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOS inverter.

Unit-III:

Basic Circuit Concepts: Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, The Delay Unit, Inverter Delays, Propagation Delays, Wiring Capacitances, Fan-in and fan-out characteristics, Choice of layers, Switch logic, Gate logic.

Scaling Of MOS Circuits: Scaling models, Scaling factors for device parameters, Limits due to sub threshold currents, current density limits on logic levels and supply voltage due to noise.

Unit-IV:

FPGA Design: ASIC design flow, FPGA design flow, Basic FPGA architecture, FPGA Technologies, CPLD, Introduction to SoC design.

VlSI Design Issues: VLSI Design issues and design trends, design process, design for testability, technology options, power calculations, package selection, clock mechanisms, mixed signal design.

Text Books:

1. Essentials of VLSI Circuits and Systems By Kamran Eshraghian, Douglas and A. Pucknell and Sholeh Eshraghian, Prentice-Hall of India Private Limited,2005 Edition.
2. VLSI Design-Black Book By Dr. K.V.K.K. Prasad, Kattula Shyamala, Kogent Learning Solutions Inc.2012 Edition.

References:

1. VLSI Design By A.Albert Raj & T.Latha,PHI Learning Private Limited,2010.
2. VLSI Design-A.Shanthi and A.Kavita, New Age International Private Limited, 2006 First Edition.

PEDAGOGICAL APPROACH:

1. Class room Lectures
2. Class room Tutorials
3. Home Assignment

4. Quizzes
5. Using LCD projectors for interactive learning.
6. NPTEL videos

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
UNIT I : INTRODUCTION			
1	1	INTRODUCTION TO IC TECHNOLOGY	
1	2	MOS AND RELATED VLSI TECHNOLOGY	
2	4	BASIC MOS TRANSISTORS, ENHANCEMENT AND DEPLETION MODES OF TRANSISTOR ACTION	
2	6	IC PRODUCTION PROCESS, FABRICATION OF NMOS TRANSISTOR	
1	7	FABRICATION OF NMOS TRANSISTOR	
1	8	FABRICATION OF PMOS TRANSISTOR	
1	9	FABRICATION OF CMOS TRANSISTOR USING P-WELL	
1	10	FABRICATION OF CMOS TRANSISTOR USING N-WELL	
1	11	FABRICATION OF CMOS TRANSISTOR USING TWIN TUB	
BASIC ELECTRICAL PROPERTIES OF MOS CIRCUITS			
2	13	IDS VS VDS RELATIONSHIPS	
1	14	ASPECTS OF MOS TRANSISTORS THRESHOLD VOLTAGE	
1	15	TRANS CONDUCTANCE AND OUTPUT CONDUCTANCE	
1	16	MOS TRANSISTOR FIGURE OF MERIT	
1	17	BICMOS INVERTER	
1	18	COMPARISON BETWEEN CMOS AND BICMOS TECHNOLOGY	
1	19	ALTERNATIVE PULL UP NETWORKS, CMOS INVERTER	
UNIT II : MOS AND CMOS CIRCUIT DESIGN PROCESSES			
1	20	NMOS INVERTER	
1	21	RATIO OF PULL UP TO PULL DOWN OF NMOS INVERTER DRIVEN BY ANOTHER NMOS INVERTER	
2	23	. RATIO OF PULL UP TO PULL DOWN OF NMOS INVERTER DRIVEN BY ANOTHER NMOS	

		INVERTER THROUGH PASS TRANSISTOR	
UNIT II : MOS AND CMOS CIRCUIT DESIGN PROCESSES			
1	24	MOS LAYERS AND INTRODUCTION TO STICK DIAGRAMS	
1	25	DESIGN RULES AND LAYOUT	
1	26	GENERAL OBSERVATIONS ON DESIGN RULES	
1	27	2µM DOUBLE METAL, DOUBLE POLY CMOS/BICMOS RULES	
1	28	1.2µM DOUBLE METAL, DOUBLE POLY CMOS RULES	
1	29	LAYOUT OF CMOS INVERTER	
1	30	LAYOUT DIAGRAMS OF NAND AND NOR GATES	
1	31	SYMBOLIC DIAGRAMS-TRANSLATION TO MASK FORM	
UNIT III : BASIC CIRCUIT COMPONENTS			
1	32	SHEET RESISTANCE CONCEPT APPLIED TO MOS TRANSISTORS AND INVERTERS	
1	33	AREA CAPACITANCE OF LAYERS AND STANDARD UNIT OF CAPACITANCE, SOME AREA CAPACITANCE CALCULATIONS	
1	34	THE DELAY UNIT, INVERTER DELAYS	
1	35	DRIVING LARGE CAPACITIVE LOADS	
2	37	PROPAGATION DELAYS ,WIRING CAPACITANCES	
1	38	FAN IN AND FAN OUT CHARACTERISTICS, CHOICE OF LAYERS	
SCALING OF MOS CIRCUITS			
1	39	SCALING MODELS AND SCALING FACTORS	
1	40	SCALING FACTORS FOR DEVICE PARAMETERS	
1	41	LIMITATIONS OF SCALING	
1	42	LIMITS DUE TO SUB THRESHOLD CURRENTS,	
1	43	LIMITATIONS ON LOGIC LEVELS AND SUPPLY VOLTAGE DUE TO NOISE AND CURRENT DENSITY	
1	44	SWITCH LOGIC	
1	45	GATE LOGIC	
UNIT IV : FPGA Design			
1	46	ASIC DESIGN FLOW	

1	47	FPGA DESIGN FLOW	
2	49	BASIC FPGA ARCHITECTURE	
2	51	FPGA TECHNOLOGIES	
1	52	CPLD	
1	53	INTRODUCTION TO SOC DESIGN	
VlSI Design Issues			
1	54	VLSI DESIGN ISSUES	
1	55	VLSI DESIGN TRENDS	
1	56	DESIGN PROCESS	
2	58	DESIGN FOR TESTABILITY	
2	60	FPGA TECHNOLOGIES	
2	62	TECHNOLOGY OPTIONS	
1	63	POWER CALCULATIONS	
1	64	PACKAGE SELECTION	
1	65	CLOCK MECHANISMS	
1	66	MIXED SIGNAL DESIGN	

COURSE OUTCOMES vs PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
C323.1	3											2	3	
C323.2			3	2								2	2	
C323.3	3	3	2					2					3	
C323.4		2						3					3	
C323.5				3							2	3	3	
C323.6						2	3						3	
AVG	3	2.5	2.5	2.5		2	3	2.5			2	2.33	2.66	

CO INDEX	POs MAPPED	PSOs MAPPED

C323.1	1,12	1
C323.2	3,4,12	1
C323.3	1,2,3,8	1
C323.4	2,8	1
C323.5	4,11,12	1
C323.6	6,7	1

NRI INSTITUTE OF TECHNOLOGY

Teaching Plan &Realization

NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester:3-2**
Name of the Course: MPMC	**Regulation: NRIA18**
Course Area/Module: EMBEDDED SYSTEMS	**No. of students registered: 192**
Course Coordinator: G.SRINIVAS BABU **Designation:** ASSOCIATE PROFESSOR	**Course Instructors:** **1.** G.SRINIVAS BABU **2.** P.VENU GOPAL
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week:**
Credits:4	

COURSE OBJECTIVES:

Students will be able to:

1. To familiarize with architecture of 8086 microprocessor.
2. To introduce the assembly language programming concepts of 8086 processor.
3. To expose with various interfacing devices with 8086.
4. To familiarize with architecture of 8051 microcontroller.
5. To introduce the assembly language programming concepts of 8051 microcontroller.
6. To expose with various interfacing devices with 8051 microcontroller.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO 1: Gain the knowledge of the architecture of 8086 Microprocessor and instruction set.
CO 2: Gain the knowledge of the architecture of 8051 Microcontroller and instruction set.
CO 3: Identify a detailed s/w & h/w structure of the microprocessor and microcontroller.
CO 4: Illustrate how the different peripherals are interfaced with 8086.
CO 5: Interface various I/O devices to the 8051 microcontroller.
CO 6: Develop 8086 and 8051 based different kinds of applications.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1.	Switching Theory Logic Design.
2.	Computer Organization and Architecture.

COURSE DESCRIPTION:

Microprocessors and Microcontrollers course is intended to introduce the architecture, programming of microprocessors and interfacing various hardware circuits to microprocessors. The topics covered are architecture, addressing modes, instruction set of 8086, minimum and maximum mode operation of 8086, 8086 INSTRUCTION SET, Assembly language programming fundamentals, interfacing of static Ram, EPROM, DMA Controller, keyboard, display,8255, stepper motor, A/D and D/A converter, data transmission,8251 USART, 8259 interrupt controller, data transmission, 8251 USART, modes of timer operation of 8051, programming of Real time control by using basic microcontroller, This course analyze the complete architectural, programming, interfacing details of 8086 microprocessor-8051 microcontroller.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15%
Mid Examination - II	90	15	15%
Online Quiz Examination - I	20	10	10%
Online Quiz Examination - I	20	10	10%
Assignment-I	-	5	5%
Assignment-I	-	5	5%
Class Test-I	50	10	10%
Class Test-II	50	10	10%
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT – I

8086 Microprocessor: Introduction to Microprocessor, Features of 8086 Processor, Register Organization of 8086, Architecture, Memory Segmentation, Signal Descriptions of 8086.

Modes of 8086 System: Physical Memory Organization, General Bus Operation, I/O Addressing Capability, Minimum and Maximum Mode 8086 Systems and Timing Diagrams.

Unit - II

Instruction Set and Assembly Language Programming of 8086: Addressing Modes, Instruction Sets, Assembler Directives and Operators, Simple Programs Involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

Stack and Interrupts: Introduction to Stack, Stack Structure of 8086, Interrupts and Interrupt Service Routines, Interrupt Cycle of 8086, Non Maskable Interrupts, Maskable Interrupts, Interrupt Programming.

Unit - III

Basic Peripherals and Interfacing: Semiconductor Memory Interfacing, PIO 8255, Modes of Operations of 8255, Interfacing Analog to Digital Data Converters, Interfacing Digital to Analog Converters, Stepper Motor Interfacing.

Programmable Peripheral Devices: Programmable Interrupt Controller 8259A, Programmable Communication Interface 8251 USART, DMA Controller 8257.

Unit - IV

8051 Microcontrollers: Introduction to Microcontrollers, Features of 8051 Controller, Architecture of 8051, Signal Description of 8051, Register Set 0f 8051, Memory Organization, Addressing Modes of 8051, Instruction Set of 8051.

Interfacing with Keyboard/Display Devices: Input/Output Ports and Circuits, Timers and Counters Serial Ports, Interrupt Structure, Interrupt Priority in 8051, LED’s, 7 Segment Display, LCD, A/D, D/A and Keyboard Interfacing.

Text Books:

1. A. K. Ray and K.M. Bhurchandani, “Advanced Microprocessors and Peripherals”, TMH, 2nd edition, 2006
2. Kenneth. J. Ayala, “The 8051 Microcontroller”, 3rd Edition, Cengage Learning, 2010.
3.
4.
5.
6.

References:

1. D. V. Hall’ “Microprocessors and Interfacing”, TMH, 2nd edition 2006. .
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, “The 8051 Microcontrollers and Embedded Systems”, Pearson, 2nd Edition.
3. Barry B.Brey, “The Intel Microprocessors”, PHI, 7th Edition, 2006.
4.
5.
6.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction to Micro-Processors	
1	2	Features of 8086 Micro-Processor	
1	3	Register Organization of 8086	
2	5	Architecture	
1	6	Memory Segmentation	
2	8	Signal Description of 8086	
1	9	Physical Memory Organization	
1	10	General Bus Operation	
1	11	I/O Addressing Capability	
3	14	Minimum & Maximum Mode of 8086 System Timing Diagram	
1	15	Addressing Modes	
2	17	Instruction Set	
2	19	Assembler Directives and Operators	
3	22	Simple Programs Involving Logical, Branch and Call Instructions, Sorting, String Manipulations	
1	23	Introduction to Stack, Stack Structure of 8086	
1	24	Interrupts and Interrupt Service Routines	
1	25	Interrupt Cycle of 8086	
1	26	Non Maskable Interrupts	
1	27	Maskable Interrupts	
1	28	Interrupt Programming	
1	29	Semiconductor Memories Interfacing	
1	30	PIO 8255	
2	32	Modes of Operations of 8255	
1	33	Interfacing Analog to Digital Data Converters	
1	34	Interfacing Digital to Analog Converters	
1	35	Stepper Motor Interfacing	
2	37	Programmable Interrupt Controller 8259A	
2	39	Programmable Communication Interface 8251 USART	

2	41	DMA Controller 8257	
1	42	Introduction to Microcontrollers	
1	43	Features of 8051Controller	
1	44	Architecture of 8051	
1	45	Signal Description of 8051	
1	46	Register Set 0f 8051	
1	47	Memory Organization	
1	48	Addressing Modes of 8051	
1	49	Instruction Set of 8051	
1	50	Input/Output Ports and Circuits	
1	51	Timers and Counters Serial Ports	
1	52	Interrupt Structure	
1	53	Interrupt Priority in 8051	
1	54	LED's	
1	55	7 Segment Display, LCD	
1	56	A/D and D/A Converters	
1	57	Keyboard Interfacing	

NRI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution Permanently Affiliated to JNTUK, Kakinada)
(Accredited by NAAC with "A" Grade and ISO 9001:2015 Certified Institution)
POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester:3-2**
Name of the Course: ML	**Regulation: NRIA18**
Course Area/Module: MACHINE LEARNING	**No. of students registered: 195**
Course Coordinator: SK. ASHRAF ALI **Designation:** ASSOCIATE PROFESSOR	**Course Instructors:** **1.** SK. ASHRAF ALI **2.** DR. R SUNITHA **3.** A. BHAVYA SRI
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week:**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

1.	Explain about data preprocessing and its uses in prediction
2.	Explain how linear models are learning from the data.
3.	Explain the Improving efficiency of the models using nonlinearity and ensembles
4.	Explain how neural networks help in increasing efficiency

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO	Description
CO1	Understanding the machine learning basics and how data is preprocessed
CO2	How linear models help in prediction
CO3	Distance based models complexity
CO4	Probabilistic models understanding
CO5	Nonlinear models and ensembles improve efficiency
CO6	How neural network provide nonlinearity

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	**Linear algebra**
2	**Probability and statistics**

COURSE DESCRIPTION:

This course emphasizes a comprehensive knowledge on fundamental methods at the core of modern machine learning, in tune with the requirements of Industry. The objective of this course is to enable the students to understand theoretical foundations and apply that knowledge to design and develop essential algorithms for supervised and unsupervised learning.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	90	15	15%
Mid Examination – II	90	15	15%
Online Quiz Examination – I	20	10	10%
Online Quiz Examination – I	20	10	10%
Assignment-I	-	5	5%
Assignment-I	-	5	5%
Class Test-I	50	10	10%
Class Test-II	50	10	10%
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT I: The Ingredients of Machine Learning: Introduction to Machine Learning, Types of Machine Learning, Models - The output of Machine Learning
Binary Classification and related tasks: Classification, Calculating accuracy in classification.

Natural Language Processing (NLP): Text data preprocessing, Bag of words, TF IDF, Word2vec, Plane and Hyper-plane for machine learning, Data Cleaning, Data Preprocessing (Min – Max Scaling), Normalizing, Standardize, Mean, Variance, Standard Deviation, One Hot Encoding

UNIT II: Beyond Binary Classification: Handling more than two classes, finding minimum and maximum of a function, Gradient Descent, Linear Regression, Multiple Regression, Calculating accuracy in regression (RMSE), Effect of outliers and noisy data, overfitting and underfitting models, K-fold cross validation, confusion matrix for cross validation

Logistic Regression: Sigmoid function in logistic regression, loss functions in logistic regression.
Linear Models: The Least Square method, Support Vector Machine (SVM)

UNIT III: Tree Model: Decision Trees, Ranking and Probability estimation trees,
Distance Based Models: Distance Measures (Euclidean, Manhattan and Minkowski), Neighbors, KNN, Distance based clustering, Hierarchical Clustering, Agglomerative Clustering

Probabilistic model: Naive Bayes algorithm for classification, Laplace, smoothing
Model Ensembles: Bagging and Random Forest, Boosting

UNIT IV: Dimensionality Reduction: Principal Component Analysis (PCA), Implementation and demonstration.

Artificial Neural Networks: Introduction, Neural network representation, appropriate problems for neural network learning, Multilayer networks and the back propagation algorithm.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben- David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

E-RESOURCES:

1.https://alex.smola.org/drafts/thebook.pdf
2.https://www.slideshare.net/liorrokach/introduction-to-machine-learning-13809045

SWAYAM/NPTEL/MOOCS Courses :

1. https://onlinecourses.nptel.ac.in/noc21_ge20/
2. https://onlinecourses.nptel.ac.in/noc21_cs85/

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
		UNIT I	
		Part – 1: The Ingredients of Machine Learning	
1	1	Introduction to Machine Learning	
2	3	Types of Machine Learning	
2	5	Models - The output of Machine Learning	
2	7	Binary Classification and related tasks: Classification	
1	8	Calculating accuracy in classification	
		Part -2: Natural Language Processing (NLP)	
1	9	Text data preprocessing	
1	10	Bag of words	
2	12	TF IDF, Word2vec	
2	14	Plane and Hyper-plane for machine learning	
1	15	Data Cleaning	

1	16	Data Preprocessing (Min – Max Scaling)	
1	17	Normalizing, Standardize	
1	18	Mean, Variance, Standard Deviation	
1	19	One Hot Encoding	
		UNIT II	
		Part - 1 BEYOND BINARY CLASSIFICATION	
1	20	Handling more than two classes	
1	21	Finding minimum and maximum of a function	
1	22	Gradient Descent	
2	24	Linear Regression	
1	25	Multiple Regression	
1	26	Calculating accuracy in regression (RMSE)	
1	27	Effect of outliers and noisy data	
1	28	overfitting and underfitting models	
2	30	K-fold cross validation, confusion matrix for cross validation	
		Part -2 LOGISTIC REGRESSION	
1	31	Sigmoid function in logistic regression	
1	32	loss functions in logistic regression	
1	33	Linear Models: The Least Square method	
2	35	Support Vector Machine (SVM)	
		UNIT III	
		Part - 1 TREE MODEL	
2	37	Decision Trees	
2	39	Ranking and Probability estimation trees	
1	40	Distance Based Models	
1	41	Distance Measures (Euclidean, Manhattan and Minkowski)	
1	42	Neighbors, KNN	
1	43	Distance based clustering	
1	44	Hierarchical Clustering, Agglomerative Clustering	

Part -2 PROBABILISTIC MODEL			
2	46	Naive Bayes algorithm for classification	
1	47	Laplace, smoothing	
1	48	Model Ensembles: Bagging	
1	49	Random Forest , Boosting	
UNIT IV			
Part - 1 DIMENSIONALITY REDUCTION			
2	51	Principal Component Analysis (PCA)	
1	52	Implementation and demonstration.	
Part -2 ARTIFICIAL NEURAL NETWORKS			
1	53	Introduction	
1	54	Neural network representation	
2	56	appropriate problems for neural network learning	
2	58	Multilayer networks	
2	60	The back propagation algorithm	

COURSE OUTCOMES Vs PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)															
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	PSO1	PSO2	PSO3
CO1	1		2	3	3								1	2	
CO2			2	2	2									2	3
CO3			2	3	1									1	2
CO4	2		3	1	1									3	
CO5	2		1	2	2								2		
CO6	1		2		2									2	1
Avg.	1		2	1.83	1.83										

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan &Realization	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-21**
Branch: ECE	**Year & Semester:III/I**
Name of the Course: Cellular and Mobile Communications	**Regulation: R18**
Course Area/Module: Communication Systems	**No. of students registered: 120**
Course Coordinator: Dr. K.Prathyusha **Designation:Associate Professor**	**Course Instructors:** **1.** Dr. K. Prathyusha **2.** S. V. Rama Rao
No. of Lecture Hours per week:	**No. of Tutorial Hours per week: 4**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

1. An understanding on cellular communication system, architecture, functioning, various standards and gains knowledge of the various cellular mobile standards.
2. Understanding of the Cellular concept, Frequency reuse, Hand-off strategies, cell splitting, cell sectoring, Cellular structures.
3. Understand different co-channel interference non co-channel interference. Understand the concept of frequency management, Channel assignment with fixed and non-fixed channels.
4. To understand cell coverage in traffic and signal reflections in different terrains and also interpret the Lee Model. Interpret the Omni-directional and directional antennas used at cell sites and their synthesis methods and also understand different types of antennas.
5. Understand the fundamental techniques to assign a handoff without termination of call, different handoffs, how a dropped call can be overcome.
6. To understand the multiple access techniques CDMA technology, GSM architectures, concepts of LTE along with 5G challenges.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Demonstrate an understanding on cellular communication system, architecture, functioning, various standardsand different evolution of cellular communication systems up to 5G.
2. Interpret the cellular system operation and design concepts, cell splitting.
3. Measure Co-Channel and Non Co-Channel interferences for various mobile radio propagation models and interpret the C/I measurements for different antenna systems. Estimate the frequency management, channel assignment, channel sharing and channel borrowing techniques.
4. Understand impairments due to multipath fading channel, and designing of different antennas. Design the Omni-directional and directional antennas used at cell sites and their synthesis methods.
5.Demonstrates the fundamental techniques to assign a handoff without termination of call, different handoffs, how a dropped call can be overcome.
6. To choose proper multiple accessing methods, CDMA technology, GSM architectures and GSM channels and familiar with 5G challenges.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	WirelessCommunication Engineering
2	Analog Communications
3	Digital Communications

COURSE DESCRIPTION:

This Course considers the basic concepts of mobile cellular communications and specifics of current and proposed US cellular systems.This subject is aimed towards giving an overview of the most important principles that are making the development within mobile communications possible. This course deals with various methodologies to improve the received signal quality in mobile communication. Methods to improve performance and combat the adverse effect of the radio channel are also discussed. Different techniques for resource sharing in mobile communications techniques (FDMA, OFDMA, TDMA, CDMA) and methods for calculating system capacity are described. Finally a roadmap for future development is given, describing the most important technology trends with LTE and 5G features and Challenges.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	**90 mins**	**15**	**15**
Mid Examination - II	**90 mins**	**15**	**15**
Online Quiz Examination - I	**20 mins**	**10**	**10**
Online Quiz Examination - II	**20 mins**	**10**	**10**
Assignment 1	**50 mins**	**5**	**5**
Assignment 2	**50 mins**	**5**	**5**
Class Test 1	**50 mins**	**10**	**10**
Class Test 2	**50 mins**	**10**	**10**
Semester End Examination	**180 mins**	**60**	**60**

COURSE CONTENT (Syllabus):

MOBILE &CELLULAR COMMUNICATION

Introduction to Cellular Mobile Systems: A basic cellular system, Performance criteria, Uniqueness of mobile radio environment: Modal of transmission medium, Mobile fading characteristics, Delay spread and Coherence bandwidth, Operation of Cellular Systems, Hexagonal shaped cells. Evolution of mobile cellular communication: different generations of mobile cellular communication (1G, 2G, 3G, 4G and beyond), 5G vision.

Elements of Cellular Mobile Radio System Design: Concept of frequencyreuse channels: Frequency reuse schemes, Frequency reuse distance, Number of customers in the system, Permanent and Dynamic cell splitting, cell sectoring, Cellular structures: macro, micro, pico and femto cells.

UNIT II

Interference: Co-channel Interference at the mobile unit and cell site, Design of an Omni-directional and Directional antenna systems. Non-cochannel Interference:Adjacent channel interference: Next channel interference, Neighboring channel interference, Near-End-Far-End Interference.

Frequency Management: Numbering the channels and grouping into subsets, Frequency spectrum utilization, Setup, access and paging channels, Self-location scheme at the mobile unit.

Channel Assignment: Channel assignments to cell sites and travelling mobile units, Fixed channel assignment: Adjacent-channel assignment, Channel sharing, Channel borrowing and Underlay-overlay cells, Non-fixed channel assignment algorithms.

UNIT III

Cell Coverage for Signal and Traffic: Signal reflections in flat and hilly terrain, obtaining the mobile point-to-point model (Lee Model), Phase difference between direct and ground reflected paths, General formula for mobile radio propagation between two fixed stations over water or flat open area, Land to mobile transmission over water, Foliage loss.

Cell Site and Mobile Antennas: Sum and difference patterns and their synthesis, Antennas at cell site: Omni directional and Directional antennas: Start-up and Abnormal antenna configurations, Space diversity antennas, Umbrella pattern antennas, unique situations of cell site antennas, Mobile antennas: Roof-mounted and Glass-mounted antennas, Mobile high gain antennas, Horizontally oriented and vertically oriented space-diversity antennas.

UNTI IV

Handoff and Dropped calls: Concept of Handoff, Types of handoff: Based on signal strength and based on carrier to interference Ratio, Handoff initiation, Delaying handoff, Forced handoff, Power- difference handoff, mobile assigned handoff , soft and hard handoff, cell site handoff only, Intersystem handoff, Dropped call rates introduction and formula for Dropped call rate.

Digital Cellular Systems: Global system for mobile (GSM): GSM architecture, OSI model of GSM, GSM channels, Multiple Access schemes FDMA, TDMA CDMA, OFDMA, concepts of LTE and LTE-advanced standards, 5G features and challenges.

TEXTBOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Principles of Mobile Communications–Gordon L.Stuber,Springer International 2nd Edt. 2007.

REFERENCES:

1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Mobile cellular communication- G.Sasibhushan rao, Pearson Education.
4. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
5. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

PEDAGOGICAL APPROACH:

1.Classroom Lecture
2. Classroom Tutorials
3. Home Assignments
4. Quizzes
5. Group Learning

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
		Unit – IIntroduction to Cellular Mobile Systems	
1	1	A basic cellular system, Performance criteria	
1	2	**Uniqueness of mobile radio environment:** Modal of transmission medium	
1	3	Mobile fading characteristics, Delay spread and Coherence bandwidth	
1	4	Operation of Cellular Systems, Hexagonal shaped cells.	
2	6	**Evolution of mobile cellular communication:** different generations of mobile cellular communication (1G, 2G, 3G, 4G and beyond), 5G vision.	
		Elements of Cellular Mobile Radio System Design:	
1	7	Concept of frequencyreuse channels: Frequency reuse schemes, Frequency reuse distance	
1	8	Number of customers in the system	
1	9	Permanent and Dynamic cell splitting, cell sectoring	
1	10	Cellular structures: macro, micro, pico and femto cells.	
		Unit-2 : Interference	
2	12	Co-channel Interference at the mobile unit and cell site	
2	14	Design of an Omni-directional and Directional antenna systems.	
1	15	Non-cochannel Interference	
1	16	Adjacent channel interference	
2	18	Next channel interference	
2	20	Neighbouring channel interference	
1	21	Near-End-Far-End Interference.	
		Frequency Management	
1	22	Numbering the channels and grouping into subsets	
1	23	Frequency spectrum utilization	
1	24	Setup, access and paging channels	
1	25	Self-location scheme at the mobile unit.	
1	26	**Channel Assignment**: Channel assignments to cell sites and travelling mobile units	

1	27	**Fixed channel assignment:** Adjacent-channel assignment	
1	28	Channel sharing, Channel borrowing and Underlay-overlay cells	
1	29	Non-fixed channel assignment algorithms	
		Unit 3: Cell Coverage for Signal and Traffic	
2	31	Signal reflections in flat and hilly terrain	
1	32	Obtaining the mobile point-to-point model (Lee Model)	
1	33	Phase difference between direct and ground reflected paths	
1	34	General formula for mobile radio propagation between two fixed stations over water or flat open area	
1	35	Land to mobile transmission over water, Foliage loss	
		Cell Site and Mobile Antennas	
2	37	Sum and difference patterns and their synthesis	
1	38	**Antennas at cell site:Omni directional and Directional antennas:** Start-up and Abnormal antenna configurations	
1	39	Space diversity antennas	
1	40	Unique situations of cell site antennas	
1	41	**Mobile antennas**: Roof-mounted and Glass-mounted antennas	
1	42	Mobile high gain antennas	
1	43	Horizontally oriented and vertically oriented space-diversity antennas	
		Unit – 4 : Handoff and Dropped calls	
1	44	Concept of Handoff, Types of handoff	
1	45	Based on signal strength and based on carrier to interference Ratio	
1	46	Handoff initiation	
1	47	Delaying handoff	
2	49	Forced handoff	
1	50	Power- difference handoff, mobile assigned handoff	
1	51	soft and hard handoff	
1	52	cell site handoff only	
1	53	Intersystem handoff	
1	54	Dropped call rates introduction and formula for Dropped call rate.	
		Digital Cellular Systems	

1	55	**Global system for mobile (GSM):** GSM architecture	
1	56	OSI model of GSM	
1	57	GSM channels	
1	58	**Multiple Access schemes:** TDMA	
1	59	FDMA, OFDMA	
1	60	CDMA	
1	61	Concepts of LTE and LTE-advanced standards	
1	62	5G features and challenges	

NRI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution Permanently Affiliated to JNTUK, Kakinada)
(Accredited by NAAC with "A" Grade and ISO 9001:2015 Certified Institution)
POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

NRIIT/7.5.1/RC 04

Lecture Plan for the Academic Year 2020-'21

Branch: **B. Tech ECE** | Name Of the Faculty: **V. Srinivasarao, R.Upendar Rao**

Year : **III Year I Semester** | Designation: **Associate Professor**

Regulation: **NRIA18** | Subject: **LDIC**

S.NO	TOPIC	No of Classes	No of Cumulative Classes
	UNIT 1: DIFFERENTIAL AMPLIFIERS		
1.1	Introduction	1	1
1.2	DC and AC analysis of Dual input Balanced output Configuration	3	4
1.3	Properties of other differential amplifier configurations	1	5
1.4	Integrated circuits-Types, Classification	1	6
1.5	Package Types and Temperature ranges, Power supplies	2	8
1.6	Problems	1	9
	OPERATIONAL AMPLIFIERS (OP-AMPs)		
1.7	Introduction to OP-amp, Characteristics of OP-Amps, Op-amp Block Diagram	2	11
1.8	ideal and practical Op-amp Specifications, DC and AC characteristics	2	13
1.9	741 op-amp & its features, Op- Amp parameters & Measurement	1	14
1.10	Input & Output Off set voltages & currents, Slew rate, CMRR, PSRR, drift	1	15
1.11	Problems	1	16
	UNIT 2: OP-AMP APPLICATIONS		
2.1	Inverting and Non-Inverting amplifiers, Difference Amplifier	2	18
2.2	Instrumentation Amplifier, AC Amplifier	1	19
2.3	Differentiator and Integrator	2	21
2.4	Comparator, Triangular, Saw-tooth and Square Wave generators,	2	23
2.5	Schmitt Trigger, Log and Anti log Amplifiers	2	25
2.6	Problems	1	26
	OP-AMP FILTERS		
2.7	Introduction to Active Filters	1	27
2.8	Characteristics of Low pass, high pass, band pass, band reject and all pass filters	1	28
2.9	Design and analysis of Butterworth Low pass Filter 1 & II order	2	30
2.10	Design and analysis of Butterworth High pass Filter 1 & II order	1	31
2.11	Design and analysis of Butterworth band pass Filter 1 & II order	1	32
2.12	Design and analysis of Butterworth band reject Filter	1	33
2.13	All pass filters	1	34

2.14	Problems	1	35
	UNIT 3: TIMERS & PHASE LOCKED LOOPS		
3.1	Introduction to 555 timer, functional diagram	1	36
3.2	Monostable and Astable operations and applications	2	38
3.3	Schmitt Trigger	1	39
3.4	PLL – introduction, block schematic, principles and description of individual blocks	1	40
3.5	565 PLL, Applications of PLL – frequency multiplication, frequency translation and Amplitude Modulation	2	42
3.6	Problems	1	43
	D/A and A/D CONVERTERS		
3.7	Introduction, Basic DAC techniques	1	44
3.8	Different types of DACs- Weighted resistor DAC	1	45
3.9	R-2R ladder DAC, Inverted R-2R DAC	1	46
3.10	Different Types of ADCs - Parallel Comparator Type ADC	1	47
3.11	Counter Type ADC	1	48
3.12	Successive Approximation ADC and Dual Slope ADC	2	50
3.13	DAC and ADC Specifications	1	51
3.14	Problems	1	52
	UNIT 4: COMBINATIONAL LOGIC DESIGN ICs		
4.1	Decoders-74x138, 74x139	1	53
4.2	Encoders-74x148 Priority Encoder	1	54
4.3	Multiplexers-74x151 MUX	1	55
4.4	Demultiplexers -74X155, Barrel shifter	2	57
4.5	Problems	1	58
	SEQUENTIAL LOGIC DESIGN ICs		
4.6	8-Bit Latch 74x373	1	59
4.7	Flip Flops-D Flip Flop74X74, JK Flip Flop74X109	2	61
4.8	Counters- 74x163 4-Bit Binary Counter	1	62
4.9	74X163 as Modulus-N Counter	1	63
4.10	Universal Shift Register 74x194	1	64
4.11	Problems	1	65

TEXT BOOKS:

1. Linear Integrated Circuits – D. Roy Choudhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear Integrated Circuits - Ramakanth A. Gayakwad, PHI,1987.
3. Operational Amplifiers–C.G. Clayton, Butterworth & Company Publ. Ltd./Elsevier, 1971
4. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.

REFERENCE BOOKS:

1. Operational Amplifiers & Linear Integrated Circuits –Sanjay Sharma ;SK Kataria Sons;2nd Edition,2010
2. Design with Operational Amplifiers & Analog Integrated Circuits – Sergio Franco, McGraw Hill, 1988.
3. Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3rd Edition
4. Fundamentals of Digital Logic Design- Stephen Brown, ZvonkoVranesic, McGrawHill

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester: III & I**
Name of the Course: EMI	**Regulation: NRIA18**
Course Area/Module: Analog Electronics	**No. of students registered:**
Course Coordinator: Mrs. Swathi Kambhampati **Designation:Associate Professor**	**Course Instructors:** **1.** SwathiKambhampati
No. of Lecture Hours per week: 3	**No. of Tutorial Hours per week: --**
Credits: 3	

COURSE OBJECTIVES:

The course should enable the students to

1.Introduce the basic concepts related to the operation of electronic measuring instruments.
2. Acquire a sound understanding theory and performance characteristics of instruments and errors in measurement and apply to DC voltmeters, ammeters, ohmmeters.
3. Provide concepts and operation of different signal generators and wave form analyzers.
4. Compare and contrast different types of oscilloscopes
5. Select different types of D.C and A.C bridges for measurement of passive components.
6. Study the principles behind various transducers and their applications in the measurement of various parameters.

COURSE OUTCOMES:

Upon successful completion of the course the student will be able to

CO1	Understand the fundamental concepts instrumentation, basic concepts of measuring systems and characteristics of measuring systems.
CO2	Describe different types of meters and understanding the operation of meters.
CO3	Understand the Different types of signal generators and signal analyzers and their working principles
CO4	Understand the different types of Oscilloscopes and their working principles.
CO5	Explore the different types of A.C. and DC Bridges and their operations
CO6	Demonstrate the different types of transducers and their principles and operations

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Analog Electronics
2	Electrical circuits
3	Electronic Devices and circuits laboratory

COURSE DESCRIPTION:

Electronic measurements and instrumentation is used for troubleshooting of electronic equipment. It is an essential requirement of Service sector industry. This course will help to develop skills to become professional technician with capability to measure electrical parameters using various electronic instruments like analog and digital instruments. By learning this course students will able to know basics of various Instruments, transducers and working of electronic circuits used in electronic test and measuring instruments.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	90	15	15
Mid Examination – II	90	15	15
Online Quiz Examination - I	20	10	10
Online Quiz Examination - I	20	10	10
Assignments	60	05	05
Semester End Examination	180	70	70

COURSE CONTENT (Syllabus):

UNIT I

Performance Characteristics of Instruments: Block Schematic of Measuring Systems, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error,Types of Errors.

DC & AC Meters: Basic DC Voltmeter, Multi-range Voltmeters, Range extension/Solid state and differential voltmeters, AC voltmeters, Digital Voltmeters: Ramp Type, Staircase, Dual slope integrating type,Successive Approximation type, Ohmmeters series type, shunt type, Multi-meter for Voltage, Current and resistance measurements.

UNIT II

Signal Generators: fixed and variable AF oscillators, Standard AF sine and square wave signal generators, Function Generator, Square pulse, Random noise, sweep, Arbitrary waveform generator.

Wave Analyzers: Harmonic Distortion Analyzer, Spectrum Analyzer, Digital Spectrum Analyzer, Digital Fourier Analyzer, Power analyzer.

UNIT III

Oscilloscopes: CRT, Block Schematic of CRO, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits.

Special Oscilloscopes: Dual beam CRO, Dual trace oscilloscope, sampling oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type.

UNIT IV

Bridges: Measurement of Resistance – Wheatstone,Kelvin Bridge, Measurement of inductance- Maxwell's bridge, Anderson Bridge. Measurement of capacitance - Shearing Bridge. Wheat stone bridge. Wien Bridge.

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors.Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed. Basic block diagram of Data acquisition systems,single channel and multi-channel DAS.

Text Books:

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

References:

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Ed.,2004.
3. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education - 2005.

PEDAGOGICAL APPROACH:

1.Class room Lectures
2.Class room Tutorials
3.Home Assignment
4.Quizzes
5.Using LCD projectors for interactive learning.
6. NPTEL videos

No. of Lectures	Cumulative No. of Lectures	TOPIC
UNIT I :PERFORMANCE CHARACTERISTICS OF INSTRUMENTS		
1	1	Introduction to subject, basic definitions
1	2	Block Schematic of Measuring Systems
1	3	Static characteristics: Expected value, Error, Accuracy
1	4	Static characteristics: Resolution, Precision, Sensitivity, Dead zone, Drift
1	5	Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error
1	6	Types of Errors
1	7	Basic PMMC movement
1	8	DC & AC Meters: Basic DC Voltmeter, Multi-range Voltmeters
1	9	Range extension/Solid state and differential voltmeters
1	10	AC voltmeters
1	11	Digital Voltmeters: Ramp Type
1	12	Staircase, Dual slope integrating type voltmeter
1	13	Successive Approximation type digital voltmeter
1	14	Ohmmeters series type, shunt type
1	15	Multi-meter for Voltage, Current and resistance measurements
UNIT II :SIGNAL GENERATORS		
1	16	Signal Generators: fixed and variable AF oscillators
1	17	Standard AF sine and square wave signal generators
1	18	Function Generator
1	19	Square and pulse generator
1	20	Random noise generator
1	21	Sweep generator, Arbitrary waveform generator.
1	22	Wave Analyzers: Harmonic Distortion Analyzer
1	23	Spectrum Analyzer
1	24	Digital Spectrum Analyzer
1	25	Digital Fourier Analyzer, Power analyzer.
UNIT III :OSCILLOSCOPES		
1	26	CRT

1	27	Block Schematic of CRO
1	28	vertical amplifiers, horizontal deflection system
1	29	Sweep generator, trigger pulse circuit
1	30	delay line, sync selector circuits
1	31	Special Oscilloscopes: Dual beam CRO
1	32	Dual trace oscilloscope
1	33	sampling oscilloscope
1	34	digital readout oscilloscope
1	35	digital storage oscilloscope
1	36	Lissajous method of frequency measurement
1	37	standard specifications of CRO
2	39	probes for CRO- Active & Passive, attenuator type
UNIT IV :BRIDGES AND TRANSDUCERS		
1	40	Introduction to Bridges, Types of bridges, Measurement of Resistance – Wheatstone bridge
1	41	Kelvin Bridge
1	42	Measurement of inductance- Maxwell's bridge
1	43	Anderson Bridge
1	44	Measurement of capacitance - Shearing Bridge
1	45	Wien Bridge
1	46	Transducers- active & passive transducers
1	47	Resistance, Capacitance, inductance transducers
1	48	Strain gauges
1	49	LVDT
1	50	Piezo Electric transducers
1	51	Resistance Thermometers
1	52	Thermocouples
1	53	Thermistors, Sensistors
1	54	Measurement of physical parameters force, pressure
1	55	Measurement of velocity
1	56	Measurement of humidity, moisture

1	57	Measurement of speed
1	58	Basic block diagram of Data acquisition systems
1	59	Single channel and multi-channel DAS.

COURSE OUTCOMES vs PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
C422.1	3	-	-	-	-	2	1	-	-	-	-	-	2	-
C422.2	-	2	2	2	-	2	-	-	-	-	-	-	-	-
C422.3	3	-	2	-	-	2	-	-	-	-	-	-	2	-
C422.4	3	2	-	-	-	-	-	-	-	-	-	-	3	-
C422.5	3	2	2	-	-	2	-	-	-	-	-	-	3	-
C422.6	3	2	-	-	-	2	-	-	-	2	-	-	2	-
Total	15	8	6	2	-	10	1	-	-	2	-	-	12	-
Avg.	3	2	2	2	-	2	1	-	-	2	-	-	2.4	-

CO INDEX	POs MAPPED	PSOs MAPPED
C422.1	1,6,7	1
C422.2	2,3,4,6	-
C422.3	1,3,6	1
C422.4	1,2	1
C422.5	1,2,3,6	1
C422.6	1,2,6,10	1

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan & Realization)	NRIIT/9.1/F-09

Name of the Program: B.TECH	**Academic Year: 2020 – 2021**
Branch: ECE	**Year & Semester: III & I**
Name of the Course: COMPUTER ORAGANISATION AND ARCHITECTURE	**Regulation: R18**
Course Area/Module: MICROCONTROLLERS AND NETWORKS	**No. of students registered: 192**
Course Coordinator: G.SRINIVAS BABU **Designation: Assoc.Prof**	**Course Instructors:** **1.** CH. SWATHI **2.** G.SRINIVAS BABU
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week: 0**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1.	Understand the principles and the implementation of computer arithmetic and ALU.
2.	Understand the fundamentals of different instruction set architectures and their relationship to the CPU design.
3.	Understand the memory system, I/O organization.
4.	Understand the operation of modern CPUs including interfacing, pipelining, memory systems and buses.
5.	Understand the principles of operation of multiprocessor systems.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.	Able to understand the basics, evolution and architecture of the computer.
2.	Able to analyze the machine instructions and how to write programs and can calculate the effective address of an operand by addressing modes.
3.	Demonstrate the memory organization and understand the concept of cache mapping techniques and able to understand concepts of control unit
4.	Analyze the concept of I/O organization and design how to interface i/o devices.
5.	Able to understand the principles of operation of multiprocessor systems.
6.	Demonstrate the relationship between the software and the hardware and focuses on the

	foundational concepts that are the basis for current computer design.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	SWITCHING THEORY AND LOGIC DESIGN

COURSE DESCRIPTION:

Conceptualize the basics of organizational and architectural issues of a digital computer. Analyze processor performance improvement using instruction level parallelism. Learn the function of Students will able to: 1. Describe basic organization of computer and the architecture of microprocessor. Implement assembly language program for given task for different microprocessors. Demonstrate control unit operations and conceptualize each element of a memory hierarchy. Study various data transfer techniques in digital computer. Learn microprocessor architecture and study assembly language programming

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	**90**	**15**	**15**
Mid Examination - II	**90**	**15**	**15**
Online Quiz Examination - I	**20**	**10**	**10**
Online Quiz Examination - I	**20**	**10**	**10**
Assignments	**60**	**05**	**05**
Semester End Examination	**180**	**70**	**70**

COURSE CONTENT (Syllabus):

UNIT -I

Basic Structure Of Computers: Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.

Computer arithmetic: Data representation, Addition and Subtraction Algorithms, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic Operations.

UNIT -II:

Machine Instruction and Programs: Register Transfer Notation, Assembly Language Notation, The role of Stacks and Queues in computer programming equation, Addressing Modes.

Type of Instructions: Basic Instruction Types, Data transfer Instructions, Arithmetic Instructions, Logical Instructions, shift and Rotate Instructions, Branch Instructions.

UNIT-III

Micro Programmed Control: Control Memory, Address Sequencing, Micro Program Example, Hard Wired Control, Micro Programmed Control.

The Memory System: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

UNIT-IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Serial Communication.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processing, Interconnection Structures, Cache Coherence.

TEXT BOOKS:

1. Computer System Architecture – M.Moris Mano, IIIrd Edition, PHI / Pearson, 2006.
2. Computer Organization, Carl Hamacher, Zvonks Vranesic, Safea Zaky, 5th Edition, McGraw Hill.

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings Seventh Edition, PHI/Pearson, 2006.
2. Computer Architecture and Organization – John P. Hayes, Mc Graw Hill International editions, 1998.

PEDAGOGICAL APPROACH:

1. Classroom Lecture
2. Classroom Tutorials
3. Home Assignments
4. Quizzes
5. NPTEL Vedios
6.PPT'S

LESSON PLAN:

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction	
1	2	Functional Units	
1	3	Basic Operational Concepts	
1	4	Bus Structures	
1	5	System Software	
1	6	Performance	
1	7	The History of Computer Development	
2	9	Data representation	
1	10	Addition and Subtraction Algorithms,	
2	12	Multiplication Algorithms	
2	14	Division Algorithms	
1	15	Floating Point Arithmetic Operations	
2	17	Register Transfer Notation	
1	20	Assembly Language Notation	
2	22	The role of Stacks and Queues in computer programming equation	
2	24	Addressing Modes	
2	26	Basic Instruction Types	

2	28	Data transfer Instructions	
2	30	Arithmetic Instructions	
1	31	Logical Instructions	
1	32	Shift and Rotate Instructions	
2	34	Branch Instructions	
1	35	Control Memory	
2	37	Address Sequencing	
2	39	Micro Program Example, Hard Wired Control	
1	40	Micro Programmed Control.	
1	41	Memory Hierarchy	
1	42	Main Memory	
2	44	Auxiliary Memory	
1	41	Associative Memory	
2	43	Cache Memory	
1	44	Virtual Memory	
2	46	Memory Management Hardware	
2	48	Peripheral Devices	
2	50	Input-Output Interface	
1	51	Asynchronous Data Transfer Modes	
1	52	Priority Interrupt	
2	54	Direct Memory Access	
2	56	Serial Communication	
1	57	Parallel Processing	
1	58	Pipelining	
1	59	Arithmetic Pipeline	
1	60	Instruction Pipeline	
1	61	RISC Pipeline	
1	62	Vector Processing, Array Processing	

2	64	Interconnection Structures	
2	66	Cache Coherence	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1	-	-	-	-	-	-	-	-	1	3	-
CO2	2	3	2	1	-	-	-	-	-	-	-	2	2	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-	2	-
CO4	3	2	2	1	1	-	-	-	-	2	-	-	2	-
CO5	3	2	2	2	1	-	-	-	-	2	-	2	2	-
CO6	3	2	2	1	1	-	-	-	-	1	-	3	2	-
Total	17	13	10	5	3	-	-	-	-	3	-	8	11	-
Avg.	2.83	2.16	1.6	0.83	1	-	-	-	-	0.5	-	1.33	1.83	-

CO INDEX	POs MAPPED	PSOs MAPPED
C314.1	PO1, PO2, PO3, PO12	PSO1
C314.2	PO1, PO2, PO3, PO4, PO12	PSO1
C314.3	PO1, PO2, PO3	PSO1
C314.4	PO1, PO2, PO3, PO4, PO5, PO10	PSO1
C314.5	PO1, PO2, PO3, PO4, PO5, PO10, PO12	PSO1
C314.6	PO1, PO2, PO3, PO4, PO5, PO10, PO12	PSO1

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE HANDOUT – 2020 -2021

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester: III-I**
Name of the Course: ANTENNAS AND WAVE PROPAGATION	**Regulation: NRIA18**
Course Area/Module: Antennas and EM Waves	**No. of students registered :**
Course Coordinator: Mr S A Rahiman **Designation: Associate Professor**	**Course Instructors:** 1. Dr P Rama Koteswara Rao 2. Mr S A Rahiman
No. of Lecture Hours per week: 03	**No. of Tutorial Hours per week:00**
Credits:03	

COURSE OBJECTIVES:

1.	To understand the applications of the electromagnetic waves in free space.
2.	To introduce the working principles of various types of antennas.
3.	To discuss the major applications of antennas with an emphasis on how antennas are employed to meet electronic system requirements.
4.	To understand the concepts of radio wave propagation in the atmosphere.

COURSE OUTCOMES:

COURSE NAME: ANTENNAS AND WAVE PROPAGATION (18A3104403) **SEM:5(III-I) Regulation:NRIA18**	
	At the end of the course, the students will be able to:
C313.1	Understand the basic antenna radiation parameters and radiation mechanism of wire antennas using mathematical equations.
C313.2	Quantify the radiation fields and power radiated by various types of wire antennas, Loop antennas also analyze their radiation characteristics using mathematical approach.
C313.3	Illustrate the different types of arrays and their radiation patterns with both mathematical and geometrical analysis.
C313.4	Understand the geometry and working principle of operation of non resonant radiators, broad band antennas and microstrip antennas with qualitative analysis.
C313.5	Design various reflector antennas, lens antennas, horn antennas also Analyze antenna measurements to assess antenna's performance
C313.6	Identify and distinguish the characteristics of different modes of radio wave propagation in the atmosphere with both qualitative and quantitative treatment.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	
1.	Electromagnetic Waves & Transmission Lines
2.	Engineering Physics

COURSE DESCRIPTION:

Students will be introduced to antennas, principle of operation, the different types of antennas and the radiation mechanism analysis and their applications. The course provides introduce the student to expose students to examples of applications and various antenna types also wave propagation over ground, through troposphere and ionosphere, propagation effects in radio frequencies.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15
Mid Examination - II	90	15	15
Online Quiz Examination - I	20	10	10
Online Quiz Examination - I	20	10	10
Assignment-I	50	5	5
Assignment-II	50	5	5
Class Test-I	50	10	10
Class test-II	50	10	10
Semester End Examination	180	60	60

COURSE CONTENT (Syllabus):

UNIT-I

Part-A (Antenna Fundamentals): Introduction, Radiation Mechanism – single wire, 2 wire. Antenna Parameters - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beamwidths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity,Gain and Resolution, ,Antenna Apertures, Aperture Efficiency, Effective Height, illustrated Problems.

Part-B(Thin Linear Wire Antennas): Retarded Potentials, Dipoles, Dipoles a thin wire antenna ,Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole – Directivity, Effective Area . Natural current distributions, and patterns of Thin Linear Center-fed Antennas of different lengths.

UNIT-II

Part-A(Antenna Arrays-I):2 element arrays – different cases, Principle of Pattern Multiplication, N element Uniform Linear Arrays – Broadside, End-fire Arrays, EFA with Increased Directivity, Directivity Relations (no derivations). Related Problems.

Part-B(Antenna Arrays-II): Concept of Scanning Arrays. Binomial Arrays, Effects of Uniform and Non-uniform Amplitude Distributions, Design Relations. Arrays with Parasitic Elements, Yagi-Uda Arrays.

UNIT-III

Part-A(Non-Resonant Radiators) : Introduction, Traveling wave radiators – basic concepts, Long wire antennas –field strength calculations and patterns, Helical Antennas – Significance, Geometry, basic properties; Design considerations of helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

Part-B(Microstrip Antennas): Introduction, Definition, Basic geometry , Features, Advantages and Limitations, Different Shapes of patch elements, Rectangular Patch Antennas –Geometry and Parameters, Radiation Mechanism of Microstrip antenna. Characteristics of Microstrip antennas, Impact of different parameters on characteristics.

UNIT-IV

Part-A(Microwave Antennas): Paraboloidal Reflectors – Geometry, characteristics, types of feeds, Spill Over, Back Lobes, Aperture Blocking, Cassegrain Feeds. Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Antenna Measurements – Directivity and Gain Measurements.

Part-B(Wave Propagation): Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, Wave Tilt.Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF and Skip Distance , Optimum Woking Frequency, , Virtual Height, Ionospheric Abnormalities,. Fundamental Equation for Free-Space Propagation, Space Wave Propagation– Mechanism, LOS and Radio Horizon. Effective Earth's Radius, Duct Propagation, Tropospheric Scattering.

Text Books:

1. Antennas and Wave Propagation– John D. Kraus and Ronald J. Marhefka, 4th Edition, TMH, 2010.

2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition,

REFERENCES:

1. Antenna Theory - C.A. Balanis, John Wiley and Sons, 2nd Edition, 2001.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Micro strip Antenna Design Hand Book – Ramesh Garg, Prakash Bhartia,Inder Bahl, Apisak Ittipiboon, Artech House, second edition 2001
4. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5,Standard Publishers Distributors, Delhi.
5. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th Edition, 1955.
6. Antennas – John D. Kraus, McGraw-Hill, 2nd Edition, 1988.

<u>PEDAGOGICAL APPROACH:</u>

1	Class room Tutorials
2	Home Assignments
3	Power point Presentations
4	Mini projects
5	Posters preparations
6	Innovative Ideas on wireless communications

LESSON PLAN

Department : ECE
Year/Semester : III YEAR / I SEM
Name of Faculty : **Dr.P.Rama Koteswara Rao**
Designation : **Professor**
: **ABDUL RAHMAN. SK**
Designation : **Associate Professor**
Subject : **ANTENNAS AND WAVE PROPAGATION**
Total Hours : **68**
Regulation : **R18**
Academic Year : **2020-2021**

Lecture .No	Cumulative	Topic Covered
		UNIT I
1	1	Introduction
1	2	Radiation Mechanism – single wire, 2 wire
1	3	Dipoles
1	4	Current Distribution on a thin wire antenna
1	5	Antenna Parameters – Radiation Patterns
1	6	Patterns in Principal Planes, Main Lobe and Side Lobes
2	8	Beam widths, Beam Area, Radiation Intensity, Beam Efficiency
1	9	Directivity, Gain and Resolution
1	10	Antenna Apertures, Aperture Efficiency
1	11	Effective Height. Related Problems
1	12	Problems Practice
2	14	Retarded Potentials
2	16	Radiation from Small Electric Dipole
1	17	Quarter wave Monopole and Half wave Dipole – Current Distributions
2	19	Evaluation of Field Components, Power Radiated, Radiation Resistance
1	20	Beam widths, Directivity
1	21	Problems Practice
		UNIT-II ANTENNA ARRAYS
1	22	Introduction
2	24	2 element arrays – Different cases
1	25	Principle of Pattern Multiplication
2	27	N-Element Uniform Linear Arrays – Broadside
1	28	Endfire Arrays
1	29	EFA with Increased Directivity, Derivation of their characteristics and comparison
1	30	Concept of Scanning Arrays
1	31	Directivity Relations (no derivations). Related Problems
1	32	Binomial Arrays
1	33	Effects of Uniform and Nonuniform Amplitude Distributions, Design Relations
1	34	Arrays with Parasitic Elements, Yagi – Uda Arrays
1	35	Folded Dipoles & their characteristics
1	36	Problems Practice
		UNIT-III
1	37	Introduction
1	38	Travelling wave radiators – basic concepts

1	39	Longwire antennas – field strength calculations and patterns
1	40	Impact of different parameters on characteristics
1	41	Broadband Antennas: Helical Antennas – Significance, Geometry, Basic properties;
1	42	Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment)
1	43	Microstrip Antennas
1	44	Definition, Basic geometry , Features
1	45	Advantages and Limitations
1	46	Different Shapes of patch elements
1	47	Rectangular Patch Antennas –Geometry and Parameters
1	48	Characteristics of Microstrip antennas
1	49	Impact of different parameters on characteristics
		UNIT-IV
1	50	Reflector Antennas : Flat Sheet Corner Reflectors
1	51	Paraboloidal Reflectors – Geometry
1	52	Characteristics, types of feeds, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Off-set Feeds, Cassegrain Feeds
1	53	Horn Antennas – Types, Optimum Horns,Design Characteristics of Pyramidal Horns
1	54	Directivity Measurement
1	55	Gain Measurements (Comparison, Absolute and 3-AntennaMethods).
1	56	Concepts of Propagation – frequency ranges and types of propagations.
1	57	Ground Wave Propagation–Characteristics, Parameters
2	59	Wave Tilt, Flat and Spherical Earth Considerations
1	60	Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics,
1	61	Mechanism of Reflection and Refraction, Critical Frequency, MUF & SkipDistance – Calculations for flat and spherical earth cases,
2	63	Optimum Frequency, LUHF, VirtualHeight, Ionospheric Abnormalities
1	64	Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations
1	65	Space Wave Propagation – Mechanism, LOS and Radio Horizon.
2	67	Tropospheric Wave Propagation – Radius of Curvature of path,
1	68	Problems Practice
		Total classes required

	NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan & Realization)	**NRIIT/9.1/F-09**

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester: II-II**
Name of the Course: PTSP	**Regulation: NRIA18**
Course Area/Module: SIGNAL PROCESSING	**No. of students registered:**
Course Coordinator: P.VENU GOPAL **Designation: ASSOCIATE PROFESSOR**	**Course Instructors:** **1.** R. Upendar Rao
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week:--1**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

1. To give students an introduction to elementary probability theory, in preparation for courses on statistical analysis, random variables and stochastic processes.
2. To mathematically model the random phenomena with the help of probability theory concepts.
3. To introduce the important concepts of random variables and stochastic processes.
4. To introduce the types of noise and modeling noise sources.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Understand the axiomatic formulation of modern Probability Theory, Characterize probability models and random variables, function of random variables and formulate fundamental probability distribution and density functions.
2. Explain the concepts of expectation and conditional expectation, Evaluate and apply moments & characteristic functions, transformation of a random variable.
3. Understand the joint distribution function, joint density function, concept of inequalities, and operations on two random variables and multiple random variables.
4. Understand the concept of random processes and determine covariance, Analyze continuous and discrete- time random processes, Explain the concepts of stationary and wide sense stationary process, autocorrelation, cross correlation functions.
5. Understand the concept of random processes, spectral density of stationary random processes and cross power density spectrum, apply the above knowledge to solve basic problems.

6. Apply the theory of stochastic processes to analyze linear systems with random inputs and the systems in the presence of different types of noise sources.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1.	Calculus skills.
2.	Solution of ordinary differential equations.
3.	Fourier transform
4.	Linear Systems

COURSE DESCRIPTION:

Probability theory, Stochastic Processes and Statistical Signal Processing are essential for research in the area of Artificial Intelligence (AI), Signal Processing (SP) and Communication Engineering (CE) and many other fields, where there is uncertainty or randomness. Uncertainty or randomness is the common phenomena in the world. However, the probability theory and stochastic processes is a rich and sophisticated field of mathematics with a reputation for being confusion. This is due to either lack of basic concepts and knowledge of interpretation of these concepts to the real world problems where there is uncertainty. If some are good enough in the solving algebraic equations, they are not able to model or interpret the uncertainty of real world applications. If some people are able to model or interpret the real world applications with probabilistic equations, they are not able to solve them.

PTSP, which is essential for scientists and engineers working in the area of Artificial intelligence, Signal processing and communication, requires lot of practice for clear in-depth understanding to interpret and solve the problems.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15
Mid Examination - II	90	15	15
Online Quiz Examination - I	20	10	10
Online Quiz Examination - I	20	10	10
Assignments	60	05	05
Class test	60	10	10
Semester End Examination	180	60	70

COURSE CONTENT (Syllabus):

UNIT I

THE RANDOM VARIABLE : Introduction, Review of Probability Theory, Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution, Conditional Density, Properties.
OPERATION ON ONE RANDOM VARIABLE – EXPECTATIONS : Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Characteristic Function, Moment Generating Function.
UNIT II

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density, Statistical Independence.
OPERATIONS ON MULTIPLE RANDOM VARIABLES: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case.
UNIT III

RANDOM PROCESSES – TEMPORAL CHARACTERISTICS: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationary and Statistical Independence.First-Order Stationary Processes, Second-order and Wide-Sense Stationarity, N^{th}-order and Strict-Sense Stationarity.
Part II: Time Averages and Ergodicity, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.
UNIT IV

RANDOM PROCESSES – SPECTRAL CHARACTERISTICS: The Power Density Spectrum: Properties, Relationship between Power Density Spectrum and Autocorrelation Function, Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Density Spectrum and Cross-Correlation Function.
Modeling of Noise Sources: Resistive (Thermal) Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Average Noise Figure, Average Noise Figure of cascaded networks.

Text Books:
1. Probability, Random Variables & Random Signal Principles, Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and S.Unnikrisha, PHI, 4th Edition, 2002.

References:
1. Probability Theory and Stochastic Processes – B. Prabhakara Rao, BS Publications.
2. Probability and Random Processes with Applications to Signal Processing, Henry Stark and John W. Woods, Pearson Education, 3rd Edition.

3. Schaum's Outline of Probability, Random Variables, and Random Processes.
4. An Introduction to Random Signals and Communication Theory, B.P. Lathi, International Textbook, 1968.
5. Random Process – Ludeman , John Wiley
6. Probability Theory and Random Processes, P. Ramesh Babu, McGrawHill, 2015.

PEDAGOGICAL APPROACH:

1. Class room lectures
2. Class room tutorials
3. Home Assignment
4.Quizzes
5. Mini projects
6.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
		Unit-1			
1	1	Introduction			
1	2	Introduction			
3	5	Review of Probability Theory			
1	6	Definition of a Random Variable, Conditions for a Function to be a Random Variable			
1	7	Discrete, Continuous and Mixed Random Variables, Distribution functions, Properties			
1	8	Density functions, Properties			
1	9	Binomial, Poisson			
2	11	Uniform, Gaussian, Exponential, Rayleigh			
1	12	Conditional Distribution, Conditional Density, Properties			
1	13	**OPERATION ON ONE RANDOM VARIABLE – EXPECTATIONS** : Introduction, Expected Value of a Random Variable			
1	14	Function of a Random Variable, Moments about the Origin			
2	16	Central Moments, Variance and Skew			
1	17	Characteristic Function			
1	18	Moment Generating Function			
3	21	Problems			
		Unit-2			
1	22	**MULTIPLE RANDOM VARIABLES:** Vector Random Variables, Joint Density Function, Properties of Joint Density			
1	23	Marginal Distribution Functions			
1	24	Conditional Distribution and Density, Statistical Independence			
2	26	**OPERATIONS ON MULTIPLE RANDOM VARIABLES**: Joint Moments about the Origin			
2	28	Joint Central Moments			
1	29	Joint Characteristic Functions			

1	30	Jointly Gaussian Random Variables: Two Random Variables case.			
3	33	Problems			
		Unit-3			
1	34	**RANDOM PROCESSES – TEMPORAL CHARACTERISTICS:** The Random Process Concept, Classification of Processes			
1	35	Deterministic and Nondeterministic Processes, Distribution and Density Functions			
1	36	Concept of Stationary and Statistical Independence. First-Order and Second-order Stationary Processes			
1	37	Wide-Sense Stationary, N^{th}-order and Strict-Sense Stationary			
1	38	Time Averages and Ergodicity			
2	40	Autocorrelation Function and its Properties			
2	42	Cross-Correlation Function and its Properties			
2	44	Covariance Functions			
1	45	Gaussian Random Processes, Poisson Random Process			
3	48	Problems			
		Unit-4			
2	50	**RANDOM PROCESSES – SPECTRAL CHARACTERISTICS:** The Power Density Spectrum: Properties			
1	51	Relationship between Power Density Spectrum and Autocorrelation Function			
2	53	Cross-Power Density Spectrum, Properties			
1	54	Relationship between Cross-Power Density Spectrum and Cross-Correlation Function			
1	55	**Modeling of Noise Sources:** Resistive (Thermal) Noise Source			
1	56	Arbitrary Noise Sources, Effective Noise			
1	57	Temperature, Average Noise Figure			
1	58	Average Noise Figure of cascaded networks			
3	61	Problems			

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2								
CO2	3	1	2	1								
CO3	3	2	3	1								
CO4	2	1	3	1								
CO5	2	1	-	2								
CO6	2	1	2	3								
Total	15	9	12	10								
Avg.	2.5	1.5	2	1.66								

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1, PO2, PO3, PO4	
CO2	PO1, PO2, PO3, PO4	
CO3	PO1, PO2, PO3, PO4	
CO4	PO1, PO2, PO3, PO4	PSO2
CO5	PO1, PO2, PO4	PSO2
CO6	PO1, PO2, PO3, PO4	PSO2

TEACHING PLAN

Name of the Faculty: **Mr. K.CHANDRAMOULI** Designation: **Assoc. Professor**
Name of theCourse:**JAVA PROGRAMMING** Class/Section: **II-I B.Tech ECE - A**
Regulation: **NRIA18** Academic Year: **2020– 21**

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to OOP	1	1
1.2	Procedural Programming Language and Object Oriented Language	1	2
1.3	Principles of OOP, Applications of OOP	1	3
1.4	History of Java, Java features	1	4
1.5	Java Virtual Machine (JVM)	1	5
1.6	Java Program Structure	1	6
1.7	Variables, Primitive data types	1	7
1.8	Identifiers, Literals – Examples	1	8
1.9	Operators, expressions – Examples	2	10
1.10	Precedence Rules and Associativity	1	11
1.11	Primitive Type Conversion and Casting	1	12
1.12	Flow of Control	2	14
1.13	Classes and objects, Class Declaration	1	15
1.14	Creating Objects, Methods	1	16
	UNIT 2:		
2.1	Constructors - Examples	1	17
2.2	Constructor Overloading, Garbage collector	2	19
2.3	Importance of static keyword and examples	1	20
2.4	this keyword - Examples	1	21
2.5	Arrays, command line arguments	2	23
2.6	Nested Classes.	2	25
2.7	Inheritance, types of inheritance	2	27
2.8	super keyword, final keyword	1	28
2.8	Overriding and Abstract class	2	30
	UNIT 3:		
3.4	Interfaces	2	32
3.6	Creating the packages, using packages, importance of CLASSPATH	1	33
3.7	java. Lang package	1	34
3.8	Exception handling, importance of try, catch, throw	1	35
3.9	throws and finally block	1	36
3.10	user-defined exceptions, Assertions	1	37
	UNIT-4		
4.1	Multithreading: Introduction	1	38
4.2	Thread life cycle	1	39
4.3	Creation of threads, Thread priorities	2	41
4.4	Thread Synchronization, Communication Between Threads	1	42

4.5	Reading data from files and writing data to files	1	43
4.6	random access file	1	44
4.6	Applet class, Applet structure	1	45
4.6	Applet life cycle, sample Applet programs	5	50
4.6	Applet programs	2	52
4.6	Applet programs	2	54
4.6	Applet programs	1	55

TEXT BOOKS:

1. The Complete Reference Java, 8th edition, Herbert Schildt, TMH.

2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan & Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester: II-II**
Name of the Course: Electromagnetic Field Theory	**Regulation: NRIA18**
Course Area/Module: Antennas and EM Waves	**No. of students registered :**
Course Coordinator: Mr S A Rahiman **Designation: Associate Professor**	**Course Instructors:** 1. Dr P RAMA KOTESWARA RAO 2. Mr S A Rahiman
No. of Lecture Hours per week: 03	**No. of Tutorial Hours per week:00**
Credits:03	

COURSE OBJECTIVES:

1. Learn the fundamentals of steady electric and magnetic fields using various laws.
2. Maxwell equations in Time varying fields and power flow by using poynting theorem.
3. To impart the knowledge of electric and magnetic fields in real time applications.
4. To learn Wave Propagation characteristics in different media.
5. To impart Wave characteristics in different media at oblique and normal incidence.
6. To study the propagation characteristics of electromagnetic wave in bounded and unbounded media.

COURSE OUTCOMES:

At the end of the course, the students will be able to:

C224.1	Interpret and Apply the static electrostatic fields with respect to coordinate systems.
C224.2	Analyze and Demonstrate the static magnetic fields in real time applications.
C224.3	Formulate the Maxwell's Equations in different forms with time considerations
C224.4	Formulate the theory of electromagnetic waves in free space with practical applications.
C224.5	Evaluate and Relate wave propagation characteristics in different conducting and non-conducting media.
C224.6	Demonstrate the reflection and Refraction of EM waves at normal and oblique incidences

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	
1.	Engineering Mathematics
2.	Engineering Physics

COURSE DESCRIPTION:

The course covers the basics of the electrostatic field—Gauss's law; boundary conditions; capacitance; Laplace’s and Poisson’s equations; energy and forces. The steady electric current. The magnetostatic fields, vector potential; Ampere’s and Biot-Savart laws; inductance; energy, Quasi static fields; electromagnetic induction. It also deals with the propagation of Electromagnetic (EM) waves through guided and unguided media.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15
Mid Examination - II	90	15	15
Online Quiz Examination - I	20	10	10
Online Quiz Examination - I	20	10	10
Assignment-I	50	5	5
Assignment-II	50	5	5
Class Test-I	50	10	10
Class test-II	50	10	10
Semester End Examination	180	60	60

COURSE CONTENT (Syllabus):

UNIT I

Part-A:

Electrostatics : Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Illustrative Problems.

Part-B:

Fields in Materials :Convection, Conduction and Displacement Current Densities, Dielectric Constant, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations..Illustrative Problems.

UNIT II

Part-A:

Magneto Statics : Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials. Illustrative Problems.

Part-B:

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces. Illustrative Problems.

UNIT III

Part-A:

EM Wave Characteristics - I: Characterization of conductor and dielectric media**,** Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H,

Part-B:

EM Wave Characteristics - I:

Sinusoidal Variations, Wave Propagation Characteristics in dielectric and conductor media, Wave Propagation Characteristics in good dielectric and good conductor media, skin depth..Illustrative Problems.

UNIT IV

Part-A:

EM Wave Characteristics – II: Polarization & Types, Brewster Angle, Critical Angle ,Total Internal Reflection, Surface Impedance. Poynting Vector and Poynting Theorem – Applications Illustrative Problems.

Part-B:

EM Wave Characteristics – II: Reflections and Refractions of uniform plane waves by a perfect dielectric at normal & Oblique incidence, Reflections and Refractions of uniform plane waves by a perfect conductor at normal & Oblique incidence.

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.
3. Transmission Lines and Networks–Umesh Sinha,Satya Prakashan (Tech. India Publications), New Delhi, 2001.

REFERENCE BOOKS:

1. Electromagnetics- J**.D. Kraus**, "**Electromagnetics**", 4th Edition, Mc Graw-Hill. Inc, 1992.
2. Engineering Electromagnetics:Nathan Ida, Springer(India)Pvt.Ltd., New Delhi, 2nd ed., 2005.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
4. Electromagnetic Field Theory and Transmission Lines: G Sasi Bhushana Rao,Wiley India 2013.

PEDAGOGICAL APPROACH:

1	Class room Tutorials
2	Home Assignments
3	Power point Presentations
4	Mini projects
5	Posters preparations
6	Innovative Ideas on wireless communications

Cumulative Lectures	Lectures	TOPIC	Remarks
Unit-1			
1	1	Introduction	
2	1	Cartesian Co-ordinate system	
3	1	Cylindrical Co-ordinate system	
4	1	Spherical Co-ordinate system	
6	2	Coulomb's Law	
7	1	Electric Field Intensity, Electric Flux Density	
9	2	Gauss Law and Applications	
10	1	Electric Potential	
11	1	Maxwell's Two Equations for Electrostatic Fields	
12	1	Illustrative Problems	
14	2	Convection, Conduction and Displacement Current Densities	
15	1	Dielectric Constant	
17	2	Continuity Equation, Relaxation Time	
18	1	Poisson's and Laplace's Equations	
19	1	Illustrative Problems	
Unit-2			
20	1	Biot-Savart Law	
22	2	Ampere's Circuital Law and Applications	
23	1	Magnetic Flux Density	
24	1	Maxwell's Two Equations for Magneto static Fields	
26	2	Magnetic Scalar and Vector Potentials	
27	1	Illustrative Problems	
29	2	Faraday's Law and Transformer EMF	
30	1	Inconsistency of Ampere's Law	
31	1	Maxwell's Equations in Different Final Forms and Word Statements	
33	2	Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces	
34	1	Illustrative Problems	
Unit-3			

35	1	Characterization of conductor and dielectric media	
37	2	Wave Equations for Conducting and Perfect Dielectric Media	
39	2	Uniform Plane Waves – Definition	
40	1	All Relations Between E & H	
42	2	Sinusoidal Variations	
44	2	Wave Propagation Characteristics in dielectric and conductor media	
46	2	Wave Propagation Characteristics in good dielectric and good conductor media	
47	1	skin depth	
48	1	Illustrative Problems	
Unit 4			
50	2	Polarization & Types	
52	2	Brewster Angle, Critical Angle	
53	1	Total Internal Reflection	
54	1	Surface Impedance	
56	2	Poynting Vector and Poynting Theorem – Applications	
57	1	Illustrative Problems	
59	2	Reflections and Refractions of uniform plane waves by a perfect dielectric at normal & Oblique incidence	
60	2	Reflections and Refractions of uniform plane waves by a perfect conductor at normal & Oblique incidence	

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan & Realization)	**NRIIT/9.1/F-09**

Name of the Program: B.Tech	**Academic Year: 2019-2020**
Branch: EEE	**Year & Semester: II & II**
Name of the Course: CONTROL SYSTEMS	**Regulation: NRIA18**
Course Area/Module: CONTROL SYSTEMS	**No. of students registered: 61**
Course Coordinator: K.VENKATA KISHORE **Designation: Associate Professor**	**Course Instructors:** **1. K.VENKATA KISHORE** **2. K. SRAVAN SAI KUMAR** **3. L.V.MAHAESH BABU**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1. To learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function
2. To study the time response of first and second order systems and improvement of performance by proportional plus derivative and proportional plus integral controllers
3. To study the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
4. To present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion.
5. To learn basic aspects of design of linear control systems using Bode plots.
6. To study state models & analyze the systems and to present the concepts of Controllability & Observability

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.	Understand Closed/Open Loop Control Systems, derive the transfer function of physical systems and determine overall transfer function using block diagram algebra & signal flow graph reduction techniques
2.	Study different types of standard test signals, find the output response of first and second order systems, determine time response specifications of second order systems and determine steady state error along with error constants
3.	Acquire the skill to analyze absolute and relative stability of LTI systems using Routh-Hurwitz stability criterion and the Root Locus Plot
4.	Analyze the stability of LTI systems using frequency response methods using Bode plots & Polar Plots.
5.	Analyze the stability of LTI systems using frequency response methods using Nyquist Plots
6.	Represent physical systems by State Transition Matrices based state space modeling and determine the output response by understanding the concepts of controllability and observability

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Laplace Transforms, Matrix Algebra & Differential Equations **[Mathematics]**
2	Kirchoff's Laws, Mesh & Nodal Analysis **[Electrical Circuit Analysis]**
3	DC & AC Motor working principles **[Electrical Machines]**

COURSE DESCRIPTION:

This course introduces the elements of linear control systems and their analysis. Classical methods of design using frequency response. The state space approach for design, modeling and analysis of simple PD, PID controllers

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test-I	40	10	40 (80% of Best + 20% of Least)
Assignment-I	--	5	
Online Quiz Examination - I	20	10	
Mid Examination - I	90	15	
Class Test-II	40	10	
Assignment-II	--	5	
Online Quiz Examination - II	20	10	
Mid Examination - II	90	15	
Semester End Examination	180	60	60

COURSE CONTENT (Syllabus):

UNIT I

Introduction to Control Systems Components

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer function.

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering -Block diagram algebra – Representation by Signal flow graph - Reduction is using Mason's gain formula.

UNIT II

Time Response Analysis

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, Introduction to P, PI, PD and PID controllers.

UNIT III

Stability Analysis in S-Domain

The concept of stability – Routh's stability , limitations ,Routh-Hurwitz criterion – qualitative stability and conditional stability.

Root Locus Technique: The root locus concept - construction of root loci –effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT IV

Frequency Response Analysis

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram- Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots- Nyquist Plots- Stability Analysis.

State Space Analysis of Continuous Systems

Concept of state, state variables and state model, derivation of state models from physical systems (Electrical), solving the Time invariant state Equations- State Transition Matrix and its Properties – Concepts of Controllability and Observability.

TEXT BOOKS:

1. Control Systems principles and design, M.Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition.
2. Automatic control systems, Benjamin C.Kuo, Prentice Hall of India, 2nd Edition.

REFERENCE BOOKS:

1. Modern Control Engineering, Kotsuhiko Ogata, Prentice Hall of India.
2. Control Systems, Manik Dhanesh N, Cengage publications.
3. Control Systems Engineering, I.J. Nagarath and M. Gopal, New Age International Publications, 5th Edition.
4. Control Systems Engineering, S.Palani, Tata McGraw Hill Publications.

E-RESOURCES:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/

PEDAGOGICAL APPROACH:

1. Chalk & Talk
2. PPT Presentations
3. Role Plays
4. Simulating Environment - MATLAB

Lesson Plan

No. of Lectures	Cumulative No. of Lectures	TOPIC
1	1	Introduction to control systems
2	3	Concepts of Control Systems- Open Loop and closed loop control systems and their differences
1	4	Different examples of control systems
1	5	Classification of control systems
1	6	Feed-Back Characteristics, Effects of feedback
2	8	Mathematical models – Differential equations, Impulse Response and transfer functions
5	13	Translational and Rotational mechanical systems
1	14	Block diagram representation of systems considering electrical systems as examples
2	16	Block diagram algebra
4	20	Representation by Signal flow graph
2	22	Reduction using Mason's gain formula
1	23	Synchro transmitter and Receiver
2	25	Transfer Function of DC Servo motor – AC Servo motor
1	26	Tutorial
1	27	Standard test signals
1	28	Time response of first order systems
3	31	Characteristic Equation of Feedback control systems, Transient response of second order systems
2	33	Time domain specifications
3	36	Steady state response – Steady state errors and error constants, Effect of adding zero to system
1	37	Effects of proportional P, I, D systems
1	38	The concept of stability
2	40	Routh's stability criterion
1	41	Qualitative stability and conditional stability
1	42	Routh-Hurwitz criterion
1	43	Examples of R-H Criteria
1	44	limitations of Routh's stability
No. of Lectures	Cumulative No. of Lectures	TOPIC
2	46	The root locus concept

3	49	Solving Root Locus Examples
1	50	Introduction, Frequency domain specifications
3	53	Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram
2	55	Phase margin and Gain margin
1	56	Stability Analysis from Bode Plots
2	58	Solution of bode plot examples
2	60	Polar Plots
3	63	Nyquist Plots
1	64	Concepts of state, state variables and state model
1	65	derivation of state models from block diagrams
1	66	Diagonalization- Solving the Time invariant state Equations
1	67	State Transition Matrix and it's Properties
3	70	Concepts of Controllability and Observability.

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-

CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-
CO6	2	-	-	3	-	-	-	-	-	-	-	-
Total	16	13	2	7	-	-	-	-	-	-	-	-
Avg.	2.67	2.6	2	2.33	-	-	-	-	-	-	-	-

CO INDEX	PO#	PSO#
CO1	**PO1**	**PSO1**
	PO2	
CO2	**PO1**	**PSO1**
	PO2	
CO3	**PO1**	**PSO1**
	PO2	
CO4	**PO1**	**PSO1**
	PO2	
	PO4	
CO5	**PO1**	**PSO1**
	PO2	
	PO3	
	PO4	
CO6	**PO1**	**PSO1**
	PO4	

	NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B.Tech	**Academic Year:** 2020 – 21
Branch: Electronics and Communication	**Year & Semester:** II & II
Name of the Course: Analog and Pulse Circuits	**Regulation:** NRIA18
Course Area/Module: Analog Electronics	**No. of students registered: 212**
Course Coordinator: Mr. D.Ravisankar **Designation:** Associate Professor	**Course Instructors:** **1.** Mr. D.Ravisankar **2.** Mrs. R.Sunitha **3.** Mr. SK Ashraf Ali
No. of Lecture Hours per week: 03	**No. of Tutorial Hours per week: 0**
Credits: 03	

COURSE OBJECTIVES:

Students will be able to:

1. To demonstrate BJT amplifier using h parameters
2. To explain feedback amplifiers and oscillators
3. To know the classification of the power amplifiers and their analysis
4. To study and design the concepts of linear and non linear wave shaping circuits
5. To analyze different types of Multi vibrators and their design procedures
6. To understand the basic principles of Sampling gates

COURSE OUTCOMES:

At the end of the course, the students will be able to develop:

1. To explain BJT amplifier using h parameter model
2. To analyze and design electronic subsystems such as feedback amplifiers and oscillators
3. To analyze power amplifiers such as Class A and Class B and compare their performance
4. To design linear and non linear wave shaping circuits with different inputs
5. To design and analyze various multi vibrators using transistors
6. To remember and analyze unidirectional and bidirectional sampling gates

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

Topic
1. Engineering Mathematics
2. Network Analysis
3. Electronic devices and circuits

COURSE DESCRIPTION:

This course starts by introducing some basic ideas of electronic amplifiers and study of feedback concepts (both positive and negative). Subsequently the course probes into introduction and emphasis of oscillators. Further design concepts of power amplifiers are also explained. This course covers pulse waveforms, linear and non linear circuits and their responses due to sinusoidal and non sinusoidal inputs. This course helps in understanding various types of multivibrators and their design procedures. This course gives an overview of unidirectional and bidirectional sampling gates and applications of sampling gates

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test – I	50	10	10%
Class Test – II	50	10	
Online Quiz Examination – I	20	10	10%
Online Quiz Examination – I	20	10	
Assignment – I	50	05	5%
Assignment – II	50	05	
Mid Examination – I	90	15	15%
Mid Examination – II	90	15	
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT I:
AMPLIFIERS:
Classification of amplifiers, Two port network, Determination of h parameters, Transistor hybrid model, Generalized analysis of transistor amplifier in CB, CE and CC configurations using h-parameters, Comparison of transistor amplifiers.

FEEDBACK AMPLIFIERS:
Feedback principle and concept, types of feedback, feedback topologies, Characteristics of negative feedback amplifiers, Generalized analysis of feedback amplifiers, Performance comparison of feedback amplifiers, Illustrative Problems

UNIT II:
OSCILLATORS:
Oscillator principle, condition for oscillations, RC-phase shift and Wien bridge oscillators and their analysis, Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators, Illustrative Problems

POWER AMPLIFIERS:
Overview of power amplifiers, Class A power Amplifiers and their analysis, Class B Push-pull amplifiers and their analysis, Illustrative Problems

UNIT III:
LINEAR WAVE SHAPING:
High pass, Low pass RC circuits, their response expressions for sinusoidal, step, pulse, square, ramp and exponential inputs (Qualitative Treatment Only)

NON LINEAR WAVE SHAPING:
Diode clippers, Transistor clippers, clipping at two independent levels, Emitter coupled clipper; Clamping operation, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage (Qualitative Treatment Only)

UNIT IV:
MULTIVIBRATORS:
Bistable Multi Vibrator – Analysis and Design of Fixed Bias Bistable Multi Vibrator, Schmitt trigger, **Monostable Multi Vibrator** – Analysis and Design of Collector Coupled Monostable Multi Vibrator, **Astable Multi Vibrator** – Analysis and Design of Collector Coupled Astable Multi vibrator (Qualitative Treatment Only)

SAMPLING GATES:
Basic operating principles of sampling gates, unidirectional sampling gate, unidirectional sampling gates to accommodate more than one input signal, bidirectional sampling gates using transistors, reduction of pedestal in a gate circuit, bidirectional sampling gates, four diode sampling gate, six diode sampling gates, applications of sampling gates

TEXT BOOKS

- Electronic Devices and Circuits- Salivahanan, N.Suressh Kumar, A. Vallavaraj, TATA McGraw Hill, Second Edition. **(UNITS I, II)**
- Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005 **(UNIT III,IV)**
- Integrated Electronics- J. Millman and C.C. Halkias, Tata Mc Graw-Hill, 1972

REFERENCES

- Electronic Circuit Analysis and Design – Donald A. Neaman, Mc Graw Hill.
- Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition.
- Electronic Circuit Analysis – A.P.Godse, Technical Publications
- Pulse and Digital Circuits – B.Yoganarsimhan
- Pulse & Digital Circuits by Venkata Rao,K,Ramasudha K, Manmadha Rao,G., Pearson,2010
- Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991

<u>E- RESOURCES</u>

1. www.modernelectronics.org
2. www.electronicsforyou.com
3. www.npteliitm.ac.in

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Amplifier – definition, Classification of amplifiers	
1	2	Two port network	
1	3	Determination of h parameters	
1	4	Transistor hybrid model	
3	7	Generalized analysis of transistor amplifier in CB, CE and CC configurations using h-parameters	
1	8	Comparison of transistor amplifiers	
1	9	Feedback principle and concept	
1	10	Types of feedback	
1	11	Feedback topologies	
1	12	Characteristics of negative feedback amplifiers	
2	14	Generalized analysis of feedback amplifiers	
1	15	Performance comparison of feedback amplifiers	
1	16	Illustrative Problems	
1	17	Oscillator principle, condition for oscillations	
2	19	RC phase shift oscillator and its analysis	
1	20	Wein bridge oscillator and its analysis	
1	21	Generalized analysis of LC Oscillators	
1	22	Hartley oscillators	
1	23	Colpitt’s oscillators	
1	24	Illustrative Problems	
1	27	Overview of power amplifiers	
3	30	Class A power Amplifiers and their analysis	
3	31	Class B Push-pull amplifiers and their analysis	
1	32	Illustrative Problems	
1	33	High pass RC circuits, Low pass RC circuits	
1	34	Response expression for sinusoidal input	
1	35	Response expression for step and pulse inputs	

1	36	Response expression for ramp input	
2	38	Response expression for square input	
2	40	Response expression for square exponential input	
2	42	Diode clippers	
1	43	Transistor clippers	
1	44	Clipping at two independent levels	
1	45	Emitter coupled clipper	
1	46	Clamping operation	
1	47	Clamping circuit theorem	
1	48	Practical clamping circuits , Effect of diode characteristics on clamping voltage	
2	50	Analysis and Design of Fixed Bias Bistable Multi Vibrator	
2	52	Schmitt trigger	
2	54	Analysis and Design of Collector Coupled Monostable Multi Vibrator	
2	56	Analysis and Design of Collector Coupled Astable Multi vibrator	
1	57	Basic operating principles of sampling gates	
1	58	Unidirectional sampling gate	
1	59	Unidirectional sampling gates to accommodate more than one input signal	
1	60	Bidirectional sampling gates using transistors	
1	61	Reduction of pedestal in a gate circuit	
1	62	Bidirectional sampling gates	
1	63	Four diode sampling gate, six diode sampling gates	
1	64	Applications of sampling gates	

LESSON PLAN

Department: **ECE** Semester / Year: **II/II**

Name of faculty: **D.NAGA RAJESH** Designation: **ASST. PROFESSOR**

Name of the subject: **MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
	Introduction to Managerial Economics and demand Analysis		
1.1	Introduction to managerial economics	2	2
1.2	Concepts of demand ,types and determinates and its exceptions	2	4
1.3	Elasticity of demand , types, measurements Demand forecasting and methods	3	7
	UNIT 2:		
	Cost Analysis and Introduction to Markets		
2.1	Different types of cost concepts	5	12
2.2	Cost volume profit analysis, Determination of breakeven point	3	15
2.3	Market structure: perfect competition	2	17
2.4	Monopoly and Monopolistic and Oligopoly, Features Price, Output Determination	6	23
	UNIT-4		
	Types of Business Organization and Business Cycles		
4.1	Forms of business organizations	1	26
4.2	Sole trader	2	28
4.3	Partnership	2	30

4.4	Joint Stock Company	2	32
4.5	Co-operative socities	1	33
4.6	Business Cycles, Meaning and Features	2	35
4.7	Phases of Business Cycle	1	36
4.8	Concept of money and money supply	1	37
4.9	Functions of commercial banks and RBI	1	38
4.10	Credit control methods of RBI	1	39
	UNIT-5		
	Introduction to Accounting & Financing Analysis		
5.1	Introduction to Double Entry Systems	2	41
5.2	Journal	3	44
5.3	Ledger	1	45
5.4	Trail balance	1	46
5.5	Final accounts	2	48
5.6	Ratio analysis	2	50
	UNIT-6		
	Capital and Capital Budgeting:		
6.1	Capital Budgeting	2	52
6.2	Meaning of Capital	1	53
6.3	Capitalization	2	55
6.4	Meaning and need for capital budgeting	1	56
6.5	Techniques of Capital Budgeting-Traditional and Modern Methods	4	60

TEXT BOOKS

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage
2. Publications, New Delhi – 2011
3. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
4. Prof. J.V.Prabhakara rao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1. V. Maheswari: Managerial Economics, Sultan Chand.
2. Suma Damodaran: Managerial Economics, Oxford 2011.

3. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
4. Vanitha Agarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson.
6. Maheswari: Financial Accounting, Vikas Publications.
7. S. A. Siddiqui & A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers, 2012

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE FILE – 2020 -2021

Name of the Program : B.Tech	**Academic Year : 2020-2021**
Branch: Electronics & Communication Engineering	**Year & Semester : II B.Tech& I sem**
Name of the Course : Network Analysis and Transmission Lines	**Regulation : NRIA18**
Course Area/Module : Microwaves and Antennas	**No of students registered :198**
Course Coordinator : N Malathi	**Course Instructors: R. Upendar Rao N. Malathi**
Designation : Associate Professor	**Credits: 3**
Contact Details : Mail id :hairehman@gmail.com	**No. of Lecture Hours per week : 4 No. of Tutorial Hours per week : 1**

PRE-REQUISITES FOR THE COURSE:

Students are assumed to have back ground knowledge on the following topics:

- 1. Properties of passive elements
- 2. Properties of conductors and Dielectrics.

Pre-requisite courses:

Applied Physics.

COURSE DESCRIPTION:

Students will be introduced to EM waves , principle of operation, the different types of wave Equations and mechanism analysis and their applications. The course provides introduce the student to expose students to examples of applications and various Transmission line types also wave propagation.

COURSE OBJECTIVES:

Students will be able To

1.	To know the behavior of the steady state and transient states in RLC circuits
2.	To understand the resonance and two port network parameters
3.	**Wave characteristics in different media for normal and oblique incidence.**
4.	**Various concepts of transmission lines and impedance measurements**

COURSE OUTCOMES:

COURSE NAME: NATL ( ) **SEM: 3(II-I)** **Regulation:**	
Upon successful completion of this course, students should be able to	
C222.1	Gain the knowledge on basic RLC circuits behavior.
C222.2	Analyze the steady state and transient states of RLC circuits.
C222.3	Analyze the two port network parameters.
C222.4	Demonstrate the reflection and Refraction of EM waves at boundaries
C222.5	Analyse basic transmission line parameters.
C222.6	Analysis and Design of a transmission lines.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	90 Min	15	15%
Mid Examination - II	90 Min	15	15%
Online Quiz Examination - I	20 Min	10	10%
Online Quiz Examination - I	20 Min	10	10%
Assignments	60 Min	5	5%
Semester End Examination	180 Min	70	70%

COURSE CONTENT (Syllabus).

UNIT I:

Network Theorems : Super position theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem.

Two Port Network: Relationship of two port variables, Short circuit admittance parameters, Open circuit impedance parameters, Transmission parameters, Hybrid parameters, Relation between parameter sets.

UNIT II:

Transient and Steady state analysis of RC, RL and RLC Circuits : Response to sinusoidal excitation—series RL, RC and RLC Circuits, parallel RC, RL and RLC.

Resonance: Introduction, Definition of Q series resonance, Bandwidth of series resonance, parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth of parallel resonance.

UNIT III:

Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Equivalent Circuit, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts,

Part II: Lossless / Low Loss Characterization, Types of Distortion, Condition for Distortion less line, Minimum Attenuation, Loading - Types of Loading.

UNIT IV:

Transmission Lines – II: Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. Low loss radio frequency lines and UHF Transmission lines, UHF Lines as Circuit Elements;

Part II: $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations, Smith Chart – Configuration and Applications, Single Stub Matching.

Prerequisites for the Course:

Mathematics I & Mathematics II

COURSE OBJECTIVES:

1. **To understand the basic concepts on RLC circuits**
2. **To know the behavior of the steady states and transient states in RLC circuits**
3. **To understand the two port network parameters**
4. **Various concepts of transmission lines and impedance measurements**

PEDAGOGICAL APPROACH:

Classroom lectures through Chalk & talk
NPTEL video lectures
Power point presentations
Home assignments
Seminars, Classroom Discussions

	NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

LESSON PLAN

Department : **ECE** Year/Semester : **II YEAR / I SEM**
Name of Faculty : **N Swarnalatha** Designation : **Assoc Professor**
: **ABDUL RAHMAN. SK** Designation : **Associate Professor**
Subject : **NATL** Total Hours : **68**
Regulation : **NRIA18** Academic Year : **2019-2020**

No. of Lectures	Cumulative No. of Lectures	Topic(s) to be covered	Remarks
		UNIT-I-	
2	2	**Super position theorem on DC**	
1	3	**Super position theorem on AC**	
2	5	Thevenin's theorem on DC	
1	6	Thevenin's theorem on AC	
2	8	Norton's theorem on DC	
1	9	Norton's theorem on AC	
2	11	Maximum Power Transfer theorem on DC	
2	13	Maximum Power Transfer theorem on AC	
1	14	Relationship of two port variables	
2	16	Short circuit admittance parameters	
2	18	Open circuit impedance parameters	
2	20	Transmission parameters	
2	22	Hybrid parameters	
2	24	Relation between parameter sets	
		UNIT – II	
1	25	Transient response of series RC	
1	26	Transient response of series RL	
1	27	Transient response of series RLC	
1	28	Transient response of parallel RC	
1	29	Transient response of parallel RL	
1	30	Transient response of parallel RLC	
1	31	Steady state response of series RC	
1	32	Steady state response of series RL	
1	33	Steady state response of series RLC	
1	34	Steady state response of parallel RC	
1	35	Steady state response of parallel RL	
1	36	Steady state response of parallel RLC	
1	37	Introduction of Resonance	

1	38	Definition of Q series resonance	
1	39	Bandwidth of series resonance	
1	40	Bandwidth of parallel resonance	
1	41	Condition of maximum impedance	
1	42	Current in anti-resonance	
		UNIT – III Transmission Lines – I	
1	43	Types, Parameters, Transmission Line Equations,	
1	44	Primary & Secondary Constants,	
2	46	Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities	
2	48	Infinite Line Concepts, Loss less /Low Loss Characterization,	
1	49	Distortion – Condition for Distortion less and Minimum Attenuation,	
1	50	Loading - Types of Loading. Related Problems.	
		UNIT-IV- Transmission Lines – II	
2	52	Input Impedance Relations,	
1	53	SC and OC Lines,	
1	54	Reflection Coefficient, VSWR.	
1	55	UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations.	
1	56	Smith Chart – Configuration and Applications,	
1	57	Single and Double Stub Matching. Related Problems.	
	57	TOTAL	

COURSE OUTCOMES Vs PROGRAM OUTCOMES & PSO MAPPING:

Courses Outcomes	PO 1	PO2	PO3	PO4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3							3		2
CO2	3	3	3							3		2
CO3	3	3	2							3		2
CO4	3	3	2							3		2
CO5	3	3	2							3		2
CO6	3	3	2							3		2
Total	18	18	14							18		10
Average	3	3	2.33							3		1.6

CO INDEX	POs MAPPED	PSOs MAPPED
C222.1	1,2,3,10&12	1
C222.2	1,2,3,10&12	1
C222.3	1,2,3,10&12	1
C222.4	1,2,3,10&12	1,2
C222.5	1,2,3,10&12	1,2
C222.6	1,2,3,10&12	1,2

Mention Gaps Identified (Missing Content of syllabus / Industry/Profession Requirements or POs) if any:

Course Attainment Target (to be collected from department):

Target : (**eg:** 50%)

Attainment level 1:(eg:>55% Students scoring more than 50% marks out of relevant maximum marks)

Attainment level 2: (**eg>**60% Students scoring more than 50% marks out of relevant maximum marks)

Attainment level 3: (eg>70% Students scoring more than 50% marks out of relevant maximum marks)

Signature of Course Coordinator

Signature of Module Coordinator

Signature of Program Coordinator

	# NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: ECE	**Year & Semester:2-1**
Name of the Course: DELD	**Regulation: NRIA18**
Course Area/Module: DIGITAL ELECTRONICS	**No. of students registered: 210**
Course Coordinator: M.MAHESH **Designation:** ASSISTANT PROFESSOR	**Course Instructors:** **1.** M.MAHESH **2.** P.VENU GOPAL
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week:0**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

1. To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, binary codes and error detecting and correcting binary code.
2. To study the theory of Boolean algebra and to study representation of switching functions using Boolean expressions and their minimization techniques.
3. To study the combinational logic design of various logic and switching devices and their realization.
4. To study some of the programmable logic devices and their use in realization of switching functions.
5. To study the sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices, their minimization techniques and their realizations.
6. To implement synchronous state machines using flip flops

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO 1: Understand the numeric information in different forms and interpret different logic gates.
CO 2: Minimize the given Switching functions in SoP and PoS forms using K-Map and Tabular Method.
CO 3: Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, De-multiplexers, and Arithmetic Circuits.
CO 4: Design combinational logic circuits using different types of Programmable Logic Designs.
CO 5: Design and Implement various sequential circuits like flip flops, registers. Design and Implement Various sequential circuits like flip flops, registers.
CO 6:.Design the state diagrams with the knowledge of Mealy and Moore conversions, state machines using various flip flops.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Set theory (Mathematics)
2	Basic logic operations like bit wise operations, Shift operations, flow charts, ASCII codes, etc. (Computer Programming)

COURSE DESCRIPTION:

This Course provides in-depth knowledge of Digital Logic and design techniques of digital circuits and fundamental concepts used in the design of digital systems. Describe the common forms of number representation in digital electronic circuits and to be able to convert between different representations. Discuss the combinational circuit's using simple logical operations. Design combinational logic circuits & sequential logic circuits. This subject is required to understand the later subjects like LDICA, MPMC, VLSI& ES, etc. By studying this subject, the students can design and understand digital systems and its importance. The students logical thinking capability will be improved which will help in placements and in their future technical assignments.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15%
Mid Examination - II	90	15	15%
Online Quiz Examination - I	20	10	10%
Online Quiz Examination - I	20	10	10%
Assignment-I	-	5	5%
Assignment-II	-	5	5%
Class Test-I	50	10	10%
Class Test-II	50	10	10%
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT- I

Number Systems and Binary Codes

Philosophy of number systems, complement representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes – Hamming codes.

Boolean algebra

Fundamental postulates of Boolean algebra, Basic theorems and properties. Digital logic gates, Representation of Boolean Functions using Canonical and Standard forms, , Multilevel NAND/NOR realizations.

UNIT- II

Minimization of Switching Functions

Minimization of switching functions using K-Map up to 5-variables, Tabulation Method.

Combinational Circuits

Design of Adders, Subtractors, Parallel Binary Adder, BCD adder, Encoder, Decoder, Multiplexer (MUX), Demultiplexer, Parity generator, Magnitude Comparator, Code converters.

UNIT- III

Programmable Logic Devices

Basic Structures of PROM, PLA, PAL, Realization of switching functions using PROM, PLA and PAL.

Sequential Logic Circuits-I

Classification of sequential circuits, Basic flip-flops (Truth tables and excitation tables), MS JK flip-flop, Race Around Condition, Conversion from one flip-flop to another flip-flop.

UNIT- IV

Sequential Logic Circuits II

Design of ripple counters, Design of synchronous counters, Registers, Shift register, Bidirectional Shift register, Universal shift register.

Synchronous Sequential Machines

State reduction and State assignment, Partitioning method, Mealy and Moore models, Design procedures, Design and realization of circuits using various Flip-flops.

Text Books:

1. Switching Theory & Logic Design by A. Anand Kumar,PHI,3rd Edition.

2. Digital Design, Morris Mano, PHI, 3rd Edition, 2001.
3. Switching and Finite Automata theory, Zvi Kohavi and Niraj k Jha, Cambridge University Press, 3rd edition, 2010
4.
5.
6.

References:

1. Fundamentals of Logic Design, Charles H. Roth, Thomson Publications, 5th Edition, 2009.
2. Modern Digital Electronics by R.P. Jain, Mcgraw Hill, 3rd edition.
3.
4.
5.
6.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction to Digital Electronics	
1	2	Introduction to Number Systems	
1	3	Binary, Octal, Decimal, Hexadecimal Number Systems	
2	5	Conversion of Numbers from One Radix to another Radix	
2	7	r's Complements and (r-1)'s Complements	
2	9	Signed Binary Numbers, problem solving	
1	10	4-bit codes, BCD, EXCESS-3	
1	11	2421,84-2-1,9's compliment code, Gray code	
1	12	Error detection and correction codes	
2	14	Parity checking, even parity, odd parity, Hamming code	
1	15	Fundamental Postulates of Boolean algebra	
1	16	Basic theorems and properties	
1	17	Basic logic operations-NOT, OR, AND	
1	18	Universal building blocks ,EX-OR, EX-NOR Gates	
2	20	Standard SOP and POS forms	
2	22	NAND-NAND and NOR-NOR realizations.	
4	26	Minimization of switching functions using K-Map up to 5-variables	
2	28	Tabulation minimization	
1	29	Design of Half adder, full adder, half subtractor, full subtractor	
1	30	Applications of full adders, 4-bit binary subtractor, adder-subtractor circuit	
1	31	BCD adder circuit, Excess3 adder circuit	
1	32	Design of Carry look-a-head adder circuit	
2	34	Design of decoder, 7 segment decoder	
2	36	Design of encoder, priority encoder	
2	38	Demultiplexer, higher order demultiplexing	
2	40	Multiplexer, higher order multiplexing,	
1	41	Realization of Boolean functions using decoders and multiplexers	

1	42	4-bit digital comparator.	
2	44	Code converters	
1	45	Basics Structures PROM, PAL, PLA	
2	47	Realization of Switching Functions using PROM, PAL, PLA	
1	48	Merits and Demerits of PROM,PLA,PAL Comparison	
1	49	Classification of sequential circuits	
1	50	Basic flip-flops, NAND RS latch, NOR RS latch	
2	52	Nand RS latch, nor RS latch, RS flip-flop,JK flip-flop, T flip-flop, D Flip- Flop	
2	54	Conversion from one flip-flop to another flip-flop	
1	55	MS JK Flip-Flop	
1	56	Race around Conditions	
1	57	Classification of Counters	
1	58	Design of ripple counters	
2	60	Design of synchronous counters	
1	61	Johnson counter, ring counter	
1	62	Design of Control Buffer register	
1	63	Shift register, bi-directional shift register	
1	64	Universal shift register.	
1	65	State Reduction and State Assignment	
2	67	Partitioning Method	
1	68	Melay to Moore conversion and vice-versa.	
2	70	Design of Realization of circuits using various flip-flops	

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NRIIT/7.5.1/RC 04

LESSON PLAN

Department	: EEE	Year/Semester	: IV/1
Name of Faculty	: I. Prasanna Kumar	Designation	: Assistant Professor
Subject	: Power system operation and control	Total Hours	: 60
Regulation	: R16	Academic Year	: 2020-21

Lecture No	Topic Covered	No. of hours Required	Cumulative Hours
	UNIT – I ECONOMIC OPERATION OF POWER SYSTEMS		
1	Optimal operation of generators in Thermal Power Stations	1	1
2	Heat rate – cost curve	1	2
3	Incremental fuel and production costs	1	3
4	Input – output characteristics	1	4
5	Optimum allocation with the losses neglected	2	6
6	Problems solving	1	7
7	Optimum generation allocation including effect of Transmission losses	2	9
8	Loss coefficients	1	10
9	General Transmission loss formula	2	12
10	Problems solving	2	14
11	Tutorial classes	1	15
	UNIT – II HYDRO THERMAL SCHEDULING		
12	Optimal scheduling of Hydrothermal system	2	17
13	Hydroelectric power plant models	2	19
14	Scheduling problems	1	20
15	Short term hydrothermal scheduling problem	2	22
16	Tutorial classes	1	23
	UNIT – III UNIT COMMITMENT		
17	Optimal Unit Commitment Problem	1	24
18	Need For unit Commitment	1	25
19	Constraints in Unit commitment	2	27
20	Cost Function Formulation	1	28
21	Solution Methods	1	29
22	Dynamic programming	1	30
23	Tutorial classes	1	31

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	UNIT – IV LOAD FREQUENCY CONTROL		
23	Transfer function	1	32
24	Modeling of Hydro Turbine	1	33
25	Necessity of keeping frequency constant	1	34
26	Definition of control area – single area control	1	35
27	Block diagram representation of an isolated power system	1	36
28	Steady state analysis	1	37
29	Dynamic response	1	38
30	Tie line bias control	1	39
31	Load frequency control of two area system	2	41
32	Tutorial classes	1	42
	UNIT – V LOAD FREQUENCY CONTROLLERS		
33	Proportional plus integral control of single area and its block diagram representation	2	44
34	Steady state response	2	46
35	Load frequency control & economic dispatch control	2	48
36	Problems solving	2	50
37	Tutorial classes	1	51
	UNIT – VI REACTIVE POWER CONTROL		
36	Overview of reactive power control – reactive compensation in Transmission systems	2	53
37	Advantages and disadvantages of different types of compensating equipment for transmission systems	1	54
38	Load compensation	1	55
39	Specific of load compensator	1	56
40	Uncompensated and compensated Transmission lines	2	58
41	Shunt and series compensation	2	60
42	Introduction to Facts	2	62
43	Problems solving	1	63
44	Tutorial classes	1	64

TEXTBOOKS:

1. Switching theory and logic design by Hill and Peterson Mc-Graw Hill MH edition
2. Modern Digital Electronics by RP Jain, TMH.
3. Fundamentals of Digital Circuits by Ananda Kumar, BEE Edition.

Reference Books:

1. Digital design by Mano 2nd edition PHI.
2. Microelectronics by Millman MH edition.
3. Fundamentals of Logic Design by Charles H.Roth Jr, Jaico Publishers.

Signature of Faculty

Signature of HOD

Head of the Department
Electrical & Electronics Engineering
NRI Institute of Technology

NRI INSTITUTE OF TECHNOLOGY

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Department of Electrical & Electronics Engineering

NRIIT/7.5.1/RC 04

LESSON PLAN

Department : **EEE** Year/Semester : **IV/I**
Name of Faculty : **K. SRAVAN SAI KUMAR** Designation : **Assistant Professor**
Subject : **SWITCH GEAR & PROTECTION** Total Hours : **66**
Regulation : **R16** Academic Year: **2020-21**

Lecture No.	Topic Covered	No. of Periods	Cumulative Periods
	UNIT-I CIRCUIT BREAKERS		
1.1	Introduction	1	1
1.2	Faults	1	2
1.3	Phenomenon of Arc, Interruption Methods, problems	4	6
1.4	Types of circuit Breakers	5	11
1.5	Circuit Breakers Ratings & Specifications	2	13
1.6	Comparisons of CB's, Auto Reclosures	1	14
	UNIT-II ELECTROMAGNETIC PROTECTION		
2.1	Introduction	1	15
2.2	Operation of Different types of Relays-Construction	3	18
2.3	Operation of Different types of Relays-Depending on Time	1	19
2.4	Operation of Different types of Relays-Depending on Distance	3	22
2.5	Comparisons	1	23
	UNIT-III GENERATOR & TRANSFORMER PROTECTION		
3.1	Introduction	1	24
3.2	Generator Faults	1	25
3.3	Stator and Rotor Faults	3	28
3.4	Abnormal Conditions	1	29
3.5	Problems	1	30
3.6	Differential Protection	2	32
3.7	Buccholz Relay & Problems	2	34
	UNIT-IV FEEDER & BUSBAR PROTECTION		
4.1	Introduction	1	35
4.2	Protection of Lines	1	36
4.3	Over current & Carrier Current Relays	2	38
4.4	Three Zone Protection Relays	2	40
4.5	Protection of Busbars	2	42
4.6	Problems	1	43

TEXT BOOKS:

1. Power System Protection and Switchgear by Badari Ram and D.N Viswakarma, TMH Publications.
2. Power system protection- Static Relays with microprocessor applications, by T.S.MadhavaRao,TMH

REFERENCE BOOKS:

1.Fundamentals of Power System Protection by Paithankar and S.R.Bhide.,PHI, 2003.
2. Art & Science of Protective Relaying – by C R Mason, Wiley Eastern Ltd.
3. Protection and SwitchGear by BhaveshBhalja, R.P. Maheshwari, NileshG.Chothani, Oxford University Press, 2013

Signature of Faculty **Signature of H.O.D**

Head of the Department
Electrical & Electronics Engineering
NRI Institute of Technology

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Department of Electrical & Electronics Engineering

NRIIT/7.5.1/RC 04

LESSON PLAN

Year	**: IV-I Semester**	**Branch : EEE**	
Name of Faculty	**: B.EEDUKONDALU**	**Designation**	**: Asst. Professor**
Subject	**: Instrumentation**	**Total classes**	**: 62**
Regulation	**: R16**	**Year: 2020-2021**	

Lecture No	Name of the Topic	No. of hours Required	Cumulative Hours
	UNIT-I SIGNALS AND THEIR REPRESENTATION		
1.1	Measuring Systems	2	2
1.2	Performance Characteristics, - Static characteristics, Dynamic Characteristics	2	4
1.3	Errors in Measurement – Gross Errors, Systematic Errors, Statistical Analysis of Random Errors.	2	6
1.4	Tutorials	1	7
1.5	Standard Test signal	2	9
1.6	Periodic, a periodic signal	1	10
1.7	Modulated signal, sampled data, pulse modulation and pulse code modulation	2	12
1.8	Tutorials	1	13
	UNIT-II TRANSDUCERS		
2.1	Definition of transducers, Classification of transducers,	2	15
2.2	Advantages of Electrical transducers, Characteristics and choice of transducers	1	16
2.3	Principle operation of resistor, inductor, LVDT and capacitor transducers;	2	18
2.4	Principle operation of LVDT &LVDT Applications,	2	20
2.5	Strain gauge and its principle of operation, guage factor,	1	21
2.6	Thermistors, Thermocouples	1	22
2.7	Synchros, Piezo electric transducers	2	24
2.8	Photovoltaic, photo conductive cells, photo diodes.	2	26
2.9	Tutorials	1	27
	UNIT – III MEASUREMENT OF NON ELECTRICAL QUANTITIES		
3.1	Measurement of strain, Gauge Sensitivity,	1	28
3.2	Measurement of Displacement, Velocity, Angular Velocity,	2	29
3.3	Measurement of Acceleration, Force,	2	30
3.4	Measurement of Torque.	1	31
3.5	Measurement of Temperature,	1	32

3.6	Measurement of Pressure, Vacuum,	1	34
3.7	Measurement of Flow, Liquid level.	1	35
3.8	Tutorials	1	36
UNIT-IV DIGITAL VOLTMETERS			
4.1	Successive approximation type DVM	2	38
4.2	Ramp type DVM	1	39
4.3	Dual-Slope integration continuos balance ty npe DVM	1	40
4.4	Micro processor based ramp type DVM	1	41
4.5	Digital frequency meter-digital phase angle meter	2	43
4.6	Tutorials	1	44
UNIT-V OSCILLOSCOPE			
5.1	Cathode ray oscilloscope	1	45
5.2	Cathode ray tube	2	47
5.3	Time base generator-horizontal and vertical amplifiers	2	50
5.4	CRO probes& applications of CRO	1	51
5.5	Measurement of phase and frequency-lissajous patterns	2	52
5.6	Sampling oscilloscope-analog and digital type data loger	1	53
5.7	Transient recorder	1	54
UNIT-VI SIGNAL ANALYZERS			
6.1	Frequency selective analyzers,	1	55
6.2	Heterodyne Application of Wave analyzers	1	56
6.3	Harmonic Analyzers, Total Harmonic distortion	1	57
6.4	spectrum analyzers,	1	58
6.5	Basic spectrum analyzers, spectral displays,	2	59
6.6	Vector impedance meter, Q meter.	1	60
6.7	Peak reading and RMS voltmeters	1	61
6.8	Tutorials	1	62

TEXT BOOKS

1. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India
2. A course in Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpatrai & Co.

REFERENCE BOOKS:

1. Electronic Instrumentation-by H.S.Kalsi Tata MCGraw-Hill Edition, 1995.
2. Modern Electronic Instrumentation and Measurement techniques – by A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.

Signature of Faculty

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Department of Electrical & Electronics Engineering

NRIIT/7.5.1/RC 04

LESSON PLAN

Year	**: IV-I Semester**	**Branch**	**: EEE**
Name of Faculty	**: S. RAMYAKA**	**Designation**	**: Asst. Professor**
Subject	**: Utilization of Electrical Energy**	**Total classes**	**: 69**
Regulation	**: R16**	**Year**	**: 2020-2021**

Lecture No	Topic Covered	No. of Classes required	Cumulative periods
	UNIT – I ELECTRIC DRIVES		
1.1	Introduction	1	1
1.2	Type of electric drives	2	3
1.3	Choice of motor	2	5
1.4	Starting and running characteristics	1	6
1.5	Speed control	2	8
1.6	Temperature rise , particular applications of electric drives	1	9
1.7	Types of industrial loads	1	10
1.8	Continuous, intermittent and variable loads, load equalization.	2	12
	UNIT – II ELECTRIC HEATING & ELECTRIC WELDING		
2.1	Advantages and methods of electric heating	2	14
2.2	Resistance heating	2	16
2.3	Induction heating	2	18
2.4	Dielectric heating	2	20
2.5	Electric welding	2	22
2.6	Resistance and arc welding	2	24
2.7	Electric welding equipment	2	26
2.8	Comparison between A.C. and D.C. Welding	1	27
	UNIT – III ILLUMINATION FUNDAMENTALS		
3.1	Introduction	1	28

3.2	terms used in illumination	1	29
3.3	laws of illumination	2	31
3.4	polar curves	1	32
3.5	Lux meter	2	34
3.6	integrating sphere, sources of light	2	36
UNIT – IV VARIOUS ILLUMINATION METHODS			
4.1	Discharge lamps	1	37
4.2	MV and SV lamps	2	39
4.3	comparison between tungsten filament lamps and fluorescent tubes	2	41
4.4	Basic principles of light control	2	43
4.5	Types and design of lighting	2	45
4.6	Flood lighting and LED lighting	2	47
UNIT – V ELECTRIC TRACTION – I			
5.1	System of electric traction and track electrification	2	49
5.2	Review of existing electric traction systems in India	3	52
5.3	Special features of traction motor	3	55
5.4	Mechanics of train movement	2	57
5.5	Speed-time curves for different services	2	59
5.6	Trapezoidal speed time curves	2	61
5.7	Quadrilateral speed time curves	1	62
UNIT – VI ELECTRIC TRACTION – II			
7.1	Calculations of tractate effort, power, specific energy consumption for given run	2	64
7.2	Methods of electric braking-plugging rheostatic braking and Regenerative braking.	2	66
7.3	Adhesive weight and braking retardation	1	67
7.4	Adhesive weight and coefficient of adhesion.	1	68
7.5	Principles of Energy efficient motors	1	69

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Electrical & Electronics Engineering
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NRIIT/7.5.1/RC 04

LESSON PLAN

Department	: EEE	Year/Semester	: IV/I
Name of Faculty	: Mr. L. V. Mahesh Babu	Designation	: Assistant professor
Subject	: ELECTRICAL DISTRIBUTION SYSTEMS	Total Hours	: 64
Regulation	: R16	Academic Year	: 2020-21

S.No.	Topic	No. of Classes	No. of Cumulative Classes
	UNIT-I General Concepts		
1.1	Introduction	1	1
1.2	Basic Definitions	1	2
1.3	Relation B/W Load & Loss Factors	2	4
1.4	Types of Loads	1	5
1.5	Load Characteristics	1	6
1.6	Load curve & Load Duration Curve	1	7
1.7	Load Modelling & Forecasting	1	8
1.8	Problems	1	9
	UNIT-II Substations & Distribution Feeders		
2.1	Introduction, Distribution Feeder	1	10
2.2	Types of Feeders	3	13
2.3	Design Considerations of Feeders	1	14
2.4	Voltage Levels of Feeders	1	15
2.5	Secondary Distribution Systems	1	16
2.6	Problems	1	17
2.7	Location of Substations	2	19
2.8	Types of substations	1	20
2.9	Benefits derived through optimal location	1	21
2.10	Rating of Substations	1	22
2.11	Service area within primary feeders	2	24
2.12	Problems	1	25
	UNIT-III System Analysis		
3.1	Introduction	1	26
3.2	Voltage drop calculations in lines	1	27
3.3	Power loss in lines	1	28
3.4	Solution for radial network	1	29
3.5	Manual method	1	30
3.6	Three phase balanced primary lines calculations	1	31
3.7	Problems	1	32
	UNIT-IV: Protection & Coordination		
4.1	Introduction	1	33
4.2	Objectives of distribution system protection	1	34
4.3	Types of common faults	2	36
4.4	Procedure for fault calculations	2	38
4.5	Protective Devices, Principle of operation of Fuses	2	40
4.6	Circuit Reclosures	1	41

4.7	line sectionalizers	1	42
4.8	circuit breakers	1	43
4.9	Coordination Procedure	1	44
4.10	Types of Coordination	2	46
4.11	Residual Current Circuit Breaker	1	47
UNIT-V Compensation of P.F Improvement			
5.1	Introduction	1	48
5.2	Different types of Power Capacitors, Their Effects	2	50
5.3	Power factor correction	1	51
5.4	Capacitor Allocation, Procedure for capacitor location	2	53
5.5	Economic Justification	1	54
5.6	Problems	2	56
UNIT-VI Voltage Control			
6.1	Introduction	1	57
6.2	Equipments for Voltage Control	3	60
6.3	Effect of series capacitors	1	61
6.4	Effect of AVB/AVR	2	63
6.5	Line drop Compensation	1	64

Text Books:

1. Electrical Power Distribution System Engineering-by Turan Gonen

Reference Books:

1. Electrical Power Distribution Systems by V.Kamaraju, Right Publishers

Faculty

Head of the Department

Head of the Department
Electrical & Electronics Engineering
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING (EEE)

LESSON PLAN NRIIT/7.5.1 RC 04

Department : **EEE**
Name of Faculty: **R. RAGHUNADHA SASTRY**
Subject : **SEM**
Regulation : **R16**

Year/Semester : **IV/I**
Designation : **Associate Professor**
Total Hours : **63**
Academic Year : **2020-21**

Lecture No	Topic Covered	No. of Classes required	Cumulative number of periods
UNIT – I: Permanent magnet materials and PMDC motors			
1.1	Introduction-classification of permanent magnet materials used in electrical machines	2	2
1.2	Minor hysteresis loop and recoil line	1	3
1.3	Stator frames of conventional dc machines	1	4
1.4	Development of electronically commutated dc motor from conventional dc motor	1	5
1.5	Permanent-magnet materials and characteristics	1	6
1.6	B-H loop and demagnetization characteristics	1	7
1.7	Temperature effects: reversible and irreversible losses	2	9
1.8	high temperature effects, reversible losses	1	10
1.9	Irreversible losses recoverable by magnetization	1	11
1.10	Mechanical properties, handling and magnetization	1	12
1.11	Application of permanent magnets in motors	1	13
1.12	Power density-operating temperature range-severity of operation duty.	1	14
UNIT – II: Stepper Motors			
2.1	Classification of a Stepper Motor- Hybrid and Variable Reluctance Motor (VRM)	2	16
2.2	Construction and principle of hybrid type synchronous stepper motor	2	18
2.3	Different configuration for switching the phase windings control circuits for stepper motors	1	19
2.4	Open loop and closed loop control of 2-phase hybrid stepping motor	2	21
2.5	Construction and principle of operation of Variable Reluctance Motor (VRM)	1	22
2.6	Single stack and multiple stack	2	24
2.7	Open loop control of 3- phase VR Stepper Motor-Applications	2	26
UNIT – III: Switched Reluctance Motors			
3.1	Construction	1	27
3.2	Comparison of conventional and switched reluctance motors	2	29
3.3	Design of stator and rotor pole arcs	2	31

3.4	Torque producing principle and torque expression	2	33
3.5	Different converter configurations for SRM	2	35
3.6	Drive and power circuits for SRM	1	36
3.7	Position sensing of rotor – Applications of SRM.	2	38
UNIT – IV: Square Wave Permanent Magnet Brushless DC Motor			
4.1	Types of constructions	2	40
4.2	Surface mounted and interior type permanent magnet	1	41
4.3	Principle of operation of BLDC motor	1	42
4.3	Torque and EMF equations	1	43
4.4	Torque speed characteristics, Performance and efficiency	1	44
4.5	Square wave brushless motors with 120^0 and 180^0 magnetic areas commutation.	2	46
UNIT – V: Sine wave Permanent Magnet Brushless Motor			
5.1	Torque and EMF equations	2	48
5.2	Phasor Diagram	1	49
5.3	Circle diagram	2	51
5.4	Torque/speed characteristics	2	53
5.5	Comparison between square wave and sine wave permanent magnet motors	2	55
5.6	Applications	1	56
UNIT – VI: Linear Induction Motors (LIM)			
6.1	Construction– principle of operation	1	57
6.2	Double sided LIM from rotating type Induction Motor	2	59
6.3	Schematic of LIM drive for traction	1	60
6.4	Development of one sided LIM with back iron	2	62
6.5	Equivalent circuit of LIM.	1	63

TEXT BOOKS:

1. Special Electrical Machines, K. Venkata Ratnam, University Press, 2009, New Delhi.
2. Brushless Permanent magnet & reluctance motor drives, clarenden press, T. J. E. Miller, 1989, Oxford.
3. Special electrical machines, E.G. Janardhanan, PHI learning private limited, 2014.

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NRIIT/7.5.1/RC 04

LESSON PLAN

Department	: EEE	Year/Semester	: IV/II
Name of Faculty	: B.EEDUKONDALU	Designation	: Assistant Professor
Subject	: DIGITAL CONTROL SYSTEMS	Total Hours	: 72
Regulation	: R16	Academic Year	: 2020-21

Lecture No	Topic Covered	No. of Classes required	Cumulative periods
UNIT – I INTRODUCTION AND SIGNAL PROCESSING			
1.1	Introduction to analog and digital control systems	1	1
1.2	Advantages of digital systems	1	2
1.3	Types of examples	1	3
1.4	Signals and processing	1	4
1.5	Sample and hold devices	1	5
1.6	Introduction, sampling theorem	1	6
1.7	Digital to Analog conversion	1	7
1.8	Analog to Digital conversion	1	8
1.9	Data reconstruction	1	9
2.0	Frequency domain characteristics of zero order hold	1	10
2.1	Tutorial	1	11
UNIT – II INTRODUCTION TO Z-TRANSFORMS			
2.1	Z-Transform and theorems,	2	13
2.2	finding inverse and method for solving difference equations	2	15
2.3	Problems on z-Transform and inverse z-transforms	3	18
2.4	Pulse transforms function	1	19
2.5	block diagram analysis of sampled – data systems	1	20
2.6	Finding open loop and closed loop responses	2	22
2.7	Mapping between s-plane and z-plane.	2	24
2.8	Tutorial	1	25
UNIT – III STATE SPACE ANALYSIS AND THE CONTROLLABILITY AND OBSERVABILITY			
3.1	State Space Representation of discrete time systems	1	26
3.2	Pulse Transfer Function Matrix	1	27
3.3	solving discrete time state space equations	2	29
3.4	State transition matrix and it's Properties, problems	2	31
3.5	Methods for Computation of State Transition Matrix	3	34
3.6	Discretization of continuous time state – space equations	2	36
3.7	Concepts of Controllability and Observability	2	38
3.8	Tests for controllability and Observability	2	40
3.9	Duality between Controllability and Observability	1	41
3.10	Controllability and Observability problems	2	43
3.11	conditions for Pulse Transfer Function	1	44
3.12	Tutorial	1	45
UNIT –IV STABILITY ANALYSIS			
4.1	Mapping between the S-Plane and the Z-Plane	2	47

TEXT BOOKS:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition

REFERENCE BOOKS:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control and State Variable Methods by M.Gopal, TMH

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NRIIT/7.5.1/RC 04

LESSON PLAN

Department	: EEE	Year/Semester	: IV/II
Name of Faculty	: Dr. N. SAMBASIVA RAO	Designation	: Professor & Head
Subject	: POWER SYSTEM REFORMS	Total Hours	: 64
Regulation	: R16	Academic Year	: 2020-21

S.No	Topic	No. of Classes	No. of Cumulative
	UNIT-I : Over view of key issues in electric utilities		
1.1	Introduction	1	1
1.2	Restructuring models	1	2
1.3	Independent system operator	1	3
1.4	Power Exchange	2	5
1.5	Market operations	1	6
1.6	Market Power	1	7
1.7	Standard cost, Transmission Pricing	1	8
1.8	Congestion Pricing	1	9
1.9	Management of Interzonal/Intra zonal Congestion.	2	11
1.10	Tutorial	1	12
	UNIT-II OASIS: Open Access Same–Time Information System		
2.1	Structure of OASIS	2	14
2.2	Processing of Information	1	15
2.3	Transfer capability onOASIS	1	16
2.4	Definitions Transfer Capability Issues	1	17
2.5	ATC – TTC	1	18
2.6	TRM –CBM calculations	1	19
2.7	Methodologies to calculate ATC.	1	20
2.8	Problems	1	21
2.9	Tutorial	1	22
	UNIT-III: Congestion Management		
3.1	Introduction	1	23
3.2	congestion management	1	24
3.3	Response of Series R-C Circuit & Problems	1	25
3.4	Methods to relieve congestion	2	27
3.5	Tutorial		28
	UNIT-IV: Electricity Pricing		
4.1	Introduction	1	29
4.2	Electricity price volatility	2	31
4.3	electricity price indexes	4	35
4.4	Challenges to electricity pricing	1	36
4.5	Construction of forward price curves	2	38
4.6	Short-time price forecasting	2	40
4.7	Tutorial		41
	UNIT-V : Power system operation in competitive environment		
5.1	Introduction	1	42
5.2	Operational planning activities of ISO	1	43
5.3	Introduction to pool markets	2	45
5.4	The ISO in pool markets	2	47
5.5	The ISO in bilateral markets	2	49
5.6	Operational planning activities of a Genco.	2	51

5.7	Tutorial	2	53
	UNIT-VI :Ancillary Services Management		
6.1	Introduction	1	54
6.2	Reactive power as an ancillary service	2	56
6.3	A Review on Reactive power as an ancillary service	3	59
6.4	Synchronous generators as ancillary service providers	3	62
6.5	Tutorial	2	64

TEXT BOOKS:

1. Loi Lei Lai; "Power system Restructuring and Deregulation", Jhon Wiley & Sons Ltd., England.
2. Kankar Bhattacharya, Math H.J. Boller, Jaap E.Daalder, 'Operation of Restructured Power System' Klum,er Academic Publisher – 2001.
3. Mohammad Shahidehpour, and Muwaffaq alomoush, –"Restructured electrical Power systems" Marcel Dekker, Inc. 2001

Head Of the Department

Head of the Department
Electrical & Electronics Engineering
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Course Handout
(Including Teaching Plan & Realization)

NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2019-20**
Branch: EEE	**Year & Semester: IV-II**
Name of the Course: HVDC Transmission	**Regulation: R16**
Course Area/Module: Electrical Circuits	**No. of students registered: 49**
Course Coordinator: R. Raghunadha Sastry **Designation: Associate Professor**	**Course Instructors:** 1. R. Raghunadha Sastry 2. K. Venkata Kishore
No. of Lecture Hours per week: 05	**No. of Tutorial Hours per week: 01**
Credits: 03	

COURSE OBJECTIVES:

Students will be able to:

1. Understand basic concepts of HVDC Transmission
2. Analyze the converter configuration
3. Know the control of converter and HVDC Transmission.
4. Understand the significance of reactive power control and AC/DC Load flow.
5. Know different converter faults, protection and effect of harmonics.
6. Learn Low pass and high pass filters.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Learn different types of HVDC Levels and basic concepts.
2. Know the operation of converters.
3. Control the converter and HVDC Transmission.
4. Acquire concept of reactive power control and AC/DC Load flow.
5. Understand converter faults, protection and harmonic effects.
6. Design Low pass and High Pass Filters,

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Power Electronics
2	Power Systems
3	Electric Circuits

COURSE DESCRIPTION:

This subject deals with the importance of HVDC transmission, analysis of HVDC converters, Faults and protections, Harmonics and Filters. It also deals with Reactive power control and Power factor improvements of the system during transmission of power over longer distances.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	30	80-20
Mid Examination - II	90	30	80-20
Online Quiz Examination - I	20	20	80-20
Online Quiz Examination - I	20	20	80-20
Assignments	-	05	
Semester End Examination	180	70	

COURSE CONTENT (Syllabus):

UNIT I
Basic Concepts: Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC &DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.
UNIT II
Analysis of HVDC Converters: Choice of converter configuration – analysis of Graetz – characteristics of 6 pulse & 12 pulse converters –Cases of two 3 phase converters in star –star mode – their performance.
UNIT III
Converter & HVDC System Control: Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system - Starting and stopping of DC link - Power Control.
UNIT IV
Reactive Power Control in HVDC: Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies sources of reactive power-AC Filters – shunt capacitors-synchronous condensers. **Power Flow Analysis In AC/DC Systems:** Modelling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC loadflow –solution of AC-DC Power flow-Simultaneous method-Sequential method.
UNIT V
Converter Fault & Protection: Converter faults – protection against over current and over voltage in converter station – surge arresters –smoothing reactors – DC breakers –Audible noise-space charge field-corona effects on DC lines-Radio interference. **Harmonics**: Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non-Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics.
UNIT VI
Filters: Types of AC filters, Design of Single tuned filters –Design of High pass filters.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
		UNIT-I			
2	2	Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links			
2	4	Apparatus required for HVDC Systems			
2	6	Comparison of AC &DC transmission			
2	8	Application of DC Transmission System			
2	10	Planning & Modern trends in DC transmission.			
		UNIT-II			
2	12	Choice of Converter configuration			
2	14	Analysis of Graetz			
2	16	Characteristics of 6 Pulse & 12 Pulse converters			
2	18	Cases of two 3 phase converters in star – Star mode and their performance			
		UNIT-III			
2	20	Principle of DC Link Control			
2	22	Converters Control Characteristics			
2	24	Firing angle control			
2	26	Current and extinction angle control			
2	28	Effect of source inductance on the system			
2	30	Starting and stopping of DC link - Power Control			
		UNIT-IV			
2	32	Reactive Power Requirements in steady state			
3	35	Conventional control Strategies			
3	38	Alternate control strategies sources of reactive power			
2	40	AC Filters, Shunt capacitors, Synchronous condensers.			
2	42	Power Flow Analysis In AC/DC Systems - Modeling of DC Links-			
3	45	DC Network-DC Converter-Controller Equations			
2	47	Solution of DC load flow			
2	49	solution of AC-DC Power flow			

Text Books:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar,New Age International (P) Limited, and Publishers.
2. HVDC Transmission by S.Kamakshaiah andV.Kamaraju-Tata McGraw-Hill

References:

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications.

PEDAGOGICAL APPROACH:

1. Black Board
2. Chalk and Talk
3. PPT
4. Role Play
5. Quiz

2	51	Simultaneous method			
2	53	Sequential method			
UNIT-V					
1	54	Converter faults			
2	56	protection against over current and over voltage in converter station			
2	58	surge arresters –smoothing reactors			
1	59	DC breakers			
2	61	Audible noise-space charge field-corona effects on DC lines-Radio interference			
1	62	**Harmonics:**Generation of Harmonics			
1	63	Characteristics harmonics			
1	64	Calculation of AC Harmonics			
1	65	Non–Characteristics harmonics			
1	66	Adverse effects of harmonics			
1	67	Calculation of voltage & current harmonics			
1	68	Effect of Pulse number on Harmonics			
UNIT-VI					
1	69	Types of AC filters			
2	71	Design of Single tuned filters – Design of High pass filters.			

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3								2	
CO2	3	2	3								2	
CO3	3	2									2	
CO4	3	2	3									
CO5	3	2										
CO6	3	2	2									2
Total	18	12	11								6	2
Avg.	3	2	3								2	1

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1,2,3,11	PSO1,2
CO2	PO1,2,3,11	PSO1
CO3	PO1,2,11	PSO1
CO4	PO1,2,3	PSO1,2
CO5	PO1,2	PSO1,2
CO6	PO1,2,3,12	PSO1,2

Signature of Course Instructor(s)

Signature of Course Coordinator

Signature of Program Coordinator

Signature of Head of the Department

Head of the Department,
Electrical & Electronics Engineering
NRI Institute of Technology

NRI INSTITUTE OF TECHNOLOGY

(Approved by AICTE, New Delhi :: Affiliated to JNTUK, Kakinada)
POTHAVARAPPADU (V), (via) Nunna, Agiripalli (M), Krishna District, A.P., PIN : 521 212, Ph : 08656-324999
Website : nrigroupofcolleges.com e-mail : nrigroupofcolleges@gmail.com

LESSON PLAN

NRIIT/7.5.1 RC 04

Name of the Faculty : R. Raghunadha Sastry
Year/Semester : III/I
Academic Year : NRIA18

Designation: Assistant Professor
Name of the subject : EMS
Total No. of Periods : 58

Lecture No	Topic Covered	No. of Classes required	Cumulative number of periods
	UNIT – I		
1.1	Classification-Deflecting, Controlling and Damping Torques	2	2
1.2	Ammeters and Voltmeters- PMMC and MI type Instruments	1	3
1.3	Expression for deflecting torques and control torques	1	4
1.4	Errors and Compensations	1	5
1.5	Extension of range using shunts and series resistances	1	6
1.6	1- Φ and 3- Φ Dynamometer wattmeter	1	7
1.7	LPF and UPF, Expression for deflecting and controlling torques	2	9
1.8	Extension of range of wattmeter using instrument transformers	2	11
1.9	Measurement of active and reactive powers in balanced and unbalanced systems	1	12
1.10	Types of PF meters: 1-Φ and 3- Φ Dynamometer type and moving iron type instruments	1	13
1.11	1- Φ inductive type energy meter, Driving and Braking Torques	2	15
1.12	Errors and Compensations	2	17
1.13	Testing by Phantom Loading using RSS meter	2	19
1.14	3- Φ Energy meter, Trivector meter	1	20
1.15	Maximum demand meters	2	22
	UNIT – II		
2.1	CT and PT: Ratio and Phase angle errors, Design considerations	2	24
2.2	Electrical resonance type frequency meters	2	26
2.3	Weston type synchronoscope	2	28
2.4	Type of P.F meters-Single phase Electrodynamometer Power Factor meter	1	29
2.5	Saturable core Frequency meter.	1	30
2.6	Mechanical Resonance type Frequency meter, Electrical Resonance type Frequency meter	1	31
	UNIT – III		
3.1	Method of measuring low, medium and high resistance	1	32
3.2	Sensitivity of Wheatstone's Bridge	1	33
3.3	Carey Foster's Bridge, Kelvin's double bridge for measuring low resistance	2	35
3.4	Loss of charge method for high resistance	1	36
3.5	Megger-Measurement of earth resistance	1	37

3.6	Measurement of Inductance and Quality Factor	1	38
3.7	Maxwell's Bridge, Hay's Bridge, Anderson's Bridge	2	40
3.8	Owen's Bridge Measurement of Capacitance and loss angle	2	42
3.9	DesautyBridge, Wien's Bridge, Schering Bridge	3	45
	UNIT – IV		
4.1	Digital Voltmeters	2	47
4.2	Successive approximation	1	48
4.3	Ramp and Integrating Type	2	50
4.4	Digital Frequency meter	1	51
4.5	Digital Multimeter	1	52
4.6	Digital Tachometer	2	54
4.7	Digital Energy Meter	2	56
4.8	Bidirectional meters accuracy class.	2	58

TEXT BOOKS:

1. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, fifth Edition, Wheeler Publishing.
2. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.

REFERENCE BOOKS:

1. Electrical Measurements – by Buckingham and Price, Prentice – Hall
2. Electrical Measurements by Harris.
3. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age
International (P) Limited, Publishers.

SIGNATURE OF FACULTY

SIGNATURE OF HOD

Head of the Department
Electrical & Electronics Engineering
NRI Institute of Technology

NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan & Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2019-20**
Branch: EEE	**Year & Semester: II-I**
Name of the Course: Electro Magnetic Fields	**Regulation: NRIA18**
Course Area/Module: Electrical Circuits	**No. of students registered: 66**
Course Coordinator: R. Raghunadha Sastry **Designation: Associate Professor**	**Course Instructors:** 1. R. Raghunadha Sastry 2. K. Venkata Kishore
No. of Lecture Hours per week: 05	**No. of Tutorial Hours per week: 01**
Credits: 03	

COURSE OBJECTIVES:

Students will be able to:

1. Understand the laws concerning Static Electric Fields, Equations concerned with static electric fields.
2. Explain the behavior and comparison of conductors and dielectrics.
3. Understand the laws of magnetic fields, Ampere's law and Maxwell's Equations.
4. Calculate the MFI for a current carrying wire.
5. Determine the Self and Mutual Inductance of a Solenoid and Toroid.
6. Solve the energy stored and energy density in static electric and magnetic fields, Electric Dipole, Dipole Moment.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Understand the concerned laws of Electro Statics.
2. Understanding and analyzing the behavior of conductors and dielectrics.
3. Understand the concerned laws of Magneto Statics and basic concepts of Magnetic Fields.
4. Solve the MFI for a current carrying wire.
5. Identify the need of Self and Mutual Inductance.
6. Understand the time varying fields.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Electrical Circuits
2	Engineering Mathematics
3	Engineering Physics

COURSE DESCRIPTION:

Electro Magnetic Fields mainly involves the study of the production of electric field and potentials due to different configurations of static charges, study the properties of conductors and dielectrics, calculate the capacitance of various configurations and understand the concept of conduction and convection current densities,study the magnetic fields produced by currents in different configurations, application of ampere's law and the Maxwell's second and third equations, study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops, developing the concept of self and mutual inductances and the energy stored and to study time varying and Maxwell's equations in different forms and Maxwell's fourth equation for the induced e.m.f.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	30	80-20
Mid Examination - II	90	30	80-20
Online Quiz Examination - I	20	20	80-20
Online Quiz Examination - I	20	20	80-20
Assignments	-	05	
Semester End Examination	180	60	

COURSE CONTENT (Syllabus):

UNIT I
ELECTROSTATICS -I :Review of vector calculus, Cartesian, cylindrical and spherical co-ordinate systems. Coulomb's law - Electric field due to different charge distributions - Electric flux and flux density - Gauss's Law - Applications of Gauss's Law - Divergence - Maxwell's first Law, Laplace's and Poison's equations - Solution of Laplace's equation in one variable, Electric Dipole - Dipole Moment - Potential and Electric Field due to Dipole - Torque on an Electric Dipole in an Electric field
UNIT II
CONDUCTORS AND DIELECTRICS: Behavior of conductors in an electric field, Current density - conduction and Convection current densities – Ohm's law in point form – Equation of continuity, concept of Polarization, Electric field inside dielectric material, Capacitance - Capacitance of parallel plate – Spherical - Co-axial capacitors with Composite Dielectric.
UNIT III
MAGNETOSTATICS :Static magnetic fields - Biot-Savart's law -Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation,

div(B)=0. Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc.
UNIT IV
INDUCTANCE AND TIME VARYING FIELDS: Self and Mutual inductance – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field. **TIME VARYING FIELDS** :Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-∂B/∂t – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem

Text Books:

1. "Engineering Electromagnetics" by William H. Hayt& John. A. Buck Mc. Graw-Hill Companies, 7th Editon.2006.
2. Electro Magnetic Fields and Transmission Lines by G.S.N. Raju

References:

1. "Principles of Electro Magnetics" by Sadiku, Oxford Publications,4th edition

2."Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition

3."Electromagnetic Field Theory" by Yaduvir Singh,Pearson.

4. Fundamentals of Engineering Electromagnetics by Sunil Bhooshan, Oxford higher Education.

PEDAGOGICAL APPROACH:

1. Black Board
2. Chalk and Talk
3. PPT
4. Role Play
5. Quiz

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
		UNIT-1			
2	2	Review of vector calculus, Cartesian, cylindrical and spherical co-ordinate systems			
1	3	Coulomb's law - Electric field due to different charge distributions			
2	5	Electric flux and flux density			
2	7	Gauss's Law - Applications of Gauss's Law			
1	8	Divergence			
2	10	Maxwell's first Law, Laplace's and Poison's equations			
2	12	Solution of Laplace's equation in one variable			
1	13	Electric Dipole - Dipole Moment			
1	14	Potential and Electric Field due to Dipole			
2	16	Torque on an Electric Dipole in an Electric field			
		UNIT-II			
1	17	Behavior of conductors in an electric field			
2	19	Current density – conduction and Convection current densities			
2	21	Ohm's law in point form			
2	23	Equation of continuity			
1	24	concept of Polarization			
1	25	Electric field inside dielectric material			
2	27	Capacitance			
3	30	Capacitance of parallel plate, Spherical, Co-axial capacitors with Composite Dielectric.			
		UNIT-III			
1	31	Static magnetic fields			
1	32	Oesterd's experiment			
1	33	Biot-Savart's law			
2	35	Magnetic field intensity (MFI) – MFI due to a straight current carrying filament			
3	38	MFI due to circular, square and solenoid current Carrying wire			
2	40	Relation between magnetic flux, magnetic flux density and MFI			
2	42	Maxwell's second Equation, div(B)=0			

2	44	Ampere's circuital law			
2	46	Ampere's circuital law applications viz MFI due to an infinite sheet of current and a long current carrying filament			
2	48	Point form of Ampere's circuital law			
1	49	Maxwell's third equation, Curl (H)=Jc.			
		UNIT-IV			
1	50	Self and Mutual inductance			
2	52	determination of self-inductance of a solenoid and toroid			
2	54	determination of mutual inductance between a straight long wire and a square loop wire in the same plane			
2	56	Energy stored and density in a magnetic field			
1	57	Time varying fields			
1	58	Faraday's laws of electromagnetic induction – Its integral and point forms			
1	59	Maxwell's fourth equation, Curl (E)=-∂B/∂t			
2	61	Simple problems			
1	62	Modification of Maxwell's equations for time varying fields			
2	64	Displacement current			
2	66	Poynting Theorem			

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3	2										
CO3	3	2										
CO4	3	3										
CO5	3	2										
CO6	3	2	2	2								
Total	18	13	2	2								
Avg.	3	3	1	1								

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1,2	PSO1,2
CO2	PO1,2	PSO1
CO3	PO1,2	PSO1
CO4	PO1,2	PSO1,2
CO5	PO1,2	PSO1,2
CO6	PO1,2,3,4	PSO1,2

Signature of Course Instructor(s)

Signature of Course Coordinator

Signature of Program Coordinator

Signature of Head of the Department

Head of the Department
Electrical & Electronics Engineering
NRI Institute of Technology

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE
Designation: Assoc.Professor
Academic Year: 2020– 2021
Name of the Faculty: Mr.Narendra Babu P
Name of the subject: Compiler Design
Year / Semester: III/1

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Overview of language processing	1	1
1.2	pre-processors	1	2
1.3	compiler – assembler – interpreters	2	4
1.4	pre-processors, – linkers &loaders	2	6
1.5	structure of a compiler	2	8
1.6	Role of Lexical Analysis	2	10
1.7	Lexical Analysis Vs. Parsing	1	11
1.8	Token & Lexemes	2	13
1.9	Recognitions of tokens	1	14
	UNIT 2:		
2.1	**Top down Parsing:** Context free grammars	3	17
2.2	Backtracking	2	19
2.3	First and Follow	2	21
2.4	LL(1) Grammars	3	24
2.5	Non-Recursive predictive parsing	2	26
2.6	Error recovery in predictive parsing.	1	27
2.7	simple LR	1	28
2.8	Model of an LR Parsers	1	29
2.9	Difference between LR and LL Parsers	1	30
2.10	SLR	2	32
2.11	construction of CLR (1)	2	34
2.12	LALR Parsing tables	2	36
2.13	Dangling ELSE Ambiguity	2	38
2.14	Error recovery in LR Parsing	1	39

	UNIT-3		
3.1	Semantic analysis	1	40
3.2	SDT Schemes & evaluation of semantic rules	2	42
3.3	Intermediate code	2	44
3.4	Types and declarations & type Checking.	2	46
3.5	Runtime Environments	1	47
3.6	Stack allocation of space	2	49
3.7	Heap Management code generation	2	51
3.8	Basic blocks and Flow graphs	3	54

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Ph : 0866 – 2469666 Website : nriit.edu.in e-mail : princiapal@nriit.edu.in

3.9	A Simple Code generation	1	55
	UNIT-4		
4.1	Machine independent code optimization Techniques common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling, inter procedural optimization.	6	61
4.2	Object code forms	1	62
4.3	machine dependent code optimization	2	64
4.4	register allocation and assignment generic code generation algorithms	2	66
4.5	DAG for register allocation	2	68

TEXT BOOKS:

1. Alfred V. Aho, Ravi Sethi& Jeffrey. D. Ullman, "Compilers Principles, Techniques & Tools", Pearson Education, third edition, 2007.
2. Andrew N. Appel, "Modern Compiler Implementation in C", Cambridge University Press, 2004.

REFERENCE BOOKS:

1. John R. Levine, Tony Mason, Doug Brown, "lex&yacc", O'Reilly Media, Inc., 1992.
2. Kenneth C. Louden, Compiler Construction: Principles and Practice, Course Technology Inc; International edition, 1997

Prepared: Faculty / Date

Verified: HOD /Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: Mr.B.Venu Gopal

Designation: Assoc.Professor

Name of the subject: Compiler Design

Academic Year: 2020- 2021

Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Overview of language processing	1	1
1.2	pre-processors	1	2
1.3	compiler – assembler – interpreters	2	4
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3.7	Heap Management code generation	2	51
3.8	Basic blocks and Flow graphs	3	54

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3.9	A Simple Code generation	1	55
	UNIT-4		
4.1	Machine independent code optimization Techniques common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling, inter procedural optimization.	6	61
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REFERENCE BOOKS:

1. John R. Levine, Tony Mason, Doug Brown, "lex&yacc", O'Reilly Media, Inc., 1992.
2. Kenneth C. Louden, Compiler Construction: Principles and Practice, Course Technology Inc; International edition, 1997

18/3/21
Prepared: Faculty / Date

Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: M.Spandana

Designation: AssistantProfessor

Name of the subject: Data structures

Academic Year: 2020– 2021

Year / Semester:

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1: Data Structures, Recursion, Searching, and Sorting		
1.1	**Data Structures:** Definition, Types of Data Structures, Arrays	1	1
1.2	Structures, Self-referential structures, Operations	2	3
1.3	Algorithm analysis Time Complexity and Space Complexity.	2	5
1.4	**Recursion:** Definition, Linear and Binary recursions, Iteration vs. Recursion	2	7
1.5	**Searching:** Linear Search, Binary Search	2	9
1.6	**Sorting:** Basic concepts, Divide-and-Conquer approach, Insertion Sort	2	11
1.7	Merge Sort, Quick Sort	2	13
1.8	Heap Sort.	2	15
	UNIT 2:Linked Lists, Stacks, and Queues.		
2.1	**Linked Lists:** Introduction, Types of Linked Lists, Operations	1	16
2.2	Inserting a node in Single Linked List, Deleting a node in Single Linked List	2	18
2.3	Inserting, Deleting a node in Double Linked List.	2	20
2.4	Searching a node in Double Linked List.	1	21
2.5	**Stacks:** Introduction, Operations, Applications,	2	23
2.6	Stacks implementation using Arrays,	2	25
2.7	Stacks implementation using Linked List	1	26
2.8	Expression Conversion: Infix to Postfix,	1	27
2.9	Infix to Prefix	1	28
2.10	**Queues:** Introduction, operations, applications	2	30
2.11	Queues implementation using Arrays	1	31
2.12	Queues implementation using Linked Lists	1	31
2.13	Circular Queue	1	33
2.14	Priority Queues	1	34

	UNIT-3Trees.		
3.1	Basic Tree Concepts, Terminology, operations	2	36
3.2	Tree traversals	1	37
3.3	**Binary Trees:** definition, properties, Binary Tree representations	1	38
3.4	Operations	1	39
3.5	**Binary Search Tree:** definition, properties, applications, Inserting	2	41
3.6	Deleting, and Searching element in Binary Search Tree	2	43
3.7	**Threaded Binary Tree:** definition, properties	1	44
3.8	Inserting a Node into a Threaded Binary Tree	1	45
3.9	**Heaps:** Definition of a Max Heap, properties	2	47
	UNIT-4Graphs		
4.1	**Graphs:** Introduction, Terminology, Representation of graphs,	1	48
4.2	Types of graphs, applications	1	49
4.3	Operations, Graph transversal techniques: Breadth First Search (BFS),	1	50
4.4	Depth First Search (DFS), implementations	1	51
4.5	**Minimum Spanning Tree (MST):** definition, Prim's algorithm,	1	52
4.6	Kruskal's algorithm	2	53
4.7	**Shortest paths:** Basic Concepts, Dijsktra's algorithm	2	55

TEXT BOOKS:

1. Fundamentals of DATA STRUCTURES in C, Horowitz,SartajSahani, Susan Anderson – Freed, University Press
2.Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage

REFERENCE BOOKS

1 .Data Structures using C, 2nd Edition,by A. K. Sharma, Pearson India
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI,2009
3. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH
4. DATA STRUCTURE USING C,UditAgarwal,KATSON Books
5. Data Structures using C,ReemaThareja, Oxford

Spandana V 17/3/2021
Prepared: Faculty / Date

Verified: HOD/Date
Head, CSE Department
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: ASSISTANT PROFESSOR

Academic Year: 2020-21

Name of the Faculty: CH.SATHA KUMARI

Name of the subject: Software Engineering

Year / Semester: II/II

TOPIC	No. of Lectures	Cummulative hours
UNIT -I		
The Nature of Software, Defining Software	1	1
Software Application Domains, Legacy Software,	1	2
The Unique Nature of Web Apps, Software Engineering	1	3
The Software Process, Software Engineering Practice,	1	4
The Essence of Practice, General Principles	1	5
Software Myths ,The Software Process: Process Models,	1	6
A Generic Process Model,	1	7
Process Assessment and Improvement,	1	8
Prescriptive Process Models,	1	9
Specialized Process Model s,	1	10
The Unified Process, Personal and Team Process Models,	1	11
Process Technology, Product and Process.	1	12
What Is Agility? Agility and the Cost of Change, What Is an Agile Process?	1	13
Extreme Programming (XP)	1	14
Other Agile Process Models, A Tool Set for the Agile Process	1	15
UNIT -2		
Requirements Engineering, Establishing the Groundwork,	1	16
Eliciting Requirements, Developing Use Cases,	1	17
Building the Requirements Model	1	18
Negotiating Requirements, Validating Requirements,	1	19
Scenarios, Information and Analysis classes	1	20
Requirements Analysis, Scenario-Based Modeling,	1	21
UML Models That Supplement the Use Case	1	22
Data Modeling Concepts, Class-Based Modeling,	1	23
Flow, Behavior, Patterns, And Web apps	1	24
Requirements Modeling Strategies,	1	25
Flow-Oriented Modeling,	1	26
Creating a Behavioral Model	1	27
Patterns for Requirements Modeling,	1	28
Requirement modeling for WebApps	1	29
UNIT -3		

Design within the Context of Software Engineering the Design Model	1	30
the Design Process, Design Concepts,	1	31
Architectural Design: Software Architecture	1	32
Architectural Genres, Architectural Styles	1	33
Architectural Design, Assessing Alternative Architectural Designs.	1	34
What Is a Component? Designing Class-Based Components User,	1	35
Conducting Component Level Design,	1	36
Component level design for Web Apps.	1	37
Performing User Interface Design: The Golden Rules,	1	38
Interface Analysis and Design	1	39
Interface Design Steps.	1	40
Interface Analysis,	1	41
UNIT -4		
Software Testing Strategies: A Strategic Approach to Software Testing	1	42
Strategic Issues, Test Strategies for Conventional Software,	1	43
Test Strategies for Object-Oriented Software,	1	44
Validation testing.	1	45 46
Testing System testing	1	47
the art of debugging.	1	48 49
Testing Conventional Applications: Software Testing Fundamentals	1	50
Internal and External Views of Testing,	1	51 52
White Box Testing, Basis Path Testing,	1	53
Black-Box Testing	1	54
Model-Based Testing	1	55
Testing for Specialized Environments	1	56
Architectures, and Applications	1	57
Patterns for Software Testing	1	58

Text Books :

Roger S.Pressman, "Software Engineering- A Practitioner's Approach". Tata McGraw-Hill International 7th ed, 2010

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17/03/21

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: ASSISTANT PROFESSOR

Academic Year: 2020-21

Name of the Faculty: CH.SATHA KUMARI

Name of the subject: Software Testing Methodologies

Year / Semester: III/II

TOPIC	No. of Lectures	Cumulative hours
UNIT-I : Introduction	2	2
Purpose of Testing,	1	3
Dichotomies	1	4
Model for Testing	1	5
Consequences ofBugs	1	6
Taxonomy of Bugs	2	8
Flow graphs and Path testing: Basics Concepts of Path Testing	1	9
Predicates, Path PredicatesandAchievable Paths	1	10
Path Sensitizing	1	11
Path Instrumentation	1	12
Application of Path Testing.	1	13
Transaction Flow Testing: Transaction Flows	2	15
Transaction Flow Testing Techniques	2	17
UNIT-II		
Dataflow testing: Basics of Dataflow Testing	1	18
Strategies in Dataflow Testing	1	19
Application of Dataflow Testing.	1	20
Domain Testing: Domains and Paths	2	22
Nice & Ugly Domains	1	23
Domain testing	1	24
Domains and Interfaces Testing	1	25
Domains and Testability.	1	26
Paths, Path products and Regular expressions : Path Products & Path Expression	2	28
ReductionProcedure	1	29
Applications	2	31
Regular Expressions	1	32
Flow Anomaly Detection	1	33
UNIT-III		
Syntax Testing: Why, What and How	1	34
A Grammar for formats	1	35
Test Case Generation	2	37

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Implementation and Application	1	38
Testability Tips.	1	39
Logic Based Testing: Overview	1	40
Decision Tables	2	42
Path Expressions	2	44
KV Charts	2	46
Specifications.	1	47
UNIT-IV:		
State, State Graphs and Transition Testing: State Graphs	2	49
Good & Bad State Graphs	1	50
StateTesting	2	52
Testability Tips.	1	53
Graph Matrices and Application:-Motivational overview	1	54
matrix of graph	1	55
relations	1	56
power of a matrix	1	57
node reduction algorithm	2	59
Software Testing Tools: Introduction to Testing, Automated Testing,concepts of test automation	2	61
Introduction to list of tools like Win runner	1	62
Load Runner, Jmeter	1	63

TEXT BOOKS:

1. **SOFTWARE TESTING TECHNIQUES, Boris bizer, Dreamtech, 2nd Edition**
2. **SOFTWARE TESTING , Yogesh Singh , Camebridge**

Prepared: Faculty / Date 17/03/21

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TEACHING PLAN

Department: CSE

Designation: ASST.PROFESSOR
Academic Year: 2020– 2021

Name of the Faculty: Mr.Ch.Poorna Venkata Srinivasa Rao

Name of the subject: Design and Analysis of Algorithms
Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to Algorithms	1	1
1.2	Fundamentals of algorithmic problem solving	1	2
1.3	Analysis framework	1	3
1.4	Performance Analysis	1	4
1.5	Space complexity	1	5
1.6	Time complexity	1	6
1.7	Growth of Functions	1	7.
1.8	Asymptotic Notation	1	8
1.9	Big oh notation	1	9
1.10	Omega notation	1	10
1.11	Theta notation	1	11
1.12	little oh	1	12
1.13	Probabilistic analysis	1	13
1.14	Amortized analysis	1	14
1.15	Divide and conquer	1	15
1.16	General method	1	16
1.17	applications-Binary search	1	17
1.18	Quick sort	1	18
1.19	Merge sort	1	19
1.20	Finding the Maximum and Minimum	1	20
	UNIT 2:		
2.1	Greedy method	1	21
2.2	The General Method	1	22
2.3	Knapsack Problem	2	24
2.4	Job Sequencing with Deadlines	2	26
2.5	Minimum-cost Spanning Trees	2	28
2.6	Prim's Algorithm	1	29
2.7	Kruskal's Algorithms	1	30
2.8	Optimal Merge Patterns	2	31
2.9	Single Source Shortest Paths	2	32
	UNIT-3		
3.1	Dynamic Programming	1	33
3.2	General method	1	34
3.3	applications-Matrix chain multiplication	2	36
3.4	Optimal binary search trees	2	38

3.5	0/1knapsack problem	2	40
3.6	All pairs shortest path problem	2	42
3.7	Travelling sales person problem	2	44
3.8	Reliability design	1	45
	UNIT-4		
4.1	Backtracking		
4.2	General method	1	46
4.3	applications-n-queen problem	1	47
4.4	sum of subsets problem	2	49
4.5	graph coloring	2	51
4.6	Hamiltonian cycles	1	52
4.7	Branch and Bound	1	53
4.8	General method	1	54
4.9	applications	1	55
4.10	Travelling sales person problem	1	56
4.11	0/1 knapsack problem	2	58
4.12	LC Branch and Bound solution	2	60
4.13	FIFO Branch and Bound solution	2	62
4.14	P and NP problems	2	64
4.15	NP-Complete problems	2	66
		2	68

TEXT BOOKS:

Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekaran, University press

REFERENCE BOOKS:

1. Introduction to The Design and Analysis of Algorithms, 3rd Edition, Anany Levitin, Pearson Education, 2017.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L. Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.
4. Algorithms – Richard Johnson Baugh and Marcus Schaefer, Pearson Education.

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TEACHING PLAN

Department: CSE

Name of the Faculty: K. UdayaSri

Designation: Associate Professor

Name of the subject: Concurrent & Parallel Programming

Academic Year: 2020– 2021

Year / Semester: IV/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Concurrent programming constructs	1	1
1.2	Concurrent versus sequential programming	1	2
1.3	Race condition	1	3
1.4	Synchronization primitives	2	5
1.5	Concurrent programming constructs	1	6
1.6	Concurrent versus sequential programming	2	8
1.7	race condition	2	10
1.8		2	12
	UNIT 2:		
2.1	Interprocess communication	2	14
2.2	Livelock and deadlocks	2	16
2.3	Starvation	2	18
2.4	deadlock prevention.	2	20
2.5	Processes and threads	2	22
2.6	Issues and challenges in concurrent programming paradigm and current trends.	1	23
	UNIT-3		
3.1	Parallel algorithms	2	25
3.2	prefix sum etc.,	2	27
3.3	ranking	1	28
3.4	searching	2	30
3.5	sorting	2	32
3.6	Traversals	2	34
	UNIT-4		
4.1	Data parallel, Task parallel	2	36
4.2	GPGPU	1	37
4.3	Parallel Architectures	2	39
4.4	Parallel programming paradigms	1	40
4.5	pthreads	2	42
4.6	Shared memory and message passing	2	44
4.7	STM	1	45

	UNIT-5		
5.1	CUDA	2	47
5.2	Intel TBB	1	48
5.3	OpenCL	2	50
5.4	OpenMP	2	52
	UNIT-6		
6.5	C++AMP	1	53
6.6	Heterogeneous Computing	2	55
6.7	OpenCL	1	56
6.8	C++AMP	2	58
6.9	Algorithms	2	60

TEXT BOOKS:

1. Mordechai Ben-Ari. Principles of Concurrent and Distributed Programming, Prentice-Hall International.
2. Greg Andrews. Concurrent Programming: Principles and Practice, Addison Wesley.
3. GadiTaubenfeld. Synchronization Algorithms and Concurrent Programming, Pearson.
4. M. Ben-Ari. Principles of Concurrent Programming, Prentice Hall.
5. Fred B. Schneider. On Concurrent Programming, Springer.
6. Brinch Hansen. The Origins of Concurrent Programming: From Semaphor

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Verified: HOD/Date 16/3/2021

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NRIIT/7.5.1/RC 04

TEACHING PLAN

Department:CSE
Name of the Faculty: Dr.K.SWATHI
Designation: Professor
Name of the subject: Distributed Database Management Systems
Academic Year: 2020 – 2021
Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction of object database systems	2	2
1.2	Structured data types, operations on structured data	2	4
1.3	encapsulation and ADTS, Inheritance	2	6
1.4	Database design for ORDBMS	1	7
1.5	ORBMS implementation and challenges	2	9
1.6	OODBMS, comparison of RDBMS	1	10
1.7	OODBMS and ORDBMS	2	12
1.8	Introduction to Parallel databases	2	14
1.9	architectures for parallel databases	1	15
1.10	Parallel Query Evaluation: Data partitioning and parallelizing sequential operator evaluation code	1	16
1.11	parallelizing individual operations	2	18
1.12	parallel query optimization	1	19
	UNIT 2:		
2.1	Introduction to distributed databases	2	21
2.2	Features of distributed databases vs centralized databases	2	23
2.3	Why distributed databases	2	25
2.4	DDBMS: Levels of transparency, reference architecture for DDB	2	27
2.5	types of data fragmentation	1	28
2.6	distribution transparency for read-only and update applications	2	30
2.7	distributed database access primitives	2	31
2.8	Integrity constraints in distributed databases	2	33
	UNIT 3:		
3.1	Distributed database design: framework for distributed database design	2	35
3.2	the design of database fragmentation	2	37
3.3	allocation of fragments;	2	39
3.4	Distributed Query processing: Equivalence of transformations for queries	2	41
3.5	transforming global queries into fragment queries	2	43
3.6	distributed grouping and aggregation functions	3	46
	UNIT 4:		
4.1	A framework for query optimization	1	47
4.2	join queries and general queries	2	49

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4.3	non-join queries in a distributed DBMS	2	50
4.4	joins in a distributed DBMS	1	51
4.5	cost based query optimization	1	52
4.6	DBMS Vs IR systems	1	53
4.7	Introduction to Information retrieval	2	55
4.8	Indexing for text search	2	57
4.9	web search engine	1	58
4.10	managing text in a DBMS	1	59
4.11	a data model for XML	1	60
4.12	Querying XML data	1	61
4.13	efficient evaluation of XML queries	1	62

TEXTBOOKS:

1. Raghuramakrishnan and Johannes Gehrke, "Database Management Systems", 3rd Edition, TMH, 2006.
2. S Ceri and G Pelagatti, "Distributed databases principles and systems", 1st Edition, TMH, 2008.

REFERNCE BOOKS:

1. Silberschatz, Korth, "Database System Concepts", 6th Edition, TMH, 2010.
2. Elmasri R, Navathe S B, Somayajulu D V L N, and Gupta S K, "Fundamentals of Database Systems", 5th Edition, Pearson Education,2009.
3. C. J. Date, "Introduction to Database Systems", 8th Edition, Pearson Education, 2009.

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NRIIT/7.5.1/RC 04

TEACHING PLAN

Department: CSE
Designation: Professor
Academic Year: 2019 – 2020

Name of the Faculty: Dr.K.SWATHI
Name of the subject: Machine Learning
Year / Semester: IV/ II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**The ingredients of machine learning, Tasks:** The problems that can be solved with machine learning	2	2
1.2	Models: the output of machine learning	2	4
1.3	Features, the workhorses of machine learning.	2	6
1.4	**Binary classification and related tasks:** Classification	1	7
1.5	Scoring and ranking	2	9
1.6	Class probability estimation	1	10
	UNIT 2:		
2.1	**Beyond binary classification:** Handling more than two classes	2	12
2.2	Regression	2	14
2.3	Unsupervised and descriptive learning	2	16
2.4	**Concept learning**: The hypothesis space,	2	17
2.5	Paths through the hypothesis space	2	19
2.6	Beyond conjunctive concepts	2	21
	UNIT 3:		
3.1	**Tree models:** Decision trees	1	22
3.2	Ranking and probability estimation trees	2	24
3.3	Tree learning as variance reduction	2	26
3.4	**Rule models:** Learning ordered rule lists	1	27
3.5	Learning unordered rule sets	2	29
3.6	Descriptive rule learning, First-order rule learning	2	31
	UNIT-4		
4.1	**Linear models:** The least-squares method	2	33
4.2	The perceptron: a heuristic learning algorithm for linear classifiers	2	35
4.3	Support vector machines	2	37
4.4	Obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods	1	38
4.5	**Distance Based Models:** Introduction, Neighbours and exemplars	2	40
4.6	Nearest Neighbours classification	1	41
4.7	Distance Based Clustering, Hierarchical Clustering.	2	43

	UNIT-5		
5.1	**Probabilistic models:** The normal distribution and its geometric interpretations	1	44
5.2	Probabilistic models for categorical data	2	46
5.3	Discriminative learning by optimizing conditional Likelihood Probabilistic models with hidden variables	2	48
5.4	**Features:** Kinds of feature, Feature transformations	2	50
5.5	Feature construction and selection.	1	51
5.6	Model ensembles: Bagging and random forests, Boosting	1	52
	UNIT-6		
6.1	**Dimensionality Reduction:** Principal Component Analysis (PCA)	1	53
6.2	Implementation and demonstration.	2	55
6.3	**Artificial Neural Networks:** Introduction, Neural network representation	1	56
6.4	Appropriate problems for neural network learning	2	58
6.5	Multilayer networks and the back propagation algorithm	2	60

TEXTBOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERNCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben- David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: K.CHANDRA MOULI

Designation: ASSOCIATE PROFESSOR

Name of the subject: Web Technologies and Advanced Java Programming

Academic Year: 2020-2021

Year / Semester: II/II

S. No	Topics to be covered	No. of Lectures	Cumulative No. of Lectures
	UNIT I:		
1	HTML tags	2	2
2	Lists	1	3
2	Tables	2	5
3	Images, forms	2	7
4	Frames	2	9
5	Cascading style sheets	2	11
6	Introduction to Java script. Objects in Java Script.	4	15
7	Dynamic HTML with Java Script	2	17
	UNIT II:		
8	XML Introduction	2	19
9	Document type Definition	2	21
10	XML schemas	2	23
11	Document object model	2	25
12	XSLT	2	27
13	SAX	2	29
14	UNIT III:		
15	**Web servers and servlets:** Life cycle of a servlet JSDK,	2	31
16	The servlet API	2	33
17	The Javax.servlet package	2	36
18	Reading servlet packages and initialization parameters	2	38
19	The Javax.servlet http package	2	40
20	Reading Servlet parameters, and Reading Initialization parameters.,	2	42
21	Handling Http Request & Responses	2	44
22	Using Cookies-Session Tracking, Security Issues.	2	46
	UNIT IV		
23	Database Access: Database Programming using JDBC	2	48
24	studying javax.sql.* package, accessing a database from a JSP page	2	50
25	Introduction to JSP: The Problem with Servlet.	2	52
26	Anatomy of a JSP Page	1	53
27	JSP Application Development: Generating Dynamic Content, Using Scripting ElementsImplicit JSP Objects	2	55
28	Conditional Processing–Displaying Values Using an Expression to Set	2	57

	an Attribute		
29	Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages	2	59
30	Requests, and Users Passing Control and Date between Pages	1	60
31	Sharing Session and Application Data–Memory Usage Considerations	2	62

TEXT BOOKS:

- The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH
- Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
- Web Technologies, Uttam K Roy, Oxford Java Server Pages , Hans Bergstan, Oreilly

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TEACHING PLAN

Department: CSE

Name of the Faculty: CH.V.MURALI KRISHNA

Designation: Assoc. Professor

Name of the subject: DAA

Academic Year: 2020– 2021

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1: Introduction to Algorithms		
1.1	Fundamentals of algorithmic problem solving	2	2
1.2	Analysis framework, Performance Analysis: - Space complexity	2	4
1.3	Time complexity, Growth of Functions	2	6
1.4	Asymptotic Notation- Big oh notation	2	8
1.5	Omega notation, Theta notation, little oh	2	10
1.6	**Divide and Conquer:** General method, applications- Binary search	2	12
1.7	Quick sort, Merge sort	2	14
1.8	Finding the Maximum and Minimum	2	16
	UNIT 2: Greedy method		
2.1	Probabilistic analysis, Amortized analysis	2	18
2.2	**Greedy method:** The General Method	1	19
2.3	0/1 Knapsack Problem	1	20
2.4	Job Sequencing with Deadlines	1	21
2.5	Minimum-cost Spanning Trees	2	23
2.6	Prim's Algorithm	1	24
2.7	Kruskal's Algorithms	1	25
2.8	Optimal Merge Patterns	2	27
2.9	Single Source Shortest Paths	2	29
	UNIT-3 Dynamic Programming		
3.1	General method	2	31
3.2	Applications	1	32
3.3	Matrix chain multiplication	2	34
3.4	Optimal binary search trees	2	36
3.5	0/1knapsack problem	2	38
3.6	All pairs shortest path problem	2	40
3.7	Travelling sales person problem	2	41
3.8	Reliability design	2	43
	UNIT-4 Backtracking		
4.1	General method, applications-n-queen problem	2	45
4.2	sum of subsets problem	2	47
4.3	graph coloring	1	48
4.4	Hamiltonian cycles	1	49

4.5	**Branch and Bound:** General method	1	50
4.6	Applications	1	51
4.7	Travelling sales person problem	1	52
4.8	0/1 knapsack problem	1	53
4.9	LC Branch and Bound solution	2	55
4.10	FIFO Branch and Bound solution	2	57
4.11	P and NP problems	3	60
4.12	NP-Complete problems	2	62

TEXT BOOKS:

Fundamentals of Computer Algorithms, Ellis Horowitz,,SatrajSahni and Rajasekaran, University press

REFERENCE BOOKS:

1. . Introduction to The Design and Analysis of Algorithms, 3rd Edition, Anany Levitin, Pearson Education, 2017.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L. Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.

4.Algorithms – Richard Johnson Baugh and Marcus Schaefer, Pearson Education

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TEACHING PLAN

Department: CSE

Name of the Faculty: CH.V.MURALI KRISHNA

Designation: Assoc. Professor

Name of the subject: C.C & A.D

Academic Year: 2020- 2021

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT-1:Systems modeling, Clustering and virtualization		
1.1	Scalable Computing over the Internet, Technologies for Network based systems	2	2
1.2	System models for Distributed and Cloud Computing	2	4
1.3	Software environments for distributed systems and clouds	2	6
1.4	Performance, Security And Energy Efficiency	2	8
1.5	**Virtual Machines and Virtualization of Clusters and Data Centers:** Implementation Levels of Virtualization	2	10
1.6	Virtualization Structures/ Tools and mechanisms, Virtualization of CPU	2	12
1.7	Memory and I/O Devices, Virtual Clusters and Resource Management	2	14
1.8	Virtualization for Data Center Automation	2	16
	UNIT-2: Cloud Platform Architecture		
2.1	Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds	2	18
2.2	Public Cloud Platforms, Inter Cloud Resource Management	2	20
2.3	Cloud Security and Trust Management, Service Oriented Architecture,	1	20
2.4	Message Oriented Middleware	2	22
2.5	**Cloud Programming and Software Environments:** Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms	2	24
2.6	Programming Support of Google App Engine,	2	26
2.7	Programming on Amazon AWS and Microsoft Azure	2	28
2.8	Emerging Cloud Software Environments	2	30
	UNIT-3 Cloud Based Applications		
3.1	**Cloud Based Applications :** developing web service, Understanding cloud ecosystem- SaaS/PaaS, Popular APIs	2	32
3.2	**Designing Code for The Cloud:** Designing cloud infrastructure; Web Browsers and the Presentation Layer- Understanding Web browsers attributes and differences	3	35

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3.3	Building blocks of the presentation layer: HTML, HTML5, CSS, Silver-light, flash, java script, JQuery, Boot Strap	4	39
3.4	**Web Development Techniques and Frameworks:** Working with AJAX controls, JQuery, JSON, XML, REST	3	42
3.5	Working on Application development Frameworks e.g. Ruby on Rails	2	46
3.6	.Net, Java API's or JSF; Deployment	2	48
3.7	Environments – Platform As A Service(PAAS) ,Amazon, vmForce, Google App Engine	2	50
3.8	Azure, Heroku, AppForce	2	52
	UNIT-4 Developing and Deploying an Application in the real cloud		
4.1	Building on the experience of the first project students will study the design, development	2	54
4.2	testing and deployment of an application in the cloud using a development framework and deployment platform	2	56
4.3	**Using real cloud services:** Working with compute	2	58
4.4	Data intensive services	2	60
4.5	load balancing and scaling services available on real cloud platforms	2	62

TEXT BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Chris Hay, Brian Prince, "Azure in Action" Manning Publications [ISBN: 978-1935182481],2010.
4.Eugene Ciurana, "Developing with Google App Engine" Apress; 1 edition[ISBN: 978-1430218319],2009

REFERENCE BOOKS:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assoc. Professor

Academic Year: 2020– 2021

Name of the Faculty: CH.V.MURALI KRISHNA

Name of the subject: R-Programming Lab

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
1	Implementation of Data Frames and Lists	2	2
2	Implementation of Matrix Addition and Multiplication	2	4
3	Implementation of Quick Sort	2	6
4	Implementation of Binary Search Tree	2	8
5	Implementation of Set Operations	2	10
6	Implementation of Reading and Writing files	2	12
7	Implementation of Graph Operations	2	14
8	Implementation of Correlation	2	16
9	Implementation of ANNOVA	2	18
10	Implementation of Linear Regression	2	20
11	Implementation of Logistic Regression	2	22
12	Implementation of Random Forest	2	24

TEXT BOOKS

1. The Art of R Programming, Norman Matloff, Cengage Learning
2. R for Everyone, Lander, Pearson

REFERENCE BOOKS:

1. R Cookbook, PaulTeetor, Oreilly.
2. R in Action,RobKabacoff, Manning

12/3/2021

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Verified: HOD /Date

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Agiripalli (M) Krishna Dt.

TEACHING PLAN

Department: CSE

Designation: ASSOCIATE PROFESSOR

Academic Year: 2020-2021

Name of the Faculty: K.CHANDRA MOULI

Name of the subject: Web Technologies and Advanced Java Programming Lab.

Year / Semester: II/II

TOPIC	No. of Lectures	Cumulative No. of Lectures
HTML TAGS	3	3
HTML TAGS	3	6
HOME PAGE: The static home page must contain three frames. Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below). Left frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame. Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.	3	9
LOGIN PAGE **CATOLOGUE PAGE:** The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following: 1. Snap shot of Cover Page. 2. Author Name. 3. Publisher. 4. Price. 5. Add to cart button. **REGISTRATION PAGE:** Create a "*registration form* "with the following fields 1) Name (Text field) 2) Password (password field) 3) E-mail id (text field) 4) Phone number (text field) 5) Sex (radio button) 6) Date of birth (3 select boxes) 7) Languages known (check boxes – English, Telugu, Hindi, Tamil) 8) Address (text area)	3	12
Validations using JAVA script	3	15

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Ph : 0866 – 2469666 Website : nriit.edu.in e-mail : princiapal@nriit.edu.in

Week 4: Design a web page using **CSS** (Cascading Style Sheets) which includes the following: Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles	3	18
Week 5: Write an XML file which will display the Book information which includes the following: 1) Title of the book 2) Author Name 3) ISBN number 4) Publisher name 5) Edition 6) Price	3	21
Write a Document Type Definition (DTD) to validate the above XML file.	3	24
Week 6: 1) Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port. 2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root. Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)	3	27
Week-7: **User Authentication :** Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following. 1. Create a Cookie and add these four user id's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.	3	30
Week-8: Install a database(Mysql or Oracle).	3	33

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form). Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).		
Week-9: Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).	3	36
Week-10: Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.	3	39

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assoc. Professor

Academic Year: 2020- 2021

Name of the Faculty: T. B Prasad Reddy

Name of the subject: Artificial Intelligence

Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction	1	1
1.2	History, Intelligent Systems	1	2
1.3	Foundations of AI, Sub areas of AI, Applications	1	3
1.4	Problem Solving – State-Space Search	2	5
1.5	General Problem Solving, Characteristics of Problem	1	6
1.6	Exhaustive Searches	2	8
1.7	Heuristic Search Techniques	2	10
1.8	Iterative-Deepening A*, Constraint Satisfaction	2	12
	UNIT 2:		
2.1	Logic Concepts and Logic Programming: Introduction,	1	13
2.2	Propositional Calculus	1	14
2.3	Propositional Logic, Natural Deduction System, Resolution Refutation in Propositional Logic	2	16
2.4	Predicate Logic	2	18
2.5	Logic Programming Representing Knowledge Using Rules: Logic programming	2	20
2.6	Procedural Vs Declarative knowledge	1	21
2.7	Forward Vs Backward Reasoning, Matching	1	22
2.8	Control Knowledge Representation: Introduction	1	23
2.9	Approaches to Knowledge Representation	2	25
2.10	Knowledge Representation using Semantic Network	1	26
2.11	Extended Semantic Networks for KR	1	27
2.12	Knowledge Representation using Frames	1	28
2.13	Conceptual dependencies, Scripts	1	29

	UNIT-3		
3.1	Learning from observation - Inductive learning – Decision trees – Explanation based learning –	2	31
3.2	Learning methods - Reinforcement Learning	1	32
3.3	Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning,	1	33
3.4	Statistical Truth Maintenance Systems,	1	34
3.5	Logics for Non-Monotonic Reasoning,	2	36
3.6	Statistical Reasoning: Bayes Theorem,	2	38
3.7	Certainty Factors and Rule-Based Systems,	1	39
3.8	Bayesian Probabilistic Inference,	1	40
3.9	Bayesian Networks, DempsterShafer Theory	2	42
3.10	Planning: Components of a Planning System, Goal Stack Planning,	1	43
3.11	Non-linear Planning using Constrait Posting, Hierarchical Planning,	1	44
3.12	Reactive Systems	1	45
	UNIT-4		
4.1	Natural Language Processing: Steps in The Natural Language Processing, ,	1	46
4.2	Syntactic Processing and Augmented Transition Nets,	1	47
4.3	Semantic Analysis,	1	48
4.4	NLP Understanding Systems;	1	49
4.5	Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control	1	50
4.6	Fuzzy Inferences & Fuzzy Systems Planning with state-space search – partial-order	2	52
4.7	planning – planning graphs – planning and acting in the real world	1	53
4.8	Experts Systems: Overview of an Expert System,	1	54
4.9	Architecture of an Expert Systems,	1	55
4.10	Different Types of Expert Systems,	1	56
4.11	Architectures, Knowledge Acquisition and Validation Techniques,	1	57
4.12	Knowledge System Building Tools, Expert System Shells.	2	59
4.13	AI Programming languages: Overview of LISP and PROLOG, Production System in Prolog	1	60

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TEXT BOOKS:

1. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata Mcgraw-Hill Publications
2. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI publication

REFERENCE BOOKS:

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall
3. Artificial Intelligence, Robert Schalkoff, Mcgraw-Hill Publications
4. Artificial Intelligence and Machine Learning, Vinod Chandra S.S., Anand Hareendran S.

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NRIIT/7.5.1/RC 04

TEACHING PLAN

Department:CSE

Designation: Assoc.Professor

Academic Year: 2020 – 2021

Name of the Faculty:T. B Prasad Reddy

Name of the subject: Machine Learning

Year / Semester: IV/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**The ingredients of machine learning, Tasks:** The problems that can be solved with machine learning	2	2
1.2	Models: the output of machine learning	2	4
1.3	Features, the workhorses of machine learning.	2	6
1.4	**Binary classification and related tasks:** Classification	1	7
1.5	Scoring and ranking	2	9
1.6	Class probability estimation	1	10
	UNIT 2:		
2.1	**Beyond binary classification:** Handling more than two classes	2	12
2.2	Regression	2	14
2.3	Unsupervised and descriptive learning	2	16
2.4	**Concept learning**: The hypothesis space,	2	17
2.5	Paths through the hypothesis space	2	19
2.6	Beyond conjunctive concepts	2	21
	UNIT 3:		
3.1	**Tree models:** Decision trees	1	22
3.2	Ranking and probability estimation trees	2	24
3.3	Tree learning as variance reduction	2	26
3.4	**Rule models:** Learning ordered rule lists	1	27
3.5	Learning unordered rule sets	2	29
3.6	Descriptive rule learning, First-order rule learning	2	31
	UNIT-4		
4.1	**Linear models:** The least-squares method	2	33
4.2	The perceptron: a heuristic learning algorithm for linear classifiers	2	35
4.3	Support vector machines	2	37
4.4	Obtaining probabilities from linearclassifiers, Going beyond linearity with kernel methods	1	38
4.5	**Distance Based Models:** Introduction, Neighbours and exemplars	2	40
4.6	Nearest Neighbours classification	1	41
4.7	Distance Based Clustering,Hierarchical Clustering.	2	43

	UNIT-5		
5.1	**Probabilistic models:** The normal distribution and its geometric interpretations	1	44
5.2	Probabilistic models for categorical data	2	46
5.3	Discriminative learning by optimizing conditional LikelihoodProbabilistic models with hidden variables	2	48
5.4	**Features:** Kinds of feature, Featuretransformations	2	50
5.5	Feature construction and selection.	1	51
5.6	Model ensembles: Bagging and randomforests, Boosting	1	52
	UNIT-6		
6.1	**Dimensionality Reduction:** Principal Component Analysis (PCA)	1	53
6.2	Implementation and demonstration.	2	55
6.3	**Artificial Neural Networks:** Introduction, Neural network representation	1	56
6.4	Appropriate problems for neural network learning	2	58
6.5	Multilayer networks and the back propagation algorithm	2	60

TEXTBOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERNCE BOOKS:

1. UnderstandingMachine Learning: From Theory toAlgorithms, Shai Shalev-Shwartz, Shai Ben- David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

16/3/21

Prepared: Faculty / Date

Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020– 2021

Name of the Faculty: G.Venendra

Name of the subject: CPP

Year / Semester: IV/II

TOPIC	No. of Lectures	Cumulative No. of Lectures
UNIT- I Concurrent versus Sequential programming	2	2
Concurrent programming constructs and race condition	2	4
Synchronization primitives	2	6
UNIT - II Processes and threads	2	8
Interprocess communication	2	10
Livelock and deadlocks	2	12
Starvation, and Deadlock Prevention	2	14
Issues and Challenges in Concurrent programming paradigm and current trends.	2	16
UNIT-III Parallel algorithms – sorting	3	19
Ranking	2	21
Searching	2	23
Traversals, prefix sum, etc.	3	26
UNIT- IV Parallel programming paradigms – Data parallel	2	28
Task parallel	2	30
Shared memory and message passing	3	33
Parallel Architectures, GPGPU	3	36
pthreads, STM	2	38
UNIT-V OpenMP, OpenCL	5	43

Cilk++, Intel TBB	4	47
CUDA	5	52
UNIT-VI Heterogeneous Computing: C++AMP	5	57
OpenCL	4	61

Text Books/References:

1. Mordechai Ben-Ari. Principles of Concurrent and Distributed Programming, Prentice-Hall International.
2. Greg Andrews. Concurrent Programming: Principles and Practice, Addison Wesley.
3. Gadi Taubenfeld. Synchronization Algorithms and Concurrent Programming, Pearson.
4. M. Ben-Ari. Principles of Concurrent Programming, Prentice Hall.
5. Fred B. Schneider. On Concurrent Programming, Springer.
6. Brinch Hansen. The Origins of Concurrent Programming: From Semaphores to Remote Procedure calls.

SWAYAM/NPTEL/MOOCS Courses :

1. https://nptel.ac.in/courses/106102114/

E- Resourses

1. https://www.geeksforgeeks.org/introduction-to-parallel-computing/
2. https://chetsarena.wordpress.com/parallel-computing-2/parallel-computing/
3. https://www.cs.rice.edu/~vs3/comp422/lecture-notes/index.html
4. https://computing.llnl.gov/tutorials/parallel_comp/

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020- 2021

Name of the Faculty: G.Venendra

Name of the subject: UML & DP

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to UML	1	1
1.2	Importance of modeling	1	2
1.3	principles of modeling	1	3
1.4	object oriented modeling	2	5
1.5	conceptual model of the UML	1	6
1.6	Architecture, Software Development Life Cycle.	1	7
1.7	**Structural Modeling**: Classes, Relationships	1	8
1.8	common Mechanisms, and diagrams	1	9
1.9	Advanced classes	2	11
1.10	advanced relationships	2	13
1.11	Object diagrams : common modeling techniques.	1	14
	UNIT 2:		
2.1	**Behavioral Modeling**: Interactions, Interaction diagrams	1	15
2.2	Use cases, Use case Diagrams	1	16
2.3	Activity Diagrams.	2	18
2.4	Events and signals	2	20
2.5	state machines, state chart diagrams.	2	22
2.6	**Advanced Behavioral Modeling** Architectural Modeling:	1	23
2.7	Components Deployment	1	24
2.8	Component diagrams	1	25
.2.9	Deployment diagrams	2	27
2.10	Common modeling techniques for component diagrams	2	29
2.11	Common modeling techniques for deployment diagrams	1	30
	UNIT-3		
3.1	**Introduction** : What Is a Design Pattern?	1	31
3.2	Design Patterns in Smalltalk MVC	1	32
3.3	Describing Design Patterns	2	34
3.4	Catalog of Design Patterns	1	35

3.5	Organizing the Catalog,	1	36
3.6	How Design Patterns Solve Design Problems	1	37
3.7	How to Select a Design Pattern	1	38
3.8	How to Use a Design Pattern.	2	40
3.9	**Creational Patterns** : Abstract Factory	2	42
3.10	Builder, Factory Method	2	44
3.11	Prototype, Singleton.	1	45
	UNIT-4		
4.1	**Structural Patterns:**	1	46
4.2	Adapter, Bridge	2	48
4.3	Composite, Decorator, Façade	2	50
4.4	Flyweight, Proxy.	1	51
4.5	**Behavioral Patterns:**	2	53
4.6	Chain of Responsibility	2	55
4.7	Command Interpreter, Iterator	2	57
4.8	Mediator, Memento	1	58
4.8	Observer, Strategy	1	59
4.9	Template Method	2	61
4.10	What to Expect from Design Patterns	1	62

TEXT BOOKS:

1. The unified Modeling language user guide by Grady Booch, James Rumbaugh , Ivar Jacobson, PEA
2. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:
1. Satzinger: Object Oriented Analysis and Design, CENGAGE
2. O'reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreillly
3. 'Applying UML and patterns' by Craig Larman, Pearson

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Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty : S.NAHIDA

Designation: ASSOCIATE PROFESSOR

Name of the subject: Web Technologies and Advanced Java Programming Lab.

Academic Year: 2020-2021

Year / Semester: II/II

TOPIC	No. of Lectures	Cumulative No. of Lectures
HTML TAGS	3	3
HTML TAGS	3	6
HOME PAGE: The static home page must contain three frames. Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below). Left frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame. Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.	3	9
LOGIN PAGE **CATOLOGUE PAGE:** The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following: 1. Snap shot of Cover Page. 2. Author Name. 3. Publisher. 4. Price. 5. Add to cart button. **REGISTRATION PAGE:** Create a "*registration form* "with the following fields 1) Name (Text field) 2) Password (password field) 3) E-mail id (text field) 4) Phone number (text field) 5) Sex (radio button) 6) Date of birth (3 select boxes) 7) Languages known (check boxes – English, Telugu, Hindi, Tamil) 8) Address (text area)	3	12
Validations using JAVA script	3	15

Week 4: Design a web page using **CSS (Cascading Style Sheets)** which includes the following: Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles	3	18
Week 5: Write an XML file which will display the Book information which includes the following: 1) Title of the book 2) Author Name 3) ISBN number 4) Publisher name 5) Edition 6) Price	3	21
Write a Document Type Definition (DTD) to validate the above XML file.	3	24
Week 6: 1) Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port. 2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root. Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)	3	27
Week-7: **User Authentication :** Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following. 1. Create a Cookie and add these four user id's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.	3	30
Week-8: Install a database(Mysql or Oracle).	3	33

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form). Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).		
Week-9: Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).	3	36
Week-10: Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.	3	39

Prepared: Faculty / Date 16/3/21

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: ASSOCIATE PROFESSOR

Academic Year: 2020-2021

Name of the Faculty: S.NAHIDA

Name of the subject: Web Technologies and Advanced Java Programming

Year / Semester: II/II

S. No	Topics to be covered	No. of Lectures	Cumulative No. of Lectures
	UNIT I:		
1	HTML tags	2	2
2	Lists	1	3
2	Tables	2	5
3	Images, forms	2	7
4	Frames	2	9
5	Cascading style sheets	2	11
6	Introduction to Java script. Objects in Java Script.	4	15
7	Dynamic HTML with Java Script	2	17
	UNIT II:		
8	XML Introduction	2	19
9	Document type Definition	2	21
10	XML schemas	2	23
11	Document object model	2	25
12	XSLT	2	27
13	SAX	2	29
14	**UNIT III:**		
15	**Web servers and servlets:** Life cycle of a servlet JSDK,	2	31
16	The servlet API	2	33
17	The Javax.servlet package	2	36
18	Reading servlet packages and initialization parameters	2	38
19	The Javax.servlet http package	2	40
20	Reading Servlet parameters, and Reading Initialization parameters.,	2	42
21	Handling Http Request & Responses	2	44
22	Using Cookies-Session Tracking, Security Issues.	2	46
	UNIT IV		
23	Database Access: Database Programming using JDBC	2	48
24	studying javax.sql.* package, accessing a database from a JSP page	2	50
25	Introduction to JSP: The Problem with Servlet.	2	52
26	Anatomy of a JSP Page	1	53
27	JSP Application Development: Generating Dynamic Content, Using Scripting ElementsImplicit JSP Objects	2	55
28	Conditional Processing – Displaying Values Using an Expression to Set	2	57

	an Attribute		
29	Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages	2	59
30	Requests, and Users Passing Control and Date between Pages	1	60
31	Sharing Session and Application Data – Memory Usage Considerations	2	62

TEXT BOOKS:

- The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH
- Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
- Web Technologies, Uttam K Roy, Oxford Java Server Pages , Hans Bergstan, Oreilly

Prepared: Faculty / Date 16/3/21

Verified: HOD/Date 16/3/21

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE **Name of the Faculty:** Mr.M.V.P.Umamaheswara Rao

Designation: Associate Professor **Name of the subject**: Operating Systems

Academic Year: 2020- 2021 **Year / Semester:** III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Computer System and Operating System Overview:** Overview of computer operating systems, operating systems functions	2	2
1.2	Operating systems structures	2	4
1.3	Systems calls	2	6
1.4	Operating systems generation	2	8
1.5	**Process Management** – Process concept- process scheduling, operations	2	10
1.6	Inter process communication	2	12
1.7	Multi Thread programming models	2	14
1.8	Process scheduling criteria and algorithms, and their evaluation	4	18
	UNIT 2:		
2.1	**Concurrency**: Process synchronization	1	19
2.2	The critical- section problem	1	20
2.3	Peterson's Solution	1	21
2.4	Synchronization Hardware	1	22
2.5	Semaphores	2	24
2.6	Classic problems of synchronization	1	25
2.7	Monitors	2	27
2.8	Synchronization examples	1	28
2.9	**Memory Management**: Swapping	1	29
2.10	Contiguous memory allocation	2	31
2.11	Paging	1	32
2.12	Structure of the page table	1	33
2.13	Segmentation	1	34
	UNIT-3		
3.1	**Virtual Memory Management**: Virtual memory	1	35
3.2	Demand paging	1	36
3.3	Page-Replacement algorithms	3	39
3.4	Allocation of Frames	2	41
3.5	Thrashing	1	42
3.6	**Principles of deadlock** – System model	1	43
3.7	Deadlock characterization	1	44
3.8	Deadlock prevention	1	45

3.9	Deadlock Detection and avoidance	1	46
3.10	Recovery form deadlock	1	47
	UNIT-4		
4.1	**File System Interface-** the concept of a file, Access Methods	1	48
4.2	Directory structure	1	49
4.3	File system mounting	1	50
4.4	File sharing, protection	1	51
4.5	**File System implementation-** File system structure	2	53
4.6	File system implementation	1	54
4.7	Directory implementation	1	55
4.8	Allocation methods, free-space management	1	56
4.9	**Mass-storage structure:** overview of Mass-storage structure	2	58
4.10	Disk structure	1	59
4.11	Disk attachment	1	60
4.12	Disk scheduling	3	63
4.13	Swap-space management	2	65

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems – Internal and Design Principles, William Stallings, Sixth Edition–2005, Pearson Education.

REFERENCE BOOKS:

1. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH.
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.

E-RESOURCES:

https://nptel.ac.in/courses/106105214/
https://www.udacity.com/course/introduction-to-operating-systems--ud923
https://www.youtube.com/watch?v=qf668RboXLs
https://www.youtube.com/watch?v=VoaNyf9iO4Q&list=PLV8vIYTIdSnaHTjrBXjSyNTOWEtA33hvn

KL 15/8/2021

Prepared: Faculty / Date

3/16/2011

Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: Mr.M.V.P.Umamaheswara Rao

Designation: Associate Professor

Name of the subject: Operating Systems & Unix Programming Lab

Academic Year: 2020– 2021

Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	PART-A		
1	Simulate the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority	3	3
2	Simulate MVT and MFT	3	6
3	Simulate all File Organization Techniques a) Single level directory b) Two level c) Hierarchical d) DAG	3	9
4	Simulate Bankers Algorithm for Dead Lock Avoidance	3	12
5.	Simulate Bankers Algorithm for Dead Lock Prevention.	3	15
6	Simulate all page replacement algorithms a) FIFO b) LRU c) LFU Etc. …	3	18
7	Simulate Paging Technique of memory management.	3	21
8	Simulate all file allocation strategies a) Sequential b) Indexed c) Linked c) Hierarchical d) DAG	3	24
	PART-B		
11	Write a shell script to generate a multiplication table.	1	25
12	Write a shell script that copies multiple files to a directory.	1	26
13	Write a shell script which counts the number of lines and words present in a given file.	1	27
14	Write a shell script which displays the list of all files in the given directory.	1	28
15	Write a shell script(small calculator) that adds, subtracts, multiplies and divides the given two integers.	1	29
16	Write a shell script to reverse the rows and columns of a matrix.	1	30
17	Write a C program that counts the number of blanks in a text file.	1	31
18	C program Displaying real time of day for every 60 seconds	1	32
19	Write a C program that illustrates the creation of child process using fork system call.	1	33
20	Write a C program that illustrates file locking using semaphores.	1	34
21	Write a C program that implements a producer-consumer system with two processes.(using semaphores)	1	35
22	Write a C program that illustrates the following.	1	36

	a)Creating a message queue. b)Writing to a message queue. c)Reading from a message queue.		

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems' – Internal and Design Principles Stallings, Sixth Edition–2005, Pearson education
3.Advanced Programming in the UNIX Environment, 3rd EditionW. Richard Stevens, Stephen A. Rago
4.A Practical Guide to Linux Commands, Editors, and Shell ProgrammingMark G. Sobell, Matthew Helmke

REFERENCE BOOKS:

1. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH.
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.
4. The Linux Programming Interface.A Linux and UNIX System Programming Handbook Michael Kerrisk.
5. Shell Programming in Unix, Linux and OS XThe Fourth Edition of Unix Shell Programming Stephen G. Kochan, Patrick Wood
6. Shell ScriptingHow to Automate Command Line Tasks Using Bash Scripting and Shell ProgrammingJaosn Cannon

E-RESOURCES:

https://www.tutorialspoint.com/unix/index.htm
https://www.guru99.com/unix-linux-tutorial.html
https://www.javatpoint.com/linux-tutorial
https://nptel.ac.in/courses/106105214/
https://www.udacity.com/course/introduction-to-operating-systems--ud923
https://www.youtube.com/watch?v=qf668RboXLs

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TEACHING PLAN

Department: CSE
Designation: Assistant Professor
Academic Year: 2020- 2021

Name of the Faculty: CH.Santhi
Name of the subject: CC&AD
Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Systems modeling, Clustering and virtualization:** Introduction	1	1
1.2	Scalable Computing over the Internet	1	2
1.3	Technologies for Network based systems	1	3
1.4	System models for Distributed and Cloud Computing	2	5
1.5	Software environments for distributed systems and clouds Performance,	2	7
1.6	Security And Energy Efficiency	1	8
1.7	**Virtual Machines and Virtualization of Clusters and Data Centers:** Implementation Levels of Virtualization	1	9
1.8	Virtualization Structures/ Tools and mechanisms,	1	10
1.9	Virtualization of CPU, Memory and I/O Devices,	1	11
1.10	Virtual Clusters and Resource Management,	2	13
1.11	Virtualization for Data Center Automation.	1	14
	UNIT 2:		
2.1	**Cloud Platform Architecture:** Introduction	1	15
2.2	Cloud Computing and service Models	1	16
2.3	Architectural Design of Compute and Storage Clouds	2	18
2.4	Public Cloud Platforms	2	20
2.5	Inter Cloud Resource Management	2	22
2.6	Cloud Security and Trust Management	1	23
2.7	Service Oriented Architecture	1	24
2.8	Message Oriented Middleware.	1	25
2.9	**Cloud Programming and Software Environments:** Introduction	2	27
2.10	Features of Cloud and Grid Platforms	2	29
2.11	Parallel & Distributed Programming Paradigms	1	30
2.12	Programming Support of Google App Engine	1	31
2.13	Programming on Amazon AWS and Microsoft Azure	1	32
2.14	Emerging Cloud Software Environments.	1	33
	UNIT-3		
3.1	**Cloud Based Applications:** Introduction	1	34
3.2	Developing web service	1	35
3.3	Understanding cloud ecosystem-SaaS/PaaS, Popular APIs	2	37
3.4	**Designing Code for The Cloud:** Introduction	1	38

3.5	Designing cloud infrastructure	1	39
3.6	Web Browsers and the Presentation Layer	1	40
3.7	Understanding Web browsers attributes and differences	1	41
3.8	Building blocks of the presentation layer: HTML, HTML5	2	43
3.9	CSS, Silver-light, flash	2	45
3.10	java script, JQuery, Boot Strap	2	47
3.11	**Web Development Techniques and Frameworks:** Introduction	1	48
3.12	Working with AJAX controls, JQuery, JSON,	1	49
3.13	XML, REST. Working on Application development Frameworks e.g. Ruby on Rails	1	50
3.14	Net, Java API's or JSF	1	51
3.15	Deployment Environments – Platform As A Service(PAAS) ,Amazon	1	52
3.16	vmForce, Google App Engine	1	53
3.17	Azure, Heroku, AppForce	1	54
	UNIT-4		
4.1	**Developing and Deploying an Application in the real cloud:** Introduction	1	55
4.2	Building on the experience of the first project students will study the design	1	56
4.3	Testing and deployment of an application in the cloud using a development framework	1	57
4.4	and deployment platform	1	58
4.5	**Using real cloud services:** Introduction	1	59
4.6	Working with compute	1	60
4.7	Data intensive services	1	61
4.8	load balancing	1	62
4.8	scaling services	1	63
4.9	scaling services available on real cloud platforms	1	64

TEXT BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Chris Hay, Brian Prince, "Azure in Action" Manning Publications [ISBN: 978-1935182481],2010.
4.Eugene Ciurana, "Developing with Google App Engine" Apress; 1 edition[ISBN: 978-1430218319],2009

REFERENCE BOOKS:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

Prepared: Faculty / Date 16/03/2021

16/3/20
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: Dr.D.Suneetha

Designation: Professor

Name of the subject: Artificial Intelligence

Academic Year: 2020- 2021

Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction	1	1
1.2	History, Intelligent Systems	1	2
1.3	Foundations of AI, Sub areas of AI, Applications	1	3
1.4	Problem Solving – State-Space Search	2	5
1.5	General Problem Solving, Characteristics of Problem	1	6
1.6	Exhaustive Searches	2	8
1.7	Heuristic Search Techniques	2	10
1.8	Iterative-Deepening A*, Constraint Satisfaction	2	12
	UNIT 2:		
2.1	Logic Concepts and Logic Programming: Introduction,	1	13
2.2	Propositional Calculus	1	14
2.3	Propositional Logic, Natural Deduction System, Resolution Refutation in Propositional Logic	2	16
2.4	Predicate Logic	2	18
2.5	Logic Programming Representing Knowledge Using Rules: Logic programming	2	20
2.6	Procedural Vs Declarative knowledge	1	21
2.7	Forward Vs Backward Reasoning, Matching	1	22
2.8	Control Knowledge Representation: Introduction	1	23
2.9	Approaches to Knowledge Representation	2	25
2.10	Knowledge Representation using Semantic Network	1	26
2.11	Extended Semantic Networks for KR	1	27
2.12	Knowledge Representation using Frames	1	28
2.13	Conceptual dependencies, Scripts	1	29

	UNIT-3		
3.1	Learning from observation - Inductive learning – Decision trees – Explanation based learning –	2	31
3.2	Learning methods - Reinforcement Learning	1	32
3.3	Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning,	1	33
3.4	Statistical Truth Maintenance Systems,	1	34
3.5	Logics for Non-Monotonic Reasoning,	2	36
3.6	Statistical Reasoning: Bayes Theorem,	2	38

3.7	Certainty Factors and Rule-Based Systems,	1	39
3.8	Bayesian Probabilistic Inference,	1	40
3.9	Bayesian Networks, DempsterShafer Theory	2	42
3.10	Planning: Components of a Planning System, Goal Stack Planning,	1	43
3.11	Non-linear Planning using Constrait Posting, Hierarchical Planning,	1	44
3.12	Reactive Systems	1	45
	UNIT-4		
4.1	Natural Language Processing: Steps in The Natural Language Processing, ,	1	46
4.2	Syntactic Processing and Augmented Transition Nets,	1	47
4.3	Semantic Analysis,	1	48
4.4	NLP Understanding Systems;	1	49
4.5	Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control	1	50
4.6	Fuzzy Inferences & Fuzzy Systems Planning with state-space search – partial-order	2	52
4.7	planning – planning graphs – planning and acting in the real world	1	53
4.8	Experts Systems: Overview of an Expert System,	1	54
4.9	Architecture of an Expert Systems,	1	55
4.10	Different Types of Expert Systems,	1	56
4.11	Architectures, Knowledge Acquisition and Validation Techniques,	1	57
4.12	Knowledge System Building Tools, Expert System Shells.	2	59
4.13	AI Programming languages: Overview of LISP and PROLOG, Production System in Prolog	1	60

TEXT BOOKS:

1. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata Mcgraw-Hill Publications
2. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI publication

REFERENCE BOOKS:

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall
3. Artificial Intelligence, Robert Schalkoff, Mcgraw-Hill Publications
4. Artificial Intelligence and Machine Learning, Vinod Chandra S.S., Anand Hareendran S.

16/3/2020
Prepared: Faculty / Date

16/3/2020
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020– 2021

Name of the Faculty: CH.Santhi

Name of the subject: UML & DP

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to UML	1	1
1.2	Importance of modeling	1	2
1.3	principles of modeling	1	3
1.4	object oriented modeling	2	5
1.5	conceptual model of the UML	1	6
1.6	Architecture, Software Development Life Cycle.	1	7
1.7	**Structural Modeling:** Classes, Relationships	1	8
1.8	common Mechanisms, and diagrams	1	9
1.9	Advanced classes	2	11
1.10	advanced relationships	2	13
1.11	Object diagrams : common modeling techniques.	1	14
	UNIT 2:		
2.1	**Behavioral Modeling:** Interactions, Interaction diagrams	1	15
2.2	Use cases, Use case Diagrams	1	16
2.3	Activity Diagrams.	2	18
2.4	Events and signals	2	20
2.5	state machines, state chart diagrams.	2	22
2.6	**Advanced Behavioral Modeling** Architectural Modeling:	1	23
2.7	Components Deployment	1	24
2.8	Component diagrams	1	25
2.9	Deployment diagrams	2	27
2.10	Common modeling techniques for component diagrams	2	29
2.11	Common modeling techniques for deployment diagrams	1	30
	UNIT-3		
3.1	**Introduction** : What Is a Design Pattern?	1	31
3.2	Design Patterns in Smalltalk MVC	1	32
3.3	Describing Design Patterns	2	34
3.4	Catalog of Design Patterns	1	35

3.5	Organizing the Catalog,	1	36
3.6	How Design Patterns Solve Design Problems	1	37
3.7	How to Select a Design Pattern	1	38
3.8	How to Use a Design Pattern.	2	40
3.9	**Creational Patterns** : Abstract Factory	2	42
3.10	Builder, Factory Method	2	44
3.11	Prototype, Singleton.	1	45
	UNIT-4		
4.1	**Structural Patterns:**	1	46
4.2	Adapter, Bridge	2	48
4.3	Composite, Decorator, Façade	2	50
4.4	Flyweight, Proxy.	1	51
4.5	**Behavioral Patterns:**	2	53
4.6	Chain of Responsibility	2	55
4.7	Command Interpreter, Iterator	2	57
4.8	Mediator, Memento	1	58
4.8	Observer, Strategy	1	59
4.9	Template Method	2	61
4.10	What to Expect from Design Patterns	1	62

TEXT BOOKS:

1. The unified Modeling language user guide by Grady Booch, James Rumbaugh , Ivar Jacobson, PEA

2. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Satzinger: Object Oriented Analysis and Design, CENGAGE
2. O'reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreillly
3. 'Applying UML and patterns' by Craig Larman, Pearson

Prepared: Faculty / Date 16/03/2021

16/3/2021
Verified: HOD /Date
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TEACHING PLAN

Department: CSE

Name of the Faculty: B.Sesikala

Designation: Assistant Professor

Name of the subject: Distributed Systems

Academic Year: 2020– 2021

Year / Semester: IV/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Characterization of Distributed Systems:** Introduction	1	1
1.2	Examples of Distributed Systems	2	3
1.3	Resource Sharing and the Web	1	4
1.4	Challenges	1	5
1.5	**System Models:** Introduction	1	6
1.6	Architectural Models- Software Layers, System Architecture	2	8
1.7	Variations, Interface and Objects,	1	9
1.8	Design Requirements for Distributed Architectures	3	12
1.9	Fundamental Models- Interaction Model, Failure Model, Security Model	3	15
	UNIT 2:		
2.1	**Interprocess Communication:** Introduction	1	16
2.2	The API for the Internet Protocols	1	17
2.3	The Characteristics of Interprocess communication, Sockets	1	18
2.4	UDP Datagram Communication	2	20
2.5	TCP Stream Communication; External Data Representation and Marshalling	2	22
2.6	Client Server Communication; Group Communication	2	24
2.7	IP Multicast- an implementation of group communication	2	26
2.8	Reliability and Ordering of Multicast.	2	28
	UNIT 3:		
3.1	**Distributed Objects and Remote Invocation:** Introduction	1	29
3.2	Communication between Distributed Objects- Object Model	1	30
3.3	Distributed Object Modal	1	31
3.4	Design Issues for RMI	1	32
3.5	Implementation of RMI	1	33

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3.6	Distributed Garbage Collection; Remote Procedure Call	1	34
3.7	Events and Notifications	1	35
3.8	Case Study: JAVA RMI	1	36
	UNIT-4:		
4.1	**Operating System Support:** Introduction	1	37
4.2	The Operating System Layer	2	39
4.3	Protection	1	40
4.4	Processes and Threads –Address Space	2	42
4.5	Creation of a New Process	1	43
4.6	Threads	2	45
	UNIT-5		
5.1	**Distributed File Systems:** Introduction	1	46
5.2	File Service Architecture	1	47
5.3	Peer-to-Peer Systems: Introduction	1	48
5.4	Napster and its Legacy	1	49
5.5	Peer-to-Peer Middleware	1	50
5.6	Routing Overlays	1	51
5.7	**Coordination and Agreement:** Introduction	1	52
5.8	Distributed Mutual Exclusion	1	53
5.9	Elections, Multicast Communication	2	55
	UNIT-6	1	56
6.1	**Transactions & Replications:** Introduction	1	57
6.2	System Model and Group Communication	2	59
6.3	Concurrency Control in Distributed Transactions	1	60
6.4	Distributed Dead Locks	1	61
6.5	Transaction Recovery	1	62
6.6	Replication- -Introduction	1	63
6.7	Passive (Primary) Replication	2	65
6.8	Active Replication	2	67

TEXT BOOKS:

1. Ajay D Kshemkalyani, MukeshSighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication

REFERENCE BOOKS

1. Distributed-Systems-Principles-Paradigms-Tanenbaum PHI

B. Sai Lal 16/03/2021
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16/3/21
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: B.Maheswari

Designation: Assistant Professor

Name of the subject: JAVA

Academic Year: 2020– 2021

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to OOP	1	1
1.2	Procedural Programming Language and Object Oriented Language	1	2
1.3	Principles of OOP , Applications of OOP, History of Java	1	3
1.4	Java features, Java Virtual Machine (JVM)	2	5
1.5	Java Program Structure	1	6
1.6	Variables, Primitive data types	1	7
1.7	Identifiers, Literals- Examples	1	8
1.8	Operators, expressions – Examples	1	9
1.9	Precedence Rules and Associativity, Primitive Type Conversion and Casting Flow of Control	2	11
1.10	Classes and objects, Class Declaration, Creating Objects, Methods, Method Overloading	2	13
1.11	Over view	1	14
	UNIT 2:		
2.1	Constructors – Examples, Constructor Overloading	1	15
2.2	Garbage collector,	1	16
2.3	Importance of static keyword and examples, this keyword – Examples	2	18
2.4	Arrays, command line arguments, Nested Classes	2	20
2.5	Inheritance, types of inheritance, Forms of Inheritance	2	22
2.6	super keyword, final keyword,	1	23
2.7	Polymorphism an its and implementation	1	24
2.8	Method overriding	1	25
2.9	Creating the packages, using packages, importance of CLASSPATH,	2	27
2.10	Access Protection, importing packages	2	29
2.11	Over view	1	30
	UNIT-3		
3.1	Interfaces	1	31
3.2	implementing interfaces	1	32
3.3	Nested Interfaces, Variables in interfaces,	2	34
3.4	Multiple inheritance of interfaces	1	35

3.5	Differences between abstract class & interfaces	1	36
3.6	Exception handling	1	37
3.7	importance of try, catch,	1	38
3.8	importance of throw, throws and finally block	2	40
3.9	user-defined exceptions	2	42
3.10	Assertions	2	44
3.11	Over view	1	45
	UNIT-4		
4.1	Multithreading: Introduction, differences	1	46
4.2	Thread life cycle, Creation of threads	2	48
4.3	Thread priorities, Thread Synchronization	2	50
4.4	Communication between Threads	1	51
4.5	Reading data from files and writing data to files	2	53
4.6	Files & random access file	2	55
4.7	Applet class	2	57
4.8	Applet structure	1	58
4.8	Applet life cycle	1	59
4.9	sample Applet programs	2	61
4.10	Over view	1	62

TEXT BOOKS:

1. The Complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

16/3/21
Prepared: Faculty / Date

16/3/21
Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020– 2021

Name of the Faculty: B.Maheswari

Name of the subject: CO

Year / Semester: II/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction of Basic Structure of Computers	1	1
1.2	Computer Types, Functional unit	2	3
1.3	Basic Operational concepts	1	4
1.4	Bus structures, Software, Performance	2	6
1.5	Introduction of Register Transfer	1	7
1.6	Micro-Operations , Register Transfer Language	2	9
1.7	Bus and memory Transfers.	1	10
1.8	Arithmetic Micro-operations, Logic Micro operations	2	12
1.9	Shift Micro-operations, Arithmetic Logic Shift Unit	2	14
1.10	Basic Computer Organization and Design	2	16
1.11	Instruction codes	1	17
1.12	Computer Registers, Computer Instructions	2	19
1.13	Timing and Control	1	20
1.14	Instruction cycle	1	21
1.15	Memory Reference Instructions, Input-Output and Interrupts	1	22
	UNIT 2:		
2.1	Introduction to Central Processing Unit	1	23
2.2	General register Organization	1	24
2.3	Stack Organization	2	26
2.4	Instruction Formats	2	28
2.5	Addressing Modes	2	30
2.6	Data Transfer and Manipulation	1	31
2.7	Program Control, Reduced Instruction Set Computer (RISC).	1	32
2.8	Micro Programmed Control : Control memory	1	33
2.9	Address sequencing	2	35
2.10	micro program example, design of control unit	2	37
	UNIT 3:		
3.1	Introduction of Computer Arithmetic	1	38
3.2	Addition and subtraction Algorithms	2	40
3.3	multiplication Algorithms	1	41
3.4	Division Algorithms	1	42

3.5	Floating – point Arithmetic operations	1	43
3.6	Introduction of Memory Organization,Memory Hierarchy	1	44
3.7	Main Memory, Auxiliary memory	2	46
3.8	Associative Memory, Cache Memory	2	48
3.9	Virtual Memory	1	49
3.10	Memory Management Hardware.Input Output	1	50
	UNIT 4:		
4.1	Introduction of Organization,Peripheral Devices	1	51
4.2	Input-output Interface	1	52
4.3	Asynchronous Data Transfer, Modes of Transfer,	2	54
4.4	Priority Interrupt	1	55
4.5	Direct Memory Access (DMA)	1	56
4.6	Input-Output Processor	1	57
4.7	Serial Communication, Standard I/O Interfaces	1	58
4.8	PCI Bus, USB	1	59
4.9	Pipeline and vector processing,parallel processing	1	60
4.10	Pipelining, Arithmetic pipeline	1	61
4.11	Instruction pipeline	1	62
4.12	RISC Pipeline, Vector Processing	1	63

TEXT BOOKS:

1 Morris M. Mano, Computer Systems Architecture.3 Ed, Pearson/PHI, 2013
2.Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

REFERENCE BOOKS:

John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.

B. M 16/3/21
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16/3/21
Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE
Name of the Faculty: Dr.Ch.Surya Kiran
Designation: Professor
Name of the subject: Artificial Intelligence
Academic Year: 2020– 2021
Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction	1	1
1.2	History, Intelligent Systems	1	2
1.3	Foundations of AI, Sub areas of AI, Applications	1	3
1.4	Problem Solving – State-Space Search	2	5
1.5	General Problem Solving, Characteristics of Problem	1	6
1.6	Exhaustive Searches	2	8
1.7	Heuristic Search Techniques	2	10
1.8	Iterative-Deepening A*, Constraint Satisfaction	2	12
	UNIT 2:		
2.1	Logic Concepts and Logic Programming: Introduction,	1	13
2.2	Propositional Calculus	1	14
2.3	Propositional Logic, Natural Deduction System, Resolution Refutation in Propositional Logic	2	16
2.4	Predicate Logic	2	18
2.5	Logic Programming Representing Knowledge Using Rules: Logic programming	2	20
2.6	Procedural Vs Declarative knowledge	1	21
2.7	Forward Vs Backward Reasoning, Matching	1	22
2.8	Control Knowledge Representation: Introduction	1	23
2.9	Approaches to Knowledge Representation	2	25
2.10	Knowledge Representation using Semantic Network	1	26
2.11	Extended Semantic Networks for KR	1	27
2.12	Knowledge Representation using Frames	1	28
2.13	Conceptual dependencies, Scripts	1	29
	UNIT-3		
3.1	Learning from observation - Inductive learning – Decision trees – Explanation based learning –	2	31
3.2	Learning methods - Reinforcement Learning	1	32
3.3	Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning,	1	33
3.4	Statistical Truth Maintenance Systems,	1	34
3.5	Logics for Non-Monotonic Reasoning,	2	36
3.6	Statistical Reasoning: Bayes Theorem,	2	38
3.7	Certainty Factors and Rule-Based Systems,	1	39

3.8	Bayesian Probabilistic Inference,	1	40
3.9	Bayesian Networks, DempsterShafer Theory	2	42
3.10	Planning: Components of a Planning System, Goal Stack Planning,	1	43
3.11	Non-linear Planning using Constrait Posting, Hierarchical Planning,	1	44
3.12	Reactive Systems	1	45
	UNIT-4		
4.1	Natural Language Processing: Steps in The Natural Language Processing, ,	1	46
4.2	Syntactic Processing and Augmented Transition Nets,	1	47
4.3	Semantic Analysis,	1	48
4.4	NLP Understanding Systems;	1	49
4.5	Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control	1	50
4.6	Fuzzy Inferences & Fuzzy Systems Planning with state-space search – partial-order	2	52
4.7	planning – planning graphs – planning and acting in the real world	1	53
4.8	Experts Systems: Overview of an Expert System,	1	54
4.9	Architecture of an Expert Systems,	1	55
4.10	Different Types of Expert Systems,	1	56
4.11	Architectures, Knowledge Acquisition and Validation Techniques,	1	57
4.12	Knowledge System Building Tools, Expert System Shells.	2	59
4.13	AI Programming languages: Overview of LISP and PROLOG, Production System in Prolog	1	60

TEXT BOOKS:

1. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata Mcgraw-Hill Publications
2. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI publication

REFERENCE BOOKS:

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall
3. Artificial Intelligence, Robert Schalkoff, Mcgraw-Hill Publications
4. Artificial Intelligence and Machine Learning, Vinod Chandra S.S., Anand Hareendran S.

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: R. Seetharam

Designation: Assistant Professor

Name of the subject: Computer Organization

Academic Year: 2020- 2021

Year / Semester: II/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Basic Structure Of Computers**	1	1
1.2	Computer Types	1	2
1.3	Functional unit	1	3
1.4	Basic Operational concepts	1	4
1.5	Bus structures	1	5
1.6	Software, Performance	1	6
1.7	Register Transfer Language	1	7
1.8	Register Transfer	1	8
1.9	Bus and memory Transfers	1	9
1.10	Arithmetic Micro-operations	1	10
1.11	Logic Microoperations	1	11
1.12	Shift Micro-operations, Arithmetic Logic Shift Unit	1	12
1.13	**Basic Computer Organization and Design:** Instruction codes	1	13
1.14	Computer Registers , Computer Instructions	1	14
1.15	Timing and Control, Instruction cycle	1	15
1.16	Memory Reference Instructions, Input-Output and Interrupts	1	16
	UNIT 2:		
2.1	**Central Processing Unit:** General register Organization	1	17
2.2	Stack Organization, Instruction Formats	2	19
2.3	Addressing Modes	2	21
2.4	Data Transfer and Manipulation	2	23
2.5	Program Control	1	24
2.6	Reduced Instruction Set Computer (RISC)	1	25
2.7	**Micro Programmed Control** : Control memory	1	26
2.8	Address sequencing, Micro program example	2	28
2.9	Design of control unit	2	30

	UNIT-3		
3.1	**Computer Arithmetic :** Addition and subtraction	2	32
3.2	multiplication Algorithms	2	34
3.3	Division Algorithms	2	36
3.4	Floating – point Arithmetic operations	2	38
3.5	**Memory Organization:** Memory Hierarchy	1	39
3.6	Main Memory	1	40
3.7	Auxiliary memory, Associative Memory	1	41
3.8	Cache Memory	1	42
3.9	Virtual Memory	1	43
3.10	Memory Management Hardware	1	44
3.11	**Input Output**	1	45
	UNIT-4		
4.1	**Organization**: Peripheral Devices	1	46
4.2	Input-output Interface	1	47
4.3	Asynchronous Data Transfer	1	48
4.4	Modes of Transfer	1	49
4.5	Priority Interrupt	1	50
4.6	Direct Memory Access (DMA)	2	52
4.7	Input-Output Processor	1	53
4.8	Serial Communication	1	54
4.9	Standard I/O Interfaces: PCI Bus, USB	1	55
4.10	**Pipeline and vector processing**: parallel processing	1	56
4.11	Pipelining, Arithmetic pipeline	1	57
4.12	Instruction pipeline, RISC Pipeline	2	59
4.13	Vector Processing	1	60

TEXT BOOKS:

1. Morris M. Mano, Computer Systems Architecture.3 Ed, Pearson/PHI, 2013
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

REFERENCE BOOKS:

John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.

E-RESOURCES:

https://www.tutorialspoint.com/computer_organization/index.asp
https://www.geeksforgeeks.org/computer-organization-basic-computer-instructions/

16/3/21

Prepared: Faculty / Date

16/3/21

Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE
Designation: Assoc.Professor
Academic Year: 2020– 2021
Name of the Faculty: Mr.Narendra Babu P
Name of the subject: Compiler Design
Year / Semester: III/1

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Overview of language processing	1	1
1.2	pre-processors	1	2
1.3	compiler – assembler – interpreters	2	4
1.4	pre-processors, – linkers &loaders	2	6
1.5	structure of a compiler	2	8
1.6	Role of Lexical Analysis	2	10
1.7	Lexical Analysis Vs. Parsing	1	11
1.8	Token & Lexemes	2	13
1.9	Recognitions of tokens	1	14
	UNIT 2:		
2.1	**Top down Parsing:** Context free grammars	3	17
2.2	Backtracking	2	19
2.3	First and Follow	2	21
2.4	LL(1) Grammars	3	24
2.5	Non-Recursive predictive parsing	2	26
2.6	Error recovery in predictive parsing.	1	27
2.7	simple LR	1	28
2.8	Model of an LR Parsers	1	29
2.9	Difference between LR and LL Parsers	1	30
2.10	SLR	2	32
2.11	construction of CLR (1)	2	34
2.12	LALR Parsing tables	2	36
2.13	Dangling ELSE Ambiguity	2	38
2.14	Error recovery in LR Parsing	1	39

	UNIT-3		
3.1	Semantic analysis	1	40
3.2	SDT Schemes & evaluation of semantic rules	2	42
3.3	Intermediate code	2	44
3.4	Types and declarations & type Checking.	2	46
3.5	Runtime Environments	1	47
3.6	Stack allocation of space	2	49
3.7	Heap Management code generation	2	51
3.8	Basic blocks and Flow graphs	3	54

3.9	A Simple Code generation	1	55
	UNIT-4		
4.1	Machine independent code optimization Techniques common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling, inter procedural optimization.	6	61
4.2	Object code forms	1	62
4.3	machine dependent code optimization	2	64
4.4	register allocation and assignment generic code generation algorithms	2	66
4.5	DAG for register allocation	2	68

TEXT BOOKS:

1. Alfred V. Aho, Ravi Sethi& Jeffrey. D. Ullman, "Compilers Principles, Techniques & Tools", Pearson Education, third edition, 2007.
2. Andrew N. Appel, "Modern Compiler Implementation in C", Cambridge University Press, 2004.

REFERENCE BOOKS:

1. John R. Levine, Tony Mason, Doug Brown, "lex&yacc", O'Reilly Media, Inc., 1992.
2. Kenneth C. Louden, Compiler Construction: Principles and Practice, Course Technology Inc; International edition, 1997

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Verified: HOD /Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE
Name of the Faculty: Mr.B.Venu Gopal
Designation: Assoc.Professor
Name of the subject: Compiler Design
Academic Year: 2020- 2021
Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Overview of language processing	1	1
1.2	pre-processors	1	2
1.3	compiler – assembler – interpreters	2	4
1.4	pre-processors, – linkers &loaders	2	6
1.5	structure of a compiler	2	8
1.6	Role of Lexical Analysis	2	10
1.7	Lexical Analysis Vs. Parsing	1	11
1.8	Token & Lexemes	2	13
1.9	Recognitions of tokens	1	14
	UNIT 2:		
2.1	**Top down Parsing:** Context free grammars	3	17
2.2	Backtracking	2	19
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2.6	Error recovery in predictive parsing.	1	27
2.7	simple LR	1	28
2.8	Model of an LR Parsers	1	29
2.9	Difference between LR and LL Parsers	1	30
2.10	SLR	2	32
2.11	construction of CLR (1)	2	34
2.12	LALR Parsing tables	2	36
2.13	Dangling ELSE Ambiguity	2	38
2.14	Error recovery in LR Parsing	1	39

	UNIT-3		
3.1	Semantic analysis	1	40
3.2	SDT Schemes & evaluation of semantic rules	2	42
3.3	Intermediate code	2	44
3.4	Types and declarations & type Checking.	2	46
3.5	Runtime Environments	1	47
3.6	Stack allocation of space	2	49
3.7	Heap Management code generation	2	51
3.8	Basic blocks and Flow graphs	3	54

3.9	A Simple Code generation	1	55
	UNIT-4		
4.1	Machine independent code optimization Techniques common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling, inter procedural optimization.	6	61
4.2	Object code forms	1	62
4.3	machine dependent code optimization	2	64
4.4	register allocation and assignment generic code generation algorithms	2	66
4.5	DAG for register allocation	2	68

TEXT BOOKS:

1. Alfred V. Aho, Ravi Sethi& Jeffrey. D. Ullman, "Compilers Principles, Techniques & Tools", Pearson Education, third edition, 2007.
2. Andrew N. Appel, "Modern Compiler Implementation in C", Cambridge University Press, 2004.

REFERENCE BOOKS:

1. John R. Levine, Tony Mason, Doug Brown, "lex&yacc", O'Reilly Media, Inc., 1992.
2. Kenneth C. Louden, Compiler Construction: Principles and Practice, Course Technology Inc; International edition, 1997

8/3/21
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: M.Spandana

Designation: AssistantProfessor

Name of the subject: Data structures

Academic Year: 2020– 2021

Year / Semester:

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1: Data Structures, Recursion, Searching, and Sorting		
1.1	**Data Structures:** Definition, Types of Data Structures, Arrays	1	1
1.2	Structures, Self-referential structures, Operations	2	3
1.3	Algorithm analysis Time Complexity and Space Complexity.	2	5
1.4	**Recursion:** Definition, Linear and Binary recursions, Iteration vs. Recursion	2	7
1.5	**Searching:** Linear Search, Binary Search	2	9
1.6	**Sorting:** Basic concepts, Divide-and-Conquer approach, Insertion Sort	2	11
1.7	Merge Sort, Quick Sort	2	13
1.8	Heap Sort.	2	15
	UNIT 2:Linked Lists, Stacks, and Queues.		
2.1	**Linked Lists:** Introduction, Types of Linked Lists, Operations	1	16
2.2	Inserting a node in Single Linked List, Deleting a node in Single Linked List	2	18
2.3	Inserting, Deleting a node in Double Linked List.	2	20
2.4	Searching a node in Double Linked List.	1	21
2.5	**Stacks:** Introduction, Operations, Applications,	2	23
2.6	Stacks implementation using Arrays,	2	25
2.7	Stacks implementation using Linked List	1	26
2.8	Expression Conversion: Infix to Postfix,	1	27
2.9	Infix to Prefix	1	28
2.10	**Queues:** Introduction, operations, applications	2	30
2.11	Queues implementation using Arrays	1	31
2.12	Queues implementation using Linked Lists	1	31
2.13	Circular Queue	1	33
2.14	Priority Queues	1	34

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	UNIT-3Trees.		
3.1	Basic Tree Concepts, Terminology, operations	2	36
3.2	Tree traversals	1	37
3.3	**Binary Trees:** definition, properties, Binary Tree representations	1	38
3.4	Operations	1	39
3.5	**Binary Search Tree:** definition, properties, applications, Inserting	2	41
3.6	Deleting, and Searching element in Binary Search Tree	2	43
3.7	**Threaded Binary Tree:** definition, properties	1	44
3.8	Inserting a Node into a Threaded Binary Tree	1	45
3.9	**Heaps:** Definition of a Max Heap, properties	2	47
	UNIT-4Graphs		
4.1	**Graphs:** Introduction, Terminology, Representation of graphs,	1	48
4.2	Types of graphs, applications	1	49
4.3	Operations, Graph transversal techniques: Breadth First Search (BFS),	1	50
4.4	Depth First Search (DFS), implementations	1	51
4.5	**Minimum Spanning Tree (MST):** definition, Prim's algorithm,	1	52
4.6	Kruskal's algorithm	2	53
4.7	**Shortest paths:** Basic Concepts, Dijsktra's algorithm	2	55

TEXT BOOKS:

1. Fundamentals of DATA STRUCTURES in C, Horowitz,SartajSahani, Susan Anderson – Freed, University Press
2.Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage

REFERENCE BOOKS

1 .Data Structures using C, 2nd Edition,by A. K. Sharma, Pearson India
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI,2009
3. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH
4. DATA STRUCTURE USING C,UditAgarwal,KATSON Books
5. Data Structures using C,ReemaThareja, Oxford

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: ASSISTANT PROFESSOR

Academic Year: 2020-21

Name of the Faculty: CH.SATHA KUMARI

Name of the subject: Software Engineering

Year / Semester: II/II

TOPIC	No. of Lectures	Cummulative hours
UNIT -I		
The Nature of Software, Defining Software	1	1
Software Application Domains, Legacy Software,	1	2
The Unique Nature of Web Apps, Software Engineering	1	3
The Software Process, Software Engineering Practice,	1	4
The Essence of Practice, General Principles	1	5
Software Myths ,The Software Process: Process Models,	1	6
A Generic Process Model,	1	7
Process Assessment and Improvement,	1	8
Prescriptive Process Models,	1	9
Specialized Process Model s,	1	10
The Unified Process, Personal and Team Process Models,	1	11
Process Technology, Product and Process.	1	12
What Is Agility? Agility and the Cost of Change. What Is an Agile Process?	1	13
Extreme Programming (XP)	1	14
Other Agile Process Models, A Tool Set for the Agile Process	1	15
UNIT -2		
Requirements Engineering, Establishing the Groundwork,	1	16
Eliciting Requirements, Developing Use Cases,	1	17
Building the Requirements Model	1	18
Negotiating Requirements, Validating Requirements.	1	19
Scenarios, Information and Analysis classes	1	20
Requirements Analysis, Scenario-Based Modeling,	1	21
UML Models That Supplement the Use Case	1	22
Data Modeling Concepts, Class-Based Modeling.	1	23
Flow, Behavior, Patterns, And Web apps	1	24
Requirements Modeling Strategies.	1	25
Flow-Oriented Modeling,	1	26
Creating a Behavioral Model	1	27
Patterns for Requirements Modeling,	1	28
Requirement modeling for WebApps	1	29
UNIT -3		

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Design within the Context of Software Engineering the Design Model	1	30
the Design Process, Design Concepts,	1	31
Architectural Design: Software Architecture	1	32
Architectural Genres, Architectural Styles	1	33
Architectural Design, Assessing Alternative Architectural Designs.	1	34
What Is a Component? Designing Class-Based Components User,	1	35
Conducting Component Level Design,	1	36
Component level design for Web Apps.	1	37
Performing User Interface Design: The Golden Rules,	1	38
Interface Analysis and Design	1	39
Interface Design Steps,	1	40
Interface Analysis,	1	41
UNIT -4		
Software Testing Strategies: A Strategic Approach to Software Testing	1	42
Strategic Issues, Test Strategies for Conventional Software,	1	43
Test Strategies for Object-Oriented Software,	1	44
Validation testing,	1	45 46
Testing System testing	1	47
the art of debugging.	1	48 49
Testing Conventional Applications: Software Testing Fundamentals	1	50
Internal and External Views of Testing,	1	51 52
White Box Testing, Basis Path Testing,	1	53
Black-Box Testing	1	54
Model-Based Testing	1	55
Testing for Specialized Environments	1	56
Architectures, and Applications	1	57
Patterns for Software Testing	1	58

<u>**Text Books :**</u>

Roger S.Pressman, "Software Engineering- A Practitioner's Approach". Tata McGraw-Hill International 7th ed, 2010

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: ASSISTANT PROFESSOR

Academic Year: 2020-21

Name of the Faculty: CH.SATHA KUMARI

Name of the subject: Software Testing Methodologies

Year / Semester: III/II

TOPIC	No. of Lectures	Cumulative hours
UNIT-I : Introduction	2	2
Purpose of Testing,	1	3
Dichotomies	1	4
Model for Testing	1	5
Consequences ofBugs	1	6
Taxonomy of Bugs	2	8
Flow graphs and Path testing: Basics Concepts of Path Testing	1	9
Predicates, Path PredicatesandAchievable Paths	1	10
Path Sensitizing	1	11
Path Instrumentation	1	12
Application of Path Testing.	1	13
Transaction Flow Testing: Transaction Flows	2	15
Transaction Flow Testing Techniques	2	17
UNIT-II		
Dataflow testing: Basics of Dataflow Testing	1	18
Strategies in Dataflow Testing	1	19
Application of Dataflow Testing.	1	20
Domain Testing: Domains and Paths	2	22
Nice & Ugly Domains	1	23
Domain testing	1	24
Domains and Interfaces Testing	1	25
Domains and Testability.	1	26
Paths, Path products and Regular expressions : Path Products & Path Expression	2	28
ReductionProcedure	1	29
Applications	2	31
Regular Expressions	1	32
Flow Anomaly Detection	1	33
UNIT-III		
Syntax Testing: Why, What and How	1	34
A Grammar for formats	1	35
Test Case Generation	2	37

Implementation and Application	1	38
Testability Tips.	1	39
Logic Based Testing: Overview	1	40
Decision Tables	2	42
Path Expressions	2	44
KV Charts	2	46
Specifications.	1	47
UNIT-IV:		
State, State Graphs and Transition Testing: State Graphs	2	49
Good & Bad State Graphs	1	50
StateTesting	2	52
Testability Tips.	1	53
Graph Matrices and Application:-Motivational overview	1	54
matrix of graph	1	55
relations	1	56
power of a matrix	1	57
node reduction algorithm	2	59
Software Testing Tools: Introduction to Testing, Automated Testing,concepts of test automation	2	61
Introduction to list of tools like Win runner	1	62
Load Runner, Jmeter	1	63

TEXT BOOKS:

1. **SOFTWARE TESTING TECHNIQUES, Boris bizer, Dreamtech, 2nd Edition**

2. **SOFTWARE TESTING , Yogesh Singh , Camebridge**

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TEACHING PLAN

Department: CSE
Designation: ASST.PROFESSOR
Academic Year: 2020– 2021

Name of the Faculty: Mr.Ch.Poorna Venkata Srinivasa Rao
Name of the subject: Design and Analysis of Algorithms
Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to Algorithms	1	1
1.2	Fundamentals of algorithmic problem solving	1	2
1.3	Analysis framework	1	3
1.4	Performance Analysis	1	4
1.5	Space complexity	1	5
1.6	Time complexity	1	6
1.7	Growth of Functions	1	7.
1.8	Asymptotic Notation	1	8
1.9	Big oh notation	1	9
1.10	Omega notation	1	10
1.11	Theta notation	1	11
1.12	little oh	1	12
1.13	Probabilistic analysis	1	13
1.14	Amortized analysis	1	14
1.15	Divide and conquer	1	15
1.16	General method	1	16
1.17	applications-Binary search	1	17
1.18	Quick sort	1	18
1.19	Merge sort	1	19
1.20	Finding the Maximum and Minimum	1	20
	UNIT 2:		
2.1	Greedy method	1	21
2.2	The General Method	1	22
2.3	Knapsack Problem	2	24
2.4	Job Sequencing with Deadlines	2	26
2.5	Minimum-cost Spanning Trees	2	28
2.6	Prim's Algorithm	1	29
2.7	Kruskal's Algorithms	1	30
2.8	Optimal Merge Patterns	2	31
2.9	Single Source Shortest Paths	2	32

	UNIT-3		
3.1	Dynamic Programming	1	33
3.2	General method	1	34
3.3	applications-Matrix chain multiplication	2	36
3.4	Optimal binary search trees	2	38

3.5	0/1knapsack problem	2	40
3.6	All pairs shortest path problem	2	42
3.7	Travelling sales person problem	2	44
3.8	Reliability design	1	45
	UNIT-4		
4.1	Backtracking	1	46
4.2	General method	1	47
4.3	applications-n-queen problem	2	49
4.4	sum of subsets problem	2	51
4.5	graph coloring	1	52
4.6	Hamiltonian cycles	1	53
4.7	Branch and Bound	1	54
4.8	General method	1	55
4.9	applications	1	56
4.10	Travelling sales person problem	2	58
4.11	0/1 knapsack problem	2	60
4.12	LC Branch and Bound solution	2	62
4.13	FIFO Branch and Bound solution	2	64
4.14	P and NP problems	2	66
4.15	NP-Complete problems	2	68

TEXT BOOKS:

Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekaran, University press

REFERENCE BOOKS:

1. Introduction to The Design and Analysis of Algorithms, 3rd Edition, Anany Levitin, Pearson Education, 2017.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L. Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.
4. Algorithms – Richard Johnson Baugh and Marcus Schaefer, Pearson Education.

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TEACHING PLAN

Department: CSE
Name of the Faculty: K. UdayaSri
Designation: Associate Professor
Name of the subject: Concurrent & Parallel Programming
Academic Year: 2020– 2021
Year / Semester: IV/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Concurrent programming constructs	1	1
1.2	Concurrent versus sequential programming	1	2
1.3	Race condition	1	3
1.4	Synchronization primitives	2	5
1.5	Concurrent programming constructs	1	6
1.6	Concurrent versus sequential programming	2	8
1.7	race condition	2	10
1.8		2	12
	UNIT 2:		
2.1	Interprocess communication	2	14
2.2	Livelock and deadlocks	2	16
2.3	Starvation	2	18
2.4	deadlock prevention.	2	20
2.5	Processes and threads	2	22
2.6	Issues and challenges in concurrent programming paradigm and current trends.	1	23
	UNIT-3		
3.1	Parallel algorithms	2	25
3.2	prefix sum etc.,	2	27
3.3	ranking	1	28
3.4	searching	2	30
3.5	sorting	2	32
3.6	Traversals	2	34
	UNIT-4		
4.1	Data parallel, Task parallel	2	36
4.2	GPGPU	1	37
4.3	Parallel Architectures	2	39
4.4	Parallel programming paradigms	1	40
4.5	pthreads	2	42
4.6	Shared memory and message passing	2	44
4.7	STM	1	45

	UNIT-5		
5.1	CUDA	2	47
5.2	Intel TBB	1	48
5.3	OpenCL	2	50
5.4	OpenMP	2	52
	UNIT-6		
6.5	C++AMP	1	53
6.6	Heterogeneous Computing	2	55
6.7	OpenCL	1	56
6.8	C++AMP	2	58
6.9	Algorithms	2	60

TEXT BOOKS:

1. Mordechai Ben-Ari. Principles of Concurrent and Distributed Programming, Prentice-Hall International.
2. Greg Andrews. Concurrent Programming: Principles and Practice, Addison Wesley.
3. GadiTaubenfeld. Synchronization Algorithms and Concurrent Programming, Pearson.
4. M. Ben-Ari. Principles of Concurrent Programming, Prentice Hall.
5. Fred B. Schneider. On Concurrent Programming, Springer.
6. Brinch Hansen. The Origins of Concurrent Programming: From Semaphor

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NRIIT/7.5.1/RC 04

TEACHING PLAN

Department: CSE
Name of the Faculty: Dr.K.SWATHI
Designation: Professor
Name of the subject: Distributed Database Management Systems
Academic Year: 2020 – 2021
Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction of object database systems	2	2
1.2	Structured data types, operations on structured data	2	4
1.3	encapsulation and ADTS, Inheritance	2	6
1.4	Database design for ORDBMS	1	7
1.5	ORBMS implementation and challenges	2	9
1.6	OODBMS, comparison of RDBMS	1	10
1.7	OODBMS and ORDBMS	2	12
1.8	Introduction to Parallel databases	2	14
1.9	architectures for parallel databases	1	15
1.10	Parallel Query Evaluation: Data partitioning and parallelizing sequential operator evaluation code	1	16
1.11	parallelizing individual operations	2	18
1.12	parallel query optimization	1	19
	UNIT 2:		
2.1	Introduction to distributed databases	2	21
2.2	Features of distributed databases vs centralized databases	2	23
2.3	Why distributed databases	2	25
2.4	DDBMS: Levels of transparency, reference architecture for DDB	2	27
2.5	types of data fragmentation	1	28
2.6	distribution transparency for read-only and update applications	2	30
2.7	distributed database access primitives	2	31
2.8	Integrity constraints in distributed databases	2	33
	UNIT 3:		
3.1	Distributed database design: framework for distributed database design	2	35
3.2	the design of database fragmentation	2	37
3.3	allocation of fragments;	2	39
3.4	Distributed Query processing: Equivalence of transformations for queries	2	41
3.5	transforming global queries into fragment queries	2	43
3.6	distributed grouping and aggregation functions	3	46
	UNIT 4:		
4.1	A framework for query optimization	1	47
4.2	join queries and general queries	2	49

4.3	non-join queries in a distributed DBMS	2	50
4.4	joins in a distributed DBMS	1	51
4.5	cost based query optimization	1	52
4.6	DBMS Vs IR systems	1	53
4.7	Introduction to Information retrieval	2	55
4.8	Indexing for text search	2	57
4.9	web search engine	1	58
4.10	managing text in a DBMS	1	59
4.11	a data model for XML	1	60
4.12	Querying XML data	1	61
4.13	efficient evaluation of XML queries	1	62

TEXTBOOKS:

1. Raghuramakrishnan and Johannes Gehrke, "Database Management Systems", 3rd Edition, TMH, 2006.
2. S Ceri and G Pelagatti, "Distributed databases principles and systems", 1st Edition, TMH, 2008.

REFERNCE BOOKS:

1. Silberschatz, Korth, "Database System Concepts", 6th Edition, TMH, 2010.
2. Elmasri R, Navathe S B, Somayajulu D V L N, and Gupta S K, "Fundamentals of Database Systems", 5th Edition, Pearson Education,2009.
3. C. J. Date, "Introduction to Database Systems", 8th Edition, Pearson Education, 2009.

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NRIIT/7.5.1/RC 04

TEACHING PLAN

Department: CSE
Designation: Professor
Academic Year: 2019 – 2020
Name of the Faculty: Dr.K.SWATHI
Name of the subject: Machine Learning
Year / Semester: IV/ II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**The ingredients of machine learning, Tasks:** The problems that can be solved with machine learning	2	2
1.2	Models: the output of machine learning	2	4
1.3	Features, the workhorses of machine learning.	2	6
1.4	**Binary classification and related tasks:** Classification	1	7
1.5	Scoring and ranking	2	9
1.6	Class probability estimation	1	10
	UNIT 2:		
2.1	**Beyond binary classification:** Handling more than two classes	2	12
2.2	Regression	2	14
2.3	Unsupervised and descriptive learning	2	16
2.4	**Concept learning**: The hypothesis space,	2	17
2.5	Paths through the hypothesis space	2	19
2.6	Beyond conjunctive concepts	2	21
	UNIT 3:		
3.1	**Tree models:** Decision trees	1	22
3.2	Ranking and probability estimation trees	2	24
3.3	Tree learning as variance reduction	2	26
3.4	**Rule models:** Learning ordered rule lists	1	27
3.5	Learning unordered rule sets	2	29
3.6	Descriptive rule learning, First-order rule learning	2	31
	UNIT-4		
4.1	**Linear models:** The least-squares method	2	33
4.2	The perceptron: a heuristic learning algorithm for linear classifiers	2	35
4.3	Support vector machines	2	37
4.4	Obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods	1	38
4.5	**Distance Based Models:** Introduction, Neighbours and exemplars	2	40
4.6	Nearest Neighbours classification	1	41
4.7	Distance Based Clustering, Hierarchical Clustering.	2	43

	UNIT-5		
5.1	**Probabilistic models:** The normal distribution and its geometric interpretations	1	44
5.2	Probabilistic models for categorical data	2	46
5.3	Discriminative learning by optimizing conditional Likelihood Probabilistic models with hidden variables	2	48
5.4	**Features:** Kinds of feature, Feature transformations	2	50
5.5	Feature construction and selection.	1	51
5.6	Model ensembles: Bagging and random forests, Boosting	1	52
	UNIT-6		
6.1	**Dimensionality Reduction:** Principal Component Analysis (PCA)	1	53
6.2	Implementation and demonstration.	2	55
6.3	**Artificial Neural Networks:** Introduction, Neural network representation	1	56
6.4	Appropriate problems for neural network learning	2	58
6.5	Multilayer networks and the back propagation algorithm	2	60

TEXTBOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERNCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben- David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

Prepared: Faculty / Date

Verified: HOD/Date

16/3/21

Head, CSE Department
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: K.CHANDRA MOULI

Designation: ASSOCIATE PROFESSOR

Name of the subject: Web Technologies and Advanced Java Programming

Academic Year: 2020-2021

Year / Semester: II/II

S. No	Topics to be covered	No. of Lectures	Cumulative No. of Lectures
	UNIT I:		
1	HTML tags	2	2
2	Lists	1	3
2	Tables	2	5
3	Images, forms	2	7
4	Frames	2	9
5	Cascading style sheets	2	11
6	Introduction to Java script. Objects in Java Script.	4	15
7	Dynamic HTML with Java Script	2	17
	UNIT II:		
8	XML Introduction	2	19
9	Document type Definition	2	21
10	XML schemas	2	23
11	Document object model	2	25
12	XSLT	2	27
13	SAX	2	29
14	UNIT III:		
15	**Web servers and servlets:** Life cycle of a servlet JSDK,	2	31
16	The servlet API	2	33
17	The Javax.servlet package	2	36
18	Reading servlet packages and initialization parameters	2	38
19	The Javax.servlet http package	2	40
20	Reading Servlet parameters, and Reading Initialization parameters.,	2	42
21	Handling Http Request & Responses	2	44
22	Using Cookies-Session Tracking, Security Issues.	2	46
	UNIT IV		
23	Database Access: Database Programming using JDBC	2	48
24	studying javax.sql.* package, accessing a database from a JSP page	2	50
25	Introduction to JSP: The Problem with Servlet.	2	52
26	Anatomy of a JSP Page	1	53
27	JSP Application Development: Generating Dynamic Content, Using Scripting ElementsImplicit JSP Objects	2	55
28	Conditional Processing–Displaying Values Using an Expression to Set	2	57

	an Attribute		
29	Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages	2	59
30	Requests, and Users Passing Control and Date between Pages	1	60
31	Sharing Session and Application Data–Memory Usage Considerations	2	62

TEXT BOOKS:

- The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH
- Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
- Web Technologies, Uttam K Roy, Oxford Java Server Pages , Hans Bergstan, Oreilly

17/3/2021

Prepared: Faculty / Date **Verified: HOD/Date**

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assoc. Professor

Academic Year: 2020– 2021

Name of the Faculty: CH.V.MURALI KRISHNA

Name of the subject: DAA

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1: Introduction to Algorithms		
1.1	Fundamentals of algorithmic problem solving	2	2
1.2	Analysis framework, Performance Analysis: - Space complexity	2	4
1.3	Time complexity, Growth of Functions	2	6
1.4	Asymptotic Notation- Big oh notation	2	8
1.5	Omega notation, Theta notation, little oh	2	10
1.6	**Divide and Conquer:** General method, applications-Binary search	2	12
1.7	Quick sort, Merge sort	2	14
1.8	Finding the Maximum and Minimum	2	16
	UNIT 2: Greedy method		
2.1	Probabilistic analysis, Amortized analysis	2	18
2.2	**Greedy method:** The General Method	1	19
2.3	0/1 Knapsack Problem	1	20
2.4	Job Sequencing with Deadlines	1	21
2.5	Minimum-cost Spanning Trees	2	23
2.6	Prim's Algorithm	1	24
2.7	Kruskal's Algorithms	1	25
2.8	Optimal Merge Patterns	2	27
2.9	Single Source Shortest Paths	2	29
	UNIT-3 Dynamic Programming		
3.1	General method	2	31
3.2	Applications	1	32
3.3	Matrix chain multiplication	2	34
3.4	Optimal binary search trees	2	36
3.5	0/1knapsack problem	2	38
3.6	All pairs shortest path problem	2	40
3.7	Travelling sales person problem	2	41
3.8	Reliability design	2	43
	UNIT-4 Backtracking		
4.1	General method, applications-n-queen problem	2	45
4.2	sum of subsets problem	2	47
4.3	graph coloring	1	48
4.4	Hamiltonian cycles	1	49

4.5	**Branch and Bound:** General method	1	50
4.6	Applications	1	51
4.7	Travelling sales person problem	1	52
4.8	0/1 knapsack problem	1	53
4.9	LC Branch and Bound solution	2	55
4.10	FIFO Branch and Bound solution	2	57
4.11	P and NP problems	3	60
4.12	NP-Complete problems	2	62

TEXT BOOKS:

Fundamentals of Computer Algorithms, Ellis Horowitz,,SatrajSahni and Rajasekaran, University press

REFERENCE BOOKS:

1. . Introduction to The Design and Analysis of Algorithms, 3rd Edition, Anany Levitin, Pearson Education, 2017.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L. Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.

4.Algorithms – Richard Johnson Baugh and Marcus Schaefer, Pearson Education

17/3/2021

Prepared: Faculty / Date

Verified: HOD/Date

Head, CSE Department
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TEACHING PLAN

Department: CSE

Name of the Faculty: CH.V.MURALI KRISHNA

Designation: Assoc. Professor

Name of the subject: C.C & A.D

Academic Year: 2020– 2021

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT-1:Systems modeling, Clustering and virtualization		
1.1	Scalable Computing over the Internet, Technologies for Network based systems	2	2
1.2	System models for Distributed and Cloud Computing	2	4
1.3	Software environments for distributed systems and clouds	2	6
1.4	Performance, Security And Energy Efficiency	2	8
1.5	**Virtual Machines and Virtualization of Clusters and Data Centers:** Implementation Levels of Virtualization	2	10
1.6	Virtualization Structures/ Tools and mechanisms, Virtualization of CPU	2	12
1.7	Memory and I/O Devices, Virtual Clusters and Resource Management	2	14
1.8	Virtualization for Data Center Automation	2	16
	UNIT-2: Cloud Platform Architecture		
2.1	Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds	2	18
2.2	Public Cloud Platforms, Inter Cloud Resource Management	2	20
2.3	Cloud Security and Trust Management, Service Oriented Architecture,	1	20
2.4	Message Oriented Middleware	2	22
2.5	**Cloud Programming and Software Environments:** Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms	2	24
2.6	Programming Support of Google App Engine,	2	26
2.7	Programming on Amazon AWS and Microsoft Azure	2	28
2.8	Emerging Cloud Software Environments	2	30
	UNIT-3 Cloud Based Applications		
3.1	**Cloud Based Applications :** developing web service, Understanding cloud ecosystem- SaaS/PaaS, Popular APIs	2	32
3.2	**Designing Code for The Cloud:** Designing cloud infrastructure; Web Browsers and the Presentation Layer-Understanding Web browsers attributes and differences	3	35

3.3	Building blocks of the presentation layer: HTML, HTML5, CSS, Silver-light, flash, java script, JQuery, Boot Strap	4	39
3.4	**Web Development Techniques and Frameworks:** Working with AJAX controls, JQuery, JSON, XML, REST	3	42
3.5	Working on Application development Frameworks e.g. Ruby on Rails	2	46
3.6	.Net, Java API's or JSF; Deployment	2	48
3.7	Environments – Platform As A Service(PAAS) ,Amazon, vmForce, Google App Engine	2	50
3.8	Azure, Heroku, AppForce	2	52
	UNIT-4 Developing and Deploying an Application in the real cloud		
4.1	Building on the experience of the first project students will study the design, development	2	54
4.2	testing and deployment of an application in the cloud using a development framework and deployment platform	2	56
4.3	**Using real cloud services:** Working with compute	2	58
4.4	Data intensive services	2	60
4.5	load balancing and scaling services available on real cloud platforms	2	62

TEXT BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Chris Hay, Brian Prince, "Azure in Action" Manning Publications [ISBN: 978-1935182481],2010.
4. Eugene Ciurana, "Developing with Google App Engine" Apress; 1 edition[ISBN: 978-1430218319],2009

REFERENCE BOOKS:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

Prepared: Faculty / Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assoc. Professor

Academic Year: 2020– 2021

Name of the Faculty: CH.V.MURALI KRISHNA

Name of the subject: R-Programming Lab

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
1	Implementation of Data Frames and Lists	2	2
2	Implementation of Matrix Addition and Multiplication	2	4
3	Implementation of Quick Sort	2	6
4	Implementation of Binary Search Tree	2	8
5	Implementation of Set Operations	2	10
6	Implementation of Reading and Writing files	2	12
7	Implementation of Graph Operations	2	14
8	Implementation of Correlation	2	16
9	Implementation of ANNOVA	2	18
10	Implementation of Linear Regression	2	20
11	Implementation of Logistic Regression	2	22
12	Implementation of Random Forest	2	24

TEXT BOOKS

1. The Art of R Programming, Norman Matloff, Cengage Learning
2. R for Everyone, Lander, Pearson

REFERENCE BOOKS:

1. R Cookbook, PaulTeetor, Oreilly.
2. R in Action,RobKabacoff, Manning

12/3/2021

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TEACHING PLAN

Department: CSE

Designation: ASSOCIATE PROFESSOR

Academic Year: 2020-2021

Name of the Faculty: K.CHANDRA MOULI

Name of the subject: Web Technologies and Advanced Java Programming Lab.

Year / Semester: II/II

TOPIC	No. of Lectures	Cumulative No. of Lectures
HTML TAGS	3	3
HTML TAGS	3	6
HOME PAGE: The static home page must contain three frames. Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below). Left frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame. Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.	3	9
LOGIN PAGE **CATOLOGUE PAGE:** The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following: 1. Snap shot of Cover Page. 2. Author Name. 3. Publisher. 4. Price. 5. Add to cart button. **REGISTRATION PAGE:** Create a "*registration form* "with the following fields 1) Name (Text field) 2) Password (password field) 3) E-mail id (text field) 4) Phone number (text field) 5) Sex (radio button) 6) Date of birth (3 select boxes) 7) Languages known (check boxes – English, Telugu, Hindi, Tamil) 8) Address (text area)	3	12
Validations using JAVA script	3	15

Week 4: Design a web page using **CSS** (Cascading Style Sheets) which includes the following: Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles	3	18
Week 5: Write an XML file which will display the Book information which includes the following: 1) Title of the book 2) Author Name 3) ISBN number 4) Publisher name 5) Edition 6) Price	3	21
Write a Document Type Definition (DTD) to validate the above XML file.	3	24
Week 6: 1) Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port. 2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root. Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)	3	27
Week-7: **User Authentication :** Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following. 1. Create a Cookie and add these four user id's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.	3	30
Week-8: Install a database(Mysql or Oracle).	3	33

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form). Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).		
Week-9: Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).	3	36
Week-10: Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.	3	39

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TEACHING PLAN

Department: CSE

Designation: Assoc. Professor

Academic Year: 2020- 2021

Name of the Faculty: T. B Prasad Reddy

Name of the subject: Artificial Intelligence

Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction	1	1
1.2	History, Intelligent Systems	1	2
1.3	Foundations of AI, Sub areas of AI, Applications	1	3
1.4	Problem Solving – State-Space Search	2	5
1.5	General Problem Solving, Characteristics of Problem	1	6
1.6	Exhaustive Searches	2	8
1.7	Heuristic Search Techniques	2	10
1.8	Iterative-Deepening A*, Constraint Satisfaction	2	12
	UNIT 2:		
2.1	Logic Concepts and Logic Programming: Introduction,	1	13
2.2	Propositional Calculus	1	14
2.3	Propositional Logic, Natural Deduction System, Resolution Refutation in Propositional Logic	2	16
2.4	Predicate Logic	2	18
2.5	Logic Programming Representing Knowledge Using Rules: Logic programming	2	20
2.6	Procedural Vs Declarative knowledge	1	21
2.7	Forward Vs Backward Reasoning, Matching	1	22
2.8	Control Knowledge Representation: Introduction	1	23
2.9	Approaches to Knowledge Representation	2	25
2.10	Knowledge Representation using Semantic Network	1	26
2.11	Extended Semantic Networks for KR	1	27
2.12	Knowledge Representation using Frames	1	28
2.13	Conceptual dependencies, Scripts	1	29

	UNIT-3		
3.1	Learning from observation - Inductive learning – Decision trees – Explanation based learning –	2	31
3.2	Learning methods - Reinforcement Learning	1	32
3.3	Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning,	1	33
3.4	Statistical Truth Maintenance Systems,	1	34
3.5	Logics for Non-Monotonic Reasoning,	2	36
3.6	Statistical Reasoning: Bayes Theorem,	2	38
3.7	Certainty Factors and Rule-Based Systems,	1	39
3.8	Bayesian Probabilistic Inference,	1	40
3.9	Bayesian Networks, DempsterShafer Theory	2	42
3.10	Planning: Components of a Planning System, Goal Stack Planning,	1	43
3.11	Non-linear Planning using Constrait Posting, Hierarchical Planning,	1	44
3.12	Reactive Systems	1	45
	UNIT-4		
4.1	Natural Language Processing: Steps in The Natural Language Processing, ,	1	46
4.2	Syntactic Processing and Augmented Transition Nets,	1	47
4.3	Semantic Analysis,	1	48
4.4	NLP Understanding Systems;	1	49
4.5	Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control	1	50
4.6	Fuzzy Inferences & Fuzzy Systems Planning with state-space search – partial-order	2	52
4.7	planning – planning graphs – planning and acting in the real world	1	53
4.8	Experts Systems: Overview of an Expert System,	1	54
4.9	Architecture of an Expert Systems,	1	55
4.10	Different Types of Expert Systems,	1	56
4.11	Architectures, Knowledge Acquisition and Validation Techniques,	1	57
4.12	Knowledge System Building Tools, Expert System Shells.	2	59
4.13	AI Programming languages: Overview of LISP and PROLOG, Production System in Prolog	1	60

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TEXT BOOKS:

1. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata Mcgraw-Hill Publications
2. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI publication

REFERENCE BOOKS:

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall
3. Artificial Intelligence, Robert Schalkoff, Mcgraw-Hill Publications
4. Artificial Intelligence and Machine Learning, Vinod Chandra S.S., Anand Hareendran S.

16/3/21

Prepared: Faculty / Date

Verified: HOD/Date

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NRIIT/7.5.1/RC 04

TEACHING PLAN

Department:CSE
Designation: Assoc.Professor
Academic Year: 2020 – 2021

Name of the Faculty:T. B Prasad Reddy
Name of the subject: Machine Learning
Year / Semester: IV/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**The ingredients of machine learning, Tasks:** The problems that can be solved with machine learning	2	2
1.2	Models: the output of machine learning	2	4
1.3	Features, the workhorses of machine learning.	2	6
1.4	**Binary classification and related tasks:** Classification	1	7
1.5	Scoring and ranking	2	9
1.6	Class probability estimation	1	10
	UNIT 2:		
2.1	**Beyond binary classification:** Handling more than two classes	2	12
2.2	Regression	2	14
2.3	Unsupervised and descriptive learning	2	16
2.4	**Concept learning**: The hypothesis space,	2	17
2.5	Paths through the hypothesis space	2	19
2.6	Beyond conjunctive concepts	2	21
	UNIT 3:		
3.1	**Tree models:** Decision trees	1	22
3.2	Ranking and probability estimation trees	2	24
3.3	Tree learning as variance reduction	2	26
3.4	**Rule models:** Learning ordered rule lists	1	27
3.5	Learning unordered rule sets	2	29
3.6	Descriptive rule learning, First-order rule learning	2	31
	UNIT-4		
4.1	**Linear models:** The least-squares method	2	33
4.2	The perceptron: a heuristic learning algorithm for linear classifiers	2	35
4.3	Support vector machines	2	37
4.4	Obtaining probabilities from linearclassifiers, Going beyond linearity with kernel methods	1	38
4.5	**Distance Based Models:** Introduction, Neighbours and exemplars	2	40
4.6	Nearest Neighbours classification	1	41
4.7	Distance Based Clustering,Hierarchical Clustering.	2	43

	UNIT-5		
5.1	**Probabilistic models:** The normal distribution and its geometric interpretations	1	44
5.2	Probabilistic models for categorical data	2	46
5.3	Discriminative learning by optimizing conditional LikelihoodProbabilistic models with hidden variables	2	48
5.4	**Features:** Kinds of feature, Featuretransformations	2	50
5.5	Feature construction and selection.	1	51
5.6	Model ensembles: Bagging and randomforests, Boosting	1	52
	UNIT-6		
6.1	**Dimensionality Reduction:** Principal Component Analysis (PCA)	1	53
6.2	Implementation and demonstration.	2	55
6.3	**Artificial Neural Networks:** Introduction, Neural network representation	1	56
6.4	Appropriate problems for neural network learning	2	58
6.5	Multilayer networks and the back propagation algorithm	2	60

TEXTBOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERNCE BOOKS:

1. UnderstandingMachine Learning: From Theory toAlgorithms, Shai Shalev-Shwartz, Shai Ben- David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

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Prepared: Faculty / Date

Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020– 2021

Name of the Faculty: G.Venendra

Name of the subject: CPP

Year / Semester: IV/II

TOPIC	No. of Lectures	Cumulative No. of Lectures
UNIT- I Concurrent versus Sequential programming	2	2
Concurrent programming constructs and race condition	2	4
Synchronization primitives	2	6
UNIT - II Processes and threads	2	8
Interprocess communication	2	10
Livelock and deadlocks	2	12
Starvation, and Deadlock Prevention	2	14
Issues and Challenges in Concurrent programming paradigm and current trends.	2	16
UNIT-III Parallel algorithms – sorting	3	19
Ranking	2	21
Searching	2	23
Traversals, prefix sum, etc.	3	26
UNIT- IV Parallel programming paradigms – Data parallel	2	28
Task parallel	2	30
Shared memory and message passing	3	33
Parallel Architectures, GPGPU	3	36
pthreads, STM	2	38
UNIT-V OpenMP, OpenCL	5	43

Cilk++, Intel TBB	4	47
CUDA	5	52
UNIT-VI Heterogeneous Computing: C++AMP	5	57
OpenCL	4	61

Text Books/References:

1. Mordechai Ben-Ari. Principles of Concurrent and Distributed Programming, Prentice-Hall International.
2. Greg Andrews. Concurrent Programming: Principles and Practice, Addison Wesley.
3. Gadi Taubenfeld. Synchronization Algorithms and Concurrent Programming, Pearson.
4. M. Ben-Ari. Principles of Concurrent Programming, Prentice Hall.
5. Fred B. Schneider. On Concurrent Programming, Springer.
6. Brinch Hansen. The Origins of Concurrent Programming: From Semaphores to Remote Procedure calls.

SWAYAM/NPTEL/MOOCS Courses :

1. https://nptel.ac.in/courses/106102114/

E- Resourses

1. https://www.geeksforgeeks.org/introduction-to-parallel-computing/
2. https://chetsarena.wordpress.com/parallel-computing-2/parallel-computing/
3. https://www.cs.rice.edu/~vs3/comp422/lecture-notes/index.html
4. https://computing.llnl.gov/tutorials/parallel_comp/

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020- 2021

Name of the Faculty: G.Venendra

Name of the subject: UML & DP

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to UML	1	1
1.2	Importance of modeling	1	2
1.3	principles of modeling	1	3
1.4	object oriented modeling	2	5
1.5	conceptual model of the UML	1	6
1.6	Architecture, Software Development Life Cycle.	1	7
1.7	**Structural Modeling**: Classes, Relationships	1	8
1.8	common Mechanisms, and diagrams	1	9
1.9	Advanced classes	2	11
1.10	advanced relationships	2	13
1.11	Object diagrams : common modeling techniques.	1	14
	UNIT 2:		
2.1	**Behavioral Modeling**: Interactions, Interaction diagrams	1	15
2.2	Use cases, Use case Diagrams	1	16
2.3	Activity Diagrams.	2	18
2.4	Events and signals	2	20
2.5	state machines, state chart diagrams.	2	22
2.6	**Advanced Behavioral Modeling** Architectural Modeling:	1	23
2.7	Components Deployment	1	24
2.8	Component diagrams	1	25
2.9	Deployment diagrams	2	27
2.10	Common modeling techniques for component diagrams	2	29
2.11	Common modeling techniques for deployment diagrams	1	30
	UNIT-3		
3.1	**Introduction** : What Is a Design Pattern?	1	31
3.2	Design Patterns in Smalltalk MVC	1	32
3.3	Describing Design Patterns	2	34
3.4	Catalog of Design Patterns	1	35

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3.5	Organizing the Catalog,	1	36
3.6	How Design Patterns Solve Design Problems	1	37
3.7	How to Select a Design Pattern	1	38
3.8	How to Use a Design Pattern.	2	40
3.9	**Creational Patterns** : Abstract Factory	2	42
3.10	Builder, Factory Method	2	44
3.11	Prototype, Singleton.	1	45
	UNIT-4		
4.1	**Structural Patterns:**	1	46
4.2	Adapter, Bridge	2	48
4.3	Composite, Decorator, Façade	2	50
4.4	Flyweight, Proxy.	1	51
4.5	**Behavioral Patterns:**	2	53
4.6	Chain of Responsibility	2	55
4.7	Command Interpreter, Iterator	2	57
4.8	Mediator, Memento	1	58
4.8	Observer, Strategy	1	59
4.9	Template Method	2	61
4.10	What to Expect from Design Patterns	1	62

TEXT BOOKS:

1. The unified Modeling language user guide by Grady Booch, James Rumbaugh , Ivar Jacobson, PEA
2. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Satzinger: Object Oriented Analysis and Design, CENGAGE
2. O'reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreilly
3. 'Applying UML and patterns' by Craig Larman, Pearson

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TEACHING PLAN

Department: CSE

Name of the Faculty : S.NAHIDA

Designation: ASSOCIATE PROFESSOR

Name of the subject: Web Technologies and Advanced Java Programming Lab.

Academic Year: 2020-2021

Year / Semester: II/II

TOPIC	No. of Lectures	Cumulative No. of Lectures
HTML TAGS	3	3
HTML TAGS	3	6
HOME PAGE: The static home page must contain three frames. Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below). Left frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame. Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.	3	9
LOGIN PAGE **CATOLOGUE PAGE:** The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following: 1. Snap shot of Cover Page. 2. Author Name. 3. Publisher. 4. Price. 5. Add to cart button. **REGISTRATION PAGE:** Create a "*registration form* "with the following fields 1) Name (Text field) 2) Password (password field) 3) E-mail id (text field) 4) Phone number (text field) 5) Sex (radio button) 6) Date of birth (3 select boxes) 7) Languages known (check boxes – English, Telugu, Hindi, Tamil) 8) Address (text area)	3	12
Validations using JAVA script	3	15

Week 4: Design a web page using **CSS** (Cascading Style Sheets) which includes the following: Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles	3	18
Week 5: Write an XML file which will display the Book information which includes the following: 1) Title of the book 2) Author Name 3) ISBN number 4) Publisher name 5) Edition 6) Price	3	21
Write a Document Type Definition (DTD) to validate the above XML file.	3	24
Week 6: 1) Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port. 2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root. Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)	3	27
Week-7: **User Authentication :** Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following. 1. Create a Cookie and add these four user id's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.	3	30
Week-8: Install a database(Mysql or Oracle).	3	33

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form). Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).		
Week-9: Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).	3	36
Week-10: Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.	3	39

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TEACHING PLAN

Department: CSE

Designation: ASSOCIATE PROFESSOR

Academic Year: 2020-2021

Name of the Faculty: S.NAHIDA

Name of the subject: Web Technologies and Advanced Java Programming

Year / Semester: II/II

S. No	Topics to be covered	No. of Lectures	Cumulative No. of Lectures
	UNIT I:		
1	HTML tags	2	2
2	Lists	1	3
2	Tables	2	5
3	Images, forms	2	7
4	Frames	2	9
5	Cascading style sheets	2	11
6	Introduction to Java script. Objects in Java Script.	4	15
7	Dynamic HTML with Java Script	2	17
	UNIT II:		
8	XML Introduction	2	19
9	Document type Definition	2	21
10	XML schemas	2	23
11	Document object model	2	25
12	XSLT	2	27
13	SAX	2	29
14	**UNIT III:**		
15	**Web servers and servlets:** Life cycle of a servlet JSDK,	2	31
16	The servlet API	2	33
17	The Javax.servlet package	2	36
18	Reading servlet packages and initialization parameters	2	38
19	The Javax.servlet http package	2	40
20	Reading Servlet parameters, and Reading Initialization parameters.,	2	42
21	Handling Http Request & Responses	2	44
22	Using Cookies-Session Tracking, Security Issues.	2	46
	UNIT IV		
23	Database Access: Database Programming using JDBC	2	48
24	studying javax.sql.* package, accessing a database from a JSP page	2	50
25	Introduction to JSP: The Problem with Servlet.	2	52
26	Anatomy of a JSP Page	1	53
27	JSP Application Development: Generating Dynamic Content, Using Scripting ElementsImplicit JSP Objects	2	55
28	Conditional Processing – Displaying Values Using an Expression to Set	2	57

	an Attribute		
29	Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages	2	59
30	Requests, and Users Passing Control and Date between Pages	1	60
31	Sharing Session and Application Data – Memory Usage Considerations	2	62

TEXT BOOKS:

- The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH
- Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
- Web Technologies, Uttam K Roy, Oxford Java Server Pages , Hans Bergstan, Oreilly

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TEACHING PLAN

Department: CSE **Name of the Faculty:** Mr.M.V.P.Umamaheswara Rao

Designation: Associate Professor **Name of the subject:** Operating Systems

Academic Year: 2020- 2021 **Year / Semester:** III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Computer System and Operating System Overview:** Overview of computer operating systems, operating systems functions	2	2
1.2	Operating systems structures	2	4
1.3	Systems calls	2	6
1.4	Operating systems generation	2	8
1.5	**Process Management** – Process concept- process scheduling, operations	2	10
1.6	Inter process communication	2	12
1.7	Multi Thread programming models	2	14
1.8	Process scheduling criteria and algorithms, and their evaluation	4	18
	UNIT 2:		
2.1	**Concurrency**: Process synchronization	1	19
2.2	The critical- section problem	1	20
2.3	Peterson's Solution	1	21
2.4	Synchronization Hardware	1	22
2.5	Semaphores	2	24
2.6	Classic problems of synchronization	1	25
2.7	Monitors	2	27
2.8	Synchronization examples	1	28
2.9	**Memory Management**: Swapping	1	29
2.10	Contiguous memory allocation	2	31
2.11	Paging	1	32
2.12	Structure of the page table	1	33
2.13	Segmentation	1	34
	UNIT-3		
3.1	**Virtual Memory Management**: Virtual memory	1	35
3.2	Demand paging	1	36
3.3	Page-Replacement algorithms	3	39
3.4	Allocation of Frames	2	41
3.5	Thrashing	1	42
3.6	**Principles of deadlock** – System model	1	43
3.7	Deadlock characterization	1	44
3.8	Deadlock prevention	1	45

3.9	Deadlock Detection and avoidance	1	46
3.10	Recovery form deadlock	1	47
	UNIT-4		
4.1	**File System Interface-** the concept of a file, Access Methods	1	48
4.2	Directory structure	1	49
4.3	File system mounting	1	50
4.4	File sharing, protection	1	51
4.5	**File System implementation-** File system structure	2	53
4.6	File system implementation	1	54
4.7	Directory implementation	1	55
4.8	Allocation methods, free-space management	1	56
4.9	**Mass-storage structure:** overview of Mass-storage structure	2	58
4.10	Disk structure	1	59
4.11	Disk attachment	1	60
4.12	Disk scheduling	3	63
4.13	Swap-space management	2	65

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems – Internal and Design Principles, William Stallings, Sixth Edition–2005, Pearson Education.

REFERENCE BOOKS:

1. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH.
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.

E-RESOURCES:

https://nptel.ac.in/courses/106105214/
https://www.udacity.com/course/introduction-to-operating-systems--ud923
https://www.youtube.com/watch?v=qf668RboXLs
https://www.youtube.com/watch?v=VoaNyf9iO4Q&list=PLV8vIYTIdSnaHTjrBXjSyNTOWEtA33hvn

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TEACHING PLAN

Department: CSE

Name of the Faculty: Mr.M.V.P.Umamaheswara Rao

Designation: Associate Professor

Name of the subject: Operating Systems & Unix Programming Lab

Academic Year: 2020– 2021

Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	PART-A		
1	Simulate the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority	3	3
2	Simulate MVT and MFT	3	6
3	Simulate all File Organization Techniques a) Single level directory b) Two level c) Hierarchical d) DAG	3	9
4	Simulate Bankers Algorithm for Dead Lock Avoidance	3	12
5	Simulate Bankers Algorithm for Dead Lock Prevention.	3	15
6	Simulate all page replacement algorithms a) FIFO b) LRU c) LFU Etc. …	3	18
7	Simulate Paging Technique of memory management.	3	21
8	Simulate all file allocation strategies a) Sequential b) Indexed c) Linked c) Hierarchical d) DAG	3	24
	PART-B		
11	Write a shell script to generate a multiplication table.	1	25
12	Write a shell script that copies multiple files to a directory.	1	26
13	Write a shell script which counts the number of lines and words present in a given file.	1	27
14	Write a shell script which displays the list of all files in the given directory.	1	28
15	Write a shell script(small calculator) that adds, subtracts, multiplies and divides the given two integers.	1	29
16	Write a shell script to reverse the rows and columns of a matrix.	1	30
17	Write a C program that counts the number of blanks in a text file.	1	31
18	C program Displaying real time of day for every 60 seconds	1	32
19	Write a C program that illustrates the creation of child process using fork system call.	1	33
20	Write a C program that illustrates file locking using semaphores.	1	34
21	Write a C program that implements a producer-consumer system with two processes.(using semaphores)	1	35
22	Write a C program that illustrates the following.	1	36

	a)Creating a message queue. b)Writing to a message queue. c)Reading from a message queue.		

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems' – Internal and Design Principles Stallings, Sixth Edition–2005, Pearson education
3. Advanced Programming in the UNIX Environment, 3rd EditionW. Richard Stevens, Stephen A. Rago
4. A Practical Guide to Linux Commands, Editors, and Shell ProgrammingMark G. Sobell, Matthew Helmke

REFERENCE BOOKS:

1. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH.
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.
4. The Linux Programming Interface.A Linux and UNIX System Programming Handbook Michael Kerrisk.
5. Shell Programming in Unix, Linux and OS XThe Fourth Edition of Unix Shell Programming Stephen G. Kochan, Patrick Wood
6. Shell ScriptingHow to Automate Command Line Tasks Using Bash Scripting and Shell ProgrammingJaosn Cannon

E-RESOURCES:

https://www.tutorialspoint.com/unix/index.htm
https://www.guru99.com/unix-linux-tutorial.html
https://www.javatpoint.com/linux-tutorial
https://nptel.ac.in/courses/106105214/
https://www.udacity.com/course/introduction-to-operating-systems--ud923
https://www.youtube.com/watch?v=qf668RboXLs

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TEACHING PLAN

Name of the Faculty: CH.Santhi
Department: CSE
Name of the subject: CC&AD
Designation: Assistant Professor
Year / Semester: III/II
Academic Year: 2020- 2021

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Systems modeling, Clustering and virtualization:** Introduction	1	1
1.2	Scalable Computing over the Internet	1	2
1.3	Technologies for Network based systems	1	3
1.4	System models for Distributed and Cloud Computing	2	5
1.5	Software environments for distributed systems and clouds Performance,	2	7
1.6	Security And Energy Efficiency	1	8
1.7	**Virtual Machines and Virtualization of Clusters and Data Centers:** Implementation Levels of Virtualization	1	9
1.8	Virtualization Structures/ Tools and mechanisms,	1	10
1.9	Virtualization of CPU, Memory and I/O Devices,	1	11
1.10	Virtual Clusters and Resource Management,	2	13
1.11	Virtualization for Data Center Automation.	1	14
	UNIT 2:		
2.1	**Cloud Platform Architecture:** Introduction	1	15
2.2	Cloud Computing and service Models	1	16
2.3	Architectural Design of Compute and Storage Clouds	2	18
2.4	Public Cloud Platforms	2	20
2.5	Inter Cloud Resource Management	2	22
2.6	Cloud Security and Trust Management	1	23
2.7	Service Oriented Architecture	1	24
2.8	Message Oriented Middleware.	1	25
2.9	**Cloud Programming and Software Environments:** Introduction	2	27
2.10	Features of Cloud and Grid Platforms	2	29
2.11	Parallel & Distributed Programming Paradigms	1	30
2.12	Programming Support of Google App Engine	1	31
2.13	Programming on Amazon AWS and Microsoft Azure	1	32
2.14	Emerging Cloud Software Environments.	1	33
	UNIT-3		
3.1	**Cloud Based Applications:** Introduction	1	34
3.2	Developing web service	1	35
3.3	Understanding cloud ecosystem-SaaS/PaaS, Popular APIs	2	37
3.4	**Designing Code for The Cloud:** Introduction	1	38

3.5	Designing cloud infrastructure	1	39
3.6	Web Browsers and the Presentation Layer	1	40
3.7	Understanding Web browsers attributes and differences	1	41
3.8	Building blocks of the presentation layer: HTML, HTML5	2	43
3.9	CSS, Silver-light, flash	2	45
3.10	java script, JQuery, Boot Strap	2	47
3.11	**Web Development Techniques and Frameworks:** Introduction	1	48
3.12	Working with AJAX controls, JQuery, JSON,	1	49
3.13	XML, REST. Working on Application development Frameworks e.g. Ruby on Rails	1	50
3.14	Net, Java API's or JSF	1	51
3.15	Deployment Environments – Platform As A Service(PAAS) ,Amazon	1	52
3.16	vmForce, Google App Engine	1	53
3.17	Azure, Heroku, AppForce	1	54
	UNIT-4		
4.1	**Developing and Deploying an Application in the real cloud:** Introduction	1	55
4.2	Building on the experience of the first project students will study the design	1	56
4.3	Testing and deployment of an application in the cloud using a development framework	1	57
4.4	and deployment platform	1	58
4.5	**Using real cloud services:** Introduction	1	59
4.6	Working with compute	1	60
4.7	Data intensive services	1	61
4.8	load balancing	1	62
4.8	scaling services	1	63
4.9	scaling services available on real cloud platforms	1	64

TEXT BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Chris Hay, Brian Prince, "Azure in Action" Manning Publications [ISBN: 978-1935182481],2010.
4.Eugene Ciurana, "Developing with Google App Engine" Apress; 1 edition[ISBN: 978-1430218319],2009

REFERENCE BOOKS:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

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16/3/20

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: Dr.D.Suneetha

Designation: Professor

Name of the subject: Artificial Intelligence

Academic Year: 2020- 2021

Year / Semester: III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction	1	1
1.2	History, Intelligent Systems	1	2
1.3	Foundations of AI, Sub areas of AI, Applications	1	3
1.4	Problem Solving – State-Space Search	2	5
1.5	General Problem Solving, Characteristics of Problem	1	6
1.6	Exhaustive Searches	2	8
1.7	Heuristic Search Techniques	2	10
1.8	Iterative-Deepening A*, Constraint Satisfaction	2	12
	UNIT 2:		
2.1	Logic Concepts and Logic Programming: Introduction,	1	13
2.2	Propositional Calculus	1	14
2.3	Propositional Logic, Natural Deduction System, Resolution Refutation in Propositional Logic	2	16
2.4	Predicate Logic	2	18
2.5	Logic Programming Representing Knowledge Using Rules: Logic programming	2	20
2.6	Procedural Vs Declarative knowledge	1	21
2.7	Forward Vs Backward Reasoning, Matching	1	22
2.8	Control Knowledge Representation: Introduction	1	23
2.9	Approaches to Knowledge Representation	2	25
2.10	Knowledge Representation using Semantic Network	1	26
2.11	Extended Semantic Networks for KR	1	27
2.12	Knowledge Representation using Frames	1	28
2.13	Conceptual dependencies, Scripts	1	29
	UNIT-3		
3.1	Learning from observation - Inductive learning – Decision trees – Explanation based learning –	2	31
3.2	Learning methods - Reinforcement Learning	1	32
3.3	Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning,	1	33
3.4	Statistical Truth Maintenance Systems,	1	34
3.5	Logics for Non-Monotonic Reasoning,	2	36
3.6	Statistical Reasoning: Bayes Theorem,	2	38

3.7	Certainty Factors and Rule-Based Systems,	1	39
3.8	Bayesian Probabilistic Inference,	1	40
3.9	Bayesian Networks, DempsterShafer Theory	2	42
3.10	Planning: Components of a Planning System, Goal Stack Planning,	1	43
3.11	Non-linear Planning using Constrait Posting, Hierarchical Planning,	1	44
3.12	Reactive Systems	1	45
	UNIT-4		
4.1	Natural Language Processing: Steps in The Natural Language Processing, ,	1	46
4.2	Syntactic Processing and Augmented Transition Nets,	1	47
4.3	Semantic Analysis,	1	48
4.4	NLP Understanding Systems;	1	49
4.5	Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control	1	50
4.6	Fuzzy Inferences & Fuzzy Systems Planning with state-space search – partial-order	2	52
4.7	planning – planning graphs – planning and acting in the real world	1	53
4.8	Experts Systems: Overview of an Expert System,	1	54
4.9	Architecture of an Expert Systems,	1	55
4.10	Different Types of Expert Systems,	1	56
4.11	Architectures, Knowledge Acquisition and Validation Techniques,	1	57
4.12	Knowledge System Building Tools, Expert System Shells.	2	59
4.13	AI Programming languages: Overview of LISP and PROLOG, Production System in Prolog	1	60

TEXT BOOKS:

1. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata Mcgraw-Hill Publications
2. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI publication

REFERENCE BOOKS:

1.Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall
3. Artificial Intelligence, Robert Schalkoff, Mcgraw-Hill Publications
4. Artificial Intelligence and Machine Learning, Vinod Chandra S.S., Anand Hareendran S.

16/3/2020
Prepared: Faculty / Date

16/3/2020
Verified: HOD/Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020– 2021

Name of the Faculty: CH.Santhi

Name of the subject: UML & DP

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to UML	1	1
1.2	Importance of modeling	1	2
1.3	principles of modeling	1	3
1.4	object oriented modeling	2	5
1.5	conceptual model of the UML	1	6
1.6	Architecture, Software Development Life Cycle.	1	7
1.7	**Structural Modeling:** Classes, Relationships	1	8
1.8	common Mechanisms, and diagrams	1	9
1.9	Advanced classes	2	11
1.10	advanced relationships	2	13
1.11	Object diagrams : common modeling techniques.	1	14
	UNIT 2:		
2.1	**Behavioral Modeling:** Interactions, Interaction diagrams	1	15
2.2	Use cases, Use case Diagrams	1	16
2.3	Activity Diagrams.	2	18
2.4	Events and signals	2	20
2.5	state machines, state chart diagrams.	2	22
2.6	**Advanced Behavioral Modeling** Architectural Modeling:	1	23
2.7	Components Deployment	1	24
2.8	Component diagrams	1	25
2.9	Deployment diagrams	2	27
2.10	Common modeling techniques for component diagrams	2	29
2.11	Common modeling techniques for deployment diagrams	1	30
	UNIT-3		
3.1	**Introduction** : What Is a Design Pattern?	1	31
3.2	Design Patterns in Smalltalk MVC	1	32
3.3	Describing Design Patterns	2	34
3.4	Catalog of Design Patterns	1	35

3.5	Organizing the Catalog,	1	36
3.6	How Design Patterns Solve Design Problems	1	37
3.7	How to Select a Design Pattern	1	38
3.8	How to Use a Design Pattern.	2	40
3.9	**Creational Patterns** : Abstract Factory	2	42
3.10	Builder, Factory Method	2	44
3.11	Prototype, Singleton.	1	45
	UNIT-4		
4.1	**Structural Patterns:**	1	46
4.2	Adapter, Bridge	2	48
4.3	Composite, Decorator, Façade	2	50
4.4	Flyweight, Proxy.	1	51
4.5	**Behavioral Patterns:**	2	53
4.6	Chain of Responsibility	2	55
4.7	Command Interpreter, Iterator	2	57
4.8	Mediator, Memento	1	58
4.8	Observer, Strategy	1	59
4.9	Template Method	2	61
4.10	What to Expect from Design Patterns	1	62

TEXT BOOKS:

1. The unified Modeling language user guide by Grady Booch, James Rumbaugh , Ivar Jacobson, PEA

2. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Satzinger: Object Oriented Analysis and Design, CENGAGE
2. O'reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreillly
3. 'Applying UML and patterns' by Craig Larman, Pearson

Prepared: Faculty / Date 16/03/2021

16/3/2021
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TEACHING PLAN

Department: CSE
Name of the Faculty: B.Sesikala
Designation: Assistant Professor
Name of the subject: Distributed Systems
Academic Year: 2020– 2021
Year / Semester: IV/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Characterization of Distributed Systems:** Introduction	1	1
1.2	Examples of Distributed Systems	2	3
1.3	Resource Sharing and the Web	1	4
1.4	Challenges	1	5
1.5	**System Models:** Introduction	1	6
1.6	Architectural Models- Software Layers, System Architecture	2	8
1.7	Variations, Interface and Objects,	1	9
1.8	Design Requirements for Distributed Architectures	3	12
1.9	Fundamental Models- Interaction Model, Failure Model, Security Model	3	15
	UNIT 2:		
2.1	**Interprocess Communication:** Introduction	1	16
2.2	The API for the Internet Protocols	1	17
2.3	The Characteristics of Interprocess communication, Sockets	1	18
2.4	UDP Datagram Communication	2	20
2.5	TCP Stream Communication; External Data Representation and Marshalling	2	22
2.6	Client Server Communication; Group Communication	2	24
2.7	IP Multicast- an implementation of group communication	2	26
2.8	Reliability and Ordering of Multicast.	2	28
	UNIT 3:		
3.1	**Distributed Objects and Remote Invocation:** Introduction	1	29
3.2	Communication between Distributed Objects- Object Model	1	30
3.3	Distributed Object Modal	1	31
3.4	Design Issues for RMI	1	32
3.5	Implementation of RMI	1	33

3.6	Distributed Garbage Collection; Remote Procedure Call	1	34
3.7	Events and Notifications	1	35
3.8	Case Study: JAVA RMI	1	36
	UNIT-4:		
4.1	**Operating System Support:** Introduction	1	37
4.2	The Operating System Layer	2	39
4.3	Protection	1	40
4.4	Processes and Threads –Address Space	2	42
4.5	Creation of a New Process	1	43
4.6	Threads	2	45
	UNIT-5		
5.1	**Distributed File Systems:** Introduction	1	46
5.2	File Service Architecture	1	47
5.3	Peer-to-Peer Systems: Introduction	1	48
5.4	Napster and its Legacy	1	49
5.5	Peer-to-Peer Middleware	1	50
5.6	Routing Overlays	1	51
5.7	**Coordination and Agreement:** Introduction	1	52
5.8	Distributed Mutual Exclusion	1	53
5.9	Elections, Multicast Communication	2	55
	UNIT-6	1	56
6.1	**Transactions & Replications:** Introduction	1	57
6.2	System Model and Group Communication	2	59
6.3	Concurrency Control in Distributed Transactions	1	60
6.4	Distributed Dead Locks	1	61
6.5	Transaction Recovery	1	62
6.6	Replication- -Introduction	1	63
6.7	Passive (Primary) Replication	2	65
6.8	Active Replication	2	67

TEXT BOOKS:

1. Ajay D Kshemkalyani, MukeshSighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication

REFERENCE BOOKS

1. Distributed-Systems-Principles-Paradigms-Tanenbaum PHI

B. Sai Lal 16/03/2021
Prepared: Faculty / Date

16/3/21
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020– 2021

Name of the Faculty: B.Maheswari

Name of the subject: JAVA

Year / Semester: III/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction to OOP	1	1
1.2	Procedural Programming Language and Object Oriented Language	1	2
1.3	Principles of OOP , Applications of OOP, History of Java	1	3
1.4	Java features, Java Virtual Machine (JVM)	2	5
1.5	Java Program Structure	1	6
1.6	Variables, Primitive data types	1	7
1.7	Identifiers, Literals- Examples	1	8
1.8	Operators, expressions – Examples	1	9
1.9	Precedence Rules and Associativity, Primitive Type Conversion and Casting Flow of Control	2	11
1.10	Classes and objects, Class Declaration, Creating Objects, Methods, Method Overloading	2	13
1.11	Over view	1	14
	UNIT 2:		
2.1	Constructors – Examples, Constructor Overloading	1	15
2.2	Garbage collector,	1	16
2.3	Importance of static keyword and examples, this keyword – Examples	2	18
2.4	Arrays, command line arguments, Nested Classes	2	20
2.5	Inheritance, types of inheritance, Forms of Inheritance	2	22
2.6	super keyword, final keyword,	1	23
2.7	Polymorphism an its and implementation	1	24
2.8	Method overriding	1	25
2.9	Creating the packages, using packages, importance of CLASSPATH,	2	27
2.10	Access Protection, importing packages	2	29
2.11	Over view	1	30
	UNIT-3		
3.1	Interfaces	1	31
3.2	implementing interfaces	1	32
3.3	Nested Interfaces, Variables in interfaces,	2	34
3.4	Multiple inheritance of interfaces	1	35

3.5	Differences between abstract class & interfaces	1	36
3.6	Exception handling	1	37
3.7	importance of try, catch,	1	38
3.8	importance of throw, throws and finally block	2	40
3.9	user-defined exceptions	2	42
3.10	Assertions	2	44
3.11	Over view	1	45
	UNIT-4		
4.1	Multithreading: Introduction, differences	1	46
4.2	Thread life cycle, Creation of threads	2	48
4.3	Thread priorities, Thread Synchronization	2	50
4.4	Communication between Threads	1	51
4.5	Reading data from files and writing data to files	2	53
4.6	Files & random access file	2	55
4.7	Applet class	2	57
4.8	Applet structure	1	58
4.8	Applet life cycle	1	59
4.9	sample Applet programs	2	61
4.10	Over view	1	62

TEXT BOOKS:

1. The Complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

16/3/21
Prepared: Faculty / Date

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Designation: Assistant Professor

Academic Year: 2020– 2021

Name of the Faculty: B.Maheswari

Name of the subject: CO

Year / Semester: II/II

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction of Basic Structure of Computers	1	1
1.2	Computer Types, Functional unit	2	3
1.3	Basic Operational concepts	1	4
1.4	Bus structures, Software, Performance	2	6
1.5	Introduction of Register Transfer	1	7
1.6	Micro-Operations , Register Transfer Language	2	9
1.7	Bus and memory Transfers.	1	10
1.8	Arithmetic Micro-operations, Logic Micro operations	2	12
1.9	Shift Micro-operations, Arithmetic Logic Shift Unit	2	14
1.10	Basic Computer Organization and Design	2	16
1.11	Instruction codes	1	17
1.12	Computer Registers, Computer Instructions	2	19
1.13	Timing and Control	1	20
1.14	Instruction cycle	1	21
1.15	Memory Reference Instructions, Input-Output and Interrupts	1	22
	UNIT 2:		
2.1	Introduction to Central Processing Unit	1	23
2.2	General register Organization	1	24
2.3	Stack Organization	2	26
2.4	Instruction Formats	2	28
2.5	Addressing Modes	2	30
2.6	Data Transfer and Manipulation	1	31
2.7	Program Control, Reduced Instruction Set Computer (RISC).	1	32
2.8	Micro Programmed Control : Control memory	1	33
2.9	Address sequencing	2	35
2.10	micro program example, design of control unit	2	37
	UNIT 3:		
3.1	Introduction of Computer Arithmetic	1	38
3.2	Addition and subtraction Algorithms	2	40
3.3	multiplication Algorithms	1	41
3.4	Division Algorithms	1	42

3.5	Floating – point Arithmetic operations	1	43
3.6	Introduction of Memory Organization,Memory Hierarchy	1	44
3.7	Main Memory, Auxiliary memory	2	46
3.8	Associative Memory, Cache Memory	2	48
3.9	Virtual Memory	1	49
3.10	Memory Management Hardware.Input Output	1	50
	UNIT 4:		
4.1	Introduction of Organization,Peripheral Devices	1	51
4.2	Input-output Interface	1	52
4.3	Asynchronous Data Transfer, Modes of Transfer,	2	54
4.4	Priority Interrupt	1	55
4.5	Direct Memory Access (DMA)	1	56
4.6	Input-Output Processor	1	57
4.7	Serial Communication, Standard I/O Interfaces	1	58
4.8	PCI Bus, USB	1	59
4.9	Pipeline and vector processing,parallel processing	1	60
4.10	Pipelining, Arithmetic pipeline	1	61
4.11	Instruction pipeline	1	62
4.12	RISC Pipeline, Vector Processing	1	63

TEXT BOOKS:

1 Morris M. Mano, Computer Systems Architecture.3 Ed, Pearson/PHI, 2013

2.Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

REFERENCE BOOKS:

John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.

B. M 16/3/21
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16/3/21
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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE | **Name of the Faculty:** Dr.Ch.Surya Kiran

Designation: Professor | **Name of the subject:** Artificial Intelligence

Academic Year: 2020– 2021 | **Year / Semester:** III/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	Introduction	1	1
1.2	History, Intelligent Systems	1	2
1.3	Foundations of AI, Sub areas of AI, Applications	1	3
1.4	Problem Solving – State-Space Search	2	5
1.5	General Problem Solving, Characteristics of Problem	1	6
1.6	Exhaustive Searches	2	8
1.7	Heuristic Search Techniques	2	10
1.8	Iterative-Deepening A*, Constraint Satisfaction	2	12
	UNIT 2:		
2.1	Logic Concepts and Logic Programming: Introduction,	1	13
2.2	Propositional Calculus	1	14
2.3	Propositional Logic, Natural Deduction System, Resolution Refutation in Propositional Logic	2	16
2.4	Predicate Logic	2	18
2.5	Logic Programming Representing Knowledge Using Rules: Logic programming	2	20
2.6	Procedural Vs Declarative knowledge	1	21
2.7	Forward Vs Backward Reasoning, Matching	1	22
2.8	Control Knowledge Representation: Introduction	1	23
2.9	Approaches to Knowledge Representation	2	25
2.10	Knowledge Representation using Semantic Network	1	26
2.11	Extended Semantic Networks for KR	1	27
2.12	Knowledge Representation using Frames	1	28
2.13	Conceptual dependencies, Scripts	1	29
	UNIT-3		
3.1	Learning from observation - Inductive learning – Decision trees – Explanation based learning –	2	31
3.2	Learning methods - Reinforcement Learning	1	32
3.3	Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning,	1	33
3.4	Statistical Truth Maintenance Systems,	1	34
3.5	Logics for Non-Monotonic Reasoning,	2	36
3.6	Statistical Reasoning: Bayes Theorem,	2	38
3.7	Certainty Factors and Rule-Based Systems,	1	39

3.8	Bayesian Probabilistic Inference,	1	40
3.9	Bayesian Networks, DempsterShafer Theory	2	42
3.10	Planning: Components of a Planning System, Goal Stack Planning,	1	43
3.11	Non-linear Planning using Constrait Posting, Hierarchical Planning,	1	44
3.12	Reactive Systems	1	45
	UNIT-4		
4.1	Natural Language Processing: Steps in The Natural Language Processing, ,	1	46
4.2	Syntactic Processing and Augmented Transition Nets,	1	47
4.3	Semantic Analysis,	1	48
4.4	NLP Understanding Systems;	1	49
4.5	Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control	1	50
4.6	Fuzzy Inferences & Fuzzy Systems Planning with state-space search – partial-order	2	52
4.7	planning – planning graphs – planning and acting in the real world	1	53
4.8	Experts Systems: Overview of an Expert System,	1	54
4.9	Architecture of an Expert Systems,	1	55
4.10	Different Types of Expert Systems,	1	56
4.11	Architectures, Knowledge Acquisition and Validation Techniques,	1	57
4.12	Knowledge System Building Tools, Expert System Shells.	2	59
4.13	AI Programming languages: Overview of LISP and PROLOG, Production System in Prolog	1	60

TEXT BOOKS:

1. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata Mcgraw-Hill Publications
2. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI publication

REFERENCE BOOKS:

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall
3. Artificial Intelligence, Robert Schalkoff, Mcgraw-Hill Publications
4. Artificial Intelligence and Machine Learning, Vinod Chandra S.S., Anand Hareendran S.

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CSE

Name of the Faculty: R. Seetharam

Designation: Assistant Professor

Name of the subject: Computer Organization

Academic Year: 2020- 2021

Year / Semester: II/I

SNO	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
	UNIT 1:		
1.1	**Basic Structure Of Computers**	1	1
1.2	Computer Types	1	2
1.3	Functional unit	1	3
1.4	Basic Operational concepts	1	4
1.5	Bus structures	1	5
1.6	Software, Performance	1	6
1.7	Register Transfer Language	1	7
1.8	Register Transfer	1	8
1.9	Bus and memory Transfers	1	9
1.10	Arithmetic Micro-operations	1	10
1.11	Logic Microoperations	1	11
1.12	Shift Micro-operations, Arithmetic Logic Shift Unit	1	12
1.13	**Basic Computer Organization and Design:** Instruction codes	1	13
1.14	Computer Registers , Computer Instructions	1	14
1.15	Timing and Control, Instruction cycle	1	15
1.16	Memory Reference Instructions, Input-Output and Interrupts	1	16
	UNIT 2:		
2.1	**Central Processing Unit:** General register Organization	1	17
2.2	Stack Organization, Instruction Formats	2	19
2.3	Addressing Modes	2	21
2.4	Data Transfer and Manipulation	2	23
2.5	Program Control	1	24
2.6	Reduced Instruction Set Computer (RISC)	1	25
2.7	**Micro Programmed Control** : Control memory	1	26
2.8	Address sequencing, Micro program example	2	28
2.9	Design of control unit	2	30

	UNIT-3		
3.1	**Computer Arithmetic :** Addition and subtraction	2	32
3.2	multiplication Algorithms	2	34
3.3	Division Algorithms	2	36
3.4	Floating – point Arithmetic operations	2	38
3.5	**Memory Organization:** Memory Hierarchy	1	39
3.6	Main Memory	1	40
3.7	Auxiliary memory, Associative Memory	1	41
3.8	Cache Memory	1	42
3.9	Virtual Memory	1	43
3.10	Memory Management Hardware	1	44
3.11	**Input Output**	1	45
	UNIT-4		
4.1	**Organization**: Peripheral Devices	1	46
4.2	Input-output Interface	1	47
4.3	Asynchronous Data Transfer	1	48
4.4	Modes of Transfer	1	49
4.5	Priority Interrupt	1	50
4.6	Direct Memory Access (DMA)	2	52
4.7	Input-Output Processor	1	53
4.8	Serial Communication	1	54
4.9	Standard I/O Interfaces: PCI Bus, USB	1	55
4.10	**Pipeline and vector processing**: parallel processing	1	56
4.11	Pipelining, Arithmetic pipeline	1	57
4.12	Instruction pipeline, RISC Pipeline	2	59
4.13	Vector Processing	1	60

TEXT BOOKS:

1. Morris M. Mano, Computer Systems Architecture.3 Ed, Pearson/PHI, 2013
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

REFERENCE BOOKS:
John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.

E-RESOURCES:
https://www.tutorialspoint.com/computer_organization/index.asp
https://www.geeksforgeeks.org/computer-organization-basic-computer-instructions/

16/3/21
Prepared: Faculty / Date

16/3/21
Verified: HOD/Date

NRI Institute of Technology
POTHAVARA ADU (Vill)
Agiripalli (M) Krishna Dist

	NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B.Tech& Civil Engineering	**Academic Year:** 2019-2020
Branch: Civil Engineering	**Year & Semester:**II Year & I Semester
Name of the Course: BCP	**Regulation:** NRIA 18
Course Area/Module: Civil engineering	**No. of students registered:**
Course Coordinator: Mrs. P. Urmila **Designation:**Assistant Professor	**Course Instructors:** 1. **Mrs. P. Urmila** 2.
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Students will be Initiated with the knowledge of basic building materials and their properties.
2. Students will be Impart with the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped and flat roofs.
3. Be exposed to the various patterns of floors, walls, different types of paints and varnishes.
4. Impart the students with the techniques of formwork and scaffolding.
5. The students should be exposed to classification of aggregates, moisture content of the aggregate.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Student should be able to get the knowledge of different construction materials and their properties
2. Student is expected to know the classification of aggregates and their structural requirements.
3. Student should be able to understand properties and the components of lime and cement
4. Student is expected to understand the types of masonry, uses of timber and its properties
5. Student should be able to identify components of building and types of floors and roofs

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Building materials
2	Building construction

COURSE DESCRIPTION:

The course presents the knowledge of the different types of building components, building materials and their structural importance. As to construct the different types of structures, it is mandatory to know about the different materials in keen. There is no. of materials used for the construction like stones, cement, aggregates, lime, brick, timber, paints. Before using them in the construction, mechanical properties are to be known. This course also deals with the construction techniques. So, it is useful to know about the different masonry types, different roofing systems and the different components of the buildings like roofing systems, lintels, arches, vaults, staircase and their usage in the structures.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15%
Mid Examination - II	90	15	
Online Quiz Examination - I	20	10	10%
Online Quiz Examination - I	20	10	
Class Test-I	45	10	10%
Class Test-II	45	10	
Assignments	-	5	5%
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT I
Stones, Bricks and Tiles Properties of building stones – relation to their structural requirements, classification of stones – stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials

UNIT II

Lime and Cement Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime. Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

Aggregates: Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate- Bulking of sand – Sieve analysis.

UNIT III

Masonry Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls.

Wood: Structure – Properties- Seasoning of timber. Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fibre Reinforced Plastics, Steel, Aluminium.

UNIT IV

Building Components Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs.

Finishing's: Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering. Paints: Constituents of a paint – Types of paints – Painting of new/old wood- Varnish. Form Works and Scaffoldings.

Text Books:

1. Building Materials, S. S. Bhavikatti, Vices publications House private ltd.
2. Building Construction, S. S. Bhavikatti, Vices publications House private ltd.
3. Building Materials, B. C. Punmia, Laxmi Publications private ltd.
4. Building Construction, B.C. Punmia, Laxmi Publications (p) ltd.

References:

1. Building Materials, S. K. Duggal, New Age International Publications.
2. Building Materials, P. C. Verghese, PHI learning (P) ltd.
3. Building Materials, M. L. Gambhir, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Building construction, P. C. Verghese, PHI Learning (P) Ltd.
5. Building Materials, Construction and Planning, S. MahaboobBasha, Anuradha Publications,Chennai.

E- Resourses

- http://www.nptelvideos.in/2012/11/building-materials-and-construction.html
- https://www.alljntuworld.in/download/building-materials-construction-planning-bmcp-materials-notes/
- http://textofvideo.nptel.iitm.ac.in/105102012/lec1.pdf
- http://nptel.ac.in/courses/105104030/http://freevideolectures.com/Course/3357/Concrete-Technology

PEDAGOGICAL APPROACH:

S. No	Approach	P-IDX
1	Practice based explanation	1
2	Mini- projects to bright students	2
3	Assigning Group tasks	3
4	Student independent assignments	4
5	Use of Video Lectures from e-resources	5
6	Chalk and talk in the class room	6

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
		UNIT - I	
1	1	Stones, Bricks and Tiles	12-06-2019
1	2	Properties of building stones	13-06-2019
1	3	Relation to their structural requirements	14-06-2019
1	4	Classification of stones	17-06-2019
1	5	Stone quarrying& Precautions in Blasting	18-06-2019
1	6	Dressing of stone	19-06-2019
1	7	Composition of good brick earth	20-06-2019
1	8	Various methods of manufacturing of bricks	21-06-2019
1	9	Characteristics of good tile& Types of tiles	24-06-2019
1	10	Manufacturing methods of Tiles	25-06-2019
2	12	Uses of materials like Aluminum, Gypsum, Glass and Bituminous materials	26-06-2019
1	13	Tutorial - I	28-06-2019

1	14	Practice Test / Assignment	01-07-2019
UNIT – II			
1	15	Lime and Cement Lime	02-07-2019
1	16	Various ingredients of lime	03-07-2019
1	17	Constituents of lime stone	04-07-2019
1	18	Classification of lime	05-07-2019
2	20	Various methods of manufacture of lime.	08-07-2019
1	21	Portland cement- Chemical Composition	10-07-2019
1	22	Hydration	11-07-2019
2	24	Types of cement and their properties	12-07-2019
2	26	Various field and laboratory tests for Cement.	16-07-2019
2	28	Various ingredients of cement concrete and their importance	18-07-2019
2	30	various tests for concrete	22-07-2019
1	31	Classification of aggregate – Coarse and fine aggregates	24-07-2019
1	32	Particle shape and texture – Bond and Strength of aggregate	25-07-2019
1	33	Specific gravity – Bulk Density, porosity and absorption	26-07-2019
1	34	Moisture content of Aggregate	29-07-2019
1	35	Bulking of sand – Sieve analysis.	30-07-2019
1	36	Tutorial – II	31-07-2019
1	37	Practice Test / Assignment	01-08-2019
UNIT – III			
1	38	Masonry Types of masonry	12-08-2019
2	40	English and Flemish bonds	13-08-2019
2	42	Rubble and Ashlar Masonry	16-08-2019
1	43	Cavity and partition walls	20-08-2019
1	44	Wood: Structure – Properties- Seasoning of timber.	21-08-2019
2	46	Classification of various types of woods used in buildings	22-08-2019
1	47	Defects in timber	26-08-2019
2	49	Alternative materials for wood Galvanized Iron, Fiber Reinforced Plastics, Steel, Aluminum.	27-08-2019

1	50	Tutorial – III	29-08-2019
1	51	Practice Test / Assignment	30-08-2019
UNIT – IV			
1	52	Introduction to Building Components Lintels, arches, vaults, stair cases : Lintels– types	02-09-2019
1	53	Stair cases – types	03-09-2019
1	54	Arches – types	04-09-2019
1	55	Vaults – types	05-09-2019
1	56	Different types of floors	06-09-2019
1	57	Concrete, Mosaic, Terrazzo floors	09-09-2019
1	58	Roofs - Lean to roof, Coupled Roofs.	10-09-2019
1	59	Finishing's: Damp Proofing and water proofing materials and uses	11-09-2019
1	60	Plastering Pointing	12-09-2019
1	61	White washing and distempering.	13-09-2019
1	62	Paints: Constituents of a paint	16-09-2019
2	63	Types of paints – Painting of new/old wood- Varnish	17-09-2019
1	64	Form Works and Scaffoldings.	19-09-2019
1	65	Tutorial - IV	20-09-2019
1	66	Practice Test / Assignment	23-09-2019

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Courses Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	-	-	3	-	-	-	-	3	3	-	-
CO2	3	-	-	-	2	-	3	-	-	-	-	2	3	-	-
CO3	3	-	-	-	-	-	3	-	-	-	-	2	2	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	3	3	-	-
CO5	3	-		-	3	-	-	-	-	-	-	2	3	-	-
CO6	3	-	-	-	-	-	-	-	-	-	2	3	2	-	-

Total	18	2	-	-	5	-	9	-	-	-	2	15	16	-	-
Average	3	2	-	-	2.5	-	3	-	-	-	2	2.5	2.66	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO211.1	PO1, PO7, PO12	PSO1
CO211.2	PO1, PO5, PO7, PO12	PSO1
CO211.3	PO1, PO7, PO12	PSO1
CO211.4	PO1, PO12	PSO1
CO211.5	PO1, PO5, PO12	PSO1
CO211.6	PO1, PO11, PO12	PSO1

Signature of Course Instructor(s)   Signature of Course Coordinator   Signature of Program Coordinator   Signature of Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: II-I**
Name of the Course: Building planning & drawing	**Regulation: NRIA 18**
Course Area/Module: Building planning & drawing	**No. of students registered: 80**
Course Coordinator: B.Udayasankar **Designation:ASSISTANT PROFESSOR**	**Course Instructors:** **1. B.Udayasankar** **2. V.Phaneendra**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:03**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1) Initiating the student to different building bye-laws and regulations.
2) Imparting the planning aspects of residential buildings and public buildings.
3) Giving training exercises on various signs and bonds and different building units.
4) Imparting the skills and methods of planning of various buildings.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1	Student should be able to plan various buildings as per the building by-laws.
2	Student should know the minimum standards for various parts of buildings & characteristics.
3	The student should be able to distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
4	The student is expected to learn the skills of drawing building elements and plan the
5	Student should be able to understand various brick masonry & building elements standard drawings.
6	Student should be able to develop drawing of building plan, section and elevation.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	**Engineering drawing**

EALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15%
Mid Examination - II	90	15	
Online Quiz Examination - I	20	10	10%
Online Quiz Examination - I	20	10	
Class test – I	45	10	10%
Class test – I	45	10	
Assignments		5	5%
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT I

Introduction of building drawing: Building Byelaws and Regulations Introduction- terminology- objectives of building byelaws- floor area ratio- floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations- height of buildings- wall thickness – lightening and ventilation requirements. Types of buildings and principals of planning of buildings

LOs:

1. **Understand building bye-laws**
2. **Understand planning components of building and standard dimensions.**

UNIT II

Residential Buildings: Minimum standards for various parts of buildings requirements of different rooms and their grouping- characteristics of various types of residential buildings and relationship between plan, elevation and forms and functions

Public Buildings: Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels and motels, buildings for recreation, Landscaping requirements.

LOs:

1. **Understand various requirements of building by visualizing the details.**
2. **Identify differences between residential buildings and public building standards.**

UNIT III

Sign Conventions: Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles.

Bonds: English bond and Flemish bond - odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner. **Doors, Windows, Ventilators**: Panelled door, glazed door, panelled and glazed door, panelled windows glazed windows, fixed ventilators, swing ventilators. **Roofs:** coupled roof, collar roofs, King Post truss and Queen Post truss. **LOs:** **1. Identify sign conventions and symbols used in civil engineering drawing.** **2. Understand detailed Drawing of building and structural elements and visualize.**
UNIT IV
Planning and Designing of Buildings: Draw the Plan, Elevation and Sections of a Residential and Public buildings from the given line diagram. **LOs:** **1. Understand basic terms plan section and elevation in drawing** **2. Introduction to computer applications in developing drawing skills**
TEXT BOOKS:
1. Planning, designing and Scheduling, Gurucharan Singh and Jagadish Singh 2. Building planning and drawing by M. Chakravarthi. 3. 3. ‘A’ Series & ‘B’ Series of JNTU Engineering College, Anantapur,
REFERENCE BOOKS:
1. Building drawing, M G Shah, C M Kale and S Y Patki, Tata McGraw Hill, New Delhi. 2. Principles of Building Drawing, M G Shah and C M Kale, Trinity Publications, New Delhi. 3. Civil Engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi. 4. Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi, and Chennai.

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
1	1	**INTRODUCTION TO BUILDING PLANNING AND DRAWING**	1-12-2020
2	2	INTRODUCTION TO THE COURSE	2-12-2020
3	3	Course objectives of the course	4-12-2020
4	4	UNIT 01-INTRODUCTION	5-12-2020
5	5	**UNIT 01: Introduction of building drawing**	7-12-2020
6	6	Building Byelaws and Regulations	8-12-2020
7	7	Introduction- terminology	10-12-2020
8	8	objectives of building byelaws	11-12-2020
9	9	floor area ratio	14-12-2020
10	10	floor space index	16-12-2020
11	11	principles under laying building bye laws	17-12-2020
12	12	classification of buildings	18-12-2020
13	13	open space requirements	-2112-2020
14	14	built up area limitations	22-12-2020
15	15	height of buildings	23-12-2020
16	16	wall thickness	26-12-2020
17	17	lightening and ventilation requirements	28-12-2020
18	18	Types of buildings and principals of planning of buildings	29-12-2020
19	19	**UNIT 02- INTRODUCTION-RESIDENTIAL BUILDINGS**	30-12-2020
20	20	Minimum standards for various parts of buildings requirements of different roomsand their grouping	2-1-2021
21	21	characteristics of various types of residential buildings and relationship between plan, elevation and forms and functions	4-1-2021
22	22	characteristics of various types of residential buildings and relationship between plan, elevation and forms and functions	5-1-2021
23	23	INTRODUCTION TO PUBLIC BUILDINGS	18-1-2021
24	24	Planning of educational institutions	19-1-2021
25	25	Planning of hospitals	21-1-2021
26	26	Planning of dispensaries	22-1-2021
27	27	Planning of office buildings	23-1-2021

28	28	Planning of banks	25-1-2021
29	29	Planning of industrial buildings	27-1-2021
30	30	Planning of hotels and motels	28-1-2021
31	31	Planning of buildings for recreation	29-1-2021
32	32	Landscaping requirements	30-1-2021
33	33	**UNIT 03—INTRODUCTION**	1-2-2021
34	34	**Sign Conventions:** Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles.	2-2-2021
35	35	**Bonds:** English bond and Flemish bond	3-2-2021
36	36	**Bonds:** English bond and Flemish bond	4-2-2021
37	37	odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner	6-2-2021
38	38	odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner	8-2-2021
39	39	odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner	9-2-2021
40	40	odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner	10-2-2021
41	41	**Doors, Windows, Ventilators-INTRODUCTION**	10-2-2021
42	42	Panelled door	11-2-2021
43	43	glazed door	11-2-2021
44	44	panelled and glazeddoor	11-2-2021
45	45	panelled and glazeddoor	12-2-2021
46	46	panelled windows glazed windows	12-2-2021
47	47	panelled windows glazed windows	12-2-2021
48	48	fixed ventilators, swing ventilators	12-2-2021
49	49	**Roofs:** INTRODUCTION	13-2-2021
50	50	coupled roof	13-2-2021
51	51	collar roofs	13-2-2021
52	52	King Post truss	15-2-2021

53	53	Queen Post truss	15-2-2021
54	54	**UNIT 04—INTRODUCTION**	15-2-2021
55	55	**Planning and Designing of Buildings**	16-2-2021
56	56	PRINCIPLES OF PLANNING OF RESIDENTIAL BUILDING REVISION	16-2-2021
57	57	Draw the Plan, Elevation and Sections of a Residential from the given line diagram	16-2-2021
58	58	Draw the Plan, Elevation and Sections of a Residential from the given line diagram	16-2-2021
59	59	Draw the Plan, Elevation and Sections of a Residential from the given line diagram	17-2-2021
60	60	Draw the Plan, Elevation and Sections of a Residential from the given line diagram	17-2-2021
61	61	Draw the Plan, Elevation and Sections of a Public buildings from the given line diagram	17-2-2021
62	62	Draw the Plan, Elevation and Sections of a Public buildings from the given line diagram	18-2-2021
63	63	Draw the Plan, Elevation and Sections of a Public buildings from the given line diagram	20-2-2021
64	64	Draw the Plan, Elevation and Sections of a Public buildings from the given line diagram	20-2-2021
65	65	REVISION OF THE COURSE	20-2-2021
66	66	COURSE OUTCOMES	20-2-2021

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	2	-	-	-	-	-	-	-
CO4	1	2	-	-	3	-	-	-	-	-	-	-
CO5	-	1	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	3	-	-	-	-	-	-	-
Total	8	9	-	-	11	-	-	-	-	-	-	-
Avg.	2	1.8	-	-	2.75	-	-	-	-	-	-	-

CO INDEX	POs MAPPED
C0211.1	PO1,PO2
C0211.2	PO1,PO2
C0211.3	PO1,PO2,PO5
C0211.4	PO1,PO2,PO5
C0211.5	PO2,PO5
C0211.6	PO5

Signature of Course Signature of CourseSignature of ProgramSignature of Instructor(s) Coordinator CoordinatorHead of the Department

	# NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B.Tech& Civil Engineering	**Academic Year:** 2020-2021
Branch: Civil Engineering	**Year & Semester:**II Year & I Semester
Name of the Course: COMPLEX VARIABLES AND FOURIER SERIES	**Regulation:** NRIA 18
Course Area/Module: Civil engineering	**No. of students registered:**
Course Coordinator: DR.B BABU PRASAD **Designation:**Professor	**Course Instructors:** 1. **M.SURESH BABU** 2. **DR.B BABU PRASAD**
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. To familiarize the techniques in complex variables
2. To familiarize the techniques in Fourier series.
3. To familiarize the techniques in partial differential equations.
4. To equip the students to solve application problems in their disciplines.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Write an analytic function if either real part or imaginary part is known and by using Cauchy-Riemann equations or apply Milne-Thompson method(L3)
CO2 Evaluate the integral of complex function over the region bounded by the closed curves by apply either Cauchy-Goursat theorem or Cauchy's integral formula or Cauchy's Residue theorem(L5)
CO3 Write the infinite series expansion of complex function by apply Taylor's/Maclaurin's/Laurent's series(L3)
CO4 Write a Fourier series expansion of a periodic function by using Euler's formulae (L3)
CO5 Solve the Partial difference equations (L3)
CO6 Solve one dimensional wave and heat equations by using partial differential equations (L3)

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	M1
2	M2

COURSE DESCRIPTION:

The course presents the knowledge Topics in mathematics that every educated person needs to know to process, evaluate, and understand the numerical and graphical information in our society. Applications of mathematics in problem solving, finance, probability, statistics, geometry, population growth.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	90	15	15%
Mid Examination – II	90	15	
Online Quiz Examination – I	20	10	10%
Online Quiz Examination – I	20	10	
Class Test-I	45	10	10%
Class Test-II	45	10	
Assignments	-	5	5%
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT I
Complex Variable – Differentiation &Integration Complex function , Real and Imaginary parts of Complex function, Limit, Continuity and Derivative of complex function, Cauchy-Riemann equations, Analytic function, entire function, singular point, conjugate function, Harmonic functions, Milne-Thomson method. Line integral of a complex function, Cauchy's theorem (only statement), Cauchy's Integral Formula.
UNIT II
Complex Variable- Series expansion, Residue Theorem & Evaluation of Real Integrals Absolutely convergent and uniformly convergent of series of complex terms, Radius of convergence, Taylor's series, Maclaurin's series expansion, Laurent's series. Zeros of an analytic function, Singularity, Isolated singularity, Removable singularity, Essential singularity, pole of order m, simple pole, Residues, Residue theorem, Calculation of residues, Residue at a pole of order m, Evaluation of real definite integrals: Integration around the unit circle, Integration around semi circle.
UNIT III

Fourier Series Introduction- Periodic functions – Fourier series of -periodic function - Dirichlet's conditions – Even and odd functions –Change of interval– Half-range sine and cosine series.
UNIT IV
Partial Differentials Equations & Applications Introduction, Formation of PDE, Solution of PDE, Linear equations of first order, Non-linear equations of first order. Applications: Method of separation of Variables, One dimensional Wave and Heat equations.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.

2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

Reference:

1. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7/e, Mc-Graw Hill, 2004.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

E- Resourses

- http://www.nptelvideos.in/2012/11/building-materials-and-construction.html
- https://www.alljntuworld.in/download/building-materials-construction-planning-bmcp-materials-notes/
- http://textofvideo.nptel.iitm.ac.in/105102012/lec1.pdf
- http://nptel.ac.in/courses/105104030/http://freevideolectures.com/Course/3357/Concrete-Technology

PEDAGOGICAL APPROACH:

S. No	Approach	P-IDX
1	Practice based explanation	1
2	Mini- projects to bright students	2
3	Assigning Group tasks	3
4	Student independent assignments	4
5	Use of Video Lectures from e-resources	5
6	Chalk and talk in the class room	6

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
		UNIT – I	
1	1	Complex function	12-06-2020
1	2	Real and Imaginary parts of Complex function	13-06-2020
1	3	Limit	14-06-2020
1	4	Continuity and Derivative of complex function	17-06-2020
1	5	Cauchy-Riemann equations	18-06-2020
1	6	Analytic function	19-06-2020
1	7	entire function	20-06-2020
1	8	singular point	21-06-2020
1	9	conjugate function	24-06-2020
1	10	Harmonic functions	25-06-2020
2	12	Milne-Thomson method. Line integral of a complex function	26-06-2020
1	13	Cauchy's theorem (only statement)	28-06-2020
1	14	Cauchy's Integral Formula	01-07-2020
		UNIT – II	
1	15	Absolutely convergent and uniformly convergent of series of complex terms	02-07-2020
1	16	Radius of convergence	03-07-2020
1	17	Taylor's series	04-07-2020
1	18	Maclaurin's series expansion	05-07-2020
2	20	Laurent's series	08-07-2020
1	21	Zeros of an analytic function	10-07-2020
1	22	Singularity	11-07-2020
2	24	Isolated singularity	12-07-2020
2	26	Removable singularity	16-07-2020
2	28	Essential singularity	18-07-2020
2	30	pole of order m	22-07-2020
1	31	simple pole	24-07-2020
1	32	Residues	25-07-2020
1	33	Residue theorem	26-07-2020

1	34	Calculation of residues	29-07-2020
1	35	Residue at a pole of order m	30-07-2020
1	36	Evaluation of real definite integrals: Integration around the unit circle	31-07-2020
1	37	Integration around semi circle.	01-08-2020
		UNIT – III	
1	38	Introduction	12-08-2020
2	40	Periodic functions	13-08-2020
2	42	Fourier series of -periodic function	16-08-2020
1	43	Dirichlet's conditions	20-08-2020
1	44	Even and odd functions	21-08-2020
2	46	Change of interval	22-08-2020
1	47	Half-range sine and cosine series.	26-08-2020
		UNIT – IV	
1	52	Introduction	02-09-2020
1	53	Formation of PDE	03-09-2020
1	54	Solution of PDE	04-09-2020
1	55	Linear equations of first order	05-09-2020
1	56	Non-linear equations of first order.	06-09-2020
1	57	Applications	09-09-2020
1	58	Method of separation of Variables	10-09-2020
1	59	One dimensional Wave and Heat equations.	11-09-2020

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Courses Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	-	-	3	-	-	-	-	3	3	-	-
CO2	3	-	-	-	2	-	3	-	-	-	-	2	3	-	-
CO3	3	-	-	-	-	-	3	-	-	-	-	2	2	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	3	3	-	-

CO5	3	-		-	3	-	-	-	-	-	-	2	3	-	-
CO6	3	-	-	-	-	-	-	-	-	-	2	3	2	-	-
Total	18	2	-	-	5	-	9	-	-	-	2	15	16	-	-
Average	3	2	-	-	2.5	-	3	-	-	-	2	2.5	2.66	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO211.1	PO1, PO7, PO12	PSO1
CO211.2	PO1, PO5, PO7, PO12	PSO1
CO211.3	PO1, PO7, PO12	PSO1
CO211.4	PO1, PO12	PSO1
CO211.5	PO1, PO5, PO12	PSO1
CO211.6	PO1, PO11, PO12	PSO1

Signature of Course Instructor(s)　　Signature of Course Coordinator　　Signature of Program Coordinator　　Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan &Realization	NRIIT/9.1/F-09

Name of the Program: B.Tech & Civil Engineering	**Academic Year:** 2020-2021
Branch: Civil Engineering	**Year & Semester:** II Year & I Semester
Name of the Course: Fluid Mechanics	**Regulation:** NRIA 18
Course Area/Module: Civil engineering	**No. of students registered: 89**
Course Coordinator: Mr.P.SRINIVAS Civil Engineering **Designation:** Assistant Professor	**Course Instructors:** 1. **Mr.P.SRINIVAS** 2.
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. To explain concepts of fluid mechanics used in Civil Engineering
2. To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects
3. To impart ability to solve engineering problems in fluid mechanics
4. To enable the students measure quantities of fluid flowing in pipes, tanks and channels
5. To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces
6. To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Understand the principles of fluid statics, kinematics and dynamics
2. Familiarize basic terms used in fluid mechanics
3. Understand flow characteristics and classify the flows
4. Apply the continuity, momentum and energy principles
5. Estimate various losses in flow through channels
6. Understand fundamentals of kinematics and equations Cartesian coordinates.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	A good understanding and intuition on calculus and physics in general.
2	Mathematical methods applied to problems.

COURSE DESCRIPTION:

This class provides students with an introduction to principal concepts and methods of fluid mechanics. Topics covered in the course include pressure, hydrostatics, and buoyancy; open systems and control volume analysis; mass conservation and momentum conservation for moving fluids; viscous fluid flows, flow through pipes; dimensional analysis; boundary layers, and lift and drag on objects. Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical application

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	**90**	**15**	
Mid Examination - II	**90**	**15**	
Online Quiz Examination - I	**20**	**10**	
Online Quiz Examination - I	**20**	**10**	
Class Test-I	**45**	**10**	
Class Test-II	**45**	**10**	
Assignments	**-**	**5**	
Semester End Examination	**180**	**60**	

COURSE CONTENT (Syllabus):

UNIT I

Basic concepts and definitions:

Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavity, surface tension, capillarity, Bulk modulus of elasticity, compressibility.

UNIT II

Fluid statics:

Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Pressure gauges.

Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT III

Fluid kinematics:

Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three -dimensional continuity equations in Cartesian coordinates.

UNIT IV

Fluid Dynamics:

Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length; Friction factor for pipe flow.

Text Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi, 7th Edition.
2. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House, 18th Edition

References:

1. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill.
3. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. K. Subramanya, Open Channel flow, Tata Mc.Grawhill Publishers

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Remarks
1	1	**Unit-1 Basic concepts and definitions** Introduction	02-11-2020	
1	2	Distinction between a fluid and a solid	03-11-2020	
2	4	Density, Specific weight, Specific gravity	05-11-2020	
2	6	Kinematic and dynamic viscosity	07-11-2020	
1	7	variation of viscosity with temperature	09-11-2020	
2	9	Newton law of viscosity; vapour pressure, boiling point	11-11-2020	
2	11	cavity, surface tension, capillarity	13-11-2020	
1	12	Bulk modulus of elasticity, compressibility	17-11-2020	
1	13	Tutorial	18-11-2020	
1	14	**Unit-2 Fluid statics** Introduction	20-11-2020	
2	16	Pressure at a point, Pascal's law	23-11-2020	
2	18	pressure variation with temperature, density and altitude	26-11-2020	
3	21	Piezometer, U-Tube Manometer, Single Column Manometer	30-11-2020	
3	24	U Tube Differential Manometer. Pressure gauges	05-12-2020	
4	28	Hydrostatic pressure and forcehorizontal, vertical and inclined surfaces	10-12-2020	
1	29	Buoyancy	16-12-2020	
2	31	stability of floating bodies	21-12-2020	

1	32	Tutorial	22-12-2020	
1	33	**Unit-3 Fluid kinematics** Introduction	23-12-2020	
1	34	Classification of fluid flow	24-12-2020	
3	37	steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows	04-01-2021	
2	39	Stream line, path line, streak line and stream tube	08-01-2021	
2	41	stream function	11-01-2021	
2	43	velocity potential function	18-01-2021	
2	45	One,two and three -dimensional continuity equations in Cartesian coordinates	22-01-2021	
1	46	Tutorial	25-01-2021	
1	47	**UNIT -IV: Fluid Dynamics** introduction	27-01-2021	
1	48	Surface and body forces	28-01-2021	
3	51	Equations of motion - Euler's equation; Bernoulli's equation – derivation	29-01-2021	
3	54	Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube	03-02-2021	
2	56	Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced	08-02-2021	
3	59	Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number	10-02-2021	
3	62	Energy losses in pipelines; Darcy – Weisbach equation	15-02-2021	
2	64	Minor losses in pipelines	19-02-2021	
1	65	Hydraulic Grade Line and Total Energy Line	20-02-2021	
1	66	Concept of equivalent length; Friction factor for pipe flow	22-02-2021	
1	67	Tutorial	23-02-2021	

Signature of Course Instructor(s) | Signature of Course Coordinator | Signature of Program Coordinator | Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: II-I**
Name of the Course: PROFESSIONAL ETHICS & HUMAN VALUES	**Regulation: NRIA 18**
Course Area/Module: PROFESSIONAL ETHICS & HUMAN VALUES	**No. of students registered: 80**
Course Coordinator: V.PHANEENDRA KUMAR **Designation: ASSISTANT PROFESSOR**	**Course Instructors:** **1. V.phaneendra kumar**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:00**
Credits:00	

COURSE OBJECTIVES:

Students will be able to:

1) To create awareness on engineering ethics and human values.
2) To understand social responsibility of an engineer.
3) To instill moral and social values and loyalty.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1) Grooms themselves as ethical, responsible and societal beings.
2) Discuss ethics in society and apply the ethical issues related to engineering.
3) Exhibit the understanding of ethical theories in professional environment.
4) Recognize their roe as social experimenters (engineers) and comprehend codes of ethics.
5) Identify the risks likely to come across in the professional world, analyzing them and find solutions.
6) Realize the responsibilities and rights of engineers in the society.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	**Prerequisites: Basic understanding about Engineering profession.**

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	90	15	15%
Mid Examination – II	90	15	
Online Quiz Examination - I	20	10	10%
Online Quiz Examination - I	20	10	
Class test – I	45	10	10%
Class test – I	45	10	
Assignments		5	5%
Semester End Examination	180	60	60%

COURSE CONTENT (Syllabus):

UNIT – I: **Human Values**: Objectives, Morals, Values, Ethics, Integrity, Work ethics, Service learning , Virtues, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Challenges in the work place.

UNIT – II: **Engineering ethics**: Senses of 'Engineering Ethics' — Variety of moral issues — Types of inquiry — Moral dilemmas — Moral Autonomy — Kohlberg's theory — Gilligan's theory — Consensus and Controversy — Models of professional roles — Theories about right action — Self-interest — Customs and Religion — Uses of Ethical Theories

UNIT – III **Engineering as Social Experimentation:** Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, Industrial standards, A balanced outlook on law, Case study: The challenger.

UNIT – IV: **Safety, Responsibilities and Rights**: Safety and risk, types of risks, Assessment of safety and risk, Safe exit, Risk-benefit analysis, safety lessons from 'the challenger' , Case study: Power plants, Collegiality and loyalty, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, whistle blowing, Intellectual property rights, professional rights
.

TEXT BOOKS:

- **A Text book on Professional Ethics and Human Values by R.S Naagarazan- New Age International Publishers.**
- **" Engineering Ethics includes Human Values" by M. Govindarajan, S. Natarajan and V. S. Senthil Kumar- PHI Learning Pvt. Ltd-2009**

REFERENCE BOOKS:

"Professional Ethics and Human Values" by A. Alavudeen, R. Kalil Rahman and M. Jayakumaran- Laxmi Publications.

E-RESOURCES:

- www.onlineethics.org
- www.nspe.org
- www.globalethics.org
- www.ethics.org

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
1	1	**INTRODUCTION OF THE COURSE**	1-12-2020
2	2	Learning objectives of the course	2-12-2020
3	3	**UNIT 01- INTRODUCTION -HUMAN VALUES**	4-12-2020
4	4	Human values, morals and ethics	5-12-2020
5	5	Morals, ethics, values and useful definations	7-12-2020
6	6	Integrity	8-12-2020
7	7	work ethics	10-12-2020
8	8	Service learning	11-12-2020
9	9	civic virtues, Respect for others	14-12-2020
10	10	living peacefully	16-12-2020
11	11	Caring, sharing,	17-12-2020
12	12	honesty Courage.	18-12-2020
13	13	valuing time	-2112-2020
14	14	Cooperation, Commitment,	22-12-2020

15	15	Empathy, Self-confidence	23-12-2020
16	16	Challenges in the work place	26-12-2020
17	17	**UNIT 02 – INTRODUCTION-ENGINEERING ETHICS**	28-12-2020
18	18	Engineering ethics, Senses of 'Engineering Ethics,	29-12-2020
19	19	Senses of 'Engineering Ethics' — Variety of moral issues	30-12-2020
20	20	Types of inquiry,	2-1-2021
21	21	Moral dilemmas, Moral Autonomy	4-1-2021
22	22	Kohlberg's theory — Gilligan's theory	5-1-2021
23	23	Consensus and Controversy,	18-1-2021
24	24	Models of professional roles	19-1-2021
25	25	Theories about right action,	21-1-2021
26	26	Self-interest — Customs and Religion — Uses of Ethical Theories	22-1-2021
27	27	**UNIT 03- INTRODUCTION**	23-1-2021
28	28	Engineering as a social expermentation	25-1-2021
29	29	Engineering as experimentation	27-1-2021
30	30	Engineering as experimentation	28-1-2021
31	31	Engineers as responsible experimenters	29-1-2021
32	32	Codes of ethics	30-1-2021
33	33	Codes of ethics and role of engineers	1-2-2021
34	34	Codes of ethics and limitations	2-2-2021
35	35	Industrial standards	3-2-2021
36	36	A balanced outlook on law, case study	4-2-2021
37	37	Case study: The challenger	6-2-2021
38	38	Case study: The challenger	8-2-2021
39	39	Case study: The challenger	9-2-2021
40	40	Case study: The challenger	10-2-2021
41	41	**UNIT 04- Safety, Responsibilities and Rights:**	10-2-2021
42	42	Safety, Responsibilities and Rights:- INTRODUCTION	11-2-2021
43	43	Safety and risk	11-2-2021
44	44	Relation between safety and risk	11-2-2021
45	45	types of risks	12-2-2021

46	46	types of risks	12-2-2021
47	47	Assessment of safety and risk, Safe exit	12-2-2021
48	48	Assessment of safety and risk, Safe exit	12-2-2021
49	49	Risk-benefit analysis	13-2-2021
50	50	Risk-benefit analysis	13-2-2021
51	51	safety lessons from 'the challenger'	13-2-2021
52	52	Case study: Power plants	15-2-2021
53	53	Case study: Power plants	15-2-2021
54	54	Case study: Power plants	15-2-2021
55	55	Responsibility-Introduction	16-2-2021
56	56	Collegiality and loyalty	16-2-2021
57	57	Collective bargaining, Confidentiality	16-2-2021
58	58	Conflict of interests, Occupational crime	16-2-2021
59	59	whistle blowing, types and limitations	17-2-2021
60	60	Intellectual property rights, professional rights.	17-2-2021
61	61	Course outcomes of the course	17-2-2021
62	62	Recap/Revision unit 01 and 02	18-2-2021
63	63	Recap/Revision unit 03 and 04	13-2-2021

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	1	2	-	-	-	1
CO2	-	-	-	-	-	1	1	2	-	-	-	1
CO3	-	-	-	-	-	1	1	2	-	-	-	1
CO4	-	-	-	-	-	1	1	2	-	-	-	1
CO5	-	-	-	-	-	1	1	2	-	-	-	1
CO6	-	-	-	-	-	1	1	2	-	-	-	1
Total	-	-	-	-	-	6	6	12	-	-	-	6
Avg.	-	-	-	-	-	1	1	2	-	-	-	1

CO INDEX	POs MAPPED
C0211.1	PO6,PO7,PO8,PO12
C0211.2	PO6,PO7,PO8,PO12
C0211.3	PO6,PO7,PO8,PO12
C0211.4	PO6,PO7,PO8,PO12
C0211.5	PO6,PO7,PO8,PO12
C0211.6	PO6,PO7,PO8,PO12

Signature of Course Instructor(s)

Signature of Course Coordinator

Signature of Program Coordinator

Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B.Tech& Civil Engineering	**Academic Year:** 2020-2021
Branch: Civil Engineering	**Year & Semester:**II Year & I Semester
Name of the Course: SURVEYING & GEOMATICS	**Regulation:** NRIA 18
Course Area/Module: Civil engineering	**No. of students registered:**
Course Coordinator: Mr. G. S. R. K. DINESH **Designation:**Assistant Professor	**Course Instructors:** 1. **Mr. G. S. R. K. DINESH** 2.
No. of Lecture Hours per week:4	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Highlight the purpose of surveying in civil engineering construction
2. Explain different types of curves, their requirement and curve setting.
3. Formulate survey observations and perform calculations
4. Train on utilization of surveying instruments like EDM, Total station and GPS.
5. Demonstrate basics of photogrammetry and mapping process.
6. Throw light on remote sensing elements

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand basics of surveying and identifying the needs of surveying.
CO3 Calculate angles, distances and levels
CO2 Apply the knowledge, techniques and survey tools in engineering practice
CO4 Translate the knowledge gained for implementation infrastructure facilities
CO5 Correlate knowledge to frontiers like Hydrography, Electronic Distance Measurement, Global Positioning System, Photogrammetry and Remote Sensing.
CO6 Identify data collection methods and prepare field notes. Estimate errors in measurements and apply corrections

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	To find the area of the sight
2	Chainage

COURSE DESCRIPTION:

The course presents the knowledge of Surveying and Geoinformatics portrays a discipline that deals with acquisition, analysis, storage, distribution, management and application of spatially-referenced data.The Surveyor, as defined and produced at the University of Lagos is a professional and a geoscientist well equipped to provide spatial and other environmental information necessary for designing and planning of engineering works as well as in the location and exploitation of natural resources. His excellent background in computer science, mathematics and physics, gives him added confidence to tackle problems of diverse nature. He is given comprehensive training in Geomatics which include inter alia Land Surveying. Geodesy, Hydrography, Photogrammetry. Remote Sensing, Cartography and Geoinformatics.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	**90**	**15**	**15%**
Mid Examination – II	**90**	**15**	
Online Quiz Examination – I	**20**	**10**	**10%**
Online Quiz Examination – I	**20**	**10**	
Class Test-I	**45**	**10**	**10%**
Class Test-II	**45**	**10**	
Assignments	**-**	**5**	**5%**
Semester End Examination	**180**	**60**	**60%**

COURSE CONTENT (Syllabus):

UNIT I
Principles, Linear, angular and graphical methods, Survey stations, Survey lines- ranging, Bearing of survey lines, Levelling: Plane table surveying, Principles of levelling - booking and reducing levels; differential, reciprocal levelling, profile levelling and cross sectioning. Digital and Auto Level, Errors in

levelling; contouring: Characteristics, methods, uses; areas and volumes.
UNIT II
Trigonometric Levelling and Curves: Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods -triangulation -network- Signals. Baseline - choices - instruments and accessories - extension of base lines -corrections - Satellite station - reduction to centre - Inter-visibility of height and distances - Trigonometric levelling - Axis single corrections. Curves - Elements of simple and compound curves – Method of setting out– Elements of Reverse curve - Transition curve – length of curve – Elements of transition curve - Vertical curves
UNIT III
Modern Field Survey Systems: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Distomat, Total Station – Parts of a Total Station – Accessories –Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations.
UNIT IV
Photogrammetry Surveying: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes. Remote Sensing: Introduction –Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.

Text Books:.

1. Arora, K.R. I, Surveying, Vol-I, II and II, Standard Book House, 2015.

2. C. Venkatramaiah, Text Book of Surveying, Universities Press Pvt Ltd, Hyderabad. Revised Edition 2011.

Reference:

1. Manoj K., Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011.
2. Madhu N., Sathikumar, R. and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3. Chandra A.M., Higher Surveying, Third Edition, New Age International (P) Limited, 2002.
4. Anji Reddy M., Remote sensing and Geographical information system, B.S. Publications, 2001.

E- Resourses

- http://www.nptelvideos.in/2012/11/building-materials-and-construction.html
- https://www.alljntuworld.in/download/building-materials-construction-planning-bmcp-materials-notes/
- http://textofvideo.nptel.iitm.ac.in/105102012/lec1.pdf
- http://nptel.ac.in/courses/105104030/http://freevideolectures.com/Course/3357/Concrete-Technology

PEDAGOGICAL APPROACH:

S. No	Approach	P-IDX
1	Practice based explanation	1
2	Mini- projects to bright students	2
3	Assigning Group tasks	3
4	Student independent assignments	4
5	Use of Video Lectures from e-resources	5
6	Chalk and talk in the class room	6

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
UNIT - I			
1	1	Principles, Linear	12-06-2020
1	2	angular and graphical methods	13-06-2020
1	3	Survey stations	14-06-2020
1	4	Survey lines- ranging, Bearing of survey lines, Levelling:	17-06-2020
1	5	Plan Principles of levelling - booking e table surveying	18-06-2020
1	6	reducing levels	19-06-2020
1	7	differential, reciprocal levelling,	20-06-2020
1	8	profile levelling and cross sectioning.	21-06-2020
1	9	Digital and Auto Level,	24-06-2020
1	10	Errors in levelling;	25-06-2020
2	12	contouring: Characteristics	26-06-2020
1	13	methods	28-06-2020
1	14	uses; areas and volumes	01-07-2020
UNIT – II			
1	15	Theodolite survey: Instruments	02-07-2020
1	16	Measurement of horizontal and vertical angle	03-07-2020
1	17	Horizontal and vertical control - methods	04-07-2020

1	18	-triangulation	05-07-2020
2	20	-network- Signals	08-07-2020
1	21	Baseline – choices	10-07-2020
1	22	instruments and accessories - extension of base lines	11-07-2020
2	24	-corrections - Satellite station - reduction to centre	12-07-2020
2	26	- Inter-visibility of height and distances -	16-07-2020
2	28	- Trigonometric levelling Axis single corrections	18-07-2020
2	30	Curves - Elements of simple and compound curves –	22-07-2020
1	31	– Method of setting out	24-07-2020
1	32	– Elements of Reverse curve	25-07-2020
1	33	- Transition curve	26-07-2020
1	34	length of curve	29-07-2020
1	35	– Elements of transition curve	30-07-2020
1	36	- Vertical curves	31-07-2020
1	37		01-08-2020
UNIT – III			
1	38	Principle of Electronic Distance Measurement	12-08-2020
2	40	Modulation, Types of EDM instruments	13-08-2020
2	42	Distomat, Total Station	16-08-2020
1	43	Parts of a Total Station	20-08-2020
1	44	– Accessories –Advantages and Applications, Field Procedure for total station survey	21-08-2020
2	46	Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements	22-08-2020
1	47	errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations.	26-08-2020
UNIT – IV			
1	52	Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements,	02-09-2020
1	53	terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping-	03-09-2020
1	54	aerial triangulation, radial triangulation, methods; photographic mapping-	04-09-2020
1	55	- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.	05-09-2020

1	56	Remote Sensing: Introduction –Electromagnetic Spectrum	06-09-2020
1	57	, interaction of electromagnetic radiation with the atmosphere and earth surface,	09-09-2020
1	58	remote sensing data acquisition: platforms and sensors;	10-09-2020
1	59	visual image interpretation; digital image processing.	11-09-2020

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Courses Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	-	-	3	-	-	-	-	3	3	-	-
CO2	3	-	-	-	2	-	3	-	-	-	-	2	3	-	-
CO3	3	-	-	-	-	-	3	-	-	-	-	2	2	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	3	3	-	-
CO5	3	-		-	3	-	-	-	-	-	-	2	3	-	-
CO6	3	-	-	-	-	-	-	-	-	-	2	3	2	-	-
Total	18	2	-	-	5	-	9	-	-	-	2	15	16	-	-
Average	3	2	-	-	2.5	-	3	-	-	-	2	2.5	2.66	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO211.1	PO1, PO7, PO12	PSO1
CO211.2	PO1, PO5, PO7, PO12	PSO1
CO211.3	PO1, PO7, PO12	PSO1
CO211.4	PO1, PO12	PSO1
CO211.5	PO1, PO5, PO12	PSO1
CO211.6	PO1, PO11, PO12	PSO1

Signature of Course Instructor(s)

Signature of Course Coordinator

Signature of Program Coordinator

Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: CIVIL	**Year & Semester: II / I**
Name of the Course: STRENGTH OF MATERIALS	**Regulation: NRIA18**
Course Area/Module: STRENGTH OF MATERIALS CODE :18A2101401	**No. of students registered: 78**
Course Coordinator: M.RAMACHANDRA RAO **Designation:** ASSOCIATE PROFESSOR	**Course Instructors:** 1. M.RAMACHANDRA RAO 2. P. NARENDRA BABU
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week:1**
Credits:3	

COURSE OBJECTIVES:

Students will be able:

Course Objectives:
1To impart procedure for drawing shear force and bending moment diagrams for beams.
2.To make the student able to analyze flexural stresses in beams due to different loads.
3.To enable the student to apply the concepts of strength of materials in engineering applications and design problems.
4.To make the student able to analyze shear stresses in beams due to different loads.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy.
2.Develop shear force and bending moment diagrams for different load cases.
3.Compute the flexural stresses for different load cases and different cross-sections. Determine shear stresses for different cross-sections.
4.Knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections dueto various loading conditions
5.Understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes.
6.Can Analyze members subjected to torsion, combined torsion and bending moment &asses stresses in different engineering applications like springs subjected to different loading conditions

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Subject	Topic
1	Engineering mechanics	System of forces, Equilibrium of system of forces Friction, Centroid & Center of gravity, Trusses
2	Mathematics	Differentiation and integration
3	Engineering Physics	Dynamics, Kinematics and Kinetics Work- power-energy

COURSE DESCRIPTION: This course covers principles of strength. Content includes stress and strain, torsion, shear force and bending moment diagrams, bending stress and shear stress diagrams, deflection of beams, combined loading, deflection and stiffness of springs.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15
Mid Examination - II	90	15	
Online Quiz Examination - I	20	10	10
Online Quiz Examination - II	20	10	
Class test - I	45	10	10
Class test - II	45	10	
Assignment - I	-	05	05
Assignment - II	-	05	
Semester End Examination	180	60	60

COURSE CONTENT (Syllabus):

UNIT-I

Simple Stresses and Strains:

Types of stresses and strains – Hooke's law – Stress – strain diagram for mild steel – working stress – Factor of safety – lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them , varying sections – Composite bars. Strain energy – Resilience – Gradual, Sudden, impact and shock loadings – simple applications.

Shear Force and Bending Moment:

Definition of beam – types of beams – Concept of Shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and over changing beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – point of contra flexure – Relation between S.F, B.M and rate of loading at section of a beam.

UNIT – II

Flexural Stresses:
Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/Y = E/R – Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hallow), I, T, Angle and Channel Sections – Design of simple beam sections.

Shear Stresses:
Derivation of formula-Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T and angle sections. Combined bending and shear.

UNIT – III

Deflection of Beams:

Uniformbending – slope, deflection and radius of curvature – Differential equation for elastic line of a beam – Double integration and Macaulay's methods. Determination of slope and deflection for cantilever and simply supported beams under point loads, U.D.L. uniformly varying load-Mohr's theorems – Moment area method – application to simply supported and overhanging beams- analysis of propped cantilever beams under UDL and point loads.

UNIT – IV

Compound Stresses and Strains:
Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, and its applications.
Torsion:
Theory of pure torsion – Assumptions and Derivation of Torsion formula for circular shaft – Torsional moment of resistance – Polar section modulus – power transmission through shafts – Combined bending and torsion. Springs -Types of springs – deflection of closed coiled helical springs under axial pull – Carriage or leaf springs.

Text Books:

1 R. K. Bansal, Strength of Materials, Lakshmi Publications House Pvt. Ltd.
2 Strength of Materials by R. K. Rajput, S. Chand & Co, New Delhi

References:

1. Sadhu Singh, Strength of Materials, Khanna Publishers 11th edition 2015.
2. S. Timoshenko, D.H. Young and J.V. Rao, Engineering Mechanics, Tata McGraw-Hill Company.
3. R. Subramanian, Strength of Materials, Oxford University Press.
4. Strength of Materials by S. Ramamrutham.

PADAGOGICAL APPROACH

1. Lecture interspersed with discussions
2. Demonstration
3. Presentation (PPT)
4. Video lectures(NPTEL etc.)
5. Tutorial

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
1	1	Introduction of simple stresses and strains	12-06-20
1	2	Types of stress and strains	13-06-20
1	3	Hooks law, stress-strain diagram for mild steel	14-06-20
1	4	Volumetric strain, Elastic moduli and their relationship	14-06-20
1	5	Volumetric strain, Elastic moduli and their relationship	15-06-20
1	6	Composite bars	17-06-20
1	7	Composite bars	19-06-20
1	8	Resiliance,gradual, sudden, impact, shock loadings and its applications	20-06-20
1	9	Resiliance,gradual, sudden, impact, shock loadings and its applications	21-06-20
1	10	Working stress, Factor of safety, Lateral strain, Poisson’s ratio	21-06-20
1	11	Introduction to SF and BM, Definition of beam and types of beams	22-06-20
1	12	Concepts of shear force and bending moment diagrams	24-06-20
1	13	SF and BM diagrams for cantilever, Simply supported, Over hanging beams subjected to different loads	26-06-20
1	14	SF and BM diagrams for cantilever, Simply supported, Over hanging beams subjected to different loads	27-06-20
1	15	SF and BM diagrams for cantilever, Simply supported, Over hanging beams subjected to different loads	28-06-20
1	16	Uniformly distributed, Uniformly varying loads subjected different beams	28-06-20
1	17	Uniformly distributed, Uniformly varying loads subjected different beams	29-06-20
1	18	Point of contraflexure	01-07-20
1	19	Relation ship between SF and BM and rate of loading at section of a beam	03-07-20
1	20	Relation ship between SF and BM and rate of loading at section of a beam	04-07-20
1	21	Flexural stresses introduction, Theory of simple bending	05-07-20
1	22	Assumptions, Derivation of bending equation	05-07-20
1	23	Neutral axis, Determination of bending stresses	06-07-20

1	24	Section modulus of rectangular , and circular section, solid and hollow	08-07-20
1	25	I, T, angle, and channel section	10-07-20
1	26	I, T, angle, and channel section	11-07-20
1	27	Design of simple beam sections	12-07-20
1	28	Introduction to shear stresses and derivation	12-07-20
1	29	Shear stress distribution across various sections	13-07-20
1	30	Shear stress distribution across various sections	22-07-20
1	31	Shear stress distribution across various sections	24-07-20
1	32	Shear stress distribution across various sections	25-07-20
1	33	Shear stress distribution across various sections	26-07-20
1	34	Combined bending and shear	26-07-20
1	35	Introduction to deflection of beams	27-07-20
1	36	Uniform bending	10-08-20
1	37	Slope, deflection and radius of curvature	14-08-20
1	38	Differential equation for elastic line of beam	16-08-20
1	39	Double integration, and Macaulay’s method	16-08-20
1	40	Double integration, and Macaulay’s methods	17-08-20
1	41	Double integration, and Macaulay’s methods	19-08-20
1	42	Double integration, and Macaulay’s methods	21-08-20
1	43	Double integration, and Macaulay’s methods	22-08-20
1	44	Determination of slope and deflection for cantilever and simply supported, under various load conditions	24-08-20
1	45	Determination of slope and deflection for cantilever and simply supported, under various load conditions	26-08-20
1	46	Mohr’s theorem, Moment area method	28-08-20
1	47	Mohr’s theorem, Moment area method	29-08-20
1	48	Application to simply supported, Over hanging beams	30-08-20
1	49	Application to S.S and O hanging beams	30-08-20
1	50	Analysis of propped cantilever beams under different loading conditions	31-08-20
1	51	Analysis of propped cantilever beams under different loading conditions	04-09-20
1	52	Introduction to compound stresses and strains	05-09-20

1	53	Two dimensional system	06-09-20
1	54	Stress at a point on a plane	06-09-20
1	55	Principal stresses and principal planes	07-09-20
1	56	Principal stresses and principal planes	09-09-20
1	57	Mohr’s circle of stress and its application	11-09-20
1	58	Mohr’s circle of stress and its application	12-09-20
1	59	Introduction to torsion, Theory of pure torsion	13-09-20
1	60	Assumptions and derivation of torsional formula	13-09-20
1	61	Assumptions and derivation of torsional formula	14-09-20
1	62	Torsional moment of resistance, Polar section modulus	23-09-20
1	63	Power transmission through shafts	25-09-20
1	64	Power transmission through shafts	26-09-20
1	65	Combined bending and torsion	27-09-20
1	66	Introduction to springs, types of springs	27-09-20
1	67	Deflection of closely coiled helical springs under axial pull	28-09-20
1	68	Carriage or Leaf springs	07-10-20
1	69	Carriage or Leaf springs	09-10-20

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1							1				
CO2	1		3					1				
CO3	2	3										
CO4	1	2										
CO5	2											
CO6	1	2			1			1				
Total	8	7	3		1			3				
Avg.												

CO INDEX	POs MAPPED	PSOs MAPPED
CO211.1	PO1,PO8	PSO1,PSO2
CO211.2	PO1,PO3,PO8	PSO1,PSO2
CO211.3	PO1,PO2	PSO1,PSO2
CO211.4	PO1,PO2	PSO1,PSO2
CO211.5	PO1	PSO1,PSO2
CO211.6	PO1,PO2,PO5,PO8	PSO1,PSO2

Signature of Course Instructor(s) Signature of Course Coordinator Signature of Program Coordinator Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

Name of the Program: Bachelor of Technology	**Academic Year:2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester:II-II**
Name of the Course: - STRENGTH OF MATERIALS LAB	**Regulation:NRIA18**
Course Area/Module: - STRENGTH OF MATERIALS	**No. of students registered: 78**
Lab In-Charge: K. Teja **Designation:ASSISTANT PROFESSOR**	**Lab Instructors:** **1.** K. TEJA **2.** B.Uday Shankar
No. of Lecture Hours per week:03	**No. of Tutorial Hours per week:0**
Credits:02	

COURSE OBJECTIVES:

Students will be able to:

1.To impart procedure for drawing shear force and bending moment diagrams for beams
2.To make the student able to analyze flexural stresses in beams due to different loads
3.To make the student able to analyze shear stresses in beams due to different loads.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Conduct tension test on steel
2. Conduct compression tests on spring, wood, brick and concrete
3. Conduct flexural and torsion test to determine elastic constants
4. Determine hardness of metals

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S.No	Topic
1	---

COURSE DESCRIPTION:

Material strength refers to the point on the engineering stress–strain curve (yield stress) beyond which the material experiences deformations that will not be completely reversed upon removal of the loading and as a result, the member will have a permanent deflection.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Internal Examination	**180Minutes**	**40**	**40%**
External Examination	**180Minutes**	**60**	**60%**

Syllabus:-

1. Tension test on Steel bar

2. Bending test on (Steel / Wood) Cantilever beam.

3. Bending test on simple support beam.

4. Continuous beam – deflection test

5. Torsion test

6. Hardness test

7. Spring test

8. Compression test on wood or brick.

9. Impact test

10. Shear test

11. Verification of Maxwell's Reciprocal theorem on beams.

12. Use of Electrical resistance strain gauges

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals

2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology

REFERENCE

- " Strength of Materials Vol. ...
- " Strength of Materials Vol.II" by S P Timonshenko. ...
- " Theory of Elasticity" by S P Timonshenko and J N Goodier. ...
- " Engineering Mechanics of Solids" by Egor P Popov. ...
- " Advanced Mechanics of Solids" by Srinath L N. ...

PEDAGOGICAL APPROACH:

1. **Lecture interspersed with discussions**
2. Demonstration (Models/Charts/Field Visit)
3. Presentation (PPT)
4. Video Lectures (NPTEL, SONET, MIT etc)

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
03	03	Tension test on Steel bar	25/03/2021
03	06	Bending test on (Steel / Wood) Cantilever beam.	01/04/2021
03	09	Bending test on simple support beam.	08/04/2021
03	12	Continuous beam – deflection test	15/04/2021
03	15	Torsion test	22/04/2021
03	18	Hardness test	29/04/2021
03	21	Spring test	06/04/2021
03	24	Compression test on wood or brick.	13/04/2021
03	30	Impact test	20/04/2021
03	33	Shear test	27/04/2021
03	36	Verification of Maxwell's Reciprocal theorem on beams.	03/04/2021
03	39	Use of Electrical resistance strain gauges	10/04/2021
03	42	Practice Lab	17/04/2021
03	45	Practice Lab	24/04/2021
03	48	Internal Examination	01/07/2021

Signature of Course Instructor(s) | Signature of Course Coordinator | Signature of Program Coordinator | Signature of Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: Bachelor of Technology	**Academic Year:2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester:II-II**
Name of the Course: - SURVEYING LAB	**Regulation:NRIA18**
Course Area/Module: - SURVEYING	**No. of students registered: 78**
Lab In-Charge: K. Teja **Designation:ASSISTANT PROFESSOR**	**Lab Instructors:** **1.** K. TEJA **2.** B.Uday Shankar
No. of Lecture Hours per week:03	**No. of Tutorial Hours per week:0**
Credits:02	

COURSE OBJECTIVES:

Students will be able to:

1. To impart the practical knowledge in the field, it is essential to introduce in curriculum.
2. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.Conduct survey and collect field data.
2. Prepare field notes from survey data
3.Interpret survey data and compute areas and volumes.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S.No	Topic
1	SURVEYING

COURSE DESCRIPTION:

To get introduced to modern advanced surveying techniques involved such as **remote sensing, Total station, GPS, Photogrammetry etc**. Photogrammetric Surveying – Principle, Scale, Numbe r of Photographs, Deduction of distance & height, Elements of Astronomical survey, Solution of problems dealing with celestial triangle.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Internal Examination	180Minutes	40	40%
External Examination	180Minutes	60	60%

Syllabus:-

LIST OF EXPERIMENT

1.Survey by chain survey of road profile with offsets in case of road widening.

2.Survey in an area by chain survey (Closed circuit)

3.Determination of distance between two inaccessible points by using compass.

4.Survey in an area using compass (Closed Traverse) – Local Attraction

5.Plane table survey; finding the area of a given boundary by the method of Radiation

6. Plane table survey; finding the area of a given boundary by the method of intersection.

7.Two Point Problem by the plane table survey.

8.Fly levelling : Height of the instrument method (differential levelling)

9.Fly levelling: rise and fall method.

10.Fly levelling: closed circuit/ open circuit.

11.Fly levelling; Longitudinal Section and Cross sections of a given road profile.

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology

REFERENCE

- AICTE Recommended| Advanced Surveying:Total Station, GPS, GIS & Remote Sensing | Second Edition | By Pearson. Gopi Satheesh. Paperback. ...
- Design of Steel Structures | 3rd Edition. S Duggal. ...
- Intelligent Transport Systems. Pradip Kumar Sarkar. ...
- S K Duggal. Paperback.
- R.K. Bansal. Paperback.

PEDAGOGICAL APPROACH:

1. **Lecture interspersed with discussions**
2. Demonstration (Models/Charts/Field Visit)
3. Presentation (PPT)
4. Video Lectures (NPTEL, SONET, MIT etc)

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
03	03	Survey by chain survey of road profile with offsets in case of road widening.	25/03/2021
03	06	Survey in an area by chain survey (Closed circuit)	01/04/2021
03	09	Determination of distance between two inaccessible points by using compass.	08/04/2021
03	12	Survey in an area using compass (Closed Traverse) – Local Attraction	15/04/2021
03	15	Plane table survey; finding the area of a given boundary by the method of Radiation	22/04/2021
03	18	Plane table survey; finding the area of a given boundary by the method of intersection.	29/04/2021
03	21	Two Point Problem by the plane table survey.	06/04/2021
03	24	Fly levelling : Height of the instrument method (differential levelling)	13/04/2021
03	30	Fly levelling: rise and fall method.	20/04/2021
03	33	Fly levelling: closed circuit/ open circuit.	27/04/2021
03	36	Fly levelling; Longitudinal Section and Cross sections of a given road profile.	03/04/2021
03	39	Practice Lab	10/04/2021
03	42	Practice Lab	17/04/2021
03	45	Practice Lab	24/04/2021
03	48	Internal Examination	01/07/2021

Signature of Course Instructor(s) Signature of Course Coordinator Signature of Program Coordinator Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan& Realization form	**NRIIT/9.1/F-09**

Name of the Program: BACHELOR OF TECHNOLOGY	**Academic Year: 2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester: II/II**
Name of the Course: CONCRETE TECHNOLOGY	**Regulation: NRIA18**
Course Area/Module:	**No. of students registered: 78**
Course Coordinator: K. TEJA **Designation:ASSISTANT PROFESSOR**	**Course Instructors:** **1. K.TEJA**
No. of Lecture Hours per week: 02	**No. of Tutorial Hours per week:1**
Credits: 02	

Course Objectives:

1. To learn the concepts of Concrete production and its behaviour in various Environments.
2. To learn the test procedures for the determination of properties of concrete.
3. To understand durability properties of concrete in various environments.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Understand the basic concepts of concrete.
CO2	Realize the importance of quality of concrete
CO3	Familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
CO4	Test the fresh concrete properties and the hardened concrete properties.
CO5	Evaluate the ingredients of concrete through lab test results. design the concrete mix
CO6	familiarize the basic concepts of special concrete and their production and Applications. Understand the behavior of concrete in various environments.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	BUILDING MATERIALS

COURSE DESCRIPTION:

Concrete technology **deals with study of properties of concrete and its practical applications**. In a building construction, concrete is used for the construction of foundations, columns, beams, slabs and other load bearing elements.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test	60 Minutes	10Marks	10%
Subjective examinations	90 Minutes	15Marks	15%
Online Objective examinations	20 Minutes	10Marks	10%
Assignment	60 Minutes	5Marks	5%
Semester End Examination	180 Minutes	60Marks	60%

UNIT I

Cement General, Manufacture of Portland cement by dry process, Approximate oxide composition limits of OPC, Bogue's compounds, Hydration of cement, heat of hydration, structure of hydrated cement. Types Of Cements. Tests on cement-Soundness test, Setting times test, Compressive strength test and Fineness test by air permeability apparatus. Aggregates And Testing Of Aggregates Classification of aggregates –size, shape and texture, Mechanical properties of aggregates. Tests for aggregates-strength, bulking of fine aggregate, Fineness modulus and Zoning of fine aggregate, Fineness modulus of coarse aggregate. Water Tolerable concentrations of impurities in mixing water, Use of sea water for mixing concrete.

UNIT II

Fresh Concrete Workability, factors affecting workability, Segregation and Bleeding in concrete, measurement of workability using slump cone test, Kelly ball test, Vee-Bee test, compaction factor test. Hardened Concrete Factors affecting compressive strength of concrete, Cube compression test, split tensile strength test, flexural strength of concrete. Durability of concrete, factors affecting durability of concrete.

UNIT III

Production Of Concrete Batching of materials, mixing, transportation, placing, compaction and finishing of concrete. Curing of concrete and methods of curing. Concrete Mix Design Basic considerations for concrete mix design, factors influencing the choice of mix proportions, Indian standard method of concrete mix design .ACI method of concrete mix design. Ready Mixed Concrete (RMC)

UNIT IV

Chemical And Mineral Admixtures Functions of admixtures, accelerators, retarders, air entraining admixtures, plasticizers and super plasticizers, water proofers, fly ash, silica fume, ground granulated blast furnace slag. Special Materials In Construction And Concreting Techniques Ferro-cement, selfcompacting concrete, fiber reinforced concrete, high strength concrete. Shortcrete or guniting. Future Trends In Concrete Technology polymer concrete-properties, green building, maintenance, need for green buildings.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
		UNIT-I	
01	01	Cement General, Manufacture of Portland cement by dry process, Approximate oxide composition limits of OPC	25/03/2021
01	02	Bogue's compounds, Hydration of cement, heat of hydration, structure of hydrated cement. Types Of Cements.	26/03/2021

01	03	Tests on cement-Soundness test.	27/03/2021
02	05	Setting times test	29/03/2021
02	07	Compressive strength test and Fineness test by air permeability apparatus.	31/03/2021
01	08	Aggregates And Testing Of Aggregates Classification of aggregates	02/04/2021
02	10	size, shape and texture, Mechanical properties of aggregates.	03/04/2021
01	11	Tests for aggregates-strength, bulking of fine aggregate, Fineness modulus and Zoning of fine aggregate	06/04/2021
01	12	, Fineness modulus of coarse aggregate. Water Tolerable concentrations of impurities in mixing water,	07/04/2021
01	13	Use of sea water for mixing concrete.	08/04/2021
		UNIT-II	
01	14	Fresh Concrete Workability	09/04/2021
03	17	factors affecting workability	10/04/2021
02	19	Segregation and Bleeding in concrete	15/04/2021
01	20	measurement of workability using slump cone test	17/04/2021
01	21	Kelly ball test	19/04/2021
02	23	Vee-Bee test	20/04/2021
01	24	compaction factor test	22/04/2021
01	25	Hardened Concrete Factors affecting compressive strength of concrete	23/04/2021
01	26	Cube compression test, split tensile strength test	24/04/2021
02	28	flexural strength of concrete	26/04/2021
02	30	Durability of concrete	28/04/2021
01	31	factors affecting durability of concrete.	30/04/2021
		UNIT-III	
02	33	Production Of Concrete Batching of materials,	01/05/2021
02	35	mixing, transportation	04/05/2021
02	37	placing, compaction and finishing of concrete	06/05/2021
02	39	Curing of concrete and methods of curing.	08/05/2021
03	42	Concrete Mix Design Basic considerations for concrete mix design	17/05/2021

02	44	factors influencing the choice of mix proportions	20/05/2021
02	46	Indian standard method of concrete mix design	22/05/2021
02	48	ACI method of concrete mix design.	25/05/2021
01	49	Ready Mixed Concrete (RMC)	27/05/2021
01	50		28/05/2021
		UNIT-IV	
02	52	Chemical And Mineral Admixtures Functions of admixtures	29/05/2021
02	54	accelerators, retarders, air entraining admixtures, plasticizers and super plasticizers	01/06/2021
02	56	water proofers, fly ash, silica fume, ground granulated blast furnace slag.	03/06/2021
02	58	Special Materials In Construction And Concreting Techniques Ferro-cement, selfcompacting concrete, fiber reinforced concrete, high strength concrete. Shortcrete or guniting	05/06/2021
01	59	Future Trends In Concrete Technology polymer concrete-properties	08/06/2021
01	60	green building, maintenance, need for green buildings.	09/06/2021

TEXT BOOKS:

1. Concrete technology by A.R.Santhakumar, Oxford University Press
2. Concrete technology by M.S.Shetty, S.Chand& Company Pvt. Ltd., New Delhi

REFERENCE BOOKS:

1. Properties of concrete by A.M.Neville, Longman Publishers
2. Concrete technology by M.L.Gambhir, Tata McGraw-Hill Publishing company Ltd., New Delhi

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2-Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	-	3	-	1	-	-	-	-	-	-	-
CO2	2	3	3	-	2	-	-	-	-	-	2	-
CO3	2	3	3	-	3	-	-	-	-	-	2	-
CO4	-	2	3	-	3	-	-	-	-	-	2	2
CO5	3	-	3	-	2	-	-	-	-	-	2	1
CO6	-	-	3	-	3	-	-	-	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1, PO3, PO5	PSO1, PSO2
CO2	PO1, PO2, PO3, PO5, PO11	PSO1, PSO2
CO3	PO1, PO2, PO3, PO5, PO11	PSO1,PSO2
CO4	PO2, PO3, PO5, PO11, PO12	PSO1, PSO2
CO5	PO1, PO3, PO5, PO11, PO12	PSO1, PSO2
CO6	PO3, PO5	PSO1, PSO2

Signature of Course Signature of CourseSignature of Program Signature of
Instructor(s)CoordinatorCoordinator Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan& Realization form	NRIIT/9.1/F-09

Name of the Program: BACHELOR OF TECHNOLOGY	**Academic Year: 2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester: II/II**
Name of the Course: ENGINEERING GEOLOGY	**Regulation: NRIA18**
Course Area/Module: GEOLOGY	**No. of students registered: 78**
Course Coordinator: K. TEJA **Designation:ASSISTANT PROFESSOR**	**Course Instructors:** **1. K.TEJA**
No. of Lecture Hours per week: 02	**No. of Tutorial Hours per week:1**
Credits: 02	

Course Objectives:

1) To understand weathering process and mass movement
2) To distinguish geological formations
3) To identify geological structures and process of rock mass quality.
4) To identify subsurface information and groundwater potential sites through geophysical investigations
5) To apply geological principles of mitigation of natural hazards and select sites for dams and tunnels

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Gain basic knowledge on characteristics of rocks and minerals.
CO2	Identify and differentiate rocks using geological classification.
CO3	Apply concepts of structural geology for civil engineering structures.
CO4	Understand the seismic zones of India.
CO5	Understanding about Geophysical investigation methods & Carryout geo physical investigations using various methods
CO6	Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	…..

COURSE DESCRIPTION:

This course explores the fundamentals of geology applied to civil engineering problems. Topics include rock and mineral types, soil properties, rock mechanics, geologic structures, active tectonics and earthquake hazards, slope stability and landslides, groundwater, rivers and flood hazards. Team projects include classic engineering geology case studies and site assessment field investigations. Instruction is conducted through lecture, field trips, and laboratory exercises. 3 hours of lecture/discussion and 3 hours of laboratory/field exercises per week.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test	60 Minutes	10Marks	10%
Subjective examinations	90 Minutes	15Marks	15%
Online Objective examinations	20 Minutes	10Marks	10%
Assignment	60 Minutes	5Marks	5%
Semester End Examination	180 Minutes	60Marks	60%

UNIT I

Earth Science Application of Earth Science in Civil Engineering Practices, Understanding the earth, internal structure and composition. Weathering, erosion and denudations process on earth material and natural agencies, Geological work of wind, river underground water and glaciers Mineralogy: Mineral properties, composition and their use in the manufacture of construction materials – Quartz Group; Feldspar Group; Kaolin; Asbestos; Carbonate Group ; Gypsum; Mica Group; Ore minerals - Iron ores; pyrite; Chlorite LO: 1. Explain the formation of earth and its internal structure 2. Understand weathering and formation of natural minerals 3. Explain composition of minerals and their utilization in construction industry.

UNIT II

Definition of rock - Rock forming processes - Geological classification of rocks - Dykes and sills, common structures and textures - Megascopic study, Chemical and Mineralogical Composition of rock (Granite, Gabbro, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Tuff, Felsite, Gneiss, Schist, Quartzite, Breccia, Marble, Porphyries, Charnockite and Slate).

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints – their important types. Their importance insitu and drift soils, common types of soils, their origin and occurrence in India

LO: 1. Understand classification of rocks 2. Demonstrate chemical composition 3. Identify mineral composition of rock 4. Explain formation of folds strike and dip of geological structures 5. Assess importance of soils 6. Locate origin of different types of rocks and soils and their origin India

UNIT III

Geomorphology, hydrogeology and seismology: Ground water, Water table - ground water exploration. Site selection for dams and tunnels – analysis of failures in dams and tunnels - Seismic zones of India - Earth quakes, their causes and effects. Seismic waves, Richter scale. Landslides - causes and effects; Tsunami – causes and effects.

LO: 1. Understand geomorphology 2. Identify procedures for site selection of important structures 3. Contrast seismic Zonation of India in stages 4. Understanding about Geophysical investigation methods 5. Carryout geo physical investigations using various methods

UNIT IV

Geology of Dams, Reservoirs and Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
		UNIT-I	
01	01	Application of Earth Science in Civil Engineering Practices	25/03/2021
01	02	Understanding the earth	26/03/2021
01	03	internal structure and composition	27/03/2021
02	05	Weathering, erosion and denudations process on earth material and natural agencies	29/03/2021
02	07	Geological work of wind	31/03/2021
01	08	river underground water and glaciers Mineralogy	02/04/2021
02	10	Mineral properties	03/04/2021
01	11	composition and their use in the manufacture of construction materials	06/04/2021
01	12	Quartz Group; Feldspar Group; Kaolin; Asbestos; Carbonate Group ; Gypsum; Mica Group; Ore minerals	07/04/2021
01	13	Iron ores; pyrite; Chlorite	08/04/2021
		UNIT-II	
01	14	Definition of rock	09/04/2021
03	17	Rock forming processes - Geological classification of rocks	10/04/2021
02	19	Dykes and sills, common structures and textures	15/04/2021
01	20	Megascopic study	17/04/2021
01	21	Chemical and Mineralogical Composition of rock (Granite, Gabbro, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Tuff, Felsite, Gneiss, Schist, Quartzite, Breccia, Marble, Porphyries, Charnockite and Slate).	19/04/2021
02	23	Structural Geology:	20/04/2021
01	24	Out crop	22/04/2021
01	25	strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities	23/04/2021
01	26	and joints	24/04/2021
02	28	their important types	26/04/2021
02	30	Their importance insitu and drift soils	28/04/2021

01	31	common types of soils, their origin and occurrence in India	30/04/2021
		UNIT-III	
02	33	Ground water	01/05/2021
02	35	Water table - ground water exploration.	04/05/2021
02	37	Site selection for dams and tunnels	06/05/2021
02	39	analysis of failures in dams and tunnels	08/05/2021
03	42	Seismic zones of India	17/05/2021
02	44	Earth quakes	20/05/2021
02	46	their causes and effects	22/05/2021
02	48	Seismic waves	25/05/2021
01	49	Richter scale. Landslides - causes and effects	27/05/2021
01	50	Tsunami – causes and effects.	28/05/2021
		UNIT-IV	
02	52	Geology of Dams, Reservoirs and Tunnels	29/05/2021
02	54	Types and purpose of Dams	01/06/2021
02	56	Geological considerations in the selection of a Dam site.	03/06/2021
02	58	Life of Reservoirs Purpose of Tunnelling	05/06/2021
01	59	effects, Lining of Tunnels	08/06/2021
01	60	Influence of Geology for successful Tunnelling.	09/06/2021

TEXT BOOKS:

1. N. ChennaKesavulu, Text Book of Engineering Geology, 2nd Edition (2009), Macmillan Publishers India.
2. Vasudev Kanithi, Engineering Geology, Universities Press Pvt Ltd, Hyderabad. 2012.

REFERENCE BOOKS:

1. Parbin Singh, Engineering and General Geology, 8th Edition (2010), S K Kataria& Sons.
2. J. C. Harvey, Geology for Geotechnical Engineers, Cambridge University Press (1982).
3. Richard E. Goodman, Engineering Geology, Rock in Engineering Construction by John Wiley & Sons, Inc. 1993.
4. Billings, M. P., Structural Geology, Prentice-Hall India, 1974, New Delhe.

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2-Medium, 3 – High)												
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO

	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	-	3	-	1	-	-	-	-	-	-	-
CO2	2	3	3	-	2	-	-	-	-	-	2	-
CO3	2	3	3	-	3	-	-	-	-	-	2	-
CO4	-	2	3	-	3	-	-	-	-	-	2	2
CO5	3	-	3	-	2	-	-	-	-	-	2	1
CO6	-	-	3	-	3	-	-	-	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1, PO3, PO5	PSO1, PSO2
CO2	PO1, PO2, PO3, PO5, PO11	PSO1, PSO2
CO3	PO1, PO2, PO3, PO5, PO11	PSO1,PSO2
CO4	PO2, PO3, PO5, PO11, PO12	PSO1, PSO2
CO5	PO1, PO3, PO5, PO11, PO12	PSO1, PSO2
CO6	PO3, PO5	PSO1, PSO2

Signature of Course Signature of CourseSignature of Program Signature of
Instructor(s)CoordinatorCoordinator Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY Teaching Plan &Realization	NRIIT/9.1/F-09

Name of the Program: B.Tech & Civil Engineering	**Academic Year:** 2020-2021
Branch: Civil Engineering	**Year & Semester:** II Year & II Semester
Name of the Course: Hydraulic Engineering	**Regulation:** NRIA 18
Course Area/Module: Civil engineering	**No. of students registered:**
Course Coordinator: **Mr.P.SRINIVAS** Civil Engineering **Designation:** Assistant Professor	**Course Instructors:** 1. **Mr.P.SRINIVAS** 2.
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Introduce concepts of laminar and turbulent flows
2. To teach principles of uniform flows through open channel
3. To teach principles of non-uniform flows through open channel
4. To impart knowledge on design of turbines
5. To impart knowledge on design of centrifugal pumps
6. To impart knowledge on design of reciprocating pumps

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Understand the principles of fluid statics, kinematics and dynamics
2. Familiarize basic terms used in fluid mechanics
3. Understand flow characteristics and classify the flows
4. Apply the continuity, momentum and energy principles
5. Estimate various losses in flow through channels
6. Understand fundamentals of kinematics and equations Cartesian coordinates.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	A good understanding and intuition on calculus and physics in general.
2	Mathematical methods applied to problems.

COURSE DESCRIPTION:

Hydraulics is the section of fluid mechanics which describes production, transmission and conversion of energy during mutual interaction of fluids and mechanisms in motion. This course starts from the deep fundamentals of fluid Mechanics accompanied at later stages by an overall description of technical solutions used in machinery. The main objective of the course is to learn basic principles of fluid power generation, transmission and conversion with the use of hydraulic machines and supplementary passive equipment.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	
Mid Examination - II	90	15	
Online Quiz Examination - I	20	10	
Online Quiz Examination - I	20	10	
Class Test-I	45	10	
Class Test-II	45	10	
Assignments	-	5	
Semester End Examination	180	60	

COURSE CONTENT (Syllabus):

UNIT I
Laminar & Turbulent flow in pipes: **Laminar Flow**- Laminar flow through: circular pipes, annulus and parallel plates. Measurement of viscosity. **Turbulent Flow**- Reynolds experiment, Transition from laminar to turbulent flow. Definition of turbulence, scale and intensity. Reynolds stresses semi-empirical theories of turbulence. Resistance to flow of fluid in smooth and rough pipes-Moody's diagram.
UNIT II
Uniform flow in Open Channels: Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Computation of Normal depth. **Non-Uniform flow in Open Channels:** Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Broad Crested Weir. Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification - Elements and characteristics- Energy dissipation.
UNIT III
Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - velocity triangles at inlet and outlet - Work done and efficiency **Hydraulic Turbines**: Classification of turbines; pelton wheel and its design. Francis turbine and its design - Kaplan turbine and its design – efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.
UNIT IV
Centrifugal pumps: Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies. **Reciprocating pumps**: Working principles of a Reciprocating pump, work done; heads, losses and efficiencies;

Text Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi, 7th Edition.
2. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House, 18th Edition

References:

1. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill.
3. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. K. Subramanya, Open Channel flow, Tata Mc.Grawhill Publishers

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Remarks
1	1	**Unit-I: Laminar Flow**- Laminar flow through: circular pipes	22-03-2021	
1	2	Laminar flow through: annulus and parallel plates	23-03-2021	
2	4	**Turbulent Flow**- Reynolds experiment, Transition from laminar to turbulent flow	25-03-2021	
2	6	Definition of turbulence, scale and intensity	27-03-2021	
1	7	Reynolds stresses semi-empirical theories of turbulence	30-03-2021	
2	9	Resistance to flow of fluid in smooth and rough pipes-Moody's diagram	31-03-2021	
2	11	Tutorial	03-04-2021	
1	12	**Unit-II:** Open Channel Flow classification of open channels	05-04-2021	
1	13	classification of open channel flow	06-04-2021	
1	14	Velocity Distribution of channel section	07-04-2021	
2	16	Comparison between open channel flow and pipe flow	08-04-2021	
2	18	geometrical parameters of a channel	10-04-2021	
3	21	Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation	12-04-2021	
3	24	, Characteristics of uniform flow, Chezy's formula, Manning's formula. Computation of Normal depth	19-04-2021	
4	28	Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth	23-04-2021	
1	29	Measurement of Discharge and Velocity – Broad Crested Weir	28-04-2021	
2	31	Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow	30-04-2021	
1	32	Hydraulic Jump and classification - Elements and characteristics- Energy dissipation	01-05-2021	
1	33	Tutorial	03-05-2021	

1	34	**Unit-III:** Hydrodynamic force of jets on stationary flat, inclined and curved vanes.	05-05-2021	
3	37	Hydrodynamic force of jets on moving flat, inclined and curved vanes.	06-05-2021	
2	39	velocity triangles at inlet and outlet	12-05-2021	
2	41	Work done and efficiency	15-05-2021	
2	43	**Hydraulic Turbines**: Classification of turbines	18-05-2021	
2	45	pelton wheel and its design– efficiency	20-05-2021	
1	46	Francis turbine and its design– efficiency	22-05-2021	
1	47	Kaplan turbine and its design – efficiency	24-05-2021	
1	48	Draft tube: theory - characteristic curves of hydraulic turbines	25-05-2021	
3	51	Cavitation: causes and effects.	27-05-2021	
3	54	Tutorial	01-06-2021	
2	56	**Unit-IV: Centrifugal pumps**: Working principles of a centrifugal pump, work done by impeller	04-06-2021	
3	59	heads, losses and efficiencies; minimum starting speed	07-06-2021	
3	62	Priming; specific speed; limitation of suction lift	10-06-2021	
2	64	net positive suction head (NPSH); Performance and characteristic curves	14-06-2021	
2	66	Cavitation effects; Multistage centrifugal pumps; troubles and remedies	18-06-2021	
3	69	Working principles of a Reciprocating pump, work done; heads, losses and efficiencies	23-06-2021	
1	70	Tutorial	28-06-2021	

Signature of Course Instructor(s) | Signature of Course Coordinator | Signature of Program Coordinator | Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan& Realization form	NRIIT/9.1/F-09

Name of the Program: BACHELOR OF TECHNOLOGY	**Academic Year: 2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester: II/II**
Name of the Course: IPR & Patents	**Regulation: NRIA18**
Course Area/Module:	**No. of students registered: 78**
Course Coordinator: K. TEJA **Designation:ASSISTANT PROFESSOR**	**Course Instructors:** **1. K.TEJA**
No. of Lecture Hours per week: 02	**No. of Tutorial Hours per week:1**
Credits: 02	

Course Objectives:

1) To impart knowledge on innovations and creations.
2) To encourage students on developing Entrepreneurship Skills
3) To teach procedure for registrations of various intellectual property rights.
4) To bring awareness on cybercrimes.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Understand the need for Intellectual Property Rights and its importance
CO2	Study of Information Technology Act 2000 and classification of Cybercrimes
CO3	Study of Copyrights Act and its registrations process
CO4	Study of Patents Act and it's infringement
CO5	Study of Trademarks Act and it's registration formalities
CO6	

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	

COURSE DESCRIPTION:

Intellectual Property Rights (IPRs) are legal rights that protect creations and/or inventions resulting from intellectual activity in the industrial, scientific, literary or artistic fields. The most common IPRs include patents, copyrights, marks and trade secrets.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage

Class Test	**60 Minutes**	**10Marks**	**10%**
Subjective examinations	**90 Minutes**	**15Marks**	**15%**
Online Objective examinations	**20 Minutes**	**10Marks**	**10%**
Assignment	**60 Minutes**	**5Marks**	**5%**
Semester End Examination	**180 Minutes**	**60Marks**	**60%**

UNIT I

Introduction to Intellectual Property Rights (IPR) Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO –Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR – Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights. LO: 1. Classify intellectual property rights 2.Understand the importance of IPR

Cyber Law and Cyber Crime Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions -E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers. LO: 1. Classification of cyber crimes 2. Awareness and preventive measures of cyber crimes

UNIT II

Copyrights and Neighboring Rights Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers – Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act. LO. 1. Categorize subject matters of copyrights 2. Understand the registration process of copyrights 3. Study effect of Infringement under Copyright Act

UNIT III

Patents: Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations – Ownership and Transfer –– Revocation of Patent – Patent Appellate Board - Infringement of Patent – Double Patenting –Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related Innovations. LO. 1.Analyze Patent requirements and its registration formalities 2.Study the effect of Infringement under Patent Act

UNIT IV

Trademarks: Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership –Trademarks Claims and Infringement – Remedies – Passing Off Action. LO. 1.Analyze functions of Trademark and its registration formalities 2.Study the effect of Infringement under Trademark Act

Trade Secrets Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret –Physical Security – Employee Access Limitation – Employee Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law. LO. 1. Understand the importance of Tradesecrets 2. Understand how to maintain Tradesecrets

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
		UNIT-I	
01	01	Concept of Property - Introduction to IPR	25/03/2021
01	02	International Instruments and IPR - WIPO - TRIPS – WTO –Laws Relating to IPR - IPR Tool Kit	26/03/2021
01	03	Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property	27/03/2021
02	05	Patents - Agencies for IPR Registration	29/03/2021
02	07	Traditional Knowledge –Emerging Areas of IPR	31/03/2021
01	08	Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.	02/04/2021
02	10	Cyber Law and Cyber Crime	03/04/2021
01	11	Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions	06/04/2021
01	12	E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities	07/04/2021
01	13	Cyber Crimes - Prevention and Punishment – Liability of Network Providers.	08/04/2021
		UNIT-II	
01	14	Cyber Crimes - Prevention and Punishment – Liability of Network Providers.	09/04/2021
03	17	Introduction to Copyrights	10/04/2021
02	19	Principles of Copyright Protection	15/04/2021
01	20	Law Relating to Copyrights	17/04/2021
01	21	Subject Matters of Copyright	19/04/2021
02	23	Copyright Ownership	20/04/2021
01	24	Transfer and Duration – Right to Prepare Derivative Works.	22/04/2021
01	25	Rights of Distribution	23/04/2021
01	26	Rights of Performers	24/04/2021
02	28	Copyright Registration	26/04/2021
02	30	Limitations – Infringement of Copyright	28/04/2021
01	31	Relief and Remedy – Case Law - Semiconductor Chip Protection Act.	30/04/2021
		UNIT-III	

02	33	Introduction to Patents	01/05/2021
02	35	Laws Relating to Patents in India	04/05/2021
02	37	Patent Requirements	06/05/2021
02	39	Product Patent and Process Patent	08/05/2021
03	42	Patent Search	17/05/2021
02	44	Patent Registration and Granting of Patent - Exclusive Rights – Limitations	20/05/2021
02	46	Ownership and Transfer — Revocation of Patent	22/05/2021
02	48	Patent Appellate Board - Infringement of Patent	25/05/2021
01	49	Double Patenting –Patent Cooperation Treaty – New developments in Patents	27/05/2021
01	50	Software Protection and Computer related Innovations.	28/05/2021
		UNIT-IV	
02	52	Trademarks: Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark	29/05/2021
02	54	– Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance	01/06/2021
02	56	Transfer of rights - Deceptive Similarities - Likelihood of Confusion	03/06/2021
02	58	- Dilution of Ownership –Trademarks Claims and Infringement – Remedies – Passing Off Action.	05/06/2021
01	59	Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret –Physical Security – Employee Access Limitation	08/06/2021
01	60	Employee Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law.	09/06/2021

TEXT BOOKS:

1. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
2. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, New Delhi

REFERENCE BOOKS:

1 Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.

2 R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.

3 M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, Serials Pub

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2-

Medium, 3 – High)												
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	-	3	-	1	-	-	-	-	-	-	-
CO2	2	3	3	-	2	-	-	-	-	-	2	-
CO3	2	3	3	-	3	-	-	-	-	-	2	-
CO4	-	2	3	-	3	-	-	-	-	-	2	2
CO5	3	-	3	-	2	-	-	-	-	-	2	1
CO6	-	-	3	-	3	-	-	-	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1, PO3, PO5	PSO1, PSO2
CO2	PO1, PO2, PO3, PO5, PO11	PSO1, PSO2
CO3	PO1, PO2, PO3, PO5, PO11	PSO1,PSO2
CO4	PO2, PO3, PO5, PO11, PO12	PSO1, PSO2
CO5	PO1, PO3, PO5, PO11, PO12	PSO1, PSO2
CO6	PO3, PO5	PSO1, PSO2

Signature of Course Signature of CourseSignature of Program Signature of
Instructor(s)CoordinatorCoordinator Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan& Realization form	NRIIT/9.1/F-09

Name of the Program: BACHELOR OF TECHNOLOGY	**Academic Year: 2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester: II/II**
Name of the Course: PROBABILITY AND STATISTIC	**Regulation: NRIA18**
Course Area/Module: MATHS	**No. of students registered: 78**
Course Coordinator: K. TEJA **Designation:ASSISTANT PROFESSOR**	**Course Instructors:** **1. K.TEJA**
No. of Lecture Hours per week: 02	**No. of Tutorial Hours per week:1**
Credits: 02	

Course Objectives:

1.To familiarize the techniques in central tendency, curve fitting ,correlation and regression.
2. To familiarize the techniques in probability and random variables.
3. To familiarize the techniques in probability distribution.
4. To familiarize the techniques in large and small sample tests.
5.To equip the students to solve problems in their disciplines.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Student will be able to ¬ Find the measures of central tendency and relation between them.(L1)
CO2	Student will be able to ¬ Evaluate the correlation coefficient, rank coefficient and regression.(L5)
CO3	Students will be able to ¬ Understand probabilities of events and expectationsof random variables for elementary problems.(L2)
CO4	Students will be able to ¬ Solve problems related to binomial and passion distribution.(L3)
CO5	Student will be able to ¬ Compare situations in which it is appropriate to consider the relevance of the Normal distribution.(L4)
CO6	Student will be able to ¬ Construct hypothesis and carryout appropriate tests to checks its acceptability.(L3)

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	M1,M2,M3

COURSE DESCRIPTION:

Probability And Statistics are the two important concepts in Maths. **Probability is all about chance. Whereas statistics is more about how we handle various data using different techniques**. It helps to represent complicated data in a very easy and understandable way.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test	60 Minutes	10Marks	10%
Subjective examinations	90 Minutes	15Marks	15%
Online Objective examinations	20 Minutes	10Marks	10%
Assignment	60 Minutes	5Marks	5%
Semester End Examination	180 Minutes	60Marks	60%

UNIT I

Descriptive statistics and methods for data science (Pre-requisite:Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent Categorical and Continuous variables, Data visualization.---No Question selects from the above part) Measures of Central tendency: Arithmetic Mean – Median – Mode - Geometric Mean- Harmonic Mean and Relations between them- Merits and Demerits. Measures of Dispersion: Range – Quartile Deviation – Variance, Standard Deviation –Skewness- Kurtosis. Curve Fitting and Principles of Least Squares. Correlation- correlation coefficient - rank correlation - Regression coefficients - Regression lines.

UNIT II

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

UNIT III

Distributions Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

UNIT IV

Estimation and Testing of hypothesis:Large sample tests Small sample tests Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems Small Sample Tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), χ2 - test for goodness of fit, χ2 - test for independence of attributes.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
		UNIT-I	
01	01	(Pre-requisite:Data science, Statistics Introduction, Population vs Sample	25/03/2021
01	02	Collection of data, primary and secondary data	26/03/2021
01	03	Type of variable: dependent and independent Categorical and Continuous variables	27/03/2021
02	05	Data visualization.---No Question selects from the above part)	29/03/2021

02	07	Measures of Central tendency: Arithmetic Mean – Median – Mode - Geometric Mean- Harmonic Mean and Relations between them- Merits and Demerits.	31/03/2021
01	08	Measures of Dispersion: Range – Quartile Deviation – Variance	02/04/2021
02	10	Standard Deviation –Skewness- Kurtosis.	03/04/2021
01	11	Curve Fitting and Principles of Least Squares.	06/04/2021
01	12	Correlation- correlation coefficient - rank correlation	07/04/2021
01	13	Regression coefficients - Regression lines.	08/04/2021
		UNIT-II	
01	14	Probability	09/04/2021
03	17	probability axioms,	10/04/2021
02	19	addition law and multiplicative law of probability,	15/04/2021
01	20	conditional probability	17/04/2021
01	21	Baye's theorem	19/04/2021
02	23	random variables (discrete and continuous),	20/04/2021
01	24	probability density functions,	22/04/2021
01	25	properties	23/04/2021
01	26	mathematical expectation.	24/04/2021
02	28		26/04/2021
02	30		28/04/2021
01	31		30/04/2021
		UNIT-III	
02	33	Distributions	01/05/2021
02	35	Probability distribution	04/05/2021
02	37	Binomial,	06/05/2021
02	39	Poisson approximation to the binomial distribution and normal distribution	08/05/2021
03	42	-their properties.	17/05/2021
02	44		20/05/2021
02	46		22/05/2021
02	48		25/05/2021
01	49		27/05/2021

01	50		28/05/2021
		UNIT-IV	
02	52	Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions	29/05/2021
02	54	level of significance, two types of errors and power of the test.	01/06/2021
02	56	Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means	03/06/2021
02	58	Confidence interval for parameters in one sample and two sample problems	05/06/2021
01	59	Small Sample Tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), χ2	08/06/2021
01	60	test for goodness of fit, χ2 - test for independence of attributes.	09/06/2021

TEXT BOOKS:

1. Miller and Freund, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

REFERENCE BOOKS:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2-Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	-	3	-	1	-	-	-	-	-	-	-
CO2	2	3	3	-	2	-	-	-	-	-	2	-
CO3	2	3	3	-	3	-	-	-	-	-	2	-
CO4	-	2	3	-	3	-	-	-	-	-	2	2
CO5	3	-	3	-	2	-	-	-	-	-	2	1
CO6	-	-	3	-	3	-	-	-	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1, PO3, PO5	PSO1, PSO2
CO2	PO1, PO2, PO3,	PSO1, PSO2

	PO5, PO11	
CO3	PO1, PO2, PO3, PO5, PO11	PSO1,PSO2
CO4	PO2, PO3, PO5, PO11, PO12	PSO1, PSO2
CO5	PO1, PO3, PO5, PO11, PO12	PSO1, PSO2
CO6	PO3, PO5	PSO1, PSO2

Signature of Course Signature of CourseSignature of Program Signature of
Instructor(s)CoordinatorCoordinator Head of the Department

	NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan & Realization)	**NRIIT/9.1/F-09**

Name of the Program: B. Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: II/II-A,B**
Name of the Course: Structural Analysis-I	**Regulation: NRIA18**
Course Area/Module: Structures	**No. of students registered: 79**
Course Coordinator: M. RAMA CHANDRA RAO **Designation: Associate Professor**	**Course Instructors:** **1. M. RAMA CHANDRA RAO**
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1) To impart knowledge on Columns & Struts
2) To teach procedure for analysis of fixed beams.
3) To teach procedure for analysis of continuous beams.
4) To enable the student undergo analysis procedure of moving loads & their influence.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1) Apply Rankine's & Euler's theories for analysis of columns & struts
2) Analyze indeterminate propped cantilever beams
3) Analyze fixed beams using compatibility method
4) Analyze continuous beams using Clapeyron's theorem of three moments Analysis
5) Analyze continuous beams using slope deflection equation
6) Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure. Estimate the bending moment and shear forces in beams for different fixity conditions

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Student should know about the FORCE & MOMENT calculations
2	Student should know about the SFD &BMD
3	Student should know about the analysis of Determinate beams

COURSE DESCRIPTION:

Structural analysis is the determination of the effects of loads on physical structures and their components. Structures subject to this type of analysis include all that must withstand loads, such as buildings, bridges, vehicles, furniture, attire, soil strata, prostheses and biological tissue. Structural analysis employs the fields of applied mechanics, materials science and applied mathematics to compute a structure's deformations, internal forces, stresses, support reactions, accelerations, and stability. The results of the analysis are used to verify a structure's fitness for use, often precluding physical tests. Structural analysis is thus a key part of the engineering design of structures

A structure refers to a body or system of connected parts used to support a load. Important examples related to Civil Engineering include buildings, bridges, and towers; and in other branches of engineering, ship and aircraft frames, tanks, pressure vessels, mechanical systems, and electrical supporting structures are important. To design a structure, an engineer must account for its safety, aesthetics, and serviceability, while considering economic and environmental constraints. Other branches of engineering work on a wide variety of non-building structures.

Classification of structures

A *structural system* is the combination of structural elements and their materials. It is important for a structural engineer to be able to classify a structure by either its form or its function, by recognizing the various elements composing that structure. The structural elements guiding the systemic forces through the materials are not only such as a connecting rod, a truss, a beam, or a column, but also a cable, an arch, a cavity or channel, and even an angle, a surface structure, or a frame.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test	**60 Minutes**	**10Marks**	**10%**
Subjective examinations	**90 Minutes**	**15Marks**	**15%**
Online Objective examinations	**20 Minutes**	**10Marks**	**10%**
Assignment	**60 Minutes**	**5Marks**	**5%**
Semester End Examination	**180 Minutes**	**60Marks**	**60%**

COURSE CONTENT (Syllabus):

UNIT I

Columns and Struts:

Introduction – classification of columns – Axially loaded compression members – Euler's crippling load theory – derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – eccentric loading and Secant formula – Prof. Perry's formula.

LO: 1. Classify columns
2. Understand Euler's theory on columns and assess crippling loads
3. Analyze compression members using different theories
4. Assess load carrying capacity using different formulae

Propped Cantilevers: Analysis of propped cantilevers-shear force and bending moment diagrams-Deflection of propped cantilevers.

LO: 1. Classify Propped Cantilevers
2. Analyze the beams subjected to loads
3. Study effect of sinking of supports of performance

UNIT II

Fixed Beams – Introduction to statically indeterminate beams with U. D. load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams-Deflection of fixed beams including effect of sinking of support, effect of rotation of a support.

LO. 1. Categorize fixed beams and their performance
2. Analyze the beams subjected to loads
3. Study effect of sinking of supports of performance

I MID EXAMINATION

UNIT III

Continuous Beams: Introduction-Clapeyron's theorem of three moments Analysis of continuous beams with constant moment of inertia with one or both ends fixed continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and bending moment diagrams.

LO. 1. Categorize continuous beams and their performance
2. Analyze the beams subjected to loads
3. Study effect of sinking of supports of performance

Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

LO. 1. Develop slope deflection expressions
2. Analyze structures with and without support sinking

UNIT IV
Moving Loads : Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load, U. D load longer than the span, U. D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length. *LO. 1. Categorize different types of moving loads and their performance* *2. Analyze the beams subjected to loads*
TEXT BOOKS:
1. Ramamurtham S., Theory of Structures, Dhanpat Rai Publishing Company (p) Ltd, 2009 2. C. S. Reddy, Basic Structural Analysis, Tata McGraw Hill
REFERENCE BOOKS:
1. Timoshenko & Young, Theory of Structures, Tata McGraw Hill 2. Junarkar S. B., Structural Mechanics Vol I & II, Charotar Publishers 3. C. K. Wang, Intermediate Structural Analysis, McGraw Hill

PEDAGOGICAL APPROACH:

1. Integrative Approach
2. Reflective Approach
3. Inquiry Based Approach
4. Collaborative Approach

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
3	3	**UNIT-I** **Columns and Struts:** Introduction – classification of columns – Axially loaded compression members	25/03/2021
3	6	Euler's crippling load theory – derivation of Euler's critical load formulae for various end conditions	30/03/2021
3	9	Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory	05/04/2021
3	12	Rankine – Gordon formula – eccentric loading and Secant formula – Prof. Perry's formula	10/04/2021
5	17	**Propped Cantilevers:** Analysis of propped cantilevers-shear force and bending moment diagrams	14/04/2021
3	20	Deflection of propped cantilevers.	22/04/2021
1	21	TUTORIAL	26/04/2021
3	24	**UNIT-II** **Fixed Beams** – Introduction to statically indeterminate beams with U. D. load, central point load, eccentric point load	27/04/2021
4	28	number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams	30/04/2021
3	32	Deflection of fixed beams including effect of sinking of support	05/05/2021
2	35	effect of rotation of a support.	07/05/2021
1	36	TUTORIAL	10/05/2021
		I MID EXAMINATION	

2	38	**UNIT-III** **Continuous Beams:** Introduction-Clapeyron's theorem of three moments	17/05/2021
4	42	Analysis of continuous beams with constant moment of inertia with one or both ends fixed continuous beams with overhang	19/05/2021
4	46	continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and bending moment diagrams.	25/05/2021
4	50	**Slope-Deflection Method:** Introduction, derivation of slope deflection equation	31/05/2021
4	54	application to continuous beams with and without settlement of supports	04/06/2021
1	55	TUTORIAL	05/06/2021
5	60	**UNIT-IV** **Moving Loads** : Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load	11/06/2021
6	65	U. D load longer than the span, U. D load shorter than the span	21/06/2021
4	69	two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.	26/06/2021
1	70	TUTORIAL	27/08/2021

TEXT BOOKS:

3. Ramamurtham S., Theory of Structures, Dhanpat Rai Publishing Company (p) Ltd, 2009
4. C. S. Reddy, Basic Structural Analysis, Tata McGraw Hill

REFERENCE BOOKS:

4. Timoshenko & Young, Theory of Structures, Tata McGraw Hill
5. Junarkar S. B., Structural Mechanics Vol I & II, Charotar Publishers
6. C. K. Wang, Intermediate Structural Analysis, McGraw Hill

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1							1				
CO2	1		3					1				
CO3	2	3										
CO4	1	2										
CO5	2											
CO6	1	2			1			1				
Total	8	7	3		1			3				

CO INDEX	POs MAPPED	PSOs MAPPED
CO312.1	PO1,PO8	PSO1,PSO2
CO312.2	PO1,PO3,PO8	PSO1,PSO2
CO312.3	PO1,PO2	PSO1,PSO2
CO312.4	PO1,PO2	PSO1,PSO2
CO312.5	PO1	PSO1,PSO2
CO312.6	PO1,PO2,PO5,PO8	PSO1,PSO2

Signature of Course Instructor(s)	Signature of Course Coordinator	Signature of Program Coordinator	Signature of Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

Name of the Program: Bachelor of Technology	**Academic Year:2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester:II-II**
Name of the Course: - ADVANCED SURVEYING LAB	**Regulation:NRIA18**
Course Area/Module: - ADVANCED SURVEYING	**No. of students registered: 78**
Lab In-Charge: K. Teja **Designation:ASSISTANT PROFESSOR**	**Lab Instructors:** **1.** K. TEJA **2.** B.Uday Shankar
No. of Lecture Hours per week:03	**No. of Tutorial Hours per week:0**
Credits:02	

COURSE OBJECTIVES:

Students will be able to:

1. To impart the practical knowledge in the field, it is essential to introduce in curriculum.
2. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Conduct survey and collect field data.
2. Prepare field notes from survey data
3. Interpret survey data and compute areas and volumes.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S.No	Topic
1	SURVEYING

COURSE DESCRIPTION:

To get introduced to modern advanced surveying techniques involved such as **remote sensing, Total station, GPS, Photogrammetry etc**. Photogrammetric Surveying – Principle, Scale, Numbe r of Photographs, Deduction of distance & height, Elements of Astronomical survey, Solution of problems dealing with celestial triangle.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Internal Examination	**180Minutes**	**40**	**40%**
External Examination	**180Minutes**	**60**	**60%**

Syllabus:-

LIST OF EXPERIMENTS

1. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of Repetition method.

2. Theodolite Survey: Finding the distance between two inaccessible points.

3. Theodolite Survey: Finding the height of far object.

4. Tachometric Survey: Heights and distance problems using tachometric principles.

5. One Exercise on Curve setting. 6. One Exercise on contours.

7. Total Station: Introduction to total station and practicing setting up, levelling up and elimination of parallax error.

8. Total Station: Determination of area using total station.

9. Total Station: Traversing

10. Total Station: Contouring

11. Total Station: Determination of Remote height.

12. Total Station: distance between two inaccessible points.

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology

REFERENCE

- AICTE Recommended| Advanced Surveying:Total Station, GPS, GIS & Remote Sensing | Second Edition | By Pearson. Gopi Satheesh. Paperback. ...
- Design of Steel Structures | 3rd Edition. S Duggal. ...
- Intelligent Transport Systems. Pradip Kumar Sarkar. ...

- S K Duggal. Paperback.
- R.K. Bansal. Paperback.

PEDAGOGICAL APPROACH:

1. **Lecture interspersed with discussions**
2. Demonstration (Models/Charts/Field Visit)
3. Presentation (PPT)
4. Video Lectures (NPTEL, SONET, MIT etc)

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
03	03	Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of Repetition method.	25/03/2021
03	06	Theodolite Survey: Finding the distance between two inaccessible points.	01/04/2021
03	09	Theodolite Survey: Finding the height of far object.	08/04/2021
03	12	Tachometric Survey: Heights and distance problems using tachometric principles.	15/04/2021
03	15	One Exercise on Curve setting.	22/04/2021
03	18	One Exercise on contours.	29/04/2021
03	21	Total Station: Introduction to total station and practicing setting up, levelling up and elimination of parallax error.	06/04/2021
03	24	Total Station: Determination of area using total station.	13/04/2021
03	30	Total Station: Traversing	20/04/2021
03	33	Total Station: Contouring	27/04/2021
03	36	Total Station: Determination of Remote height.	03/04/2021
03	39	Total Station: distance between two inaccessible points.	10/04/2021
03	42	Practice Lab	17/04/2021
03	45	Practice Lab	24/04/2021
03	48	Internal Examination	01/07/2021

Signature of Course Instructor(s)Coordinator   Signature of CourseSignature of Program Coordinator   Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan & Realization)	**NRIIT/9.1/F-09**

Name of the Program: Bachelor of Technology	**Academic Year: 2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester: II-II**
Name of the Course: ENGINEERING GEOLOGY	**Regulation: NRIA18**
Course Area/Module: GEOLOGY	**No. of students registered: 78**
Lab In-Charge: K. Teja **Designation: ASSISTANT PROFESSOR**	**Lab Instructors:** **1.** K. TEJA **2.** B.Uday Shankar
No. of Lecture Hours per week:03	**No. of Tutorial Hours per week:0**
Credits:02	

COURSE OBJECTIVES:

Students will be able to:

1. To identify mega-scopic types of ore-forming & rock forming minerals
2. To identify mega-scopic types of igneous, sedimentary, metamorphic rocks
3. To identify the topography of the site & material selection

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Identify mega-scopic minerals & properties
2. Identify mega-scopic rock & properties
3. Identify the site parameters such as contour, slope & aspects for topography
4. Know the occurrence of materials using strike & dip problems

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S.No	Topic
1	---

COURSE DESCRIPTION:

The identification of different types of rocks and understanding their behavior are the major objectives of geology. Further, development of cracks, fissures in rocks, their causes and their remedies are to be learnt in this lab.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Internal Examination	**180Minutes**	**40**	**40%**
External Examination	**180Minutes**	**60**	**60%**

Syllabus:-

LIST OF EXPERIMENTS

1. Physical properties of minerals: Mega-scopic identification of
2. a) Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite,Gypsum,etc…
   b) Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc…
3. Megascopic description and identification of rocks.
   a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc…
   b) Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc…
   c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc…
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
5. Simple Structural Geology problems.
6. Bore hole data.
7. Strength of the rock using laboratory tests.
8. Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.

6. Project report on geology

REFERENCE

- ‘Applied Engineering Geology Practicals’ by M T Mauthesha Reddy, New Age International Publishers, 2nd Edition.
- ‘Foundations of Engineering Geology’ by Tony Waltham, Spon Press, 3rd edition, 2009.

PEDAGOGICAL APPROACH:

1. **Lecture interspersed with discussions**
2. Demonstration (Models/Charts/Field Visit)
3. Presentation (PPT)
4. Video Lectures (NPTEL, SONET, MIT etc)

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
03	03	Physical properties of minerals	25/03/2021
03	06	Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group	01/04/2021
03	09	Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite,Gypsum	08/04/2021
03	12	Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite	15/04/2021
03	15	Megascopic description and identification of rocks.	22/04/2021
03	18	Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt	29/04/2021
03	21	Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate	06/04/2021
03	24	Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite	13/04/2021
03	30	Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities	20/04/2021
03	33	Simple Structural Geology problems	27/04/2021
03	36	Bore hole data	03/04/2021
03	39	Strength of the rock using laboratory tests.	10/04/2021
03	42	Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.	17/04/2021
03	45	Practice Lab	24/04/2021
03	48	Internal Examination	01/07/2021

Signature of Course Instructor(s)	Signature of Course Coordinator	Signature of Program Coordinator	Signature of Head of the Department

Name of the Program: Bachelor of Technology	**Academic Year:2020-2021**
Branch: CIVIL ENGINEERING	**Year & Semester:II-II**
Name of the Course: - FLUID MECHANICS & HYDRAULIC MACHINES LAB	**Regulation:NRIA18**
Course Area/Module: - FLUID MECHANICS & HYDRAULIC MACHINES	**No. of students registered: 78**
Lab In-Charge: K. Teja **Designation:ASSISTANT PROFESSOR**	**Lab Instructors:** **1.** K. TEJA **2.** B.Uday Shankar
No. of Lecture Hours per week:03	**No. of Tutorial Hours per week:0**
Credits:02	

COURSE OBJECTIVES:

Students will be able to:

1. To impart the experimental skills in flow measurement and real fluid flow problems.
2. To impart experimental skills to verify the performance characteristics of pumps and turbines

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Student will be able to utilize the knowledge in the design of water supply pipe networks and measure the rate of flow in pipes and channels.
2. Students will have confidence in the hydraulic design of turbines and should be able to identify suitable pumps and turbines for different working conditions.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S.No	Topic
1	---

COURSE DESCRIPTION:

hydraulics, **branch of science concerned with the practical applications of fluids, primarily liquids, in motion**. It is related to fluid mechanics (q.v.), which in large part provides its theoretical foundation.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Internal Examination	**180Minutes**	**40**	**40%**
External Examination	**180Minutes**	**60**	**60%**

Syllabus:-

LIST OF EXPERIMENTS

1. Calibration of Venturimeter& Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli’s equation.
7. Reynold’s Experiment
8. Impact of jet on vanes
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance test on Kaplan turbine
12. Efficiency test on centrifugal pump.
13. Efficiency test on reciprocating pump.

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology

REFERENCE

1. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
1. Rajput, Fluid mechanics and fluid machines , S. Chand & Co

PEDAGOGICAL APPROACH:

1. **Lecture interspersed with discussions**
2. Demonstration (Models/Charts/Field Visit)
3. Presentation (PPT)
4. Video Lectures (NPTEL, SONET, MIT etc)

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
03	03	Calibration of Venturimeter& Orifice meter	25/03/2021
03	06	Determination of Coefficient of discharge for a small orifice by a constant head method.	01/04/2021
03	09	Determination of Coefficient of discharge for an external mouth piece by variable head method.	08/04/2021
03	12	Calibration of contracted Rectangular Notch and /or Triangular Notch	15/04/2021
03	15	Determination of Coefficient of loss of head in a sudden contraction and friction factor.	22/04/2021
03	18	Verification of Bernoulli's equation.	29/04/2021
03	21	Reynold's Experiment	06/04/2021
03	24	Impact of jet on vanes	13/04/2021
03	30	Performance test on Pelton wheel turbine	20/04/2021
03	33	Performance test on Francis turbine.	27/04/2021
03	36	Performance test on Francis turbine.	03/04/2021
03	39	Efficiency test on centrifugal pump.	10/04/2021
03	42	Efficiency test on reciprocating pump.	17/04/2021
03	45	Practice Lab	24/04/2021
03	48	Internal Examination	01/07/2021

Signature of Course Instructor(s) Signature of Course Coordinator Signature of Program Coordinator Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY	**NRIIT/9.1/F-09**
	Course Handout (Including Teaching Plan &Realization)	

Name of the Program: B.Tech	**Academic Year: 2019-2020**
Branch: CSE	**Year & Semester: III-I**
Name of the Course: AIR POLLUTION &CONTROL	**Regulation:AUTONOMOUS**
Course Area/Module: ENVIRONMENTAL	**No. of students registered:**
Course Coordinator: N. RAMARAO **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** **1. N.RAMARAO**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1. To know the analysis of air pollutants
2. To learn plume behavior in different environmental condition's
3. To know the different types of particulate control equipment.
4.To know analyze the control of gaseous pollutants

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Decide the ambient air quality based analysis of air pollutants.
2.Judge the plume behavior in a prevailing environmental condition.
3.The design principles of particulate and gaseous control measures for an industry
4. To know how ELR influence the dispersion of pollutants.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	FLUID MECHANICS
2	HYDROLOGY
3	HYDRAULICS AND HYDRALICS AND MACHINERY

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	
Mid Examination - II	90	15	
Online Quiz Examination - I	20	10	
Online Quiz Examination - I	20	10	
Assignments		5	
Semester End Examination	180	70	

COURSE CONTENT (Syllabus):

. UNIT-I Air pollution –definition –scope significance air pollutants measurements of pollution classification –natural and artificial – primary and secondary-point and non point

Effects of air pollution- Effects of air pollution on man, vegetation and materials – Global effects of air pollution. Green house effect- Acid rains , Depletion of Ozone layer, Heat Island.

UNIT-II Syllabus-METEOROLOGY AND PLUME DISPERSION, properties of atmosphere,

pressure forces-moisture and relative humidity-influence of meteorological phenomenon on

air-wind rose diagrams

Unit-III Syllabus -Methods of controlling Control of particulates, control at sources, Control at

equipment- Settling chamber, Centrifugal separators, Fabric filters-Dry and wet scrubbers- Electro static precipitator

UNIT-IV

NRI INSTITUTE OF TECHNOLOGY

Course Handout
(Including Teaching Plan &Realization)

NRIIT/9.1/F-09

SYLLABUS-IN PLANT CONTROL MEASURES process change-Dry and Wet methods of removal and recycling- Dust collection devices-Internal separators- Catalytic reduction

AIR POLLUTION CONTROL BY DILUTION General Meteorological factors- Atmospheric Temperature Lapse rate – speed and direction of wind- wind velocity profile-Diffusion theories- objects of stack

TEXT BOOKS **1.** AIR POLLUTION AND CONTROL BY KVSG MURALI KRISHNA PUBLISHERS: Kaushal&Co

2. ENVIRONMENTAL POLLUTION CONTROL ENGINEERING BY C.S RAO PUBLISHERS: Wiely Eastern Ltd.

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSIO N

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTORDUCTION**	2-11-20		
2	2	**INTORDUCTION**	3-11-20		
3	3	Air pollution –definition **UNIT-I** sources of air pollution	5-11-20		
4	4	Classification of air pollutants primary and secondary	7-11-20		
5	5	Point source and non point source	9-11-20		
6	6	Effects of air pollutants on humans	11-11-20		
7	7	Effects of air pollutants on plants	12-11-20		
8	8	Effects of air pollutants on materials	16-11-20		
9	9	Global warming	18-11-20		
10	10	Acid rain	19-11-20		
11	11	Depletion of Ozone layer	21-11-20		
12	12	Heat islands	23-11-20		

13	13	METEOROLOGY AND PLUME DISPERSION	25-11-20		
14	14	METEOROLOGY AND PLUME DISPERSION	26-11-20		
15	15	, properties of atmosphere, PRESUURE	28-11-20		
16	16	HEAT , WIND	30-11-20		
17	17	moisture and relative humidity	2-12-20		
18	18	influence of meteorological phenomenon on air-wind rose diagrams	3-12-20		
19	19	influence of meteorological phenomenon on air-wind rose diagrams	5-12-20		
20	20	REVISION	7-12-20		
21	21	REVISION	9-12-20		
21	21	**UNIT-III** of controlling Control of particulates	10-12-20		
22	22	control at sources	12-12-20		
23	23	PROCESS CHANGE, EQUIPMENT MODIFICATION	14-12-20		
24	24	Settling chamber,	16-12-20		
25	25	CYCLONE	17-12-20		
26	26	Fabric filters	19-12-20		
27	27	ESP	21-12-20		
28	28	dry scrubbers	23-12-20		
29	29	Dry scrubber	24-12-20		
30	30	wet scrubbers	26-12-20		
31	31	wet scrubbers	4-1-21		
32	32	Revision	6-1-21		
33	33	revision	7-1-21		
34	34	Tutorial class	9-1-21		
35	35	**Unit-IV** process change-	11-1-21		
36	36	process change-	13-1-21		

37	37	Dry and Wet methods of removal and recycling-	18-1-21		
38	38	Dry and Wet methods of removal and recycling-	20-1-21		
39	39	- Dust collection devices-Internal separators	21-1-21		
40	40	- Dust collection devices-Internal separators	23-1-21		
41	41	- Catalytic reduction	25-1-21		
42	42	- Catalytic reduction	27-1-21		
43	43	Atmospheric Temperature Lapse rate	28-1-21		
44	44	Atmospheric Temperature Lapse rate	30-1-21		
45	45	– speed and direction of wind- wind velocity profile	1-2 -21		
46	46	Diffusion theories- objects of stack	3-2- 21		
47	47	Diffusion theories- objects of stack	4-2 --21		
48	48	REVISION	6-2 -21		
49	49	REVISION	8-2- 21		
50	50	REVISION	10-2 -21		
51	51	REVISION	11-2-21		
52	52	REVISION	15-2-21		
53	53	REVISION	16-2-21		
54	54	REVISION	18-2-21		

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	*											
CO2												
CO3												
CO4												
CO5												

CO6												
Total												
Avg.												

CO INDEX	POs MAPPED	PSOs MAPPED

Signature of Course Instructor(s)   Signature of program Coordinator   Signature of Head of the Department

Signature of Course Instructor(s) | Signature of Course Coordinator | Signature of Program Coordinator | Signature of Head of the Department

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: INDIAN CONSTITUTION	**Regulation:AUTONOMOUS**
Course Area/Module: INDIAN CONSTITUTION	**No. of students registered: 110**
Course Coordinator: M S PHANI KUMAR **Designation:ASSITANTPROFESSOR**	**Course Instructors:** 1. **M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1 Understand the meaning, history, features and characteristics of Indian Constitution
CO2 Gain knowledge on fundamental rights duties and Principles and importance of State Policy
CO3 Understand the powers of Union, the Statesand Indian President.
CO4 Know about amendments of the constitution and Emergency Provisions

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	**90**	**15**	**15%**
Mid Examination – II	**90**	**15**	**15%**
Online Quiz Examination - I	**20**	**10**	**10%**
Online Quiz Examination - I	**20**	**10**	**10%**
Assignments		**5**	**5%**
Semester End Examination	**180**	**70**	**70**

COURSE CONTENT (Syllabus):

UNIT-I

- Meaning of the constitution law and constitutionalism
- Historical perspective of the Constitution of India
- Salient features and characteristics of the Constitution of India

UNIT-II

- Scheme of the fundamental rights
- The scheme of the Fundamental Duties and its legal status
- The Directive Principles of State Policy – Its importance and implementation

UNIT-III

- Federal structure and distribution of legislative and financial powers between the Union and the State
- Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT-IV

- Amendment of the Constitutional Powers and Procedure
- The historical perspectives of the constitutional amendments in India
- Emergency Provisions : National Emergency, President Rule, Financial Emergency

TEXT BOOKS:

- The Constitution of India. ...
- Introduction to the Constitution of India. ...
- India's Founding Moment: The Constitution of a Most Surprising Democracy. ...
- Widows of Vidarbha: Making of Shadows. ...
- The Indian Constitution: Cornerstone of a Nation.

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTRODUCTION- UNIT-I**	2-11-20		
2	2	**INTRODUCTION**			
3	3	**INTRODUCTION**			
4	4	• Meaning of the constitution law and constitutionalism	3-11		
5	5	• Historical perspective of the Constitution of India	4-11		
6	6	• Salient features and characteristics of the Constitution of India	5-11		
7	7	UNIT II	6-11-		
8	8	• Scheme of the fundamental rights	7--11		
9	9	• The scheme of the Fundamental Duties and its legal status	9-11		
10	10	• The Directive Principles of State Policy – Its importance and implementation	10-11		
11	11	UNIT III	11-11		

12	12	• Federal structure and distribution of legislative and financial powers between the Union and the States	12-11		
13	13	• Parliamentary Form of Government in India – The constitution powers and status of the President of India	13-11		
14	14	UNIT IV	14-11		
15	15	• Amendment of the Constitutional Powers and Procedure	16-11		
16	16	• The historical perspectives of the constitutional amendments in India	17-11		
17	17	• Emergency Provisions : National Emergency, President Rule, Financial Emergency	19-11		

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3				2				
CO2	3	3	2	3				2				
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	3	3								
CO6	3	3	3	3								
Total	18	17	13	16								
Avg.	3	2.8	2.2	2.6								

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,3,4	1,2
CO2	1.2.3.4	1,2
CO3	1.2.3.4.6	2
CO4	1.2.3.4.6	2
CO5	1.2.3.7	1,2
CO6	1,2,3,7	1,2

Signature of Course Signature of programSignature of

Instructor(s)Coordinator Head of the Department

NRI INSTITUTE OF TECHNOLOGY

	Course Handout (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

Name of the Program: B.TECH	**Academic Year:** 2020-2021
Branch: CIVIL ENGINEERING	**Year & Semester:** III-I B
Name of the Course: ENVIRONMENTAL POLLUTION & CONTROL	**Regulation:** NRIA18
Course Area/Module: ENVIRONMENTAL SCIENCE	**No. of students registered:** 41
Course Coordinator: N. RAMARAO **Designation:** ASSISTANT PROFESSOR	**Course Instructors:** 1. N.RAMARAO
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week:** 1
Credits: 3	

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
UNIT-I			
1	1	Introduction to Air Pollution	2-11-20
2	2	Introduction to Air Pollution	3-11-20
3	3	Introduction to Air Pollution	5-11-20
4	4	Air pollution Control Methods	7-11-20
5	5	Air pollution Control Methods	9-11-20
6	6	Air pollution Control Method	11-11-20
7	7	Particulate control devices – Methods of Controlling Gaseous Emissions	12-11-20
8	8	Particulate control devices – Methods of Controlling Gaseous Emissions	16-11-20
9	9	Particulate control devices – Methods of Controlling Gaseous Emissions	18-11-20
10	10	articulate control devices – Methods of Controlling Gaseous Emissions	19-11-20
11	11	Air Quality Standards	21-11-20
12	12	Noise Pollution: Noise standards, Measurement and control methods	23-11-20
13	13	Noise Pollution: Noise standards, Measurement and control methods	25-11-20

14	14	oise Pollution: Noise standards, Measurement and control methods	26-11-20
15	15	Reducing residential and industrial noise – ISO14000.	28-11-20
16	16	Tutorial-I	30-11-20
17	17	Practice test/Assignment	2-12-20
UNIT-II			
18	18	Strategies for pollution control – Volume and Strength reduction	5-12-20
19	19	Strategies for pollution control – Volume and Strength reduction	7-12-20
20	20	Strategies for pollution control – Volume and Strength reduction	9-12-20
21	21	Neutralization – Equalization – Proportioning	10-12-20
22	22	Neutralization – Equalization – Proportioning	12-12-20
23	23	Neutralization – Equalization – Proportioning	14-12-20
24	24	Common Effluent Treatment Plants	16-12-20
25	25	Recirculation of industrial wastes – Effluent standards.	17-12-20
26	26	Recirculation of industrial wastes – Effluent standards.	19-12-20
27	27	Recirculation of industrial wastes – Effluent standards.	21-12-20
28	28	Tutorial-II	23-12-20
29	29	Practice test/Assignment	24-12-20
UNIT-III			
30	30	solid waste characteristics – basics of on-site handling and collection – separation and processing	4-1-21
31	31	solid waste characteristics – basics of on-site handling and collection – separation and processing	6-1-21
32	32	solid waste characteristics – basics of on-site handling and collection – separation and processing	7-1-21
33	33	solid waste characteristics – basics of on-site handling and collection – separation and processing	9-1-21
34	34	solid waste characteristics – basics of on-site handling and collection – separation and processing	11-1-21
35	35	Incineration- Composting-Solid waste disposal methods	13-1-21
36	36	Incineration- Composting-Solid waste disposal methods	18-1-21
37	37	Characterization – Nuclear waste – Biomedical wastes – Electronic wastes – Chemical wastes	20-1-21

38	38	Treatment and management of hazardous waste-Disposal and Control methods	21-1-21
39	39	Treatment and management of hazardous waste-Disposal and Control methods	23-1-21
40	40	Treatment and management of hazardous waste-Disposal and Control methods	25-1-21
41	41	Treatment and management of hazardous waste-Disposal and Control methods	27-1-21
42	42	Tutorial-III	28-1-21
43	43	Practice test/Assignment	30-1-21
UNIT-IV			
44	44	Environmental Sanitation Methods for Hostels and Hotels, Hospitals	3-2- 21
45	45	Environmental Sanitation Methods for Hostels and Hotels, Hospitals	4-2 --21
46	46	Swimming pools and public bathing places	6-2 -21
47	47	social gatherings (melas and fares), Schools and Institutions	8-2- 21
48	48	Rural Sanitation-low cost waste disposal methods	10-2 -21
49	49	Tutorial-IV	11-2-21
50	50	Practice test/Assignment	15-2-21
51	51	REVISION	16-2-21
52	52	REVISON	18-2-21

Signature of Course Instructor(s) | Signature of Course Coordinator | Signature of Program Coordinator | Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: REINFORCED CONCRETE STRUCTURES	**Regulation:AUTONOMOUS**
Course Area/Module: REINFORCED CONCRETE STRUCTURES	**No. of students registered: 110**
Course Coordinator: M S PHANI KUMAR **Designation:ASSITANTPROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1) To teach concepts of working stress and limit state methods.
2) To impart design procedure of RC elements in flexure, shear and torsion.
3) To teach design procedure for short and long RC columns.
4) To demonstrate design of RC slab

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1 Work on different types of design philosophies
CO2 Carryout analysis and design of flexural members and detailing
CO3 Design of different types of slabs subjected to shear, bond and torsion
CO4 Design of dog legged stair case
CO5 Design different types of columns
CO6 Design different types of footings

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	FLUID MECHANICS
2	STRENGTH OF MATERIALS
3	STRUCTURAL ANALYSIS

ALUATION SCHEME:

Component	Duration	Marks	% Weightage

	(Minutes)		
Mid Examination – I	**90**	**15**	**15%**
Mid Examination – II	**90**	**15**	**15%**
Online Quiz Examination - I	**20**	**10**	**10%**
Online Quiz Examination - I	**20**	**10**	**10%**
Assignments		**5**	**5%**
Semester End Examination	**180**	**70**	**70**

COURSE CONTENT (Syllabus):

UNIT-I

Basic concepts of RCC and Design of Beams Concepts of Reinforced concrete Design – Working Stress Method - Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000. Beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections

LO: 1. Familiarize with working stress and limit stress method of design. 2. Understand stress block parameters in methods of analysis 3. Design of beams of varying cross sections adopting IS Code

UNIT-II

Shear and torsion: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing;

LO: 1. Understand behaviour of beams under shear and torsion 2. Visualize importance of bond and anchorage 3. Design and Detail RC beams under due to shear and torsion adopting IS Code.

UNIT-III

Design of one way slab, Two-way slabs and continuous slab using I.S. Coefficients Limit state design for serviceability for deflection, cracking and codal provision. Design of doglegged staircase.

LO: 1. Classify understand performance of slabs based on dimensions 2. Design reinforced concrete slabs & Stair cases as per IS codal provisions.

UNIT-IV

Short and Long columns – under axial loads, uniaxial bending and biaxial bending – I S Code provisions. LO: 1. Understand behaviour of columns with different slenderness characteristics 2. Contrast behaviour of columns axial and under Uniaxial, Biaxial eccentricities 3. Design and detail RC columns under different loads adopting IS Code. Footings: Different types of footings – Design of isolated, square, rectangular, circular footings and combined footings. LO: 1. Classify footings based on shape and utility 2. Examine the field conditions and suggest appropriate footings 3. Design reinforced concrete footings.

TEXT BOOKS:

1. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Limit State Design, Laxmi, publications Pvt. Ltd., New Delhi
2. P. C. Varghese, Limit state designed of reinforced concrete, Prentice Hall of India, New Delhi

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTRODUCTION- UNIT-I**	2-11-20		
2	2	**INTRODUCTION**			
3	3	**INTRODUCTION**			
4	4	Concepts of Reinforced concrete Design	3-11		
5	5	Working Stress Method	4-11		
6	6	Limit State method	5-11		
7	7	Material Stress	6-11-		
8	8	Strain Curves	7--11		
9	9	Safety factors	9-11		
10	10	Characteristic values	10-11		
11	11	Stress Block parameters – IS – 456 – 2000	11-11		
12	12	Beams	12-11		
13	13	Limit state analysis and design of singly reinforced	13-11		
14	14	doubly reinforced	14-11		
15	15	T and L beam sections	16-11		
16	16	Familiarize with working stress and limit stress method of design.	17-11		
17	17		19-11		
18	18		20-11		
19	19		21-11		
20	20		23-11		
21	21		24-11		
22	22		25-11		
23	23		27-11		
24	24		28-11		
25	25		30-11		
26	26	Problems	1-12-20		
27	27	**DARCY'S LAW- COEFFICIENT OF PERMEABILITY-UNIT-II**			
28	28	Shear and torsion:	4-12		

29	29	Limit state analysis and design of section for shear and torsion	7-12		
30	30	concept of bond	9-12		
31	31	anchorage and development length	11-12		
32	32	I.S. code provisions	15-12		
33	33	Design examples in simply supported and continuous beams,	17-12		
34	34	detailing;	19-12		
35	35	Problems	22-12		
36	36	Problems	26-12-21		
37	37	**EFFECTIVE STRESS PRINCIPLE: UNIT-III**			
38	38	Design of one way slab,	4-01-21		
39	39	Design of one way slab,	5-1		
40	40	Two-way slabs and continuous slab using I.S.	6-1		
41	41	Two-way slabs and continuous slab using I.S.	8-1		
42	42	Coefficients Limit state design for serviceability for deflection,	11-1		
43	43	Coefficients Limit state design for serviceability for deflection,	16-1		
44	44	cracking and codal provision	19-1		
45	45	cracking and codalprovisio	20-1		
46	46	Design of doglegged staircase.	21-1		
47	47	Design of doglegged staircase.	23-1		
48	48	Problems	25-1		
49	48	Problems	27-1		
50	50	Problems	28-1		
51	51	Problems	29-1		
52	52	Problems	1-2-21		
53	53	Problems	2-2		
54	54	**UNIT-IV: Consolidation of Soil**			
55	55	Short and Long columns	3-2		
56	56	under axial loads	5-2		
57	57	uniaxial bending and biaxial bending	8-2		
58	58	I S Code provisions.	10-2		

59	59	Different types of footings	12-2		
60	60	Design of isolated	15-2		
61	61	square	17-2		
62	62	rectangular	19-2		
63	63	circular footings	22-2		
64	64	combined footings.	24-2		
65	65	Problems	26-2		
66	66	Problems			
67	67	Problems	27-02-21		
68	68	REVISON ON UNIT-I			
69	69	REVISON ON UNIT-II			
70	70	REVISON ON UNIT-III			
71	71	REVISON ON UNIT-IV			
72	72	REVISON ON UNIT-I			
73	73	REVISON ON UNIT-II			
74	74	REVISON ON UNIT-III			
75	75	REVISON ON UNIT-IV			

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3				2				
CO2	3	3	2	3				2				
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	3	3								
CO6	3	3	3	3								
Total	18	17	13	16								
Avg.	3	2.8	2.2	2.6								

CO INDEX	POs MAPPED	PSOs MAPPED

CO1	1,2,3,4	1,2
CO2	1.2.3.4	1,2
CO3	1.2.3.4.6	2
CO4	1.2.3.4.6	2
CO5	1.2.3.7	1,2
CO6	1,2,3,7	1,2

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan & Realization)	**NRIIT/9.1/F-09**

Name of the Program: B. Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III/I-A,B**
Name of the Course: Structural Analysis-II	**Regulation: NRIA18**
Course Area/Module: Structures	**No. of students registered: 112**
Course Coordinator: M. RAMA CHANDRA RAO **Designation: Associate Professor**	**Course Instructors:** **1. M. RAMA CHANDRA RAO**
No. of Lecture Hours per week: 6	**No. of Tutorial Hours per week: 1**
Credits: 3	

Course Objectives:

- Familiarize Students with Different types of Structures
- Equip student with concepts of Arches
- Understand Concepts of lateral Load analysis
- Familiarize Cables and Suspension Bridges
- Understand Analysis methods Moment Distribution, Kanis Method and Matrix Methods

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Analyze three Hinged Arches and two Hinged Arches
CO2	Analyze structures using Slope deflection method
CO3	Analyze structures using Moment Distribution method
CO4	Carryout lateral Load analysis of structures
CO5	Analyze structures using Flexibility Matrix method
CO6	Analyze structures using Stiffness Matrix method

COURSE DESCRIPTION:

Flexibility method for analysis of indeterminate structures (Beams. Trusses and frames) utilizing concept of Virtual Work. Matrix analysis of structures. Effect of temperature change and yielding of supports. Three Moment Equations and applications. Slope-deflection method for analysis of beams and rigid frames. Concept of Moment distribution methods and applications on continuous beams, and frames with and without side-sway. Influence lines of indeterminate structure - Qualitative influence lines. Computer applications.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Engineering Mechanics, Strength of Materials, Structural Analysis-I

UNIT I
Three Hinged Arches: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature. Hinges with supports at different levels. **Two Hinged Arches**: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, Tied arches – Fixed arches – (No analytical question).
UNIT II
Slope-Deflection: Analysis of single bay, single storey, portal frame including side sway. **LO. 1. Analyze 2D frames using slope-deflection method.** **Moment Distribution Method**: Introduction to moment distribution method-application to continuous beams with and without settlement of supports. Analysis of single storey portal frames – including Sway. **LO.1. Develop moment distribution expressions** **2. Analyze structures with and without support sinking** **3. Analyze single storey portal frames**
UNIT III
Lateral Load Analysis Using Approximate Methods: Application to building frames. (i) Portal Method (ii) Cantilever Method.
UNIT IV
Matrix Methods: **Flexibility method**: Introduction, application to continuous beams (maximum of two unknowns) including support settlements. Analysis of single bay, single storey portal frame including sway. **Stiffness method**: Introduction, application to continuous beams (maximum of two unknowns) including support settlements. Analysis of single bay, single storey portal frame including sway.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date
UNIT-I			
4	4	Three Hinged Arches: elastic thoery of arches, Eddy's theorem, determination of horizontal thrust , bending moment	17/08/2020
4	8	Normal thrust, radial shear, effect of temperature, hinges with supports at different levels	24/08/2020
4	12	Two Hinged Arches : detemination of horizontal thrust,bending moment	28/08/2020
4	16	Normal thrust,radial shear,rib shortening and temperature stresses,tied arches,fixed arches	04/09/2020
1	17	TUTORIAL-I	09/09/2020
UNIT-II			
5	22	Slope deflection: analysis of single bay,single story,portal frame excluding side sway	10/09/2020
3	25	Side way problems	17/09/2020
6	31	Moment distribution method : intoduction,application to continious beamswith and without settlement of supports	22/09/2020
4	35	Analysis of single story portal frames including sway	30/09/2020
1	36	TUTORIAL-II	07/10/2020

UNIT-III			
1	37	lateral load analysis using approximate methods: introduction	08/10/2020
8	45	Application to building frames portal method	09/10/2020
8	53	Application to building frames cantilever method	22/10/2020
1	54	TUTORIAL-III	03/11/2020
UNIT-IV			
1	55	Introduction to matrix method	10/11/2020
3	58	Flexbility methods , application to continous beams (max two unknowns) including settlement	11/11/2020
4	62	Analysis of single bay, single storey portal frame including sway	16/11/2020
3	65	Stiffness methods , application to continous beams (max two unknowns) including settlement	23/11/2020
4	69	Analysis of single bay, single storey portal frame including sway	27/11/2020
1	70	TUTORIAL-IV	05/01/2021

TEXT BOOKS:

1. Structural Analysis, T. S. Thandavamoorthy, Oxford university press, India.
2. Structural Analysis, R.C. Hibbeler, Pearson Education, India
3. Theory of Structures – II, B. C. Punmia, Jain & Jain, Laxmi Publications, India.

REFERENCE BOOKS:

1. Intermediate Structural Analysis, C. K. Wang, Tata McGraw Hill, India
2. Theory of structures, Ramamuratam, Dhanpatrai Publications.
3. Analysis of structures, Vazrani & Ratwani – Khanna Publications.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)												
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	1							1				
CO2	1		3					1				
CO3	2	3										
CO4	1	2										
CO5	2											
CO6	1	2			1			1				
Total	8	7	3		1			3				

CO INDEX	POs MAPPED	PSOs MAPPED
CO211.1	PO1,PO8	PSO1,PSO2
CO211.2	PO1,PO3,PO8	PSO1,PSO2
CO211.3	PO1,PO2	PSO1,PSO2
CO211.4	PO1,PO2	PSO1,PSO2
CO211.5	PO1	PSO1,PSO2
CO211.6	PO1,PO2,PO5,PO8	PSO1,PSO2

Signature of Course Instructor(s)	Signature of Course Coordinator	Signature of Program Coordinator	Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: SOILMECHANICS	**Regulation:AUTONOMOUS**
Course Area/Module: SOIL MECHANICS	**No. of students registered: 110**
Course Coordinator: M S PHANI KUMAR **Designation:ASSITANTPROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1. To enable the student to find out the index properties of the soil and classify it.
2. To enable the students to differentiate between compaction and consolidation of soils and to determine the consolidation settlement.
3. To enable the student to determine permeability of soils using various methods.
4. To impart the concept of seepage of water through soils and determine the seepage discharge.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Identify various soils based on their characteristics.
2. Characterize and classify soils based on different limits.
3. Evaluate permeability and seepage of soils.
4. Determine the permeability of soils and stratified soils
5. Determine plasticity characteristics of various soils
6. Design consolidation process by predicting settlement of soils.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	FLUID MECHANICS
2	STRENGTH OF MATERIALS
3	STRUCTURAL ANALYSIS

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	15	15%
Mid Examination - II	90	15	15%
Online Quiz Examination - I	20	10	10%
Online Quiz Examination - I	20	10	10%
Assignments		5	5%
Semester End Examination	180	70	70

COURSE CONTENT (Syllabus):

UNIT-I

Introduction
Types of soils - formation and deposition - moisture content, unit weights, degree of saturation, voids ratio, porosity, specific gravity, mass specific gravity. Relationship between various soil parameters. Determination of Moisture content, Specific gravity and Unit weight using various methods.
Plasticity Characteristics of Soil
Consistency limits-liquid limit, plastic limit, shrinkage limit, plasticity, liquidity and consistency indices, flow & toughness indices. Determination of liquid limit, plastic limit and shrinkage limit. Soil classification based on particle size, texture , unified and Indian standard method.

UNIT-II

Permeability of Soil
Darcy's law- coefficient of permeability: determination by constant-head and falling-head methods. Permeability of stratified soils - factors affecting - Seepage Analysis- stream and potential functions - flow nets, graphical method to plot flow nets.

UNIT-III

Effective Stress Principle - Introduction, effective stress principle, nature of effective stress, effect of water table. Capillary action, seepage pressure, quick sand condition. Compaction of Soil- theory of compaction- optimum moisture content- maximum dry density. Stresses in soils due to point load, line load, strip load, uniformly loaded circular, rectangular loaded area. Influence factors, Isobars, Boussinesq's equation, Newmark's Influence Chart.

UNIT-IV

Consolidation of Soil - comparison between compaction and consolidation, initial, primary & secondary consolidation - Terzaghi's theory of consolidation, final settlement of soil deposits, computation of consolidation settlement and secondary consolidation.
TEXT BOOKS:
1. K. R. Arora, Soil Mechanics and Foundation Engg., Standard Publishers and Distributors, Delhi.

C. Venkataramiah, Geotechnical Engineering, New age International Pvt . Ltd, (2002).

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTRODUCTION- UNIT-I**	2-11-20		
2	2	**INTRODUCTION**			
3	3	**INTRODUCTION**			
4	4	Types of soils	3-11		
5	5	Formation and deposition	4-11		
6	6	Moisture content, unit weights, degree of saturation,	5-11		
7	7	Voids ratio, porosity, specific gravity	6-11-		
8	8	Mass specific gravity.	7--11		
9	9	Relationship between various soil parameters.	9-11		
10	10	Relationship between various soil parameters.	10-11		
11	11	Relationship between various soil parameters.	11-11		
12	12	Relationship between various soil parameters.	12-11		
13	13	Determination of Moisture content, Specific gravity and Unit weight using various methods.	13-11		
14	14	Determination of Moisture content, Specific gravity and Unit weight using various methods.	14-11		
15	15	Determination of Moisture content, Specific gravity and Unit weight using various methods.	16-11		
16	16	Consistency limits-liquid limit, plastic limit, shrinkage limit.	17-11		
17	17	Plasticity, liquidity and consistency indices.	19-11		

18	18	Flow & toughness indices.	20-11		
19	19	Determination of liquid limit.	21-11		
20	20	Determination of plastic limit.	23-11		
21	21	Determination ofshrinkage limit.	24-11		
22	22	Soil classification based on particle size.	25-11		
23	23	Soil classification based on texture.	27-11		
24	24	Unified and Indian standard method	28-11		
25	25	Unified and Indian standard method& Problems	30-11		
26	26	Problems	1-12-20		
27	27	**DARCY'S LAW- COEFFICIENT OF PERMEABILITY-UNIT-II**			
28	28	Constant-head Permeability Test	4-12		
29	29	Variable -head Permeability Test	7-12		
30	30	Permeability of stratified soils	9-12		
31	31	Permeability of stratified soils	11-12		
32	32	Factors affecting - Seepage Analysis	15-12		
33	33	Stream and potential functions	17-12		
34	34	Flow nets, graphical method to plot flow-net.	19-12		
35	35	Problems on flow-nets	22-12		
36	36	Problems on flow-nets	26-12-21		
37	37	**EFFECTIVE STRESS PRINCIPLE: UNIT-III**			
38	38	Effective stress principle, nature of effective stress.	4-01-21		
39	39	Effect of water table.	5-1		
40	40	Capillary action, seepage pressure.	6-1		
41	41	Compaction of Soil- theory of compaction-optimum moisture content, maximum dry density.	8-1		
42	42	Stresses in soils due to point load, line load, strip load.	11-1		
43	43	Stresses in soils due to point load, line load, strip load.	16-1		
44	44	Stresses in soils due to Uniformly loaded circular, rectangular loaded area.	19-1		
45	45	Influence factors, Isobars.	20-1		

46	46	Boussinesq's equation	21-1		
47	47	Newmark's Influence Chart.	23-1		
48	48	Newmark's Influence Chart.	25-1		
49	48	Boussinesq's equation	27-1		
50	50	Problems	28-1		
51	51	Problems	29-1		
52	52	Stresses in soils due torectangular loaded area.	1-2-21		
53	53	Stresses in soils due torectangular loaded area.	2-2		
54	54	**UNIT-IV: Consolidation of Soil**			
55	55	INTRODUCTION TO CONSOLIDATION	3-2		
56	56	Comparison between compaction and consolidation,	5-2		
57	57	Initial, primary & secondary consolidation	8-2		
58	58	Spring analogy	10-2		
59	59	Terzaghi's theory of consolidation.	12-2		
60	60	Terzaghi's theory of consolidation.	15-2		
61	61	Final settlement of soil deposits,	17-2		
62	62	Final settlement of soil deposits,	19-2		
63	63	Computation of consolidation settlement and secondary consolidation.	22-2		
64	64	Computation of consolidation settlement and secondary consolidation.	24-2		
65	65	Basic definitions of consolidation	26-2		
66	66	Problems			
67	67	Problems	27-02-21		
68	68	REVISON ON UNIT-I			
69	69	REVISON ON UNIT-II			
70	70	REVISON ON UNIT-III			
71	71	REVISON ON UNIT-IV			
72	72	REVISON ON UNIT-I			

73	73	REVISON ON UNIT-II			
74	74	REVISON ON UNIT-III			
75	75	REVISON ON UNIT-IV			

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3				2				
CO2	3	3	2	3				2				
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	3	3								
CO6	3	3	3	3								
Total	18	17	13	16								
Avg.	3	2.8	2.2	2.6								

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,3,4	1,2
CO2	1.2.3.4	1,2
CO3	1.2.3.4.6	2
CO4	1.2.3.4.6	2
CO5	1.2.3.7	1,2
CO6	1,2,3,7	1,2

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: -WATER RESOURCE ENGINEERING-1	**Regulation:AUTONOMOUS**
Course Area/Module: -WATER RESOURCE ENGINEERING-1	**No. of students registered: 110**
Course Coordinator: M S PHANI KUMAR **Designation:ASSITANTPROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1. Introduce hydrologic cycle and its relevance to Civil engineering
2.Make the students understand physical processes in hydrology and, components of the hydrologic cycle
3.Appreciate concepts and theory of physical processes and interactions
4.Learn measurement and estimation of the components hydrologic cycle.
5.Provide an overview and understanding of Unit Hydrograph theory and its analysis
6.Understand flood frequency analysis, design flood, flood routing
7.Appreciate the concepts of groundwater movement and well hydraulics

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1 Develop design storms and carry out frequency analysis
CO2 Determine storage capacity and life of reservoirs.
CO3 Develop unit hydrograph and synthetic hydrograph
CO4 Estimate flood magnitude and carry out flood routing.
CO5 Determine aquifer parameters and yield of wells.
CO6 Model hydrologic processes

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	FLUID MECHANICS
2	STRENGTH OF MATERIALS
3	STRUCTURAL ANALYSIS

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	**90**	**15**	**15%**
Mid Examination – II	**90**	**15**	**15%**
Online Quiz Examination – I	**20**	**10**	**10%**
Online Quiz Examination – I	**20**	**10**	**10%**
Assignments		**5**	**5%**
Semester End Examination	**180**	**70**	**70**

COURSE CONTENT (Syllabus):

UNIT-I

Engineering hydrology and Precipitation Engineering hydrology and its applications, Hydrologic cycle, hydrological datasources of data. Precipitation: Types and forms, measurement, rain gauge network, presentation of rainfall data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves, Depth-Area-Duration (DAD) curves, Probable Maximum Precipitation (PMP), design storm LO 1. Understand basics of engineering hydrology and its applications. 2. Demonstrate measurement techniques of precipitation. 3. Learn curves related to frequency of rainfall.

UNIT-II

Abstractions from Precipitation: Initial abstractions. Evaporation: factors affecting, measurement, reduction Evapo transpiration: factors affecting, measurement, control - Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices. LO 1. Attain knowledge on factors influencing evaporation. 2. Analyze factors influencing infiltration.

UNIT-III

Runoff and Hydrograph analysis: Catchment characteristics, Factors affecting runoff, components, computationempirical formulae, tables and curves, stream gauging, rating curve, flow mass curve and flow duration curve. Components of hydrograph, separation of base flow, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, derivation of unit hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of unit hydrograph, synthetic unit hydrograph.

UNIT-IV

Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearson type III distribution methods, Standard Project Flood (SPF) and Probable Maximum Flood (MPF), flood control methods and management. Flood Routing: Hydrologic routing, channel and reservoir routing-Muskingum and Puls methods of routing. LO 1. Develop knowledge on floods and its effects. 2. Understand flood routing techniques.

TEXT BOOKS:

1. Engineering Hydrology, Jayarami Reddy, P., Laxmi Publications Pvt. Ltd., (2013), New Delhi 2. Irrigation and Water Power Engineering, B. C. Punmia, Pande B. B. Lal, Ashok Kumar Jain and Arun Kumar Jain, Lakshmi Publications (P) Ltd.

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION

3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTRODUCTION- UNIT-I**	2-11-20		
2	2	**INTRODUCTION**			
3	3	**INTRODUCTION**			
4	4	Engineering hydrology and Precipitation	3-11		
5	5	Engineering hydrology and its applications	4-11		
6	6	Hydrologic cycle	5-11		
7	7	hydrological data	6-11-		
8	8	sources of data	7--11		
9	9	Precipitation	9-11		
10	10	Types and forms	10-11		
11	11	measurement	11-11		
12	12	rain gauge network	12-11		
13	13	presentation of rainfall data	13-11		
14	14	average rainfall	14-11		
15	15	continuity and consistency of rainfall data	16-11		
16	16	frequency of rainfall	17-11		
17	17	Intensity-Duration	19-11		
18	18	Frequency (IDF) curves	20-11		
19	19	Depth-Area-Duration (DAD) curves	21-11		
20	20	Probable Maximum Precipitation (PMP)	23-11		
21	21	design storm	24-11		
22	22	Problems	25-11		
23	23	Problems	27-11		
24	24	Problems	28-11		
25	25	Problems	30-11		
26	26	Problems	1-12-20		
27	27	**UNIT II**			

28	28	Abstractions from Precipitation: Initial abstractions. Evaporation	4-12		
29	29	factors affecting, measurement	7-12		
30	30	reduction Evapo transpiration	9-12		
31	31	factors affecting	11-12		
32	32	measurement, control - Infiltration	15-12		
33	33	factors affecting, Infiltration capacity curve	17-12		
34	34	measurement, infiltration indices	19-12		
35	35	Problems	22-12		
36	36	Problems	26-12-21		
37	37	**UNIT-III**			
38	38	Catchment characteristics	4-01-21		
39	39	Factors affecting runoff	5-1		
40	40	components	6-1		
41	41	Computationempirical formulae	8-1		
42	42	tables and curves	11-1		
43	43	stream gauging, rating curve	16-1		
44	44	flow mass curve and flow duration curve.	19-1		
45	45	Components of hydrograph, separation of base flow	20-1		
46	46	effective rainfall hyetograph and direct runoff hydrograph	21-1		
47	47	unit hydrograph, assumptions	23-1		
48	48	derivation of unit hydrograph	25-1		
49	48	unit hydrographs of different durations	27-1		
50	50	principle of superposition and S-hydrograph methods	28-1		
51	51	limitations and applications of unit hydrograph	29-1		
52	52	synthetic unit hydrograph	1-2-21		
53	53	Problems	2-2		
54	54	**UNIT-IV**			
55	55	Floods: Causes and effects	3-2		
56	56	frequency analysis- Gumbel’s and Log-Pearson type III distribution methods	5-2		
57	57	Standard Project Flood (SPF)	8-2		

58	58	Probable Maximum Flood (MPF)	10-2		
59	59	flood control methods and management	12-2		
60	60	Flood Routing: Hydrologic routing	15-2		
61	61	channel and reservoir routing	17-2		
62	62	Muskingum and Puls methods of routing	19-2		
63	63	Problems	22-2		
64	64	Problems	24-2		
65	65	Problems	26-2		
66	66	Problems			
67	67	Problems	27-02-21		
68	68	REVISON ON UNIT-I			
69	69	REVISON ON UNIT-II			
70	70	REVISON ON UNIT-III			
71	71	REVISON ON UNIT-IV			
72	72	REVISON ON UNIT-I			
73	73	REVISON ON UNIT-II			
74	74	REVISON ON UNIT-III			
75	75	REVISON ON UNIT-IV			

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3				2				
CO2	3	3	2	3				2				
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	3	3								
CO6	3	3	3	3								
Total	18	17	13	16								
Avg.	3	2.8	2.2	2.6								

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,3,4	1,2
CO2	1.2.3.4	1,2
CO3	1.2.3.4.6	2
CO4	1.2.3.4.6	2
CO5	1.2.3.7	1,2
CO6	1,2,3,7	1,2

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: Concrete Technology Lab	**Regulation:AUTONOMOUS**
Course Area/Module: Concrete Technology Lab	**No. of students registered: 80**
Course Coordinator: M.S.PHANI KUMAR **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:1.5	

COURSE OBJECTIVES:

Students will be able to:

1. To test the basic properties ingredients of concrete, fresh and hardened concrete

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1 Determine the consistency and fineness of cement.
CO2 Determine the setting times of cement.
CO3 Determine the specific gravity and soundness of cement.
CO4 Determine the compressive strength of cement.
CO5 Determine the workability of cement concrete by compaction factor, slump and Vee– Bee tests
CO6 Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis
CO7 Determine the flakiness and elongation index of aggregates.
CO8 Understand the non-destructive testing procedures on concrete.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	SOIL MECHANICS

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
INTERNAL EXAM	60	40	40%
EXTERNAL EXAM	60	60	60%

List of Experiments
1. Determination of normal Consistency and fineness of cement. 2. Determination of initial setting time and final setting time of cement. 3. Determination of specific gravity and soundness of cement. 4. Determination of compressive strength of cement. 5. Determination of grading and fineness modulus of coarse aggregate by sieve analysis 6. Determination of specific gravity of coarse aggregate 7. Determination of grading and fineness modulus of fine aggregate (sand) by sieve analysis. 8. Determination of bulking of sand. 9. Determination of workability of concrete by compaction factor method. 10. Determination of workability of concrete by slump test 11. Determination of workability of concrete by Vee-bee test. 12. Determination of compressive strength of cement concrete and its young's modulus. 13. Determination of split tensile strength of concrete. 14. Non-Destructive testing on concrete (for demonstration)

TEXT BOOKS:

1. Properties of Concrete by A. M. Neville, ELBS publications Oct 1996.
2. Concrete Technology by M.S. Shetty, S.Chand & Co 2009.

REFERENCE BOOKS:

1. Concrete: Micro Structure, Properties and Materials by P. K. Mehta and P. J. Monteiro,. Mc. Graw-Hill Publishing Company Ltd. New Delhi
2. Design of Concrete Mixes by N. Krishna Raju, CBS Publications, 2000

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
3	3	**List of Experiments**	2-11-20		

3	6	1. Determination of normacement	9-11		
3	9	2. Determination of initial setting time and final setting time of cement.	16-11		
3	12	3. Determination of specific gravity and soundness of cement.	23-11		
3	15	4. Determination of compressive strength of cement.	30-11		
3	18	5. Determination of grading and fineness modulus of coarse aggregate by sieve analysis.	7-12		
3	21	6. Determination of specific gravity of coarse aggregate	14-12		
3	24	7. Determination of grading and fineness modulus of fine aggregate (sand) by sieve analysis.	21-12-20		
3	27	8. Determination of bulking of sand	4-1-21		
3	30	9. Determination of workability of concrete by compaction factor method.	11-1		
3	33	10. Determination of workability of concrete by slump test	18-1		
3	36	11. Determination of workability of concrete by Vee-bee test.	25-1		
3	39	12. Determination of compressive strength of cement concrete and its young's modulus.	1-2		
3	42	13. Determination of split tensile strength of concrete.	28-12-20		
3	42	14. Non-Destructive testing on concrete (for demonstration)	28-12-20		

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	3	-	2	-	2	-	-	-	-
CO2	3	3	-	3	-	2	-	2	-	-	-	-
CO3	3	3	-	3	-	2	-	2	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
1	1,2,4,6,8	1,2
2	1,2,4,6,8	1,2,3
3	1,2,4,6,8	1,2,3

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: SOILMECHANICS LAB	**Regulation:AUTONOMOUS**
Course Area/Module: SOIL MECHANICS LAB	**No. of students registered: 80**
Course Coordinator: M.S.PHANI KUMAR **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:1.5	

COURSE OBJECTIVES:

Students will be able to:

1. To impart knowledge of determination of index properties required for classification of soils.
2. To teach how to determine compaction characteristics and consolidation behaviour from relevant lab tests; to determine permeability of soils.
3. To teach how to determine shear parameters of soil through different laboratory tests.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Determine index properties of soil and classify them.
2. Determine permeability of soils
3.Determine Compaction, Consolidation and shear strength characteristics

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	SOIL MECHANICS

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
INTERNAL EXAM	60	40	40%
EXTERNAL EXAM	60	60	60%

List of Experiments

1. **Specific gravity**
2. **Atterberg's Limits.**
3. **Field density-Core cutter and Sand replacement methods**
4. **Grain size analysis by sieving**
5. **Hydrometer Analysis Test**
6. **Permeability of soil - Constant and Variable head tests**
7. **Compaction test**
8. **Consolidation test (to be demonstrated)**
9. **Direct Shear test**
10. **Triaxial Compression test (UU Test)**
11. **Unconfined Compression test**
12. **Vane Shear test**
13. **Differential free swell (DFS)**
14. **CBR Test**

TEXT BOOKS:

1. K. R. Arora, Soil Mechanics and Foundation Engg., Standard Publishers and Distributors, Delhi.

C. Venkataramiah, Geotechnical Engineering, New age International Pvt . Ltd, (2002).

REFERENCE BOOKS:

1. 'Determination of Soil Properties' by J. E. Bowles.
2. IS Code 2720 – relevant parts.

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
3	3	List of Experiments 1. Specific gravity	2-11-20		
3	6	1. **Field density-Core cutter and Sand replacement methods**	9-11		
3	9	1. **Grain size analysis by sieving**	16-11		
3	12	1. **Hydrometer Analysis Test**	23-11		
3	15	1. **Permeability of soil - Constant and Variable head tests**	30-11		
3	18	1. **Compaction test**	7-12		
3	21	1. **Consolidation test (to be demonstrated)**	14-12		
3	24	1. **Direct Shear test**	21-12-20		
3	27	1. **Triaxial Compression test (UU Test)**	4-1-21		
3	30	1. **Unconfined Compression test**	11-1		
3	33	1. **Vane Shear test**	18-1		
3	36	1. **Differential free swell (DFS)**	25-1		
3	39	1. **CBR Test**	1-2		
3	42	1. **Atterberg's Limits.**	28-12-20		

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	3	-	2	-	2	-	-	-	-
CO2	3	3	-	3	-	2	-	2	-	-	-	-
CO3	3	3	-	3	-	2	-	2	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
1	1,2,4,6,8	1,2
2	1,2,4,6,8	1,2,3
3	1,2,4,6,8	1,2,3

Signature of Course Instructor(s) Signature of program Coordinator Signature of Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY	
	Course Handout (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-II**
Name of the Course: ENVIRONMENTAL ENGINEERING	**Regulation: AUTONOMOUS**
Course Area/Module: ENVIRONMENTAL	**No. of students registered:**
Course Coordinator: N. RAMARAO **Designation: ASSOCIATE PROFESSOR**	**Course Instructors:** **1. N.RAMARAO**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1. To teach requirements of water and its treatment.
2. To attain knowledge on treatment process of potable water.
3. To teach the Layouts of Distribution networks.
4. Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city
5.Provide knowledge of characterization of wastewater generated in a Community.
6. Treatment process of sewage and effluent disposal method and realize the importance of regulations .

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. By the end of successful completion of this course to get the knowledge of water borne diseases
2. By the end of successful completion of this course to get the knowledge Estimation of water demand for a colony /town/city and Able to identify the sources of water.
3. By the end of successful completion of this course to get the knowledge Treatment of raw water and sources of raw water.
4. . By the end of successful completion of this course to get the knowledge Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city

and characterization of wastewater generated in a community.
5. By the end of successful completion of this course to get the knowledge f treatment of sewage and the need for its treatment.
6. . By the end of successful completion of this course to get the knowledge Effluent disposal method and realize the importance of regulations in the disposal of effluents in Rivers

COURSE DESCRIPTION- Aim of this course is estimate water demand for a village/ town or city and identify source of water. It tells the process of conversion of raw water into potable water. It explains the distribution net work of water supply.

This course teaches how to estimate quantity of waste water and storm water and how to collect and transport to treatment plant. Various treatment process and of waste water effectively and how to dispose safely into water bodies like rivers, canals , seas and on land.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	FLUID MECHANICS
2	HYDROLOGY
3	HYDRAULICS AND HYDRALICS AND MACHINERY

vALUATION SCHEME:

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test	**60 Minutes**	**10Marks**	**10%**
Subjective examinations	**90 Minutes**	**15Marks**	**15%**
Online Objective examinations	**20 Minutes**	**10Marks**	**10%**
Assignment	**60 Minutes**	**5Marks**	**5%**
Semester End Examination	**180 Minutes**	**60Marks**	**60%**

COURSE CONTENT (Syllabus): UNIT -I

Introduction: Importance and Necessity of Protected Water Supply systems, Water borne diseases, Flow chart of public water supply system, Role of Environmental Engineer.

Water Demand and Quantity Estimation: Estimation of water demand for a town or city, Per capita Demand and factors influencing it - factors affecting water demand, Design Period, Population forecasting

. **Sources of Water**: Lakes, Rivers, Comparison of sources with reference to quality, quantity and other considerations- Ground water sources: springs, Wells and Infiltration galleries, Characteristics of water– Physical, Chemical and Biological characteristics and WHO guidelines for drinking water - IS 10500 2012 - Water quality standards for Agriculture, Industries and Construction.

UNIT II

Treatment of Water: Treatment methods: Theory and Design of Sedimentation, Coagulation, Filtration. Disinfection: Theory of disinfection-Chlorination and other Disinfection methods. Removal of color and odors- Removal of Iron and Manganese - AdsorptionFluoridation and deflouridation–Reverse Osmosis- Solar stills- Freezing.

UNIT-III

Collection and Conveyance of Water: Factors governing the selection of the intake structure, Conveyance of Water: Gravity and Pressure conduits, Types of Pipes, Pipe Materials, Pipe joints, Design aspects of pipe lines, Design of economical diameter of pumping main, HP of pump and monthly expenditure for an apartment and a village. Laying and testing of pipe lines- Capacity of storage reservoirs, Mass curve analysis

Distribution of Water: Methods of Distribution system, Layouts of Distribution networks, Water main appurtenances - Sluice valves, Pressure relief valves, air valves, check valves, hydrants, and water meters– Ideal water supply system. Case studies.

NIT-IV

Sewerage: Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - design of sewers. Sewer appurtenances – cleaning and ventilation of sewers. Sewage pumps

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House Plumbing: Systems of plumbing-sanitary fittings and other accessories– one pipe and two pipe systems – Design of drainage in Gated communities, Apartments and Hotels. Septic Tank - working Principles and DesignSewerage: Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - design of sewers. Sewer appurtenances – cleaning and ventilation of sewers. Sewage pumps.

House Plumbing: Systems of plumbing-sanitary fittings and other accessories– one pipe and two pipe systems – Design of drainage in Gated communities, Apartments and Hotels. Septic Tank - working Principles and Design

UNIT-V

Sewage characteristics –Characteristics of sewage - BOD equations. ThOD, COD and BOD. **Treatment of Sewage:**Primary treatment. Secondary treatment**:** Activated Sludge Process, principles, designs, and operational problems. Oxidation ponds, Trickling Filters – classification – design, operation and maintenance problems. RBCs. Fluidized bed reactors –Anaerobic digestion of sludge, Sludge Drying Beds

Ultimate Disposal of sewage: Methods of disposal – disposal into water bodiesOxygen Sag Curve- Disposal into sea, disposal on land, Crown corrosion, Sewage sickness. Effluent standards.

. Text Books

1. Elements of Environmental Engineering – K. N. Duggal, S. Chand & Company Ltd., New Delhi, 2012.
2. Environmental Engineering water supply Engineering- vol. 1 Santosh Kumar Garg ,Khanna Publishers 2018 edition
3. Sewage waste disposal and Air pollution Engineering Santosh Kumar Garg ,Khanna Publishers 2018 edition

References

1. Environmental Engineering, D. Srinivasan, PHI Learning Private Limited, New Delhi, -2011 edition
2. Wastewater engineering treatment and reuse - Metcalf & Eddy McGraw. Hill Education (India) private Limited- 2003 edition

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PEDAGOGICAL APPROACH:

	NRI INSTITUTE OF TECHNOLOGY	
	Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSIO N

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTORDUCTION**	14-02-2022		
2	2	Importance and Necessity of Protected Water Supply systems, Water borne diseases,	16-02-2022		
3	3	**UNI T-I** Importance and Necessity of Protected Water Supply systems.	17-02-2022		
4	4	Flow chart of public water supply system, Role of Environmental Engineer.s	18-02-2022		
5	5	**Quantity Estimation:** Estimation of water demand for a town or city, Per capita Demand - factors affecting water demand, Design Period, Population forecasting	19-02-2022		
6	6	factors affecting water demand, Design Period, Population forecasting	21-02-2022		
7	7	Population forecasting (PROBLEMS)	23-02-2022		
8	8	**Sources of Water**: Lakes, Rivers, Comparison of sources with reference to quality, quantity and other considerations- Ground water sources: springs, Wells and Infiltration galleries,	21-02-2022		
9	9	**Sources of Water**: Lakes, Rivers, Comparison of sources with reference to quality, quantity and other considerations- Ground water sources: springs, Wells and Infiltration galleries,	23-02-2022		
10	10	Characteristics of water– Physical, Chemical	24-02-2022		

		and Biological characteristics and WHO guidelines for drinking water - IS 10500 2012 - Water quality standards for Agriculture, Industries and Construction.			
11 12	11	Characteristics of water– Physical, Chemical and Biological characteristics and WHO guidelines for drinking water - IS 10500 2012 - Water quality standards for Agriculture, Industries and Construction.	25-02-2022		
13	13	**TUTORIAL**	26-02-2022		
14	14	**TUTORIAL**	28-02-2022		
15	15	**REVISION**	03-03-2022		
16	16	**REVISION**	04-03-2022		
17	17	UNIT-II Theory and Design of Sedimentation, Coagulation.	05-03-2022		
18	18	Filtration.	07-03-2022		
19	19	Disinfection methods	09-03-2022		
20	20	Chlorination	10-03-2022		
21	21	Removal of color and odors- Removal of Iron and Manganese	11-03-2022		
22	22	Removal of color and odors- Removal of Iron and Manganese	12-03-2022		
23	23	AdsorptionFluoridation and deflouridation	14-03-2022		
24	24	Reverse Osmosis- Solar stills- Freezing.	16-03-2022		
25	25	Reverse Osmosis- Solar stills- Freezing.	17-03-2022		
26	26	**TUTORIAL**	18-03-2022		
27	27	**TUTORIAL**			

28	28	**REVISION**	21-03-2022		
29	29	**REVISION**	23-03-2022		
30	30	Unit-III Conveyance of Water: Gravity and Pressure conduits,	24-03-2022		
31	31	Types of Pipes, Pipe Materials	24-03-2022		
32	32	Pipe joints, Design aspects of pipe lines,	25-03-2022		
33	33	Design of economical diameter of pumping main, HP of pump and monthly expenditure for an apartment and a village	26-03-2022		
34	34	Design of economical diameter of pumping main, HP of pump and monthly expenditure for an apartment and a village	31-03-2022		
35	35	Laying and testing of pipe lines- Capacity of storage r38eservoirs, Mass curve analysis	01-04-2022		
36	36	Laying and testing of pipe lines- Capacity of stora41ge reservoirs, Mass curve analysis	04-04-2022		
37	37	Methods of Distribution system, Layouts of Distr44ibution networks,	06-04-2022		
38	38	Sluice v45alves, Pressure relief valves, air valves, che46ck valves, hydrants,	07-04-2022		
39	39	water meters–Ideal water supply system. Case studies.	08-04-2022		
40	40	UNIT-IV Estimation of sewage flow and storm water drainage , fluctuations	09-04-2022		
41	41	types of sewers - design of sewers. Sewer appurtenances – cleaning and ventilation of sewers. Sewage pumps	11-04-2022		
42	42	sanitary fittings and other accessories– one pipe and two pipe system	13-04-2022		
43	43	Design of drainage in Gated communities, Apartments and Hotels.	14-04-2022		

44	44	Septic Tank - working Principles	16-04-22		
45	45	Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - design of sewers.	18-04-22		
46	46	Sewer appurtenances – cleaning and ventilation of sewers.	20-04-22		
47	47	House Plumbing: Systems of plumbing-sanitary fittings and other accessories– one pipe and two pipe systems	21-04-22		
48	48	UNIT-V Characteristics of sewage - BOD equations. ThOD, COD and BOD.	22-04-22		
49	49	Primary treatment. Secondary treatment**:**	23-04-22		
50	50	Activated Sludge Process, principles, designs, and operational problem	25-04-22		
51	51	Oxidation ponds, Trickling Filters – classification – design, operation and maintenance problems	27-04-22		
52	52	Oxidation ponds, Trickling Filters – classification – design, operation and maintenance problems	27-04-22		
53	53	RBCs. Fluidized bed reactors –Anaerobic digestion of sludge, Sludge Drying Beds	28-04-22		
54	54	Methods of disposal – disposal into water bodies	29-04-22		
55	55	Methods of disposal – disposal into water bodies	30-04-22		
56	56	Methods of disposal – disposal into water bodies	02-05-2022		
57	57	**TUTORIAL**	04-05-22		
58	58	**TUTORIAL**	06-05-22		
59	59	**REVISION**	07-05-22		
60	60	**REVISION**	09-05-22		

	NRI INSTITUTE OF TECHNOLOGY	
	Course Handout (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

	58				
	59				
	60				

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	*											
CO2												
CO3												
CO4												
CO5												
CO6												
Total												
Avg.												

CO INDEX	POs MAPPED	PSOs MAPPED

Signature of Course Instructor(s)   Signature of Course Coordinator   Signature of Program Coordinator   Signature of Head of the Department

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-II**
Name of the Course: ESSENCE OF INDIAN KNOWLEDGE AND TRADITIONS	**Regulation: AUTONOMOUS**
Course Area/Module: HIGHWAY	**No. of students registered:**
Course Coordinator: N. RAMARAO **Designation: ASSOCIATE PROFESSOR**	**Course Instructors:** **1. N.RAMARAO**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1.To develop knowledge of fundamental management concepts, skills and tools, to aid in problem solving and decision making.
2. To develop and understanding about the organizational structure and relationship between authority and responsibility in various structures.
3.To discuss the evolution of principles that make it possible to design facilities, processes, and control systems with a degree of predictability as to their performance
4.To develop comprehensive skills in planning, selecting, motivating, and developing the human resources for organisational effectiveness
5.To understand the broad scope of marketing, societal, ethical and other diverse aspects of marketing.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1	Understand the concept of Traditional knowledge and its importance
CO2	Know the need and importance of protecting traditional knowledge
CO3	Know the various enactments related to the protection of traditional knowledge
CO4	Understand the concepts of Intellectual property to protect the traditional knowledge
CO5	Develop comprehensive skills in planning, selecting, motivating, and developing the human resources for organisational effectiveness.
CO6	Understand the broad scope of marketing, societal, ethical and other diverse aspects of marketing

COURSE DESCRIPTION- Aim of this course is estimate water demand for a village/ town or city and identify source of water. It tells the process of conversion of raw water into potable water. It explains the distribution net work of water supply.

	NRI INSTITUTE OF TECHNOLOGY	
	Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

This course teaches how to estimate quantity of waste water and storm water and how to collect and transport to treatment plant. Various treatment process and of waste water effectively and how to dispose safely into water bodies like rivers, canals , seas and on land.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	FLUID MECHANICS
2	HYDROLOGY
3	HYDRAULICS AND HYDRALICS AND MACHINERY

vALUATION SCHEME:

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test	60 Minutes	10Marks	10%
Subjective examinations	90 Minutes	15Marks	15%
Online Objective examinations	20 Minutes	10Marks	10%
Assignment	60 Minutes	5Marks	5%
Semester End Examination	180 Minutes	60Marks	60%

COURSE CONTENT (Syllabus): UNIT -I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003

UNIT-III

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-IV

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

TEXT BOOKS:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta andVipin Kumar Singh, PratibhaPrakashan 2012.

REFERENCE BOOKS:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
2. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
5	5	UNIT-I	19-02-2022		
6	6	Introduction to traditional knowledge	21-02-2022		

7	7	Define traditional knowledge	23-02-2022		
8	8	nature and characteristics	21-02-2022		
	9	scope and importance	23-02-2022		
10	10	Kinds of traditional knowledge	24-02-2022		
11 12	11	**the physical and** **social contexts in which traditional knowledge develop**	25-02-2022		
13	13	**the historical impact of social change on traditional knowledge systems**	26-02-2022		
14	14	Indigenous Knowledge (IK)	28-02-2022		
15	15	**characteristics,** **traditional knowledge vis-à-vis indigenous knowledge**	03-03-2022		
16	16	**traditional knowledge Vs** **western knowledge traditional knowledge vis-à-vis formal knowledge**	04-03-2022		
17	17	UNIT II	05-03-2022		
18	18	Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection	07-03-2022		
19	19	value of TK in global economy, Role of Government to hardness TK	09-03-2022		
20	20	Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act2006,	10-03-2022		
21	21	Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);	11-03-2022		
22	22	B: The Biological Diversity Act 2002 and Rules 2004	12-03-2022		
23	23	the protection of traditional knowledge bill 2016	14-03-2022		
24	24	Geographical indications act 2003.	16-03-2022		

25	25	UNIT III	17-03-2022		
26	26	**Traditional knowledge and intellectual property: Systems of traditional knowledge protection**	18-03-2022		
27	27	**Legal concepts for the protection of traditional knowledge**			
28	28	**Certain non IPR mechanisms of traditional knowledge protection**	21-03-2022		
29	29	**Patents and traditional knowledge**	23-03-2022		
30	30	Strategies to increase protection of traditional knowledge	24-03-2022		
31	31	global legal FORA for increasing protection of Indian Traditional Knowledge	24-03-2022		
32	32	UNIT-IV	25-03-2022		
33	33	Traditional knowledge in different sectors: Traditional knowledge and engineering	26-03-2022		
34	34	Traditional medicine system	31-03-2022		
35	35	TK and biotechnology	01-04-2022		
36	36	TK in agriculture	04-04-2022		
37	37	Traditional societies depend on it for their food and healthcare needs	06-04-2022		
38	38	Importance of conservation and sustainable development of environment	07-04-2022		
	39	Management of biodiversity			
		Food security of the country and protection of TK			
	9	**TUTORIAL**	04-05-22		
	10	**TUTORIAL**	06-05-22		
	11	**REVISION**	07-05-22		
	12	**REVISION**	09-05-22		

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	*											
CO2												
CO3												
CO4												
CO5												

CO6											
Total											
Avg.											

CO INDEX	POs MAPPED	PSOs MAPPED

Signature of Course Instructor(s) | Signature of Course Coordinator | Signature of Program Coordinator | Signature of Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.TECH	**Academic Year: 20-2021**
Branch: CIVIL	**Year & Semester:**
Name of the Course: FOUNDATION ENGG	**Regulation: AUTONOMOUS**
Course Area/Module: FOUNDATION ENGG	**No. of students registered: 80**
Course Coordinator: M.S.PHANI KUMAR **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** **1.** M S PHANI KUMAR **2.**
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week:1**
Credits:4	

COURSE OBJECTIVES:

Students will be able to:

1.To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.
2.To enable the student to compute immediate and consolidation settlements of shallow foundations.
3.To impart the principles of important field tests such as SPT and Plate bearing test.
4.To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.
5. To enable the students understand the retaining structure
6. To enable the students understand the Exploration of soil

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
2.The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.
3.The student must be able to use the field test data and arrive at the bearing capacity.
4.The student must be able to design Piles based on the principles of bearing capacity.
5. The students must be able to understand about stability of slopes

6. The students must be able to understand about retaining structures

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Student should know about the IS classification
2	Student should know about the relations
3	Student should know about the soil index properties like LL,PL,SL
4	Student should know about the soil engineering properties like shear strength, compressibility , permeability

COURSE DESCRIPTION:Foundation Engineering

is a branch of civil engineering which involves the study and design of sub-structure that is the study and design of structure below the plinth level. It is applied soil mechanics and findings in the design of foundation elements of a structure. A foundation is the part of the structure that bears the load of the superstructure. Also, the foundation transfers load from the structure to the ground/soil.

Foundation design is a process of designing the footing and foundation walls of the structure. The footing can be of many varieties, for example, strip or continuous footings, drilled piles, mat foundations, etc. Designing a foundation is dependent on the geotechnical report. According to the geotechnical report, it is decided whether the structure should have a deep foundation or a shallow foundation.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	**90**	**15**	
Assignments 1	**30**	**05**	
Online Quiz Examination – I	**20**	**10**	
Class test -1	**60**	**10**	
Mid Examination - II	**90**	**15**	
Online Quiz Examination - II	**20**	**10**	
AssignmentsII	**30**	**05**	
Class Test-2	**60**	**10**	
Semester End Examination	**180**	**60**	

COURSE CONTENT (Syllabus):

UNIT – I Soil Exploration:

Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Pressure meter – planning of Programme and preparation of soil investigation report.

Stability of Slopes:
Infinite and finite earth slopes in sand and clay – types offailures – factor of safety of infinite slopes – stability analysis by Swedish arc method,standard method of slices – Taylor's Stability Number-Stability of slopes of dams and embankments - different conditions.

Earth Retaining Structures:
Rankine's & Coulomb's theory of earth pressure –Culmann's graphical method - earth pressures in layered soils.

UNIT-II Shallow Foundations – Bearing Capacity Criteria:
Types of foundations andfactors to be considered in their location - Bearing capacity – criteria for determination ofbearing capacity – factors influencing bearing capacity – analytical methods to determinebearing capacity – Terzaghi's theory - IS Methods. Settlement Criteria: Safe bearing pressurebased on N- value – allowable bearing pressure; safe bearing capacity and settlement fromplate load test – Types of foundation settlements and their determination – allowablesettlements of structures.

MID-1 EXAM

UNIT –III Pile Foundations:
Types of piles – Load carrying capacity of piles based on staticpile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays.

UNIT-IV Well Foundations:
Types – Different shapes of well – Components of well –functions – forces acting on well foundations - Design Criteria – Determination of steiningthickness and plug - construction and Sinking of wells – Tilt and shift.

MID-2 EXAM

Text Books:

1. Principles of Foundation Engineering, Das, B.M., (2011), 6th edition Cengage learning
2. Basic and Applied Soil Mechanics, Gopal Ranjan & A.S.R. Rao, New Age International Pvt. Ltd, (2004).

References:

1.Foundation Analysis and Design, Bowles, J.E., (1988), 4th Edition, McGraw-Hill Publishing Company, Newyork.

2.Analysis and Design of Substructures by Swami Saran, Sarita Prakashan, Meerut.

PEDAGOGICAL APPROACH:

1.1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
		UNIT:I			
1	1	INTRODUCTION	22-03-21		
1	2	Introduction need of soil exploration	23-3		
1	3	Boring method of soil exploration	24-3		
1	4	Sampling method of soil exploration	25-3		
1	5	Field tests- Penetration tests	26-3		
1	6	Pressure meter test	27-3		
1	7	Planning and programme	29-3		
1	8	Preparation of soil Investigation report	30-3		
1	9	stabilty of slopes	**31-3**		
1	10	Infinite earth slopes in sand and clay	**1-4**		
1	11	Finite earth slopes in sand and clay	**3-4**		
1	12	Types of failures and Factor of safety of infinite slopes	**5-4**		
1	13	Stability analysis by Sweedish method	**6-4**		
1	14	standard methods of slices	**7-4**		
1	15	Talyor's stability number	**8-4**		
1	16	Stability of slopes of dam and embankments different condition	**9-4**		
1	17	Introducton Earth reataining structures	10-4		
1	18	Rankines's theory of earth pressure	19-4		
1	19	coulomb's theory of earth pressure	20-4		
1	20	Culmann's graphical method	21-4		
1	21	Earth pressure in layered soils	22-4		
1	22	TUTORIAL	23-4		
		UNIT : II			
1	23	Shallow foundation and Bearing capacity criteria	24-4		

1	24	Types of foundations	26-4		
1	25	Factor of safety	27-4		
1	26	Determination of bearing capacity	28-4		
1	27	Factor influencing bearing capacity	29-4		
1	28	Determine bearing capacity by Terzaghi method	30-4		
1	29	Determine bearing capacity by IS method	1-5		
1	30	Shallow foundation Settlement criteria	4-5		
1	31	Safe bearing pressure based on N-value	5-5		
1	32	Safe bearing pressure based on Allowable bearing pressure	6-5		
1	33	Determine Safe bearing capacity & settlemet by plate load test	7-5		
1	34	Types of foundation settlements	8-5		
1	35	Determination of allowable settlements of structure	9-5		
1	36	problems	10-5-21		
		UNIT : III			
1	37	Introduction of Types of piles	17-5-21		
3	40	Load carrying capacity of piles based on static formulae	18-5		
3	43	Load carrying capacity of piles based on Dynamic formulae	28-5		
3	46	Pile load tests	5-6		
3	49	Load carrying capacity of pile in sands	7-6		
3	52	Load carrying capacity of pile in clays	14-6		
1	53	Tutorial	19-6		
		UNIT : IV			
1	44	Introduction of Well foundation	21-6-21		
1	45	Types and Different shapes wells	22-6		
1	46	Components of well foundation	23-6		
1	47	Forces acting on well foundation	24-6		
2	49	Design well foundation	25-6		
1	50	Determination of steining thickness and plug	28-6		
2	52	Construction and sinking of wells	29-6		
2	54	Tilt and Shift of well foundation	1-7		
1	55	Tutorial	3-7-21		

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	v	v	v	v								
CO2	v	v	v	v								
CO3	v	v	v	v		v						
CO4	v	v	v	v		v						
CO5	v	v	v				v					
CO6	v	v	v				v					
Total	6	6	6	4		2	2					
Avg.												

CO INDEX	POs MAPPED	PSOs MAPPED
CO414.1	1,2,3,4	1,2
CO414.2	1.2.3.4	1,2
CO414.3	1.2.3.4.6	2
CO414.4	1.2.3.4.6	2
CO414.5	1.2.3.7	1,2
CO414.6	1,2,3,7	1,2

Signature of Course Signature of CourseSignature of ProgramSignature of
Instructor(s)Coordinator Coordinator Head of the Department

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-II**
Name of the Course: HIGHWAY ENGINEERING	**Regulation: AUTONOMOUS**
Course Area/Module: HIGHWAY	**No. of students registered:**
Course Coordinator: N. RAMARAO **Designation: ASSOCIATE PROFESSOR**	**Course Instructors:** **1. N.RAMARAO**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1.To impart knowledge on highway development and material
2. To teach concepts of Geometric design and alignment.
3.To throw light on traffic volume studies and regulation.
4To teach design of highway intersections
5.To impart knowledge on design of pavements

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Carry out highway surveying and planning.
2. Understand characteristics of highway materials
3Geometric design and alignment
4. Design components of highway
5. Design highway intersections..
6. Design highway pavementsDesign highway pavements

COURSE DESCRIPTION- Aim of this course is estimate water demand for a village/ town or city and identify source of water. It tells the process of conversion of raw water into potable water. It explains the distribution net work of water supply.

This course teaches how to estimate quantity of waste water and storm water and how to collect and transport to treatment plant. Various treatment process and of waste water effectively and how to dispose safely into water bodies like rivers, canals , seas and on land.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	**Topic**
1	FLUID MECHANICS

2	HYDROLOGY
3	HYDRAULICS AND HYDRALICS AND MACHINERY

vALUATION SCHEME:

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Class Test	60 Minutes	10Marks	10%
Subjective examinations	90 Minutes	15Marks	15%
Online Objective examinations	20 Minutes	10Marks	10%
Assignment	60 Minutes	5Marks	5%
Semester End Examination	180 Minutes	60Marks	60%

COURSE CONTENT (Syllabus): UNIT -I

Highway development and planning:

Highway development in India – Necessity for Highway Planning- Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment and influencing Factors - Engineering Surveys – highway materials and testing.

LO: 1. Understand importance of highway development

2. Classify highways based in field conditions and alignment

3. Carryout highway materials and testing

Basic Concepts of Geometric Design

Geometric Design- Design Criteria- Cross Section Elements

UNIT II

Highway geometric design:

Sight Distance - Stopping sight Distance, Overtaking Sight Distance and

intermediate Sight Distance- Design of Horizontal Alignment- Design of Super

elevation and Extra widening- Design of Transition Curves-Design of Vertical

alignment-Gradients- Vertical curves.

LO: 1. Understand different aspects govern highway design

2. Design highway features like alignment and super elevation3. Design vertical and horizontal alignment of highways

UNIT-III

Traffic engineering and regulation:

Basic Parameters - Traffic Volume Studies- Data Collection and Presentationspeed studies- Data Collection and Presentation- Parking Studies and

characteristics- Road Accidents-Causes and Preventive measures- Accident

Data Recording – Condition Diagram and Collision Diagrams- Road Traffic

Signs – Road markings- Design of Traffic Signals –Webster Method –Saturation

flow – phasing and timing diagrams.

LO: 1. Identify need and basic parameters of traffic channelling

2. Understand traffic volume and regulation.

3. Visualize causes for road accidents

4. Design safety features traffic using different methodologies

Intersection design:

Conflicts at Intersections- Channelization –Traffic Islands and Design - Types of

Intersections – Rotary Intersection and Design.

LO: 1. Study causes for conflicts at intersections

2. Plan types and positioning of traffic intersections on highway.

UNIT-IV

Pavement design:

Flexible and rigid pavements – Components and Functions – design of Flexible

pavement (G.I method and CBR Method as per IRC 37-2018 –Design of Rigid

pavements – Westergaard’s stress equations – CC pavements - Design of

Expansion and contraction joints - Design of Dowel bars and Tie bars.

LO: 1. Distinguish flexible and rigid pavements

2. Design of pavements using different methods

3. Study expansion and contraction joints and their importance

. **Text Books**

1. S. K. Khanna and C. E. G. Justo, Highway Engineering, Nemchand& Bros., 7th edition (2000).
2. R. Srinivasa Kumar, Text Book of Highway Engineering, Universities Press Pvt Ltd, Hyderabad. 2011.

References

1. S K Sharma, A Textbook Of Highway Engineering, S. Chand and Company Limited, New Delhi
2. L. R. Kadiyali and Lal, Principles and Practice of Highway Engineering Design, Khanna Publications.

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSIO N

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTORDUCTION**	14-02-2022		
2	2	Highway development and planning	16-02-2022		
3	3	Highway development in India	17-02-2022		
4	4	Necessity for Highway Planning	18-02-2022		
5	5	Road Development Plans	19-02-2022		
6	6	Classification of Roads	21-02-2022		
7	7	Road Network Patterns	23-02-2022		
8	8	Highway Alignment and influencing Factors	21-02-2022		
9	9	Engineering Surveys	23-02-2022		
10	10	highway materials and testing	24-02-2022		
11 12	11	**Basic Concepts of Geometric Design**	25-02-2022		
13	13	**Geometric Design- Design Criteria**	26-02-2022		
14	14	Cross Section Element	28-02-2022		
15	15	**REVISION**	03-03-2022		
16	16	**REVISION**	04-03-2022		
17	17	UNIT II	05-03-2022		
18	18	Sight Distance	07-03-2022		
19	19	Stopping sight Distance	09-03-2022		
20	20	Overtaking Sight Distance and intermediate Sight Distance	10-03-2022		
21	21	Design of Horizontal Alignment	11-03-2022		
22	22	Design of Super elevation and Extra widening	12-03-2022		
23	23	Design of Transition Curves	14-03-2022		

24	24	Design of Vertical Alignment	16-03-2022		
25	25	Gradients	17-03-2022		
26	26	**Vertical curves**	18-03-2022		
27	27	**TUTORIAL**			
28	28	**REVISION**	21-03-2022		
29	29	**REVISION**	23-03-2022		
30	30	UNIT III	24-03-2022		
31	31	Basic Parameters	24-03-2022		
32	32	Traffic Volume Studies	25-03-2022		
33	33	Data Collection and Presentation	26-03-2022		
34	34	speed studies	31-03-2022		
35	35	Data Collection and Presentation	01-04-2022		
36	36	Parking Studies andcharacteristics	04-04-2022		
37	37	Road Accidents	06-04-2022		
38	38	Causes and Preventive measures	07-04-2022		
	39	Accident Data Recording			
	40	Condition Diagram and Collision Diagrams			
	41	Road Traffic Signs			
	42	Road markings			
	43	Design of Traffic Signals			

	44	Webster Method			
	45	**Saturation** **flow**			
	46	phasing and timing diagrams			
	47	Conflicts at Intersections- Channelization – Traffic Islands and Design			
	48	Types of Intersections – Rotary Intersection and Design.			
	48	UNIT-IV			
	1	Flexible and rigid pavements			
	2	Components and Functions			
	3	Design of Flexible pavement (G.I method and CBR Method as per IRC 37-2018)			
	4	Design of Rigid pavements			
	5	Westergaard's stress equations			
	6	CC pavements			
	7	Design of Expansion and contraction joints			
	8	Design of Dowel bars and Tie bars			
	9	**TUTORIAL**	04-05-22		
	10	**TUTORIAL**	06-05-22		
	11	**REVISION**	07-05-22		
	12	**REVISION**	09-05-22		

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	*											
CO2												
CO3												
CO4												
CO5												
CO6												
Total												
Avg.												

CO INDEX	POs MAPPED	PSOs MAPPED

Signature of Course Instructor(s)	Signature of Course Coordinator	Signature of Program Coordinator	Signature of Head of the Department

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	# NRI INSTITUTE OF TECHNOLOGY	
	Course Handout (Including Teaching Plan &Realization)	**NRIIT/9.1/F-09**

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course:-REPAIR AND REHABILITATION OF STRUCTURES	**Regulation:AUTONOMOUS**
Course Area/Module: : Reinforced concrete structures, Concrete Technology	**No. of students registered: 110**
Course Coordinato **Designation:ASSITANTPROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1) To describe causes of distress in concrete structures and plan repair strategies.
2) To explain issues on serviceability and durability of concrete.
3) To throw light on various repair materials and their characteristics.
4) To demonstrate repair techniques and protection measures.
5) To illustrate suitable retrofitting schemes.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1: Understand evaluation procedure and plan for repair
CO2: Design suitable rehabilitation scheme for serviceability and durability.
CO3: Choose suitable repair material for different magnitudes of distress.
CO4: Apply efficient repair and retrofitting schemes.
CO5: Understand the methods of strengthening methods for concrete structures
CO6 : Physical evaluation on condition of the structure

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Reinforced concrete structures,
2	Concrete Technology
3	

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	90	15	15%
Mid Examination – II	90	15	15%
Online Quiz Examination - I	20	10	10%
Online Quiz Examination - I	20	10	10%
Assignments		5	5%
Semester End Examination	180	70	70

COURSE CONTENT (Syllabus):

UNIT I

Maintenance and repair strategies: Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration.

UNIT II

Materials for Repair Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fiber reinforced concrete

UNIT III

Techniques for Repair And Protection Methods Rust eliminators and polymers coating for rebars during repair, foamed concrete, mortar and drypack, vacuum concrete, Gunite and Shotcrete, Epoxy injection, Mortar repair for cracks, shoring and underpinning. Methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings and cathodic protection. Engineered demolition techniques for dilapidated structures – case studies

UNIT IV

Retrofitting of Structures Repairs to overcome low member strength. Deflection, Cracking, Chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure. LO: Develop effective strategies for retrofitting. TEXT BOOKS: 1. Dension Campbell, Allen and Harold Roper, Concrete Structures, Materials, 2. Maintenance and Repair, Longman Scientific and Technical, U.K. REFERENCE BOOKS: 1. R T. Allen and S.C. Edwards, Repair of concrete Structures, Blakie and sons, UK. 2. Santhakumar, A. R. Training Course notes on damage assessment and Repair in Structures

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTRODUCTION- UNIT-Maintenance and repair strategies**	2-11-20		
2	2	**INTRODUCTION**	2-11		

3	3	**INTRODUCTION**	2-11		
4	4	Maintenance	3-11		
5	5	Repair and Rehabilitation	4-11		
6	6	Facets of Maintenance	5-11		
7	7	importance of Maintenance	6-11-		
8	8	Various aspects of Inspection	7--11		
9	9	Assessment procedure for evaluating a damaged structure,	9-11		
10	10	causes of deterioration.	10-11		
11	11	**UNIT IIMaterials for Repair**	11-11		
12	12	Special concretes and mortar	12-11		
13	13	concrete chemicals	13-11		
14	14	special elements for accelerated strength gain	14-11		
15	15	Expansive cement	16-11		
16	16	polymer concrete	17-11		
17	17	sulphur infiltrated concrete	19-11		
18	18	Ferro cement	20-11		
19	19	Fiber reinforced concrete	21-11		
20	20	**UNIT IIITechniques for Repair And Protection Methods**	23-11		
21	21	Rust eliminators and polymers coating for rebars during repair	24-11		
22	22	foamed concrete	25-11		
23	23	mortar and drypack	27-11		
24	24	vacuum concrete	28-11		
25	25	Gunite and Shotcrete	30-11		
26	26	Epoxy injection	1-12-20		
27	27	Mortar repair for cracks	2-12		
28	28	shoring and underpinning	4-12		
29	29	Methods of corrosion protection	7-12		
30	30	corrosion inhibitor	9-12		
31	31	corrosion resistant steels	11-12		
32	32	Engineered demolition techniques for dilapidated structures	15-12		

33	33	case studies	17-12		
34	34	UNIT IVRetrofitting of Structures	18-12		
35	35	Repairs to overcome low member strength	18-12		
36	36	Deflection	19-12		
37	37	Cracking	20-12		
38	38	Chemical disruption	20-12		
39	39	weathering corrosion	21-12		
40	40	wear, fire, leakage and marine exposure	21-12		
41	41	PROBLEMS	22		
42	42	PROBLEMS	22-12		
43	43	REVISION	26-12-21		
44	44	**REVISION**	3-01		

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3				2				
CO2	3	3	2	3				2				
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	3	3								
CO6	3	3	3	3								
Total	18	17	13	16								
Avg.	3	2.8	2.2	2.6								

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,3,4	1,2
CO2	1.2.3.4	1,2
CO3	1.2.3.4.6	2
CO4	1.2.3.4.6	2
CO5	1.2.3.7	1,2
CO6	1,2,3,7	1,2

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

	# NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course:WATER RESOURCE ENGINEERING-II	**Regulation:AUTONOMOUS**
Course Area/Module: Hydraulics, Water resource engineering-I	**No. of students registered: 110**
Course Coordinato **Designation:ASSITANTPROFESSOR**	**Course Instructors:** 1. **M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1.To discuss the importance of site investigation,
2) To narrate various exploration techniques
3) To describe soil sampling techniques.
4) To train with insitu sub soil exploration methods
5) To demonstrate instrumentation for sub soil exploration.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

Estimate irrigation water requirement
Design irrigation canals and canal network
Design irrigation canal structures
Plan and design diversion head works
Analyse stability of gravity and earth dams
Design ogee spillways and energy dissipation works

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic

1	Hydraulics
2	Water resource engineering-I
3	

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination – I	**90**	**15**	**15%**
Mid Examination – II	**90**	**15**	**15%**
Online Quiz Examination - I	**20**	**10**	**10%**
Online Quiz Examination - I	**20**	**10**	**10%**
Assignments		**5**	**5%**
Semester End Examination	**180**	**70**	**70**

COURSE CONTENT (Syllabus):

UNIT I

Irrigation: Necessity and importance, principal crops and crop seasons, types,methods of application, soil-water-plant relationship, soil moisture constants, consumptive use, estimation of consumptive use, crop water requirement, duty and delta, factors affecting duty, depth and frequency of irrigation, irrigation efficiencies, water logging and drainage, standards of quality for irrigation water, crop rotation.

UNIT II Canals: Classification, design of non-erodible canals - methods of economic section and maximum permissible velocity, economics of canal lining, design of erodible Canals -Kennedy's silt theory and Lacey's regime theory, balancing depth of cutting. Canal Structures: Falls: Types and location, design principles of Sarda type fall and straight glacis fall. Regulators: Head and cross regulators, design principles

UNIT III Cross Drainage Works: Types, selection, design principles of aqueduct, siphon aqueduct and super passage. Outlets: types, proportionality, sensitivity and flexibility River Training: Objectives and approaches Diversion Head Works: Types of diversion head works, weirs and barrages, Layout of diversion head works, components. causes and failures of weirs on permeable foundations, Bligh's creep theory, Khosla's theory, design of impervious floors for Subsurface flow, exit gradient.

UNIT IV Reservoir Planning: Investigations, site selection, zones of storage, yield and Storage capacity of reservoir, reservoir sedimentation. Dams: Types of dams, selection of type of dam, selection of site for a dam. Gravity dams: Forces acting on gravity dam, causes of failure of a gravity dam, Elementary profile and practical profile of a gravity dam, limiting height of a dam, stability analysis, drainage galleries, grouting. Earth Dams: Types, causes of failure, criteria for safe design, seepage, measures For control of seepage-filters, stability analysis-stability of downstream slope during steady seepage and upstream slope during sudden drawdown conditions. Spillways: Types, design principles of Ogee spillways, types of spillways crest gates. Energy dissipation below spillways-stilling basin and its appurtenances.

TEXT BOOKS: 1. Irrigation and Water Power Engineering, B. C. Punmia, Pande B. B. Lal, Ashok Kumar Jain, Arun Kumar Jain, Lakshmi Publications (P) Ltd.

2. Irrigation Engineering and Hydraulic Structure, Santosh Kumar Garg, Khanna Publishers.

REFERENCE BOOKS: 1. Irrigation and Water Resources Engineering, Asawa G L (2013), New Age International Publishers

2. Irrigation Water Resources and Water Power Engineering, Modi P N (2011), Standard Book House, New Delh

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	**INTRODUCTION- UNIT-IIrrigation**	2-11-20		
2	2	**INTRODUCTION**	2-11		
3	3	**INTRODUCTION**	2-11		
4	4	Necessity and importance	3-11		
5	5	principal crops and crop seasons	4-11		
6	6	types,methods of application	5-11		
7	7	soil-water-plant relationship	6-11-		
8	8	soil moisture constants	7--11		
9	9	consumptive use	9-11		
10	10	estimation of consumptive use	10-11		
11	11	crop water requirement	11-11		
12	12	duty and delta	12-11		
13	13	factors affecting duty, depth and frequency of irrigation	13-11		
14	14	irrigation efficiencies	14-11		
15	15	water logging and drainage	16-11		
16	16	standards of quality for irrigation water	17-11		
17	17	crop rotation	19-11		
18	18	PROBLEMS	20-11		
19	19	PROBLEMS	21-11		
20	20	PROBLEMS	23-11		
21	21	REVISION	24-11		

22	22	REVISION	25-11		
23	23	REVISION	27-11		
24	24	REVISION	28-11		
25	25	REVISION	30-11		
26	26	Problems	1-12-20		
27	27	**UNIT-IICanals,Canal Structures**	2-12		
28	28	Classification	4-12		
29	29	design of non-erodible canals	7-12		
30	30	methods of economic section	9-12		
31	31	maximum permissible velocity	11-12		
32	32	economics of canal lining	15-12		
33	33	design of erodible	17-12		
34	34	Kennedy’s silt theory	18-12		
35	35	Lacey’s regime theory	18-12		
36	36	balancing depth of cutting	19-12		
37	37	Falls: Types and location	20-12		
38	38	design principles of Sarda type fall	20-12		
39	39	straight glacis fall	21-12		
40	40	Head and cross regulators	21-12		
41	41	design principles	22		
42	42	Problems	22-12		
43	43	Problems	26-12-21		
44	44	**UNIT-IIICross Drainage Works**	3-01		
45	45	Types	4-01-21		
46	46	selection	5-1		
47	47	design principles of aqueduct	6-1		
48	48	siphon aqueduct and super passage	8-1		
49	49	. Outlets: types	11-1		
50	50	proportionality	16-1		
51	51	sensitivity and flexibility	19-1		
52	52	River Training: Objectives and approaches	20-1		

53	53	Types of diversion head works	21-1		
54	54	weirs and barrages	23-1		
55	55	Layout of diversion head works	25-1		
56	56	components	27-1		
57	57	causes and failures of weirs on permeable	28-1		
58	58	foundations	29-1		
59	59	Bligh's creep theory	1-2-21		
60	60	Khosla's theory	1-2		
61	61	design of impervious floors for Subsurface flow	1-2		
62	62	exit gradient.	2-2		
63	63	**[PROBLEMS**	2-2		
64	64	**PROBLEMS**	3-2		
65	65	**PROBLEMS**	3-2		
		REVISION CLASS	4-2		
66	66	**UNIT-IV: Reservoir Planning**	5-2		
67	67	Investigations	8-2		
68	68	site selection	10-2		
69	69	zones of storage	12-2		
70	70	yield and Storage capacity of reservoir	15-2		
71	71	reservoir sedimentation	17-2		
72	72	Types of dams	19-2		
73	73	selection of type of dam	22-2		
74	74	selection of site for a dam	24-2		
75	75	Forces acting on gravity dam	26-2		
76	76	causes of failure of a gravity dam	26-2		
77	77	Elementary profile and practical profile of a gravity dam	27-02-21		
78	78	limiting height of a dam	28-2		
79	79	stability analysis	29-2		
80	80	drainage galleries, grouting	30-2		

81	81	Types, causes of failure	1-3		
82	82	criteria for safe design	2-3		
83	83	seepage	3-3		
84	84	measures For control of seepage-filters	4-3		
85	85	stability analysiS	5-3		
86	86	stability of downstream slope during steady seepage	6-3		
87	87	upstream slope during sudden drawdown conditions	7-3		

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3				2				
CO2	3	3	2	3				2				
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	3	3								
CO6	3	3	3	3								
Total	18	17	13	16								
Avg.	3	2.8	2.2	2.6								

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,3,4	1,2
CO2	1.2.3.4	1,2
CO3	1.2.3.4.6	2
CO4	1.2.3.4.6	2
CO5	1.2.3.7	1,2
CO6	1,2,3,7	1,2

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: COMPUTER AIDED CIVIL ENGINEERING DRAWING	**Regulation:AUTONOMOUS**
Course Area/Module: COMPUTER AIDED CIVIL ENGINEERING DRAWING	**No. of students registered: 80**
Course Coordinator: M.S.PHANI KUMAR **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** 1. **M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:1.5	

COURSE OBJECTIVES:

Students will be able to:

1) To make the student prepare engineering drawings conventionally involving various design parameters.
2) To introduce fundamentals of computer aided drawing in Civil Engineering.
3) to enable the student develop drawing of building components
4) to train the student in Producing 2D & 3D drawings
5) to enable the students Communicate designs graphically
6) to teach methodologies for understanding and verification of CAD

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1 Develop drawing skills for effective demonstration of building details
CO2 Draw building plans using Computer Aided Design and Drafting software's.
CO3 Develop engineering project drawings incorporating details and design parameters in 2D & 3D.
CO4 Examine efficacy of CAD design.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	DRAWING

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
INTERNAL EXAM	60	40	40%
EXTERNAL EXAM	60	60	60%

List of Experiments
1. Sign conventions and symbols 2. Masonry bonds 3. Doors and windows 4. Buildings with load bearing walls including details of doors and windows. 5. Taking standard drawings of a typical two storied building including all MEP. 6. Joinery, rebars, finishing and other details and writing out a description of the RCC framed structures 7. Reinforcement drawings for typical slabs, beams, columns and spread footings. Industrial buildings - North light roof structures - Trusses 8. Perspective view of one and two storey buildings

TEXT BOOKS:

1. Engineering Graphics, K.C. john, PHI Publications.
2. Engineering drawing by N.D Bhatt, Charotar publications.

REFERENCE BOOKS:

1. Mastering Auto CAD 2013 and Auto CAD LT 2013 – George Omura, Sybex.
2. Auto CAD 2013 fundamentals- Elisemoss, SDC Publ.
3. Engineering Drawing and Graphics using Auto Cad–T Jeyapoovan, vikas
4. Engineering Drawing + AutoCAD – K Venugopal, V. Prabhu Raja, New Age.
5. Engineering Drawing – RK Dhawan, S Chand 6. Engineering Drawing – MB Shaw, BC Rana, Pearson

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
3	3	**List of Experiments**	2-11-20		
3	6	1. Sign conventions andSombles.	9-11		
3	9	2. Masonry bonds	16-11		
3	12	3. Doors and windows	23-11		

3	15		4. Buildings with load bearing walls including details of doors and windows	30-11		
3	18		5. Taking standard drawings of a typical two storied building including all MEP.	7-12		
3	21		6. Joinery, rebars, finishing and other details and writing out a description of the RCC framed structures	14-12		
3	24		7. Reinforcement drawings for typical slabs, beams, columns and spread footings. Industrial buildings - North light roof structures - Trusses	21-12-20		
3	27		8.Perspective view of one and two storey buildings	4-1-21		

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	3	-	2	-	2	-	-	-	-
CO2	3	3	-	3	-	2	-	2	-	-	-	-
CO3	3	3	-	3	-	2	-	2	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
1	1,2,4,6,8	1,2
2	1,2,4,6,8	1,2,3
3	1,2,4,6,8	1,2,3

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

	NRI INSTITUTE OF TECHNOLOGY Course Handout (Including Teaching Plan &Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: III-I**
Name of the Course: HIGHWAY ENGINEERING LAB	**Regulation:AUTONOMOUS**
Course Area/Module: -HIGHWAY ENGINEERING	**No. of students registered: 80**
Course Coordinator: M.S.PHANI KUMAR **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:01**
Credits:1.5	

COURSE OBJECTIVES:

Students will be able to:

¬ To test crushing value, impact resistance, specific gravity and water absorption, percentage attrition, percentage abrasion, flakiness index and elongation index for the given road aggregates.
¬ To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.
¬ To test the stability for the given bitumen mix
¬ To carry out surveys for traffic volume, speed and parking

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

CO1 Ability to test aggregates and judge the suitability of materials for the road Construction
CO2 Ability to test the given bitumen samples and judge their suitability for the road construction
CO3 Ability to obtain the optimum bitumen content for the mix design
CO4 Ability to determine the traffic volume, speed and parking characteristics

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	…..

ALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
INTERNAL EXAM	60	40	40%
EXTERNAL EXAM	60	60	60%

List of Experiments
ROAD AGGREGATES: 1. Aggregate Crushing value 2. Aggregate Impact Test. 3. Specific Gravity and Water Absorption. 4. Attrition Test 5. Abrasion Test. 6. Shape tests II. BITUMINOUS MATERIALS: 1. Penetration Test. 2. Ductility Test. 3. Softening Point Test. 4. Flash and fire point tests. 5. Stripping Test 6. Viscosity Test. III. BITUMINOUS MIX: 1. Marshall Stability test. IV. TRAFFIC SURVEYS: 1. Traffic volume study at mid blocks. 2. Traffic Volume Studies (Turning Movements) at intersection. 3. Spot speed studies. 4. Parking study. V. DESIGN & DRAWING: 1. Earthwork calculations for road works. 2. Drawing of road cross sections. 3. Rotors intersection design.

TEXT BOOKS:

Highway Material Testing Manual' by S.K. Khanna, C.E.G Justo and A.Veeraraghavan, Neam Chan Brothers New Chand Publications, New Delhi.

REFERENCE BOOKS:

1. IRC Codes of Practice
2. Asphalt Institute of America Manuals
3. Code of Practice of B.I.S.

PEDAGOGICAL APPROACH:

1. BLACK BOARD TEACHING
2. POWER POINT PRESETATION
3. DISCUSSION

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
3	3	**List of Experiments** ROAD AGGREGATES:	2-11-20		
3	6	1. Aggregate Crushing value	9-11		
3	9	2. Aggregate Impact Test.	16-11		
3	12	3. Specific Gravity and Water Absorption.	23-11		
3	15	4. Attrition Test	30-11		
3	18	5. Abrasion Test.	7-12		
3	21	6. Shape tests	14-12		
3	24	II. BITUMINOUS MATERIALS	21-12-20		
3	27	1. Penetration Test.	4-1-21		
3	28	2. Ductility Test.	4-1-21		
3	29	3. Softening Point Test.	4-1-21		
3	30	4. Flash and fire point tests.	4-1-21		
3	31	5. Stripping Test	4-1-21		
3	32	III. BITUMINOUS MIX	4-1-21		
3	33	1. Marshall Stability test.	4-1-21		
3	34	IV. TRAFFIC SURVEYS:	4-1-21		
3	35	1. Traffic volume study at mid blocks.	4-1-21		
3	36	2. Traffic Volume Studies (Turning Movements) at intersection.	4-1-21		
3	37	3. Spot speed studies.	4-1-21		
3	38	4. Parking study	4-1-21		
3	39	V. DESIGN & DRAWING:	4-1-21		
3	40	1. Earthwork calculations for road works	4-1-21		
3	41	2. Drawing of road cross sections.	4-1-21		
3	42	3. Rotors intersection design.	4-1-21		

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	3	-	3	-	2	-	2	-	-	-	-
CO2	3	3	-	3	-	2	-	2	-	-	-	-
CO3	3	3	-	3	-	2	-	2	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
1	1,2,4,6,8	1,2
2	1,2,4,6,8	1,2,3
3	1,2,4,6,8	1,2,3

Signature of Course Signature of programSignature of
Instructor(s)Coordinator Head of the Department

NRI INSTITUTE OF TECHNOLOGY

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CIVIL **Name of Faculty: B.UDAYA SHANKAR** **Designation: ASSOCIATE PROFESSOR**

Semester/ Year: IV/I 2019 – 2020 A &B **Name of the Subject: SWHM**

S NO.	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
1	**INTORDUCTION**	1	1
2	**INTORDUCTION**	1	2
3	**INTORDUCTION**	1	3
4	**UNIT-I** Goals and objectives of solid waste management	1	4
5	Classification of Solid Waste	1	5
6	Factors Influencing generation of solid waste	1	6
7	sampling and characterization	1	7
8	Future changes in waste composition	1	8
9	major legislation, monitoring responsibilities	1	9
10	Terms related to ISWM like WTE, ULB, TLV	1	10
11	Measurement of NPK and Calorific value.	1	11
12	UNIT-II: Basic Elements in Solid Waste Management : Elements and their inter relationship	1	12
13	Basic Elements in Solid Waste Management : Elements and their inter relationship	1	13
14	onsite handling, storage and processing of solid waste Collection of Solid Waste:	1	14
15	onsite handling, storage and processing of solid waste Collection of Solid Waste:	1	15
16	Type and methods of waste collection systems, analysis of collection system	1	16
17	Type and methods of waste collection systems, analysis of collection	1	17

	system		
18	optimization of collection routes– alternative techniques for collection system	1	18
19	optimization of collection routes– alternative techniques for collection system	1	19
20	REVISION	1	20
21	REVISION	1	21
22	**UNIT-III** : Need for transfer operation	1	22
23	compaction of solid waste	1	23
24	transport means and methods	1	24
25	transfer station types and design requirements	1	25
26	transfer station types and design requirements	1	26
27	shredding - materials separation and recovery,	1	27
28	shredding - materials separation and recovery,	1	28
29	and recovery, source reduction and waste minimization	1	29
30	recovery, source reduction and waste minimization	1	30
31	UNIT-IV Processing and Treatment: Processing of solid waste. Waste transformation through combustion and composting.	1	31
32	Processing and Treatment: Processing of solid waste. Waste transformation through combustion and composting.	1	32
33	Market yard wastes and warming composting and vermin composting,	1	33
34	anaerobic methods for materials recovery and treatment	1	34
35	biogas generation and cleaning– Incinerators.	1	35
36	biogas generation and cleaning– Incinerators.	1	36
37	REVISION	1	37
38	REVISION	1	38
39	REVISION	1	39
40	**UNIT-IV** Methods of Disposal, Landfills: Site selection, design and operation	1	40
41	Methods of Disposal, Landfills: Site selection, design and operation	1	41

42	: Site selection, design and operation, drainage and leachate collection systems	1	42
43	: Site selection, design and operation, drainage and leachate collection systems	1	43
44	designated waste landfill remediation. Case studies	1	44
45	designated waste landfill remediation. Case studies	1	45
46	REVISION	1	46
47	REVISION	1	47
48	**UNIT-VI** Waste Management- sources, collection, transport, treatment and disposal methods- Biomedical waste Management	1	48
49	Biomedical waste Management	1	49
50	Biomedical waste Management	1	50
51	Electronic waste Management	1	51
52	Electronic waste Management	1	52
53	Environmental law related to waste Management; Case studies.	1	53
54	Environmental law related to waste Management; Case studies.	1	54
55	Environmental law related to waste Management; Case studies.	1	55
56	REVISION	1	57
57	REVISION	1	58
58	REVISION	1	59

TEXT BOOKS:

1. Integrated Solid Waste Management, George Techobanoglous, McGraw Hill Publication, 1993

REFERENCES:

1. Solid Waste Engineering, Vesilind, P.A., Worrell, W., Reinhart, D., Cenage learning, New Delhi, 2004

2. Hazardous Waste Management, Charles A. Wentz, McGraw Hill Publication, 1995.

3. Solid and Hazardous Waste Management PM Cherry, CBS Publishers and Distributors. New Delhi, 2016.

4. Solid Waste Engineering, William A Worrell, P Aarue Vesilind, Cengage Learning, New Delhi 2016.

Signature of Course Instructor(s) **Signature of program Coordinator** **Signature of Head of the Department**

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan &Realization	NRIIT/9.1/F-09

Name of the Program: B. Tech, Civil Engineering	**Academic Year: 2020-21**
Branch: CIVIL	**Year & Semester: 4 & I**
Name of the Course: Ground Improvement Techniques	**Regulation: JNTUK**
Course Area/Module:	**No. of students registered:**
Course Coordinator: **Designation:**	**Course Instructors:** **1.** **2.**
No. of Lecture Hours per week:	**No. of Tutorial Hours per week:**
Credits:	

COURSE OBJECTIVES:

Students will be able to:

1. To make the student appreciate the need for different ground improvement methods adopted for improving the properties of remoulded and in-situ soils by adopting different techniques such as in situ densification and dewatering methods.
2. To make the student understand how the reinforced earth technology and soil nailing can obviate the problems posed by the conventional retaining walls
3. To enable the students to know how geotextiles and geosynthetics can be used to improve the engineering performance of soils.
4. To make the student learn the concepts, purpose and effects of grouting.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations.
2. The student should be in a position to design a reinforced earth embankment and check its stability.
3. The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice

4. The student should be able to understand the concepts and applications of grouting
5.
6.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	In situ densification methods- in situ densification of granular soils- vibration at ground surface and at depth, impact at ground and at depth – in situ densification of cohesive soils – pre loading – vertical drains – sand drains and geo drains – stone columns.
2	Dewatering – sumps and interceptor ditches – single and multi stage well points – vacuum well points – horizontal wells – criteria for choice of filler material around drains – electro osmosis
3	Stabilization of soils – methods of soil stabilization – mechanical – cement – lime – bitumen and polymer stabilization – use of industrial wastes like fly ash and granulated blast furnace slag.
4	Reinforce earth – principles – components of reinforced earth – design principles of reinforced earth walls – stability checks – soil nailing.
5	Geosynthetics – geotextiles – types – functions , properties and applications – geogrids , geomembranes and gabions - properties and applications
6	Grouting – objectives of grouting – grouts and their applications – methods of grouting – stage of grouting – hydraulic fracturing in soils and rocks – post grout tests

COURSE DESCRIPTION:

In this course, the students able to understand different ground improvement techniques using different methods in different soils. It includes cement and lime stabilization, reinforced earth, design principles of reinforced earth, geosynthetics, types, functions, grouting, applications etc.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	30	
Mid Examination - II	90	30	
Online Quiz Examination - I	20	5	
Online Quiz Examination - I	20	5	
Assignments	-	5	
Semester End Examination	180		

COURSE CONTENT (Syllabus):

UNIT–I

In situ densification methods- in situ densification of granular soils- vibration at ground surface and at depth, impact at ground and at depth – in situ densification of cohesive soils – pre loading – vertical drains – sand drains and geo drains – stone columns.

UNIT–2

Dewatering – sumps and interceptor ditches – single and multi stage well points – vacuum well points – horizontal wells – criteria for choice of filler material around drains – electro osmosis

UNIT–3

Stabilization of soils – methods of soil stabilization – mechanical – cement – lime – bitumen and polymer stabilization – use of industrial wastes like fly ash and granulated blast furnace slag.

UNIT–4

Reinforce earth – principles – components of reinforced earth – design principles of reinforced earth walls – stability checks – soil nailing.

UNIT–5

Geosynthetics – geotextiles – types – functions , properties and applications – geogrids , geomembranes and gabions - properties and applications

UNIT–6

Grouting – objectives of grouting – grouts and their applications – methods of grouting – stage of grouting – hydraulic fracturing in soils and rocks – post grout tests

Text Books:

1. Ground Improvement Techniques, Purushotham Raj, Laxmi Publications, New Delhi.
2. Ground Improvement Techniques, NiharRanjanPatro, Vikas Publishing House (p) limited , New Delhi.
3. An introduction to Soil Reinforcement and Geosynthetics, G. L. Siva Kumar Babu, Universities Press

References:

1. Ground Improvement, M.P. Moseley, Blackie Academic and Professional, USA.
2. Designing with Geosynethetics, R. M Koerner, Prentice Hall

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	UNIT–I In situ densification methods-, –	2.11.2020	2.11.2020	
1	2	in situ densification of granular soils-	4.11.2020	4.11.2020	
2	4	vibration at ground surface and at depth	6.11.2020	6.11.2020	
2	6	impact at ground and at depth	7.11.2020	7.11.2020	
2	8	in situ densification of cohesive soils	10.11.2020	10.11.2020	
2	10	pre loading – vertical drains	12.11.2020	12.11.2020	
2	12	sand drains and geo drains	13.11.2020	13.11.2020	
2	14	stone columns.	16.11.2020	16.11.2020	
2	16	Unit-2 Dewatering	17.11.2020	17.11.2020	
2	18	sumps and interceptor ditches	19.11.2020	19.11.2020	
2	20	single and multi stage well points	20.11.2020	20.11.2020	
2	22	vacuum well points	21.11.2020	21.11.2020	
2	24	horizontal wells	24.11.2020	24.11.2020	
2	26	criteria for choice of filler material around drains	27.11.2020	27.11.2020	
2	28	electro osmosis	30.11.2020	30.11.2020	
2	30	UNIT–3 Stabilization of soils –	02.12.2020	02.12.2020	
2	32	methods of soil stabilization – mechanical – cement – lime – bitumen and polymer	09.12.2020	09.12.2020	
2	34	stabilization – use of industrial wastes like fly ash and granulated blast furnace slag.	10.12.2020	10.12.2020	
2	36	Tutorial	16.12.2020	16.12.2020	
2	38	UNIT–4 Reinforce earth	21.12.2020	21.12.2020	
2	40	principles – components of reinforced earth	23.12.2020	23.12.2020	
2	42	design principles of reinforced earth walls	29.12.2020	29.12.2020	
2	44	stability checks	1.1.2021	1.1.2021	

1	41	soil nailing	4.1.2021	4.1.2021	
2	43	UNIT–5 Geosynthetics	5.1.2021	5.1.2021	
2	45	geotextiles – types – functions	7.1.2021	7.1.2021	
2	47	properties and applications – geogrids ,	11.1.2021	11.1.2021	
2	49	geomembranes and gabions - properties and applications	14.1.2021	14.1.2021	
2	51	UNIT–6 Grouting – objectives of grouting	19.1.2021	19.1.2021	
1	52	grouts and their applications	21.1.2021	21.1.2021	
2	54	methods of grouting – stage of grouting	27.1.2021	27.1.2021	
2	56	hydraulic fracturing in soils and rocks	2.2.2021	2.2.2021	
2	58	post grout tests	5.2.2021	5.2.2021	

Signature of Course Instructor(s)	Signature of Course Coordinator	Signature of Program Coordinator	Signature of Head of the Department

	NRI INSTITUTE OF TECHNOLOGY **TEACHING PLAN**	NRIIT/9.1/F-09

Name of the Program: B.TECH	**Academic Year: 2020-2021**
Branch: CIVIL	**Year & Semester:IV/ I**
Name of the Course: GEOTECHNICAL ENGG-II	**Regulation: R16**
Course Area/Module: GEOTECH ENGG -II	**No. of students registered:**
Course Coordinator: M.S.PHANI KUMAR **Designation:ASSOCIATE PROFESSOR**	**Course Instructors:** **1. M.S.PHANI KUMAR**
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week:1**
Credits:3	

COURSE OBJECTIVES:

Students will be able to:

1.To impart to the student knowledge of types of shallow foundations and theories Required for the determination of their bearing capacity.
2.To enable the student to compute immediate and consolidation settlements of shallow foundations.
3. To impart the principles of important field tests such as SPT and Plate bearing test.
4.To enable the student to imbibe the concepts of pile foundations and determine their Load carrying capacity.
5. To enable the students understand the retaining structure
6. To enable the students understand the Exploration of soil

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
2.The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.
3. The student must be able to use the field test data and arrive at the bearing capacity.
4. The student must be able to design Piles based on the principles of bearing capacity.
5. The students must be able to understand about stability of slopes
6. The students must be able to understand about retaining structures

	NRI INSTITUTE OF TECHNOLOGY **TEACHING PLAN**	NRIIT/9.1/F-09

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Remarks
		UNIT: I		
		INTRODUCTION	2-11-2020	
1	1	stability of slopes		
2	3	Infinite earth slopes in sand and clay		
2	5	Finite earth slopes in sand and clay		
1	6	Types of failures and Factor of safety of infinite slopes		
2	8	Stability analysis by Sweedish method		
1	9	standard methods of slices		
1	10	Talyor's stability number		
2	12	Stability of slopes of dam and embankments different condition		
1	13	Tutorial	**17-11-2020**	
		UNIT : II		
1	14	Introducton Earth reataining structures	18-11-2020	
2	16	Rankines's theory of earth pressure		
2	18	coulomb's theory of earth pressure		
1	19	Culmann's graphical method		
2	21	Earth pressure in layered soils		
1	22	Tutorial	27--11-2020	
		UNIT : III		
1	23	Shallow foundation and Bearing capacity criteria	28-11-2020	
1	24	Types of foundations		
1	25	Factor of safety		
2	27	Determination of bearing capacity		
1	28	Factor influencing bearing capacity		
1	29	Determine bearing capacity by Terzaghi method		
1	30	Determine bearing capacity by IS method		
2	32	Shallow foundation Settlement criteria		

2	34	Safe bearing pressure based on N-value	23-01-2021	
2	36	Safe bearing pressure based on Allowable bearing pressure		
2	38	Determine Safe bearing capacity & settlemet by plate load test		
1	39	Types of foundation settlements		
2	41	Determination of allowable settlements of structure		
1	42	problems		
		UNIT : IV		
1	43	Introduction of Types of piles	1-2-2021	
2	45	Load carrying capacity of piles based on static formulae		
1	46	Load carrying capacity of piles based on Dynamic formulae		
1	47	Pile load tests		
2	49	Load carrying capacity of pile in sands		
2	51	Load carrying capacity of pile in clays		
1	52	Tutorial	8-2-21	
		UNIT : V		
1	53	Introduction of Well foundation	9-2-21	
1	54	Types and Different shapes wells		
1	55	Components of well foundation		
1	56	Forces acting on well foundation		
2	58	Design well foundation		
1	59	Determination of steining thickness and plug		
2	61	Construction and sinking of wells		
2	63	Tilt and Shift of well foundation		
1	64	Tutorial	16-2-21	
		UNIT-VI		
1	65	Introduction need of soil exploration	17-2-21	
2	67	Boring method of soil exploration		
2	69	Sampling method of soil exploration		
2	71	Field tests- Penetration tests		

2	73	Pressure meter test		
1	74	Planning and program		
1	75	Preparation of soil Investigation report		20-2-21

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1								
CO2	2	3	2	2								
CO3	3	2	3	2		3						
CO4	2	2	2	3		3						
CO5	2	3	3				3					
CO6	2	3	3				2					
Total	14	16	16	8		6	2					
Avg.	2.3	2.6	2.6	2		3	2.5					

CO INDEX	POs MAPPED	PSOs MAPPED
CO414.1	1,2,3,4	1,2
CO414.2	1.2.3.4	1,2
CO414.3	1.2.3.4.6	2
CO414.4	1.2.3.4.6	2
CO414.5	1.2.3.7	1,2
CO414.6	1,2,3,7	1,2

Signature of Course Instructor(s)Coordinator   Signature of Course Coordinator   Signature of ProgramSignature of Head of the Dept.

TEACHING PLAN

Department: CIVIL **Name of Faculty: B.UDAYA SHANKAR** **Designation: ASSOCIATE PROFESSOR**

Semester/ Year: IV/I 2020 – 2021 A &B **Name of the Subject: GWD**

S NO.	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
1	**INTORDUCTION**	1	1
2	**INTORDUCTION**	1	2
3	**INTORDUCTION**	1	3
4	**UNIT-I :**I Introduction Groundwater in the hydrologic cycle	1	4
5	groundwater occurrence	1	5
6	aquifer parameters	1	6
7	and their determination	1	7
8	general groundwater flow equation	1	8
9	Well Hydraulics Steady radial flow and unsteady radial flow	1	9
10	to a well in confined and unconfined aquifers	1	10
11	Theis solution, Jocob and Chow's methods, Leaky aquifers.	1	11
12	**UNIT-II**: Well Design Water well design-well diameter	1	12
13	well depth, well screen length	1	13
14	screen diameter and screen selection	1	14
15	design of collector wells, infiltration gallery	1	15
16	design of collector wells, infiltration gallery	1	16
17	**UNIT-III: Well Construction and Development**	1	17
18	Water wells, drilling methods-rotary drilling	1	18
19	percussion drilling	1	19
20	well construction-installation of well screens-pull-back method,	1	20

	open- hole		
21	well construction-installation of well screens-pull-back method, open- hole	1	21
22	bail- down and wash-down methods	1	22
23	compaction of solid waste	1	23
24	well development-mechanical surging using compressed air	1	24
25	high velocity jetting of water	1	25
26	over pumping and back washing	1	26
27	well completion	1	27
28	well disinfection	1	28
29	well maintenance	1	29
30	well maintenance	1	30
31	**UNIT-IV** Artificial Recharge Concept of artificial recharge of groundwater	1	31
32	recharge methods-basin	1	32
33	stream-channel	1	33
34	ditch and furrow	1	34
35	flooding and recharge well methods	1	35
36	recharge mounds and induced recharge	1	36
37	Saline Water Intrusion Occurrence of saline water intrusion	1	37
38	Ghyben- Herzberg relation	1	38
39	Shape of interface, control of saline water intrusion.	1	39
40	**UNIT-V** Geophysics Surface methods of exploration of groundwater	1	40
41	Electrical resistivity and Seismic refraction methods	1	41
42	Sub-surface methods.	1	42
43	Geophysical logging and resistivity logging	1	43
44	Aerial Photogrammetry applications	1	44
45	REVISION	1	46
46	REVISION	1	47
48	**UNIT – VI** Groundwater Modelling and Management Basic principles of	1	48

	groundwater modelling		
49	Analog models-viscous fluid models and membrane models, digital models	1	49
50	Finite difference and finite element models,	1	50
51	Concepts of groundwater management	1	51
52	basin management by conjunctive use	1	52
53	case studies	1	53
54	REVISION	1	57
55	REVISION	1	58
56	REVISION	1	59

TEXT BOOKS:

1. Groundwater, Raghunath H M, New Age International Publishers, 2005. 2. Groundwater Hydrology, Todd D. K., Wiley India Pvt Ltd., 2014. 3. Groundwater Hydrology, Todd D K and L W Mays, CBS Publications, 2005.

REFERENCES:

1. Groundwater Assessment and Management, Karanth K R, Tata McGraw Hill Publishing Co., 1987. 2. Groundwater Hydrology, Bouwer H, McGraw Hill Book Company, 1978. 3. Groundwater Systems Planning and Management, Willis R and W.W.G. Yeh, Prentice Hall Inc., 1986. 4. Groundwater Resources Evaluation, Walton W C, McGraw Hill Book Company, 1978.

Signature of Course Instructor(s) | **Signature of program Coordinator** | **Signature of Head of the Department**

TEACHING PLAN

Department: CIVIL **Name of Faculty: B.UDAYA SHANKAR** **Designation: ASSOCIATE PROFESSOR**

Semester/ Year: IV/I 2020 – 2021 A &B **Name of the Subject: GWD**

S NO.	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
1	**INTORDUCTION**	1	1
2	**INTORDUCTION**	1	2
3	**INTORDUCTION**	1	3
4	**UNIT-I :** Surplus weir	1	4
5	Surplus weir	1	5
6	Surplus weir	1	6
7	Surplus weir	1	7
8	Surplus weir	1	8
9	Surplus weir	1	9
10	Surplus weir	1	10
11	Surplus weir	1	11
12	**UNIT-II** Tank sluice with a tower head	1	12
13	Tank sluice with a tower head	1	13
14	Tank sluice with a tower head	1	14
15	Tank sluice with a tower head	1	15
16	Tank sluice with a tower head	1	16
17	**UNIT-III:** Canal drop-Notch type	1	17
18	Canal drop-Notch type	1	18
19	Canal drop-Notch type	1	19
20	Canal drop-Not	1	20

21	Canal drop-Notch type	1	21
22	Canal drop-Notch type	1	22
23	Canal drop-Notch type	1	23
24	Canal drop-Notch type	1	24
25	Canal drop-Notch type	1	25
26	Canal drop-Notch type	1	26
27	Canal drop-Notch type	1	27
28	Canal drop-Notch type	1	28
29	Canal drop-Notch type	1	29
30	Canal drop-Notch type	1	30
31	**UNIT-IV**	1	31
32	Canal regulator	1	32
33	Canal regulator	1	33
34	Canal regulator	1	34
35	Canal regulator	1	35
36	Canal regulator	1	36
37	Canal regulator	1	37
38	Canal regulator	1	38
39	Canal regulator	1	39
40	**UNIT-V** Under tunnel	1	40
41	Under tunnel	1	41
42	Under tunnel	1	42
43	Under tunnel	1	43
44	Under tunnel	1	44
45	Under tunnel	1	46
46	Under tunnel	1	47
48	**UNIT – VI**	1	48
49	Syphon aqueduct type III	1	49
50		1	50

51	Syphon aqueduct type III	1	51
52	Syphon aqueduct type III	1	52
53	Syphon aqueduct type III	1	53
54	Syphon aqueduct type III	1	57
55	REVISION	1	58
56	REVISION	1	59

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by C. Satyanarayana Murthy, New age International Publishers.

REFERENCES:

1. Irrigation Engineering and Hydraulic Structures, S. K. Garg, Standard Book House. 2. Irrigation and Water Power Engineering, B. C Punmia & Lal, Lakshmi Publications Pvt. Ltd., New Delhi

Signature of Course Instructor(s)

Signature of program Coordinator

Signature of Head of the Department

NRI INSTITUTE OF TECHNOLOGY

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POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

NRIIT/9.1/F-09

TEACHING PLAN			
Department: CIVIL	**Name of Faculty: B.UDAYA SHANKAR**	**Designation: ASSOCIATE PROFESSOR**	
Semester/ Year: IV/I 2020 – 2021 A &B	**Name of the Subject: IPR**		
S NO.	**TOPIC**	**NO. OF CLASSES**	**NO. OF CUMULATIVE CLASSES**
1	**INTORDUCTION**	1	1
2	**INTORDUCTION**	1	2
3	**INTORDUCTION**	1	3
4	**UNIT-I :** Introduction to Intellectual Property Rights (IPR)	1	4
5	Concept of Property	1	5
6	Introduction to IPR	1	6
7	International Instruments and IPR – WIPO	1	7
8	TRIPS – WTO -Laws Relating to IPR	1	8
9	IPR Tool Kit - Protection and Regulation	1	9
10	Copyrights and Neighboring Rights – Industrial Property	1	10
11	Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR - Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.	1	11
12	**UNIT-II**: Copyrights and Neighboring Rights	1	12
13	Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights	1	13
14	Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to	1	14
15	Prepare Derivative Works –Rights of Distribution – Rights of Performers – Copyright Registration – Limitations	1	15
16	Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act.	1	16
17	**UNIT-III:** Patents	1	17

18	Introduction to Patents - Laws Relating to Patents in India – Patent Requirements	1	18
19	Product Patent and Process Patent - Patent Search	1	19
20	Patent Registration and Granting of Patent	1	20
21	Exclusive Rights – Limitations	1	21
22	Ownership and Transfer	1	22
23	Revocation of Patent	1	23
24	Patent Appellate Board	1	24
25	Infringement of Patent	1	25
26	Compulsory Licensing	1	26
27	Patent Cooperation Treaty	1	27
28	New developments in Patents	1	28
29	Software Protection and Computer related Innovations.	1	29
31	**UNIT-IV**: Trademarks	1	31
32	Introduction to Trademarks	1	32
33	Laws Relating to Trademarks	1	33
34	Functions of Trademark	1	34
35	Distinction between Trademark and Property Mark	1	35
36	Marks Covered under Trademark Law	1	36
37	Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities	1	37
38	Likelihood of Confusion - Dilution of Ownership	1	38
39	Trademarks Claims and Infringement – Remedies – Passing Off Action.	1	39
40	**UNIT-V** Introduction to Trade Secrets	1	40
41	General Principles	1	41
42	Laws Relating to Trade Secrets	1	42
43	Maintaining Trade Secret	1	43
44	Physical Security – Employee Access Limitation – Employee	1	44
45	Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law.	1	46

46	REVISION	1	47
48	**UNIT – VI** Cyber Law and Cyber Crime	1	48
49	Introduction to Cyber Law	1	49
50	Information Technology Act 2000	1	50
51	Protection of Online and Computer Transactions	1	51
52	E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities	1	52
53	Cyber Crimes - Prevention and Punishment – Liability of Network Providers.	1	53
54	Relevant Cases Shall be dealt where ever necessary	1	57
55	REVISION	1	58
56	REVISION	1	59

TEXT BOOKS:

1. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.
2. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
3. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, New Delhi
4. Richard Stim: Intellectual Property, Cengage Learning, New Delhi.

REFERENCES:

1. Kompal Bansal &Parishit Bansal Fundamentals of IPR for Engineers, B. S. Publications (Press)

2. Cyber Law - Texts & Cases, South-Western's Special Topics Collections.

3. R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.

4. M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, Serials Pub

Signature of Course Instructor(s) | **Signature of program Coordinator** | **Signature of Head of the Department**

	NRI INSTITUTE OF TECHNOLOGY TEACHING PLAN	NRIIT/9.1/F-09

Name of the Program: B. Tech	**Academic Year: 2020-2021**
Branch: Civil Engineering	**Year & Semester: IV/I**
Name of the Course: REMOTE SENSING & GIS	**Regulation: R16**
Course Area/Module: Civil Engineering	**No. of students registered: 79**
Course Coordinator: M. Krishna Kumar **Designation:Assistant Professor**	**Course Instructors:** 1. **M. Krishna Kumar** 2.
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week: 1**
Credits: 4	

Course Learning Objectives:

The course is designed to

- introduce the basic principles of Remote Sensing and GIS techniques.
- learn various types of satellite sensors and platforms
- learn concepts of visual and digital image analyses
- understand the principles of spatial analysis
- appreciate application of RS and GIS to Civil engineering

Course outcomes:

At the end of the course the student will be able to

- be familiar with ground, air and satellite based sensor platforms.
- interpret the aerial photographs and satellite imageries
- create and input spatial data for GIS application
- apply RS and GIS concepts in water resources engineering
- applications of various satellite data

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Remarks
3	3	**UNIT – I** **Introduction to remote sensing:** Basic concepts of remote sensing, Electromagnetic radiation, Electromagnetic spectrum, Interaction with atmosphere, Energy interaction with the earth surfaces, Characteristics of remote sensing systems	17-08-2020	
8	11	**UNIT – I** **Sensors and platforms:** Introduction, Types of sensors, Airborne remote sensing, Space borne remote sensing, Image data characteristics, Digital image data formats-band Interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT, MODIS, ASTER, RISAT and CARTOSAT	25-08-2020	
1	12	**TUTORIAL**	01-09-2020	
12	24	**UNIT – II** **Image analysis:** Introduction, elements of visual interpretations, Digital image processing- Image pre-processing, Image enhancement, Image classification, Supervised classification, Unsupervised classification.	03-09-2020	
1	25	**TUTORIAL**	15-09-2020	
06	31	**UNIT – III** **Geographic Information System:** Introduction, key components, Application areas of GIS, Map projections.	17-09-2020	
06	37	**UNIT – III** **Data entry and preparation**: Spatial data input, Raster data models, Vector data models..	25-09-2020	
1	38	**TUTORIAL**	10-10-2020	

-	-	**I MID EXAMINATION**	24-11-2020	
10	48	**UNIT – IV** **Spatial data analysis**: Introduction, Overlay function-vector Overlay operations, Raster overlay operations, Arithmetic operators, Comparison and logical operators, Conditional expressions, Overlay using a decision table, Network analysis-optimal path finding, Network allocation, network tracing and buffer analysis.	01-12-2020	
1	49	**TUTORIAL**	26-01-2020	
10	59	**UNIT – V** **RS and GIS applications General**: Land cover and land use, Agriculture, forestry, geology, geomorphology, urban applications	02-01-2021	
1	60	**TUTORIAL**	21-01-2021	
4	64	**UNIT – VI** **Applications of Hydrology, Water Resources and Disaster Management:** Flood zoning and mapping, Groundwater prospects and potential recharge zones,	24-01-2021	
4	68	**UNIT – VI** Watershed management and disaster management with case studies.	10-02-2021	
1	69	**TUTORIAL**	15-01-2021	
-	-	**II MID EXAMINATION**	17-01-2021	

TEXT BOOKS:

1. Remote sensing and GIS, Bhatta B (2008) , Oxford University Press
2. Remote Sensing and Image Interpretation, Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013), Wiley India Pvt. Ltd., New Delhi
3. Fundamentals of Geographic Information Systems, Demers, M.N, Wiley India Pvt. Ltd, 2013.

REFERENCES:

1. Fundamentals of Remote Sensing, George Joseph, Universities Press, 2013.

2. Concepts and Techniques of Geographical Information System, Chor Pang Lo andA K W Yeung, Prentice Hall (India), 2006

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	2	2										
CO3		3	3		2							
CO4				3	3	3						
CO5	3	3	3									
Total												
Avg.	2.66	2.5	3	3	2.5	3						

CO INDEX	POs MAPPED	PSOs MAPPED
CO411.1	1,2	1
CO411.2	1,2	1,2
CO411.3	2,3,5	2
CO411.4	4,5,6	1,2
CO411.5	1,2,3	1

Signature of Course Instructor(s) | Signature of Course Coordinator | Signature of Program Coordinator | Signature of Head of the Dept.

TEACHING PLAN

Department: CIVIL **Name of Faculty: P.NARENDRA BABU** **Designation: ASSOCIATE PROFESSOR**

Semester/ Year: IV/I 2020 - 2021 A &B **Name of the Subject: WRE - II**

S NO.	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
I	**UNIT:I**		
1	Necessity and importance, principal crops and crop seasons	1	1
2	methods of application	2	3
3	soil-water-plant relationship,soil moisture constants	1	4
4	consumptive use, estimation of consumptive use	1	5
5	crop water requirement, duty and delta	2	7
6	factors affecting duty	1	8
7	depth and frequency of irrigation, irrigation efficiencies	1	9
8	water logging and drainage,	1	10
9	standards of quality for irrigation water, crop rotation	1	11
II	**UNIT : II**		
10	Classification of canals	1	12
11	design of non-erodible canals	2	14
12	methods of economic **section and maximum permissible velocity**	2	16
13	economy of canal lining	1	17
14	design of erodible canals -Kennedy's silt theory	2	19
15	Lacey's regime theory	2	21
16	balancing depth of cutting.	1	22
III	**UNIT : III**		
17	Types and location of falls	1	23
18	design principles of Sarda type fall	3	26
19	design principles of straight **glacis fall**	2	28
20	Head and cross regulators, design principles	2	30
21	Types, selection of Cross Drainage Works	1	31
22	design principles of aqueduct,	2	33
23	design principles of siphon aqueduct and super passage.	2	35
24	design principles of super passage.	2	37
25	types of outlets	1	38
26	types, proportionality, sensitivity and flexibility	1	39
27	Objectives and approaches of river training	1	40
IV	**UNIT : IV**		
28	Types of diversion head works, weirs and barrages	1	41
29	layout of diversion head works, components	2	43

30	causes and failures of weirs on permeable foundations	**1**	**44**
31	Bligh's creep theory	**1**	**45**
32	Khosla's theory	**1**	**46**
33	design of impervious floors for subsurface flow	**2**	**48**
34	exit gradient.	**1**	**49**
V	**UNIT : V**		
35	Investigations, site selection, zones of storage of reservior	**2**	**51**
36	yield and storage capacity of reservoir, reservoir sedimentation	**2**	**53**
37	Types of dams, selection of type of dam, selection of site for a dam	**1**	**54**
38	Forces acting on a gravity dam, causes of failure of a gravity **dam**	**2**	**56**
39	elementary profile and practical profile of a gravity dam	**2**	**58**
40	limiting height of a dam, stability analysis	**2**	**60**
41	drainage galleries, grouting.	**1**	**61**
VI	**UNIT : VI**		
42	Types, causes of failure, criteria for safe design of earth dam	**1**	**62**
43	seepage measures for control of seepage-filters	**1**	**63**
44	stability of downstream slope during steady seepage	**1**	**64**
45	stability of upstream slope during sudden drawdown conditions	**1**	**65**
46	Types of spillways, design principles of Ogee spillways	**2**	**67**
47	types of spillways **crest gates**	**1**	**68**
48	Energy dissipation below spillways-stilling basin & its appurtenances.	**1**	**69**

TEXT BOOKS:

1.Irrigation and Water Power Engineering'by Punmia B C

2.Irrigation and water resorce engineering by G.L.ASAWA

3.Irrigation water resouces and water power engineering by P.N.MODI

REFERENCES:

1.Water resources engineering by L.W.MAYS (2013),Wiley India Pvt Ltd

2.Irrigation engineering by R.K.SHARMA,S.Chand publications

3.Water Resources Engineering'by Satyanarayana Murthy Challa(2008), New Age International Publishers.

Signature of Course Instructor(s) **Signature of program Coordinator** **Signature of Head of the Department**

NRI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution Permanently Affiliated to JNTUK, Kakinada)
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POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

NRIIT/9.1/F-09

TEACHING PLAN

Department: CIVIL **Name of Faculty: B.UDAYA SHANKAR** **Designation: ASSOCIATE PROFESSOR**

Semester/ Year: IV/I 2019 - 2020 A &B **Name of the Subject: CTM**

SL.NO	TOPIC	No. of Lectures	Cumulative No. of Lectures
I	**UNIT-1Introduction to Construction Technology & Management**	1	1
1	Construction project management and its relevance	2	3
2	qualities of a project manager	1	4
3	project planning	1	5
4	coordination	1	6
5	scheduling	1	7
6	monitoring	1	8
7	bar charts	2	10
8	Milestone charts	2	12
9	critical Path Method	2	14
II	Applications in civil engineering works	1	15
10	**UNIT -II** Project Evaluation and Review Technique (PERT)	1	16
11	cost analysis	1	17
12	updating	2	19
13	crashing for optimum cost – crashing for optimum resources	2	21
14	allocation of resources	1	22
15	**UNIT- III** Construction equipment	1	23
16	economical considerations	1	24
III	earthwork equipment – Trucks and handling equipment	2	26
17	rear dump trucks	1	27
18	capacities of trucks and handling equipment	1	28
19	calculation of truck production	1	29
20	compaction equipment	1	30
21	types of compaction rollers	2	32
22	**UNIT –IV** Hoisting and earthwork equipment	1	33
23	hoists	2	35
24	cranes – tractors	2	37
25	bulldozers – graders	2	39
26	scrapers–	2	41
27	draglines - clamshell buckets	1	42
IV	**UNIT -V** Concreting equipment	1	43
28	crushers – jaw crushers –	2	45
29	gyratory crushers – impact crushers	2	47

30	selection of crushing equipment	1	48
31	screening of aggregate	1	49
32	concrete mixers	1	50
33	mixing and placing of concrete	2	52
34	consolidating and finishing	2	54
V	**UNIT –VI** Construction methods	1	55
35	earthwork – piling	2	57
36	placing of concrete	1	58
37	form work	1	59
38	fabrication and erection	1	60
39	quality control and safety engineering	2	62

TEXT BOOKS:

1. Construction Planning Equipment and Methods, Peurifoy and Schexnayder , Shapira, Tata McGraw-Hill

2. Construction Project Management Theory and Practice, Kumar Neeraj Jha (2011), Pearson.

3. Construction Technology, Subir K. Sarkar and Subhajit Saraswati, Oxford University Press.

4. Project Planning and Control with PERT and CPM, B. C. Punamia and K K Khandelwal, Laxmi Publications Pvt Ltd. Hyderabad

REFERENCES:

1. Construction Project Management - An Integrated Approach, Peter Fewings , Taylor and Francis

2. Construction Management Emerging Trends and Technologies, Trefor Williams , Cengage learning.

3. Hand Book of Construction Management, P. K. Joy, Trinity Press Chennai, New Delhi

Signature of Course Instructor(s) **Signature of program Coordinator** **Signature of Head of the Department**

	# NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

Name of the Program: B. Tech, Civil Engineering	**Academic Year: 2020-21**
Branch: CIVIL	**Year & Semester: 4 & II**
Name of the Course: ESTIMATION SPECIFICATION & CONTRACTS	**Regulation:**
Course Area/Module:	**No. of students registered:**
Course Coordinator: **Designation:**	**Course Instructors:** **1.** **2.**
No. of Lecture Hours per week:	**No. of Tutorial Hours per week:**
Credits:	

COURSE OBJECTIVES:

Students will be able to:

1. Understand the quantity calculations of different components of the buildings
2. Understand the rate analysis of different quantities of the buildings components.
3. Learn various specifications and components of the buildings.
4.
5.
6.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. The student should be able to determine the quantities of different components of buildings
2. The student should be in a position to find the cost of various building components
3. The student should be capable of finalizing the value of structures.
4.
5.
6.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates –Approximate method of Estimating.
2	Rate Analysis – Working out data for various items of work over head and contigent charges.
3	Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules.
4	Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings Standard specifications for different items of building construction
5	Detailed Estimation of Buildings using individual wall method.
6	Detailed Estimation of Buildings using centre line method.

COURSE DESCRIPTION:

In this course, the students able to understand General items of work in Building, Standard Units Principles of working out quantities for detailed and abstract estimates, and Approximate method of Estimating, Rate Analysis, Working out data for various items of work over head and contigent charges, Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules, Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings Standard specifications for different items of building construction, Detailed Estimation of Buildings using individual wall method, Detailed Estimation of Buildings using centre line method.

EVALUATION SCHEME:

Component	Duration (Minutes)	Marks	% Weightage
Mid Examination - I	90	30	
Mid Examination - II	90	30	
Online Quiz Examination - I	20	5	
Online Quiz Examination - I	20	5	
Assignments	-	5	
Semester End Examination	180		

COURSE CONTENT (Syllabus):

UNIT–I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates –Approximate method of Estimating.

UNIT–2

Rate Analysis – Working out data for various items of work over head and contigent charges.

UNIT–3

Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules.

UNIT–4

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings Standard specifications for different items of building construction

UNIT–5

Detailed Estimation of Buildings using individual wall method.

UNIT–6

Detailed Estimation of Buildings using centre line method.

Text Books:

1. Estimating and Costing, B.N. Dutta, UBS publishers, 2000.
2. Civil Engineering Contracts and Estimates, B. S. Patil, Universities Press (India) Pvt. Ltd., Hyd.
3. Construction Planning and Technology, Rajiv Gupta, CBS Publishers & Distributors Pvt. Ltd. New Delhi.
4. Estimating and Costing, G.S. Birdie

References:

1. Standard Schedule of rates and standard data book, Public works department
2. IS 1200 (Parts I to XXV-1974/ Method of Measurement of Building & Civil Engg Works – B.I.S.
3. Estimation, Costing and Specifications, M. Chakraborthi; Laxmi publications.
4. National Building Code

	NRI INSTITUTE OF TECHNOLOGY	NRIIT/9.1/F-09
	Teaching Plan &Realization	

No. of Lectures	Cumulative No. of Lectures	TOPIC	Scheduled Date	Taught on Date	Remarks
1	1	Unit-1 Introduction	22.3.2021	22.3.2021	
1	2	General items of work in building	24.3.2021	24.3.2021	
2	4	Standard Units Principles of working out quantities for detailed and abstract estimates	26.3.2021	26.3.2021	
2	6	Approximate method of Estimating.	27.3.2021	27.3.2021	
2	8	Unit-2 Rate Analysis	30.3.2021	30.3.2021	
2	10	Working out data for various items of work over head and contigent charges	01.4.2021	01.4.2021	
2	12	Working out data for various items of work over head and contigent charges examples	03.4.2021	03.4.2021	
2	14	Unit 3 Earthwork for roads and canals,	05.4.2021	05.4.2021	
2	16	Reinforcement bar bending	07.4.2021	07.4.2021	
2	18	bar requirement schedules.	08.4.2021	08.4.2021	
2	20	Unit-4 Contracts – Types of contracts	13.5.2021	13.5.2021	
2	22	Contract Documents	14.5.2021	14.5.2021	
2	24	Conditions of contract,	17.5.2021	17.5.2021	
2	26	Valuation of buildings Standard specifications for different items of building construction	21.5.2021	21.5.2021	
2	28	Unit-5 Detailed Estimation of Buildings using individual wall method.	24.5.2021	24.5.2021	
2	30	Detailed Estimation of Buildings using individual wall method.	27.5.2021	27.5.2021	
2	32	Detailed Estimation of Buildings using center line method.	03.6.2021	03.6.2021	
2	34	Detailed Estimation of Buildings using center line method.	10.6.2021	10.6.2021	
2	36	Tutorial	23.6.2021	23.6.2021	

	NRI INSTITUTE OF TECHNOLOGY Teaching Plan &Realization	**NRIIT/9.1/F-09**

Signature of Course Instructor(s)

Signature of Course Coordinator

Signature of Program Coordinator

Signature of Head of the Department

TEACHING PLAN

Department: CIVIL **Name of Faculty: P.NARENDRA BABU** **Designation: ASSOCIATE PROFESSOR**

Semester/ Year: IV/I 2020 - 2021 A &B **Name of the Subject: PC**

S NO.	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
I	UNIT:I		
1	Basic concepts of Prestressing	1	1
2	Advantages and Applications of Prestressed Concretes	2	3
3	High Strength Concrete- Permissible Stresses	1	4
4	Shrinkage, Creep	1	5
5	Deformation Characteristics	2	7
6	High strength Steel	1	8
7	Types, Strength- Permissible Stresses	1	9
8	Relaxation of Stress, Cover Requirements.	1	10
9	Relaxation of Stress, Cover Requirements.	1	11
II	UNIT : II		
10	Prestressing Systems- Introduction, Tensioning devices	1	12
11	Pre-tensioning Systems, Post tensioning Systems	2	14
12	Basic Assumptions in Analysis of prestress and design	2	16
13	Analysis of prestress	1	17
14	Resultant Stresses at a section	2	19
15	pressure line- Concepts of load balancing	2	21
16	Stresses in Tendons, Cracking moment.	1	22
III	UNIT : III		
17	Losses of Pre-stressing	1	23
18	Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes	3	26
19	Elastic shortening of concrete,	2	28
20	creep of concrete	2	30
21	Relaxation stress in steel	1	31
22	slip in anchorage, differential shrinkage	2	33
23	bending of members and frictional losses	2	35
24	bending of members and frictional losses	2	37
25	shrinkage of concrete	1	38
26	Total losses allowed for design	1	39
27	Total losses allowed for design	1	40
IV	UNIT : IV		
28	Design for Flexural resistance	1	41

29	Types of flexural failure	**2**	**43**
30	Code procedures	**1**	**44**
31	Design of sections for flexure	**1**	**45**
32	Control of deflections	**1**	**46**
33	Control of deflections	**2**	**48**
34	Prediction of short term and long term deflections	**1**	**49**
V	**UNIT : V**		
35	Prediction of short term and long term deflections	**2**	**51**
36	Shear and Principal Stresses	**2**	**53**
37	Design of Shear reinforcements	**1**	**54**
38	Codal Provisions	**2**	**56**
39	Design for Torsion	**2**	**58**
40	Design for Combined bending	**2**	**60**
41	shear and torsion	**1**	**61**
VI	**UNIT : VI**		
42	Transfer of Prestress in pre tensioned members	**1**	**62**
43	Transmission length	**1**	**63**
44	Bond stresses- end zone reinforcement	**1**	**64**
45	Codal provisions	**1**	**65**
46	Anchorage zone Stresses in Post tensioned members	**2**	**67**
47	Stress distribution in end block	**1**	**68**
48	Anchorage Zone reinforcement	**1**	**69**

TEXT BOOKS:

1. Prestressed Concrete, N. Krishna Raju, Tata McGraw hill
2. Prestressed Concrete, N. Krishna Raju, Tata McGraw hill

REFERENCES:

1. Prestressed Concrete, P. Dayaratnam
2. Prestressed Concrete, T. Y. Lin & Burns, Wiley Publications

Signature of Course Instructor(s) | **Signature of program Coordinator** | **Signature of Head of the Department**

NRI INSTITUTE OF TECHNOLOGY

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NRIIT/9.1/F-09

TEACHING PLAN

Department: CIVIL **Name of Faculty: P.NARENDRA BABU** **Designation: ASSOCIATE PROFESSOR**

Semester/ Year: IV/I 2020 - 2021 A &B **Name of the Subject: WRE - II**

S NO.	TOPIC	NO. OF CLASSES	NO. OF CUMULATIVE CLASSES
I	**UNIT:I**		
1	Necessity and importance, principal crops and crop seasons	**1**	**1**
2	methods of application	**2**	**3**
3	soil-water-plant relationship,soil moisture constants	**1**	**4**
4	consumptive use, estimation of consumptive use	**1**	**5**
5	crop water requirement, duty and delta	**2**	**7**
6	factors affecting duty	**1**	**8**
7	depth and frequency of irrigation, irrigation efficiencies	**1**	**9**
8	water logging and drainage,	**1**	**10**
9	standards of quality for irrigation water, crop rotation	**1**	**11**
II	**UNIT : II**		
10	Classification of canals	**1**	**12**
11	design of non-erodible canals	**2**	**14**
12	methods of economic **section and maximum permissible velocity**	**2**	**16**
13	economy of canal lining	**1**	**17**
14	design of erodible canals -Kennedy's silt theory	**2**	**19**
15	Lacey's regime theory	**2**	**21**
16	balancing depth of cutting.	**1**	**22**
III	**UNIT : III**		
17	Types and location of falls	**1**	**23**
18	design principles of Sarda type fall	**3**	**26**
19	design principles of straight **glacis fall**	**2**	**28**
20	Head and cross regulators, design principles	**2**	**30**
21	Types, selection of Cross Drainage Works	**1**	**31**
22	design principles of aqueduct,	**2**	**33**
23	design principles of siphon aqueduct and super passage.	**2**	**35**
24	design principles of super passage.	**2**	**37**
25	types of outlets	**1**	**38**
26	types, proportionality, sensitivity and flexibility	**1**	**39**
27	Objectives and approaches of river training	**1**	**40**
IV	**UNIT : IV**		
28	Types of diversion head works, weirs and barrages	**1**	**41**
29	layout of diversion head works, components	**2**	**43**

30	causes and failures of weirs on permeable foundations	**1**	**44**
31	Bligh’s creep theory	**1**	**45**
32	Khosla’s theory	**1**	**46**
33	design of impervious floors for subsurface flow	**2**	**48**
34	exit gradient.	**1**	**49**
V	**UNIT : V**		
35	Investigations, site selection, zones of storage of reservior	**2**	**51**
36	yield and storage capacity of reservoir, reservoir sedimentation	**2**	**53**
37	Types of dams, selection of type of dam, selection of site for a dam	**1**	**54**
38	Forces acting on a gravity dam, causes of failure of a gravity **dam**	**2**	**56**
39	elementary profile and practical profile of a gravity dam	**2**	**58**
40	limiting height of a dam, stability analysis	**2**	**60**
41	drainage galleries, grouting.	**1**	**61**
VI	**UNIT : VI**		
42	Types, causes of failure, criteria for safe design of earth dam	**1**	**62**
43	seepage measures for control of seepage-filters	**1**	**63**
44	stability of downstream slope during steady seepage	**1**	**64**
45	stability of upstream slope during sudden drawdown conditions	**1**	**65**
46	Types of spillways, design principles of Ogee spillways	**2**	**67**
47	types of spillways **crest gates**	**1**	**68**
48	Energy dissipation below spillways-stilling basin & its appurtenances.	**1**	**69**

TEXT BOOKS:

1.Irrigation and Water Power Engineering’by Punmia B C

2.Irrigation and water resorce engineering by G.L.ASAWA

3.Irrigation water resouces and water power engineering by P.N.MODI

REFERENCES:

1.Water resources engineering by L.W.MAYS (2013),Wiley India Pvt Ltd

2.Irrigation engineering by R.K.SHARMA,S.Chand publications

3.Water Resources Engineering’by Satyanarayana Murthy Challa(2008), New Age International Publishers.

Signature of Course Instructor(s) | **Signature of program Coordinator** | **Signature of Head of the Department**

Department: MECHANICAL ENGINEERING

Academic Year: 2020-21 II Semester

Year: IV

	NRI INSTITUTE OF TECHNOLOGY **Course Handout** (Including Teaching Plan & Realization)	NRIIT/9.1/F-09

Name of the Program: B.Tech	**Academic Year: 2020-21**
Branch: MECHANICAL	**Year & Semester: IV- II**
Name of the Course: Production Planning And Control	**Regulation: R-16**
Course Area/Module: Manufacturing	**No. of students registered:**
Course Coordinator: Mrs.CH.SRI LATHA **Designation: Assoc.Professor**	**Course Instructors:** **1.** Mrs.CH.SRI LATHA
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1.An understanding of the concepts of production and service systems
2.Understanding the basic concepts of production planning and control functions and systems.
3. The ability to develop a systematic approach to the solution of planning and control problems for a widevariety of industrial and business organizations.
4. Measure the effectiveness, identify likely areas for improvement,develop and implement improved planning and control methods for production systems.
5. Identify different strategies employed in manufacturing and service industries to plan production and control inventory.
6 The knowledge of production planning and control methods currently in use by industrial companies.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Understand production systems and their characteristics.
2. Apply forecasting techniques to production systems.

3. Evaluate MRP and JIT systems against traditional inventory control systems.
4. Apply scheduling techniques to production systems
5. Analyze aggregate planning strategies.
6. Understand theory of constraints for effective management of production systems

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	Topic
1	Quantitative methods.
2	Management science and productivity
3	Operations Research

COURSE DESCRIPTION: Surveys the design, development, implementation and management of production planning systems, including master production scheduling, aggregate planning, material requirements planning, capacity and inventory planning and production activity control. Students will be exposed to contemporary approaches such as just-intime, theory of constraints and the relationship of enterprise-level planning and control systems to the overall materials flow

COURSE CONTENT (Syllabus):

UNIT – I

Introduction: Definition – objectives and functions of production planning and control – elements of production control – types of production – organization of production planning and control department – internal organization of department.

UNIT – II

Forecasting – importance of forecasting – types of forecasting, their uses – general principles of forecasting – forecasting techniques – qualitative methods and quantitive methods.

UNIT – III

Inventory management – functions of inventories – relevant inventory costs – ABC analysis – VED analysis –EOQ model – Inventory control systems – P–Systems and Q-Systems Introduction to MRP I, MRP II, ERP, LOB (Line of Balance), JIT and KANBAN system.

UNIT – IV

Routing – definition – routing procedure –route sheets – bill of material – factors affecting routing procedure, schedule –definition – difference with loading

UNIT – V

Scheduling policies – techniques, standard scheduling methods.

Line Balancing, aggregate planning, chase planning, expediting, controlling aspects.

UNIT – VI

Dispatching – activities of dispatcher – dispatching procedure – follow up – definition – reason for existence of functions – types of follow up, applications of computer in production planning and control.

Text Books:

1. Elements of Production Planning and Control / Samuel Eilon/Universal Book Corp.

2. Manufacturing, Planning and Control/Partik Jonsson Stig-Arne Mattsson/TataMcGrawHill

References:

1. Inventory Control Theory and Practice / Martin K. Starr and David W. Miller/Prentice-Hall

2. Production Planning and Control/Mukhopadyay/PHI.

3. Production Control A Quantitative Approach / John E. Biegel/Prentice-Hall

4. Production Control / Franklin G Moore & Ronald Jablonski/ Mc-GrawHill

5. Production and Operations Management/Shailendra Kale/McGraw Hill

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	**UNIT -I** Definition of ppc	
1	2	Objectives of production planningand control	
1	3	Functions of production planningand control	
1	4	Elements of production control	
3	7	Types of production organization of production planning and control department	
2	9	Internalorganization of department.	
1	10	**UNIT-II** Importance of forecasting	
1	11	Types of forecasting, their uses	
1	12	General principles of forecasting	
3	15	Forecasting techniques	
3	18	Qualitative methods and quantitive methods	
1	19	**UNIT-III** Functions of inventories	
1	20	Relevant inventory costs	
3	23	ABC analysis – VED analysis	
1	24	EOQ model	
4	28	Inventory control systems – P–Systems and Q-Systems; Introduction to MRP I, MRP II,	
2	30	ERP, LOB (Line of Balance),	
2	32	JIT and KANBAN system	
2	34	**UNIT -IV** Definition ,routing procedure	
2	36	Route sheets	
2	38	Bill of material factors affecting routing procedure,	
1	39	Schedule definition	
2	41	Difference with loading	
1	42	**UNIT -V** Scheduling policies	
2	44	Scheduling techniques,	
2	46	Standard scheduling methods.	
1	47	Line Balancing,	
1	48	Aggregate planning,	
2	50	Chase planning, expediting,	
1	51	Controlling aspects	
1	52	**UNIT-VI** Dispatching introduction	
2	54	Activities of dispatcher	
2	56	Dispatching procedure	
4	60	Follow up –definition – reason for existence of functions	
2	62	Types of follow up	

2	64	Applications of computer in production planning and control.	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		1	2			1	1	1			2	1
CO2	1	1			2	1					1	1
CO3		2			1	1	1		2	1	2	3
CO4		2	2		1				2	2	1	1
CO5		2	2		1	3	1		1		1	
CO6	2	1	1						1	1	2	1
Total	3	9	7		5	6	3	1	6	4	9	8
Avg.	1.5	1.5	1.7		1	1.5	1	1	1.5	1.2	1.5	1.6

CO INDEX	POs MAPPED	PSOs MAPPED
Co 1	2,3,6,7,8,11,12	1,2
Co 2	1,2,5,6,11,12	1,2
Co 3	2,5,6,7,9,10,11,12	1,2
Co 4	2,3,5,6,7,9,10,11,12	1,2
Co 5	2,3,5,6,7,9,11	1,2
Co 6	1,2,3,9,10,11,12	1,2

UNCONVNTIONAL MACHINING PROCESSES

Name of the Program: Bachelor of Technology	**Academic Year: 2020 - 2021**
Branch: Mechanical Engineering	**Year & Semester: IV-II**
Name of the Course: UNCONVNTIONAL MACHINING PROCESSES	**Regulation: R16**
Course Area/Module: MANUFACTURING	**No. of students registered:**
Course Coordinator: Mr. O N V P BHAGAVAN KUMAR **Designation: ASSISTENT PROFESSOR**	Course Instructors: **1.** Mr. O N V P BHAGAVAN KUMAR
No. of Lecture Hours per week:	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. To understand the need and classification of unconventional machining process and elements of ultrasonic machining process.
2. To understand the chemical & electro-chemical machining process with applications and effect of the process parameters on MRR and surface finish.
3. To understand the electric discharge machining process, its principles with applications, and different characteristics of process parameters.
4. To study the principles and applications of electron beam machining (EBM) and laser beam machining process (LBM) and applications with different characteristics of process parameters on MRR Accuracy.
5. To understand the plasma arc machining process with applications, different characteristics of process parameters on MRR Accuracy.
6. To study various mechanical machining processes with applications and metal removal procedure.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Describe un conventional machining methods and also working principles of ultrasonic machining processes.
2. Demonstrate electro-chemical machining principles in grinding, honing and debarring process.
3. Explain principle, working, applications and various characteristics of electric discharge machining process.
4. Identify the difference between EBM and LBM on the basis of its characteristics, parameters and accuracy.
5. Explain the applications, characteristics and process of plasma arc machining based on MRR and accuracy.
6. Compare different types of mechanical finishing process.

PRE-REQUISITES FOR THE COURSE:

Students are expected to have knowledge on the following topics:

S. No	**Topic**
1.	Production Technology
2.	Metal cutting and machine tools
3.	

COURSE DESCRIPTION:

The main objective of this course is to understand the mechanisms used for machining of materials in a non traditional way.

COURSE CONTENT (Syllabus):

UNIT – I

Introduction: Need for non-traditional machining methods-classification of modern machining processes – considerations in process selection, applications.

Ultrasonic machining – Elements of the process, mechanics of material removal, MRR process parameters, economic considerations, applications and limitations.

UNIT – II

Electro – Chemical Machining: Fundamentals of electro chemical machining, electrochemical grinding, electro chemical honing and de-burring process, metal removal rate in ECM, Tool design, Surface finish and accuracy, economic aspects of ECM – Simple problems for estimation of metal removal rate, fundamentals of chemical, machining, advantages and applications.

UNIT - III

Thermal Metal Removal Processes: General principle and applications of Electric Discharge Machining, Electric Discharge Grinding and wire EDM – Power circuits for EDM, Mechanics of metal removal in EDM, Process parameters, selection of tool electrode and dielectric fluids, surface finish and machining accuracy, characteristics of spark eroded surface.

UNIT – VI

Electron Beam Machining, Laser Beam Machining - Basic principle and theory, mechanics of material removal, process parameters, efficiency & accuracy, applications

UNIT-V

Plasma Machining: Application of plasma for machining, metal removal mechanism, process parameters, accuracy and surface finish and other applications of plasma in manufacturing industries.

UNIT – VI

Abrasive jet machining, Water jet machining and abrasive water jet machining: Basic principles, equipments, process variables, mechanics of material removal, MRR, application and limitations. Magnetic abrasive finishing, abrasive flow finishing, Electro stream drilling and shaped tube electrolytic machining.

Text Books:

1. Fundamentals of Machining Processes-Conventional and non – conventional processes/Hassan Abdel –Gawad El-Hafy/CRC Press-2016.

References:

1. Modern Machining Process / Pandey P.C. and Shah H.S./ TMH.

2. New Technology / Bhattacharya A/ the Institution of Engineers, India 1984.

3. Non Traditional Manufacturing Processes / Benedict /

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction: Need for non-traditional machining	
2	2	Methods-classification of modern machining processes	
3	3	Considerations in process selection of non-traditional machining	
4	4	applications of non-traditional machining	
5	5	Ultrasonic machining Introduction	
6	6	Elements of the process of Ultrasonic machining	
7	7	Mechanics of material removal of Ultrasonic machining	
8	8	MRR process parameters of Ultrasonic machining	

9	9	Economic considerations of Ultrasonic machining	
10	10	Applications and limitations of Ultrasonic machining	
11	11	Electro – Chemical Machining Introduction	
12	12	Fundamentals of electro chemical machining	
13	13	Electrochemical grinding	
14	14	Electro chemical honing and de-burring process	
15	15	Metal removal rate in ECM	
16	16	Tool design, Surface finish and accuracy of electro chemical machining	
17	17	economic aspects of electro chemical machining	
18	18	Simple problems for estimation of metal removal rate	
19	19	Fundamentals of chemical machining	
20	20	Advantages and applications of electro chemical machining	
21	21	Thermal Metal Removal Processes Introduction	
22	22	General principle and applications of Electric Discharge Machining	
23	23	Electric Discharge Grinding	
24	24	Wire EDM Introduction	
25	25	Power circuits for EDM	
26	26	Mechanics of metal removal in EDM	
27	27	Process parameters of EDM	
28	28	Selection of tool electrode and dielectric fluids of EDM	
29	29	Surface finish and machining accuracy of EDM	
30	30	Characteristics of spark eroded surface of EDM	
31	31	Electron Beam Machining Introduction	
32	32	Laser Beam Machining Introduction	
33	33	Basic principle and theory of Laser Beam Machining	
34	34	Mechanics of material removal of Laser Beam Machining	
35	35	Process parameters of Laser Beam Machining	
36	36	Efficiency & accuracy of Laser Beam Machining	
37	37	Applications of Laser Beam Machining	
38	38	Plasma Machining Introduction	
39	39	Application of plasma for machining,	

40	40	Metal removal mechanism of Plasma Machining	
41	41	Process parameters of Plasma Machining	
42	42	Accuracy and surface finish of Plasma Machining	
43	43	Other applications of plasma in manufacturing industries.	
44	44	Abrasive jet machining Introduction	
45	45	Basic principles, equipments of Abrasive jet machining	
46	46	Process variables of Abrasive jet machining	
47	47	Mechanics of material removal, MRR of Abrasive jet machining	
48	48	Application and limitations of Abrasive jet machining	
49	49	Water jet machining introduction	
50	50	Basic principles, equipments of Water jet machining	
51	51	Process variables of Water jet machining	
52	52	Mechanics of material removal, MRR of Water jet machining	
53	53	Abrasive water jet machining introduction	
54	54	Basic principles, equipments of abrasive water jet machining	
55	55	Process variables of abrasive water jet machining	
56	56	Mechanics of material removal, MRR of abrasive water jet machining	
57	57	Magnetic abrasive finishing,	
58	58	Abrasive flow finishing,	
59	59	Electro stream drilling	
60	60	Shaped tube electrolytic machining.	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	1	2	-	2	-	1	-	-	-
CO2	3	3	-	1	2	-	-	-	3	-	-	-
CO3	3	-	-	1	2	-	2	-	1	-	-	-
CO4	3	-	-	1	2	-	2	-	2	-	-	-
CO5	3	-	-	1	2	-	2	-	3	-	-	-
CO6	3	-	-	1	2	-	2	-	1	-	-	-
Total	18	3	-	6	12	-	10	-	11	-	-	-

Avg.	3	0.5	-	1	2	-	1.67	-	1.83	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,4,5,7,9	1,2,3
CO-2	1,2,4,5,9	1,2,3
CO-3	1,4,5,7,9	1,2,3
CO-4	1,4,5,7,9	1,2,3
CO-5	1,4,5,7,9	1,2,3
CO-6	1,2,4,5,7,9	1,2,3

AUTOMOBILE ENGINEERING

Name of the Program: Bachelor of Technology	**Academic Year: 2020 - 2021**
Branch: Mechanical Engineering	**Year & Semester: IV-II**
Name of the Course: AUTOMOBILE ENGINEERING	**Regulation: R16**
Course Area/Module: DESIGN,CAD/CAM,DESIGN	**No. of students registered:**
Course Coordinator: Mr.G.JITENDRA **Designation: ASSISTENT PROFESSOR**	**Course Instructors:** **1.** Mr.G.JITENDRA
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Develop understanding of vehicle structure, layout, IC engine components.
2. Understand the different vehicle drives, IC engines and engine lubrication system,turbochargers and transmission system.
3. Understand the construction and working principle of automotive clutches and gear boxes
4. Understand the requirements of axles, final drive, differential, steering and suspension systems
5. Develop knowledge of automotive brakes, wheels and tires, lighting and accessories.
6. Develop harmful IC engine emissions and use viable alternate fuels in engines.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.Identify the vehicle structure, layout, IC engine components.
2. Understand the different vehicle drives, IC engines and engine lubrication system, turbochargers and transmission system.
3. Understand construction and working principle of automotive clutches and gear boxes.

4. Explain the requirements of axles, final drive, differential, steering and suspension systems
5. Understand the automotive brakes, wheels and tires, lighting and accessories.
6.Identify harmful IC engine emissions and use viable alternate fuels in engines.

COURSE DESCRIPTION:

The main objective of this course is to familiarize the automobile components and automobiles used for transportation of human beings and goods for various climatic conditions and road conditions.

COURSE CONTENT (Syllabus):

The course imparts the principles of automobile systems and provides the salient features of safety, emission and service of automobiles.

UNIT – I

INTRODUCTION: Components of four wheeler automobile – chassis and body – power unit – power
transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil
filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft.

UNIT – II

TRANSMISSION SYSTEM: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch,
magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro
mesh gear boxes, epicyclic gear box, over drive torque converter. propeller shaft – Hotch – Kiss drive, Torque
tube drive, universal joint, differential rear axles – types – wheels and tyres.

UNIT – III

STEERING SYSTEM: Steering geometry – camber, castor, king pin rake, combined angle toein, center point
steering. types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears
– types, steering linkages.

UNIT – IV

SUSPENSION SYSTEM: Objects of suspension systems – rigid axle suspension system, torsion bar, shock
absorber, Independent suspension system.

BRAKING SYSTEM: Mechanical brake system, hydraulic brake system, master cylinder, wheel cylinder
tandem master cylinder requirement of brake fluid, pneumatic and vacuum brakes.

ELECTRICAL SYSTEM: Charging circuit, generator, current – voltage regulator – starting system, bendix
drive mechanism solenoid switch, lighting systems, horn, wiper, fuel gauge – oil pressure gauge, engine
temperature indicator etc.

UNIT – V

ENGINE SPECIFICATION AND SAFETY SYSTEMS: Introduction- engine specifications with regard to
power, speed, torque, no. of cylinders and arrangement, lubrication and cooling etc.

Safety: Introduction, safety systems - seat belt, air bags, bumper, anti lock brake system (ABS), wind shield,
suspension sensors, traction control, mirrors, central locking and electric windows, speed control.

UNIT – VI

ENGINE EMISSION CONTROL: Introduction – types of pollutants, mechanism of formation, concentration
measurement, methods of controlling-engine modification, exhaust gas treatment-thermal and catalytic converters-use of alternative fuels for emission control – National and International pollution standards

ENGINE SERVICE: Introduction, service details of engine cylinder head, valves and valve mechanism, pistonconnecting
rod assembly, cylinder block, crank shaft and main bearings, engine reassembly-precautions.

Text Books:

1. Automotive Mechanics – Vol. 1 & Vol. 2 / Kirpal Singh/standard publishers
2. Automobile Engineering / William Crouse/TMH Distributors
3. Automobile Engineering/P.S Gill/S.K. Kataria & Sons/New Delhi.

References:

1. Automotive Engines Theory and Servicing/James D. Halderman and Chase D. Mitchell Jr.,/ Pearson education inc.
2. Automotive Engineering / K Newton, W.Steeds & TK Garrett/SAE
3. Automotive Mechanics : Principles and Practices/ Joseph Heitner/Van Nostrand Reinhold
4. Automobile Engineering / C Srinivasan/McGrawHill

S No	Unit / Topic Covered	NO. OF CLASSES	CUMULATIVE CLASSES
1	Introduction, Components of 4 wheeler automobile	2	2
2	Chassis and body, power transmission	1	3
3	Rear wheel drive ,front wheel drive,4 wheel drive	1	4
4	Types of automobile engines,engine construction	2	6
5	Turbo charging and supercharging,engine lubrication	1	7
6	Splash & pressure lubrication system,oil filters,oil pumps	1	8
7	Crankcase ventilation, engine service	1	9
8	Reboring,decorbonisation	1	10
9	Nitriding of crank shaft	1	11
10	Class test on Unit 1	1	12
11	Clutches ,principle,types	1	13
12	Cone clutch,single plate clutch,multiple clutch	2	15
13	Magnetic and centrifugal clutch,fluid flywheel	1	16
14	Gear boxes,types,sliding mesh,construct mesh	1	17
15	Synchromesh gear boxes,epicyclic gear box	1	18
16	Over drive torque converter,propeller shaft-hotch-kiss drive	1	19
17	Torque tube drive,universal joint	1	20
18	Differential rear axles ,types,wheels & tyres	1	21
19	Class test on Unit 2	1	22
20	Steering geometry,camber,easter	1	23
21	King pin rake,combined angle toe in	1	24
22	Centre point steering	1	25

23	Types of steering mechanism	1	26
24	Ackerman steering mechanism	1	27
25	Davis steering mechanism	1	28
26	Steering gears,types	2	30
27	Steering linkages	1	31
28	Class test on Unit 3	1	32
29	Objectives of suspension system	1	33
30	Rigid axle suspension system	1	34
31	Torsion bar, shock absorber	1	35
32	Independent suspension system	1	36
33	Mechanical brake system, Hydraulic brake system,master cylinder	1	37
34	Wheel cylinder, tandem master cylinder, Requirement of brake fluid	1	38
35	Pneumatic and vacuum brakes	1	39
	ELECTRICAL SYSTEM		
36	Charging circuit ,generator, Current voltage regulator	1	40
37	Starting system, Bendix drive mechanism,solenoid switch	1	41
38	Lighting system, Horn ,wiper,fuel gauge	1	42
39	Oil pressure gauge, Engine temperature indicator	1	43
40	Class test on Unit 4	1	44
41	Introduction,engine specification with regard to power	1	45
42	Speed,torque,no. of cylinders & arrangement	1	46
43	Lubrication,cooling	1	47
44	Safety systems,seat belt, air bags	1	48
45	Bumper, anti lock brake system(abs)	1	49
46	Wind shield,suspension sensors,traction control	1	50
47	Mirrors,central locking & electrical windows	1	51
48	Speed control	1	52
49	Class test on Unit 5	1	53
50	Introduction,types of pollutants	1	54
51	Mechanism of formation	1	55
52	Concentration measurement	1	56
53	Methods of controlling	1	57
54	Engine modification, exhaust gas treatment, Thermaltreatment	1	58
55	Catalytic convertors	1	59
56	Use of alternate fuels for emission	1	60
57	National and international pollution standards	1	61

58	Service details of engine cylinder head	1	62
59	Valve and valve mechanism	1	63
60	Piston-connecting rod assembly, Cylinder block	1	64
61	Crankshaft & main bearings, Engine assembly,precautions	1	65
62	Class test on Unit 6	1	66

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	-	-	-	-	1	-	-	2
CO2	3	2	3	1	-	-	2	-	-	-	-	1
CO3	3	2	3	1	-	-	-	-	-	-	-	1
CO4	3	2	3	1	-	-	-	-	1	-	-	1
CO5	3	2	1	1	-	-	1	-	1	-	-	2
CO6	3	3	2	2	2	1	1	-	-	-	-	3
Total	18	13	15	7	2	1	4	1	3	-	-	10
Avg.	3	2.16	2.6	1.16	0.33	0.16	0.66	0.16	0.5	-	-	1.66

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,2,3,4,9,12	1,2
CO-2	1,2,3,4,7,12	1,2
CO-3	1,2,3,4,12	1,2
CO-4	1,2,3,4,9,12	1,2
CO-5	1,2,3,4,7,9,12	1,3
CO-6	1,2,3,4,5,6,7,12	1,3

NON DESTRUCTIVE EVALUATION

Name of the Program: Bachelor of Technology	**Academic Year:** 2020 - 2021
Branch: Mechanical Engineering	**Year & Semester:** IV Year & II Semester
Name of the Course: Non-destructive Evaluation	**Regulation:** R-16
Course Area/Module: Manufacturing	**No. of students registered:**
Course Coordinator: Mr.CH.KARTHIK SAI **Designation:** Assistant Professor	**Course Instructor:** Mr. CH.KARTHIK SAI
No. of Lecture Hours per week:05	**No. of Tutorial Hours per week:** 00
Credits:03	

COURSE OBJECTIVES:

At the end or the course, the students will

1.	Understand the concepts of NDE techniques using radiography, ultrasonic's, liquid penetrates, magnetic patches and Eddy currents.
2.	Learn the basic principles of these methods and will be able to select a testing process.
3.	Understand the advantages and disadvantages of these techniques

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COURSE OUTCOMES:

At the end of the course the student will be able to

1.	Understand and explain the concepts, techniques and methods of nondestructive test Radiography.
2.	Learn and describe the principle, applications, advantages and limitations of Ultrasonic test.
3.	Understand and interpret the principle, procedure, applications, advantages and limitations of Liquid penetration test.
4.	Understand and infer the principle, procedure, applications, advantages and limitations of Magnetic particle test.
5.	Understand and describe the principle, applications, advantages and limitations of Eddy current test.
6.	Apply methods knowledge of non destructive testing to evaluate products of railways, automobiles, aircrafts, chemical industries etc.

COURSE DESCRIPTION:

The main objective of the course is to expose the students to nondestructive evaluation methods used in industries. Principles of various testing methods like LPT, Ultrasonic testing, radiography, Magnetic particle test, eddy current test are elaborately discussed. Student learns to apply various methods of nondestructive testing to evaluate products of railways, automobiles, aircrafts, chemical industries etc.

COURSE CONTENT (Syllabus):

UNIT – I:

Introduction to non-destructive testing: Radiographic test, Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques, Safety Aspects of Industrial Radiography.

UNIT – II:

Ultrasonics test:Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect, Ultrasonic Transducers and their Characteristics, Ultrasonic Equipment and Variables Affecting Ultrasonic Test, Ultrasonic Testing, Interpretations and Guidelines for Acceptance, Rejection – Effectiveness and Limitations of Ultrasonic Testing.

UNIT – III:

Liquid Penetrant Test:Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing

UNIT – IV:
Magnetic Particle Test:Magnetic Materials, Magnetization of Materials ,Demagnetization of Materials,Principle of Magnetic Particle Test, Magnetic Particle Test Equipment, Magnetic Particle Test Procedure, Standardization and Calibration, Interpretation and Evaluation, Effective Applications and Limitations of the Magnetic Particle Test.

UNIT – V:

Eddy Current Test:Principle of Eddy Current, Eddy Current Test System, Applications of Eddy Current Testing Effectiveness of Eddy Current Testing.

UNIT – VI:

Industrial Applications of NDE:Span of NDE Activities Railways, Nuclear, Non-nuclear and Chemical Industries, Aircraft and Aerospace Industries, Automotive Industries, Offshore Gas and Petroleum Projects, Coal Mining Industry, NDE of pressure vessels, castings, welded constructions.

REFERENCES

Text Books:

1. Non-destructive test and evaluation of Materials, J Prasad, GCK Nair, TMH Publishers.
2. Ultrasonic testing by Krautkramer and Krautkramer.
3. Non-destructive testing, Warress, JMc Gonmade.

References:

1. Ultrasonic inspection training for NDT: E. A. Gingel, Prometheus Press.
2. ASTM Standards, Vol 3.01, Metals and alloys.
3. Non-destructive, Hand Book – R. Hamchand.

f Lectures	Cumulative No. of Lectures	TOPIC	Remarks
2	2	**UNIT I** - Introduction to non-destructive testing	--
3	5	Radiographic test, Sources of X and Gamma Rays and their interaction with Matter	--
3	8	Radiographic equipment	--
2	10	Radiographic Techniques	--
2	12	Safety Aspects of Industrial Radiography	--
2	14	**UNIT II** - Introduction Ultrasonic test	--
2	16	Principle of Wave Propagation, Reflection, Refraction, Diffraction	--
2	18	Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect	--
2	20	Ultrasonic Transducers and their Characteristics	--
2	22	Ultrasonic Equipment and Variables Affecting Ultrasonic Test	--
2	24	Ultrasonic Testing, Interpretations and Guidelines for Acceptance, Rejection	--
2	26	Effectiveness and Limitations of Ultrasonic Testing	--
1	27	**UNIT III** - Liquid Penetrant Test	--
2	29	Basic Concepts, Liquid Penetrant System	--
2	31	Test Procedure	--
1	32	Effectiveness Liquid Penetrant Testing	--
1	33	Limitations of Liquid Penetrant Testing	--
2	35	**UNIT IV** - Magnetic Materials, Magnetization of Materials	--
2	37	Demagnetization of Materials,	--
2	39	Principle of Magnetic Particle Test	--
2	41	Magnetic Particle Test Equipment	--
2	43	Magnetic Particle Test Procedure	--
2	45	Standardization and Calibration, Interpretation and Evaluation	--
2	47	Effective Applications and Limitations of the Magnetic Particle Test.	--
2	49	**UNIT V** - Principle of Eddy Current,	--
2	51	Eddy Current Test System	--
2	53	Applications of Eddy Current Testing	--
1	54	Effectiveness of Eddy Current Testing	--
2	56	**UNT VI** - Span of NDE Activities Railways	--
2	58	Nuclear, Non-nuclear and Chemical Industries	--
2	60	Aircraft and Aerospace Industries, Automotive Industries	--
2	62	Automotive Industries, Offshore Gas and Petroleum Projects	--
2	64	Coal Mining Industry, NDE of pressure vessels	--

1	65	castings, welded constructions	--

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	-	-	-	-	-	-	-	-	1
CO2	1	1	1	-	-	-	-	-	-	-	-	1
CO3	1	1	1	-	-	-	-	-	-	-	-	1
CO4	1	1	1	-	-	-	-	-	-	-	-	1
CO5	1	1	1	-	-	-	-	-	-	-	-	1
CO6	1	3	3	-	-	-	-	-	-	-	-	1
Total	6	8	6	-	-	-	-	-	-	-	-	6
Avg.	1	1.33	1	-	-	-	-	-	-	-	-	1

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	PO1, PO2, PO3, PO12	PSO 1, PSO 3
CO-2	PO1, PO2, PO3, PO12	PSO 1, PSO 3
CO-3	PO1, PO2, PO3, PO12	PSO 1, PSO 3
CO-4	PO1, PO2, PO3, PO12	PSO 1, PSO 3
CO-5	PO1, PO2, PO3, PO12	PSO 1, PSO 3
CO-6	PO1, PO2, PO3, PO12	PSO 1, PSO 3

Year: III

HEAT TRANSFER

Name of the Program: B.Tech	**Academic Year: 2020-21**
Branch: Mechanical Engineering	**Year & Semester: III&II**
Name of the Course: Heat Transfer	**Regulation: NRIA 18**
Course Area/Module: Thermal Engineering	**No. of students registered:**
Course Coordinator: Mr.G.Gopichandu Babu **Designation: Assistant Professor**	**Course Instructor:** **Mr.G.Gopichandu Babu**
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week: 0**
Credits: 3	

COURSE OBJECTIVES:

To enable students understand different mechanisms of Heat Transfer
To impart knowledge of different types of Fins
To impart knowledge of Dimensional analysis
To enable students understand external flows and internal flows
To impart knowledge of Boiling and Condensation
To enable students apply the concepts of Radiation

COURSE OUTCOMES:

At the end of the course, the students will be able to:

Apply the modes of heat transfer
Analyze the significance of Biot and Fourier numbers.
Understand the significance of non dimensional numbers
Evaluate the empirical correlations for convective heat transfer for various cross sections
Develop Heat Exchangers and understand concept of boiling and condensation
Apply the laws of radiation heat transfer

COURSE DESCRIPTION:

This course is intended to impart knowledge of Laws of Heat Transfer, Biot and Fourier Number, Boiling and Condensation and Radiation.

COURSE CONTENT (Syllabus):

UNIT – I

INTRODUCTION: Modes and mechanisms of heat transfer – basic laws of heat transfer –General discussion about applications of heat transfer.

CONDUCTION HEAT TRANSFER: Fourier rate equation – general heat conduction equation in cartesian, cylindrical and Spherical coordinates. Steady, unsteady and periodic heat transfer – initial and boundary conditions.

ONE DIMENSIONAL STEADY STATE CONDUCTION HEAT TRANSFER: Homogeneous slabs, hollow cylinders and spheres – overall heat transfer coefficient – electrical analogy – critical radius of insulation- Variable thermal conductivity – systems with heat sources or heat generation,

UNIT – II

Extended surface (fins) heat Transfer – long fin, fin with insulated tip and short fin, application to error measurement of temperature.

ONE DIMENSIONAL TRANSIENT CONDUCTION HEAT TRANSFER: Systems with negligible internal resistance – significance of biot and fourier numbers - chart solutions of transient conduction systems

UNIT – III

CONVECTIVE HEAT TRANSFER: Classification of convective heat transfer – dimensional analysis as a tool for experimental investigation – Buckingham Pi Theorem for forced and free convection, application for developing semi – empirical non- dimensional correlation for convective heat transfer – Significance of non-dimensional numbers – concepts of continuity, momentum and Energy Equations.

UNIT –IV

FORCED CONVECTION

EXTERNAL FLOWS: Concepts about hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer -flat plates and cylinders.

INTERNAL FLOWS: Concepts about hydrodynamic and thermal entry lengths – division of internal flow based on this –use of empirical relations for horizontal pipe flow and annulus flow.

FREE CONVECTION: Development of hydrodynamic and thermal boundary layer along a vertical plate – use of empirical relations for vertical plates and pipes.

UNIT V

HEAT TRANSFER WITH PHASE CHANGE

BOILING: Pool boiling – regimes- calculations on nucleate boiling, critical heat flux and film boiling.

CONDENSATION: Film wise and drop wise condensation –Nusselt's theory of condensation on a vertical plate - film condensation on vertical and horizontal cylinders using empirical correlations.

HEAT EXCHANGERS:

Classification of heat exchangers – overall heat transfer coefficient and fouling factor – concepts of LMTD and NTU methods – Problems

UNIT VI

RADIATION HEAT TRANSFER:

Emission characteristics and laws of black-body radiation – Irradiation – total and monochromatic quantities –

laws of Planck, Wien, Kirchoff, Lambert, Stefan and Boltzmann– heat exchange between two black bodies – concepts of shape factor – Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiation networks.

Text Books:

1. Heat Transfer /JP HOLMAN/TMH
2. Heat Transfer /P.K.Nag/ TMH
3. Principles of Heat Transfer /Frank Kreith, RM Manglik & MS Bohn/Cengage learning publishers

References:

1. Heat and Mass Transfer /Arora and Domkundwar/Dhanpatrai & sons
2. Fundamentals of Engg. Heat and Mass Transfer / R.C.Sachdeva / New Age International
3. Heat and Mass Transfer /Cengel/McGraw Hill.
4. Heat and Mass Transfer /D.S.Kumar / S.K.Kataria & Sons
5. A Text book on Heat Transfer-4th Edition/ S.P Sukhatme/Universities Press

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Modes and mechanisms of heat transfer	
1	2	Basic laws of heat transfer	
1	3	General discussion about applications of heat transfer.	
2	5	**CONDUCTION HEAT TRANSFER:** Fourier rate equation	
1	6	General heat conduction equation in cartesian, cylindrical and Spherical coordinates	
1	7	Steady, unsteady and periodic heat transfer – initial and boundary conditions.	
1	8	**ONE DIMENSIONAL STEADY STATE CONDUCTION HEAT TRANSFER**	
2	10	Homogeneous slabs, hollow cylinders and spheres	
1	11	Overall heat transfer coefficient – electrical analogy, critical radius of insulation	
1	12	Variable thermal conductivity and systems with heat sources or heat generation	
1	13	Extended surface (fins) heat Transfer – long fin	
1	14	Fin with insulated tip and short fin	
1	15	Application to error measurement of temperature	
1	16	**ONE DIMENSIONAL TRANSIENT CONDUCTION HEAT TRANSFER-Introduction**	
1	17	Systems with negligible internal resistance	
1	18	Significance of biot and fourier numbers	
2	20	Chart solutions of transient conduction systems	
1	21	**CONVECTIVE HEAT TRANSFER:** Classification of convective heat transfer	
2	23	dimensional analysis as a tool for experimental investigation	
2	25	Buckingham Pi Theorem for forced and free convection	
1	26	Application for developing semi – empirical non- dimensional correlation for convective heat transfer	
2	28	Significance of non- dimensional numbers	
2	30	concepts of continuity, momentum and Energy Equations	
2	32	**FORCED CONVECTION EXTERNAL FLOWS:** Concepts about hydrodynamic and thermal boundary layer	

2	34	use of empirical correlations for convective heat transfer -flat plates and cylinders	
1	35	**INTERNAL FLOWS:** Concepts about hydrodynamic and thermal entry lengths	
1	36	Division of internal flow –use of empirical relations for horizontal pipe flow and annulus flow.	
2	38	**FREE CONVECTION:** Development of hydrodynamic and thermal boundary layer along a vertical plate	
2	40	Use of empirical relations for vertical plates and pipes	
2	42	**HEAT TRANSFER WITH PHASE CHANGE BOILING:** Pool boiling – regimes	
2	44	Calculations on nucleate boiling, critical heat flux and film boiling	
1	45	CONDENSATION: Film wise and drop wise condensation	
1	46	Nusselt's theory of condensation on a vertical plate	
2	48	Film condensation on vertical and horizontal cylinders using empirical correlations	
2	50	**HEAT EXCHANGERS:** Classification of heat exchangers	
2	52	Overall heat transfer coefficient and fouling factor	
1	53	Concepts of LMTD and NTU methods – Problems.	
1	54	**RADIATION HEAT TRANSFER:** Emission characteristics and laws of black-body radiation	
2	56	Irradiation – total and monochromatic quantities –	
2	58	Laws of Planck, Wien, Kirchoff, Lambert, Stefan and Boltzmann	
1	59	Heat exchange between two black bodies	
1	60	Concepts of shape factor	
2	62	Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiation networks.	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS O 2	PSO 3
CO1	3	2	2	2		2		2				1	1	2	1
CO2	3	3	3	2									2	1	1
CO3	3	2	2	2		1							2	1	1
CO4	3	3	3	2	2								1	2	1
CO5	3	2	2	2	3								1	2	1
CO6	3	2	2	2			3	3				1	1	2	1
Total	18	14	14	12	5	3	3	5		2		2	8	10	6
Avg.	3	2.3	2.3	2.0	2.5	1.5	3.0	2.5		2		1	1.3	3.3	1

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,2,3,4,6,8,12	1,2,3
CO-2	1,2,3,4	1,2,3
CO-3	1,2,3,4,6	1,2,3
CO-4	1,2,3,4,5	1,2,3
CO-5	1,2,3,4,5	1,2,3

CO-6	1,2,3,4,7,8	1,2,3

OPERATIONS RESEARCH

Name of the Program: B.TECH	**Academic Year: 2020-21**
Branch: MECHANICAL	**Year & Semester: III-II**
Name of the Course: OPERTIONS RESEARCH	**Regulation: NRIA 18**
Course Area/Module:	**No. of students registered:**
Course Coordinator: Mr.CH.SIVA SUBRAHMANYAM **Designation: ASSOCIATE PROFESSOR**	**Course Instructors:** **1. Mr.CH.SIVA SUBRAHMANYAM**
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

7. Student will be able to formulate the linear programming problems and find the ways to solve the problem like Big-M-Method, two phase method etc.
8. Able to formulate the transportation problem and find the different was to solve the problem and learn the process of sequencing of the jobs.
9. Able to learn the concepts of deterioration and the time to replace the items at a given time.
10. Able to formulate the strategy matrices and different ways to solve the games using algebraic and graphical methods, and learns how to deal with different types of queues.
11. Able to learn about the different types of inventories and ways to solve the inventory problems in different situations.
12. Able to learn the process of simulation and applications, advantages and solving the problems using dynamic programming for optimality of the solutions.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

7. Form linear programming problem for the data given and solving using appropriate method.
8. Solving the transportation problem,optimizing it ,assignment of jobs to different persons and finding the sequence of completion of all the jobs and idle time of machines.
9. When to replace of an item by group replacement or individual replacement.
10. Solving the game by dominance property, graphical methods with and without saddle point.
11. Maintaining different type of inventories and interval of placing the orders by minimizing the total cost
12. Solving the problems using dynamics programming and simulation methods

COURSE DESCRIPTION:

Operations research analysts use advanced mathematical and analytical methods to help organizations investigate complex issues, identify and solve problems, and make better decisions. **Operations research** analysts spend most of their time in offices, although some conduct site inspections before doing their analysis.

COURSE CONTENT (Syllabus):

UNIT – I

Development – definition– characteristics and phases – types of operation research models – applications.

ALLOCATION: Linear programming problem formulation – graphical solution – simplex method – artificial variables techniques -two–phase method, big-M method – duality principle.

UNIT – II

TRANSPORTATION PROBLEM: Formulation – optimal solution, unbalanced transportation problem –

degeneracy, assignment problem – formulation – optimal solution - variants of assignment problem- traveling salesman problem.

SEQUENCING – Introduction – flow –shop sequencing – *n* jobs through two machines – *n* jobs through three machines – job shop sequencing – two jobs through 'm' machines.

UNIT – III

REPLACEMENT: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement.

UNIT – IV

THEORY OF GAMES: Introduction – mini. max (max. mini) – criterion and optimal strategy – solution of

games with saddle points – rectangular games without saddle points – 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

WAITING LINES: Introduction – single channel – poison arrivals – exponential service times – with infinite population and finite population models– multichannel – poison arrivals – exponential service times with infinite population single channel poison arrivals.

UNIT – V

INVENTORY : Introduction – single item – deterministic models – purchase inventory models with one price break and multiple price breaks – shortages are not allowed – stochastic models – demand may be discrete variable or continuous variable – instantaneous production. Instantaneous demand and continuous demand and no set up cost. ABC & VED Analysis.

UNIT – VI

DYNAMIC PROGRAMMING: Introduction – Bellman's principle of optimality – applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

SIMULATION: Definition – types of simulation models – phases of simulation– applications of simulation –inventory and queuing problems – advantages and disadvantages – simulation languages.

Text Books:

1. "OPERATIONS RESEARCH" by S.D. SHARMA / Kedarnath Publishers
2. "OPERATIONS RESEARCH" by TAHA / Pearson pubishers

References:

1. Introduction to O.R/Hiller & Libermann/TMH
2. Operations Research / A.M. Natarajan, P. Balasubramani, A. Tamilarasi/Pearson Education
3. Operations Research / R. Pannerselvam/ PHI Publications
4. Operations Research / Wagner/ PHI Publications
5. Operations Research / J.K.Sharma / Mac Milan Publications
6. Operations Research / Pai / Oxford Publications

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	INTRODUCTION TO OR,DEVELOPMENT AND DEFINITION	
1	2	CHARACTERISTICS AND PHASES IN OR,TYPES OF OR MODELS,APPLICATIONS OF OR	
2	4	LPP FORMULTAION	
2	6	GRAPHICAL METHOD TO SOLVE LPP	
2	8	PROBLEMS ON SIMPLEX METHOD	
2	10	TWO PHASE METHOD	
2	12	BIG-M METHOD	
2	14	DUALITY METHOD	
1	15	INTRODUCTION TO TRANSPORTATION PROBLEM	
1	16	OPTIMAL SOLUTION OF TRANSPORTATION PROBLEMS-NORTH-WEST CORNER RULE	
1	17	LEAST COST METHOD ,VOGELS APPROXIMATION PROBLEMS	
2	19	U-V METHOD OF OPTIMIZATION	
1	20	UNBALANCED TRANSPORTATION	
1	21	PROBLEM OF DEGENERACY	
2	23	ASSIGNMENT PROBLEM-OPTIMUM SOLUTION	
1	24	VARIANTS OF ASSIGNMENT PROBLEM	
1	25	TRAVELLING SALESMEN PROBLEM	
1	26	n-JOBS THROUGH TWO MACHINES	
1	27	n-JOBS THROUGH THREE MACHINES	
1	28	JOB SHOP SEQUENCING	
2	30	2 JOBS THROUGH m-MACHINES	
1	31	REPLACEMENT OF ITEMS THAT DETERIRATE WITH TIME	
1	32	WHEN MONEY VALUE IS COUNTED	
1	33	WHEN MONEY VALUE IS NOT COUNTED	
1	34	REPLACEMENT OF ITEMS THAT FAIL COMPLETELY	
2	36	GROUP REPLACEMENT	
1	37	INTRODUCTION TO THE MINIMAX & MAXMIN RULES,PROBLEMS	
1	38	SOLUTION OF GAMES WITH SADDLE POINTS	
1	39	RECTANGULAR GAMES WITHOUT SADDLE POINTS	
2	41	PROBLEMS ON DOMINANCE PROPERTY	
2	43	PROBLEMS ON m*2,2*m GAMES	
2	45	INTRODUCTION TO WAITING LINES, SINGLE CHANNEL, POISSON ARRIVALS	
2	47	PROBLEMS ON M/M/1 :FIFO, INFINITE ARRIVALS	

1	48	PROBLEMS ON M/M/1 :FIFO, FINITE ARRIVALS	
1	49	INTRODUCTION TO INVENTORY, SINGLE ITEM,DETERMINISTIC MODELS	
1	50	INVENTORY MODELS WITH SHORTAGES ARE NOT ALLOWED	
1	51	INVENTORY MODELS WITH SHORTAGES ARE ALLOWED	
2	53	INVENTORY MODELS WITH ONE PRICE BREAK	
1	54	INVENTORY MODELS WITH MULTIPLE PRICE BREAK	
1	55	STOCHASTIC MODELS, DEMAND MAY BE DISCRETE VARIABLE OR CONTINUOUS MODEL	
1	56	INSTANTANEOUS DEMAND AND CONTINUOUS DEMAND AND NO SETUP COST	
1	57	ABC&VED ANALYSIS	
1	58	INTRODUCTION TO DYNAMIC PROGRAMMING AND BELLMEN PRINCIPLE O OPTIMALITY	
2	60	PROBLEMS USING DYNAMIC PROGRAMMING	
2	62	CAPITAL BUDGETING PROBLEMS	
2	64	SHORTEST PATH PROBLEMS	
2	66	LINEAR PROGRAMMING PROBLEMS	
2	68	TYPES OF SIMULATION MODELS,PHASES OF SIMULATION MODELS	
1	69	INVENTORY AND QUEUING PROBLEMS	
1	70	ADVANTAGES AND DISADVANTAGES, SIMULATION LANGUAGES	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3								
CO2	3	3	3	3								
CO3	3	3	3	3								
CO4	3	3	3	3								
CO5	3	3	3	3								
CO6	3	3	3	3								
Total	18	18	18	18								
Avg.	3	3	3	3								

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	PO-1,PO-2,PO-3,PO-4	PSO1,PSO2
CO-2	PO-1,PO-2,PO-3,PO-4	PSO1,PSO2
CO-3	PO-1,PO-2,PO-3,PO-4	PSO1,PSO2
CO-4	PO-1,PO-2,PO-3,PO-4	PSO1,PSO2

CO-5	PO-1,PO-2,PO-3,PO-4	PSO1,PSO2
CO-6	PO-1,PO-2,PO-3,PO-4	PSO1,PSO2

FINITE ELEMENT METHODS

Name of the Program: B. Tech.	**Academic Year: 2020-21**
Branch: Mechanical	**Year & Semester: III-II**
Name of the Course: Finite Element Methods	**Regulation: NRIA 18**
Course Area/Module: Design / Mechanical	**No. of students registered:**
Course Coordinator: Mr.M.SYAM KUMAR **Designation: Assistant Professor**	**Course Instructors:** **Mr.M.SYAM KUMAR**
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1.	To learn basic principles of finite element analysis procedure
2.	To learn the theory and characteristics of finite elements that represent engineering structures
3.	To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses performed by others
4.	Learn to model complex geometry problems and solution techniques.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.	Understand the concepts behind variational methods and weighted residual methods in FEM
2.	Identify the application and characteristics of FEA elements such as bars, applications to structural and heat transfer problems.
3.	Formulate finite element modeling of truss and frame elements along with the concepts of transformation from local to global matrices
4.	Develop stiffness matrix for a plane stress & plane strain conditions on a CST, Axisymmetric elements by interpolating shape functions in natural coordinate system

5. Interpolate the shape functions of Isoperimetric elements and use numerical integration to evaluate the element matrices in typical 2D problems. Formulate finite element model to steady state heat transfer analysis using one & two dimensional elements.
6. Formulate mass and stiffness matrices of 1D & beam elements to establish Eigen values &Eigen vectors using Lagrangian and Hamilton principles.

COURSE DESCRIPTION:

Finite Element Method (FEM) is a numerical technique for solving differential equations that describe many engineering problems. Main reason for its popularity is that the method results in computer codes which are versatile in nature that can solve many practical problems with minimum training.

COURSE CONTENT (Syllabus):

UNIT-I

Introduction to finite element method, stress and equilibrium, strain – displacement relations, stress – strain relations, plane stress and plane strain conditions, variational and weighted residual methods, concept of potential energy, one dimensional problems.

UNIT – II

Discretization of domain, element shapes, discretization procedures, assembly of stiffness matrix, band width, node numbering, mesh generation, interpolation functions, local and global coordinates, convergence requirements, treatment of boundary conditions.

UNIT – III

Analysis of Trusses: Finite element modelling, coordinates and shape functions, assembly of global stiffness matrix and load vector, finite element equations, treatment of boundary conditions, stress, strain and support reaction calculations. Analysis of Beams: Element stiffness matrix for Hermite beam element, derivation of load vector for concentrated and UDL, simple problems on beams.

UNIT – IV

Finite element modelling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions, formulation of axisymmetric problems.

UNIT-V

Higher order and isoparametric elements: One dimensional quadratic and cubic elements in natural coordinates, two dimensional four noded isoparametric elements and numerical integration.

UNIT – VI

Steady state heat transfer analysis : one dimensional analysis of a fin and two dimensional analysis of thin plate, analysis of a uniform shaft subjected to torsion. Dynamic Analysis: Formulation of finite element model, element consistent and lumped mass matrices, evaluation of eigen values and eigen vectors, free vibration analysis.

Text Books:

1.The Finite Element Methods in Engineering / SS Rao / Pergamon.
2. An introduction to Finite Element Method / JN Reddy / McGraw Hill

References:

1. Finite Element Method with applications in Engineering / YM Desai, Eldho & Shah /Pearson publishers
2. The Finite Element Method for Engineers – Kenneth H. Huebner, Donald L. Dewhirst, Douglas E. Smith and Ted G. Byrom / John Wiley & sons (ASIA) Pte Ltd.
3. Finite Element Analysis: Theory and Application with Ansys, Saeed Moaveniu, Pearson Education
4. Finite Element Methods / Chen
5. Finite Element Analysis: for students & Practicing Engineers / G.Lakshmi Narasaiah / BSP Books Pvt.Ltd.

No. of Lectures	**Cumulative No. of Lectures**	**TOPIC**	**Remarks**
		UNIT-1	
2	**2**	INTRODUCTION TO FEM	
3	**4**	STRESS- STRAIN, STRAIN- DISPLACEMENT, EQUILIBRIUM AND COMPATIBILITY EQUATIONS	
2	**6**	PLANE STRESS & PLANE STRAIN CONCEPTS	
2	**8**	FUNCTIONAL APPROXIMATION METHODS [PROBLEMS]	
1	**9**	PRINCIPLE OF MINIMUM POTENTIAL ENERGY CONCEPTS	
1	**10**	INTRODUCTION TO 1-D FINITE ELEMENTS	
		UNIT-2	
1	**11**	CONCEPTS OF DICRETIZATION & PROCEDURES	
2	**13**	LOAD,STRESS,STRAIN,DISPLACEMENT & THEIR RELATIONS	
1	**14**	FORMATION OF STIFFNESS MATRIX	
3	**17**	FORMULATION OF FINITE ELEMENT EQUATIONS [PROBLEMS]	
1	**18**	BAND WIDTH, NODE NUMBERING, MESH GENERATION	
1	**19**	INTERPOLATION FUNCTIONS [PASCALS TRIANGLE]	
		UNIT-3	
2	**21**	ANALYSIS OF TRUSSES	

1	**22**	FORMATION OF STIFFNESS MATRIX & LOAD VECTOR	
1	**23**	ANALYSING PROCEDURE FOR TRUSS ELEMENTS [K][Q]=[F]	
2	**25**	CALUCULATION OF STRESS,STRAIN & SUPPORT REACTIONS [PROBLEMS]	
2	**27**	ANALYSIS OF BEAMS	
2	**29**	FORMATION OF HERMITE SHAPE FUNCTION & STIFFNESS MATRIX	
3	**32**	DERIVATION OF LOAD VECTOR FOR UDL & PROBLEMS	
2	**34**	NUMERICAL PROBLEMS	
2	**36**	NUMERICAL PROBLEMS	
		UNIT-4	
1	**37**	INTRODUCTION TO 2-D FINITE ELEMENTS [CST]	
1	**38**	DERIVATION OF SHAPE FUNCTION	
1	**39**	STRESS- STRAIN, STRAIN- DISPLACEMENT RELATIONS	
1	**40**	STIFFNESS MATRIX DERIVATION [CST]	
2	**42**	PROBLEMS ON CST ELEMENT	
1	**43**	INTRODUCTION TO AXI-SYMMETRIC PROBLEMS	
1	**44**	DERIVATION OF SHAPE FUNCTION & STIFFNESS MATRIX	
1	**45**	ELASTICITY RELATIONS FOR AXI-SYMMETRIC ELEMENTS	
2	**47**	PROBLEMS ON AXI-SYMMETRIC ELEMENTS	
		UNIT – 5	
1	**48**	INTRODUCTION TO ISOPARAMETRIC ELEMENTS	
1	**49**	FORMATION OF SHAPE FUNCTION, STIFFENESS MATRIX FOR 1-D QUADRATIC & CUBIC ELEMENTS USING NATURAL CO-ORDINATE SYSTEM	
1	**50**	DERIVATION OF SHAPE FUNCTION FOR 4-NODED QUADRILATERAL ELEMENT USING NATURAL CO-ORDINATE SYSTEM	
1	**51**	INTRODUCTION TO NUMERICAL INTEGRATION [GAUSS QUADRATURE METHOD]	
2	**53**	GAUSS METHOD OF INTEGRATION FOR 1-D PROBLEMS	
2	**55**	TWO DIMENSIONAL INTEGRALS & STRESS CALCULATIONS	
		UNIT - 6	

1	**56**	INTRODUCTION TO STEADY STATE THERMAL ANALYSIS	
2	**58**	1-D ANALYSIS OF A FIN	
2	**60**	2-D ANALYSIS OF A THIN PLATE	
2	**62**	PROBLEMS ON FIN	
2	**64**	PROBLEMS ON THIN PLATE	
1	**65**	ANALYSIS OF A UNIFORM SHAFT SUBJECTED TO TORSION.	
1	**66**	PROBLEMS ON TORSION	
1	**67**	DYNAMIC ANALYSIS FOR STRUCTURAL PROBLEMS	
2	**69**	FORMULATION OF ELEMENT CONSISTENT AND LUMPED MASS MATRICES	
1	**70**	EVALUATION OF EIGEN VALUES & EIGEN VECTORS	
3	**73**	PROBLEMS ON NATURAL FRQUENCIES & MODES	
1	**74**	REVISION	
1	**75**	REVISION	
1	**76**	REVISION	

<u>COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:</u>

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3										
CO2	3	3	2	2								
CO3	3	3										3
CO4	2	2	2	1								
CO5	3	3	3	2								
CO6	3	3	3	2	3							3
Total	17	17	10	7	3							6
Avg.	3	3	2.5	1.6	3							3

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2	1,2
CO2	1,2,3,4	1,2
CO3	1,2,12	1,2
CO4	1,2,3,4	1,2
CO5	1,2,3,4	1,2
CO6	1,2,3,4,12	1,2

INSTRUMENTATION & CONTROL SYSTEMS

Name of the Program: Bachelor of Technology	**Academic Year: 2020 - 2021**
Branch: Mechanical Engineering	**Year & Semester: III-II**
Name of the Course: INSTRUMENTATION AND CONTROL SYSTEMS	**Regulation: NRIA 18**
Course Area/Module: Manufacturing	**No. of students registered:**
Course Coordinator: Ms.K.BHARGAVI **Designation: ASSISTAT PROFESSOR**	**Course Instructors:** **1.** Ms.K.BHARGAVI
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

7. Develop understanding of various measuring devices, measuring instrumental errors, measuring displacement devices.
8. Develop understanding of various temperature and pressure measuring devices.
9. Develop understanding of various level, flow and speed measuring devices.
10. Develop understanding of various stress strain measuring devices.
11. Develop understanding of various humidity, force, torque and power measuring devices.
12. Develop understanding of various elements of control systems.

COURSE OUTCOMES:

At the end of the course, the students will able to:

7. Select appropriate devices for measuring devices of deferent physical parameters.
8. Understanding of various temperature and pressure measuring devices.
9. Analyze and measuring the level and speed parameters.
10. Compare of various stress strain measuring devices.
11. Analyze humidity, force, torque and power measuring devices.
12. Develop various elements of control systems.

COURSE DESCRIPTION:

The main objective of this course is to familiarize the standard of deferent types of measuring devices and elements in control systems.

COURSE CONTENT (Syllabus):

UNIT – I

Definition – Basic principles of measurement – measurement systems, generalized configuration and functional descriptions of measuring instruments –examples.dynamic performance characteristics – sources of error, classification and elimination of error.

Measurement of Displacement: Theory and construction of various transducers to measure displacement – piezo electric, inductive, capacitance, resistance, ionization and photo electric transducers, calibration procedures.

UNIT – II

MEASUREMENT OF TEMPERATURE: Classification – ranges – various principles of measurement –expansion, electrical resistance – thermister – thermocouple – pyrometers – temperature indicators.

MEASUREMENT OF PRESSURE: Units – classification – different principles used. manometers, piston, bourdon pressure gauges, bellows – diaphragm gauges. low pressure measurement – thermal conductivity gauges – ionization pressure gauges, Mcleod pressure gauge.

UNIT – III

MEASUREMENT OF LEVEL : Direct method – indirect methods – capacitative, ultrasonic, magnetic, cryogenic fuel level indicators – bubler level indicators.

FLOW MEASUREMENT: Rotameter, magnetic, ultrasonic, turbine flow meter, hot – wire anemometer, laser Doppler anemometer (LDA).

MEASUREMENT OF SPEED : Mechanical tachometers – electrical tachometers – stroboscope, noncontact type of tachometer

Measurement of Acceleration and Vibration: Different simple instruments – principles of seismic instruments – Vibrometer and accelerometer using this principle.

UNIT – IV

STRESS STRAIN MEASUREMENTS : Various types of stress and strain measurements – electrical strain gauge – gauge factor – method of usage of resistance strain gauge for bending compressive and tensile strains – usage for measuring torque, strain gauge rosettes.

UNIT – V

MEASUREMENT OF HUMIDITY – Moisture content of gases, sling psychrometer, absorption psychrometer, dew point meter.

MEASUREMENT OF FORCE, TORQUE AND POWER- Elastic force meters, load cells, torsion meters, dynamometers.

UNIT – VI

ELEMENTS OF CONTROL SYSTEMS : Introduction, importance – classification – open and closed systems, servomechanisms–examples with block diagrams–temperature, speed & position control systems.

Text Books:

1. Measurement Systems: Applications & design / D.S Kumar/
2. Mechanical Measurements / BeckWith, Marangoni,Linehard, Pearson

References:

1. Measurement systems: Application and design/Doeblin Earnest. O. Adaptation/ TMH
2. Experimental Methods for Engineers / J.P.Holman/McGraw Hill
3. Mechanical and Industrial Measurements / R.K. Jain/ Khanna Publishers.
4. Instrumentation, measurement & analysis / B.C.Nakra & K.K.Choudhary/TMH

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Definition – Basic principles of measurement	
2	3	Measurement systems, generalized configuration	
2	5	Functional descriptions of measuring instruments examples	
2	7	Static & Dynamic performance characteristics	
2	9	Sources of error, classification and elimination of error	
5	14	Piezo electric, inductive, capacitance transducers	

4	18	Resistance, ionization and photo electric transducers	
1	19	Classification of temperature various principles of measurement	
5	24	Expansion, electrical resistance, thermister, thermocouple ,pyrometers	
1	25	Classification of pressure measuring devices	
5	30	Manometers, piston, Bourdon pressure gauges, Bellows and Diaphragm gauges	
6	36	Low pressure measurement , Thermal conductivity gauges, Ionization pressure gauges, McLeod pressure gauge	
1	37	Direct method – indirect methods –capacitive transducer	
2	39	Ultrasonic, magnetic, Cryogenic fuel level indicators – Bubbler level indicators	
2	41	Rotameter, magnetic, ultrasonic, turbine flow meter	
1	42	hot – wire anemometer, laser Doppler anemometer (LDA)	
2	44	Mechanical tachometers – electrical tachometers – stroboscope, noncontact type of tachometer	
2	46	Different simple instruments principles of seismic instruments –vibrometer and accelerometer using this principle	
2	48	Various types of stress and strain measurements – electrical strain gauge	
2	50	Gauge factor – method of usage of resistance strain gauge for bending compressive and tensile strains	
2	52	strain gauge rosettes	
2	54	Measuring torque	
1	55	Moisture content of gases, sling Psychrometer,	
1	56	Absorption Psychrometer, Dew point meter	
1	57	Elastic force meters,	
1	58	Load cells	
2	60	torsion meters	
2	62	Dynamometers	
1	63	Introduction, importance	

1	64	classification – open and closed systems	
4	68	servomechanisms–examples with block diagrams–temperature, speed & position control systems	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3									1		
CO2	3	2	2	3						1		
CO3	3			1						1		
CO4	3	3	3	2						1		
CO5	3	3	2							1		
CO6	3	2	2	1						1		
Total	18	10	9	7						6		
Avg.	3.0	2.5	2.2	1.7						1.0		

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,10	1,2
CO-2	1,2,3,4,10	1,2
CO-3	1,4,10	1,2
CO-4	1,2,3,4,10	1,2
CO-5	1,2,3,10	1,3
CO-6	1,2,3,4,10	1,3

INTRODUCTION TO MATERIAL HANDLING EQUIPMENT

Name of the Program: B.Tech	**Academic Year:** 2020-2021
Branch: Mechanical Engineering	**Year & Semester:** III& II
Name of the Course: Introduction to Material Handling Equipment (Professional Elective – II)	**Regulation:** NRIA18
Course Area/Module: Production	**No. of students registered:**
Course Coordinator: Mr.R.Vijay Krishna **Designation:** Associate Professor	**Course Instructor(s):**Mr.R.Vijay Krishna
No. of Lecture Hours per week: 05	**No. of Tutorial Hours per week:** 00
Credits: 3	

COURSE OBJECTIVES:

1. The student will know the basic Fundamentals of Material Handling Equipment and control and safety measures incorporated on material handling equipment's.

2. The student will identify and select the different handling equipment's in industry.

3. The student will identify various components of material handling systems.

4. The student will know the working principles of Components of material handling systems like Flexible hoisting, hooks, elevators.

5. The student will know the working principles of Components of material handling systems like conveyors.

6. To know the operational features of various material handling system used in industries how to connect loading stations to the different discharge or unloading conditions

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

CO1 Understand the basic Fundamentals of Material Handling Equipment.

CO2 Identify, compare and select proper material handling equipment for specific applications.

CO3 Identify the various components of material handling systems.

CO4Understand the working principles of Components of material handling systems like Flexible hoisting, hooks, elevators.

CO5Understand the working principles of Components of material handling systems like conveyors.

CO6Identify the surface transport to connect loading stations to the different discharge run loading stations

COURSE DESCRIPTION:

This course is intended to provide basic knowledge of Material handling (MH) which involves "short-distance movement that usually takes place within the confines of a building such as a plant or a warehouse and between a building and a transportation agency." It can be used to create "time and place utility" through the handling, storage, and control of material, as distinct from manufacturing (i.e., fabrication and assembly operations), which creates "form utility" by changing the shape, form, and makeup of material.

COURSE CONTENT (Syllabus):

Unit-I

Materials Handling Equipment: Introduction to material handling Equipment, Detailclassification of MHE, Application and their selection. Criteria for selection of Material HandlingEquipment's,

Factors effecting choice of material handling equipments: type of loads, hourly capacity,direction and length of travel, method of stacking at initial intermediate and final points-specificload conditions, Basic kind of material handling problems, Various methods to analyze materialHandling problems, Economics of material handling systems.

Unit-II

Components of material handling systems: Flexible hoisting appliances such as welded chains,roller chains, hemp ropes, and steel wire ropes, fastening methods of wire and chains, Appliancesfor suspending hooks-crane grab for unit and piece loads.

Lifting Methods: Lifting tackles, lifting and rigging Load handling attachments Various types ofhooks-forged, eye bolts, eye hook, electric lifting magnet, vacuum lifter, grabbing attachment forloose materials, crane attachment for handling liquids/ molten metal's.

Unit-III

Hoisting machinery and equipments: Working of different type of hoists such as lever operatedhoist, portable hand chain hoist, differential hoist, worm geared and spur geared hoist, electric andpneumatic hoists.

Working of different types of cranes and Industrial Lifts: rotary cranes, trackless cranes, mobilecranes, bridge cranes, cable cranes, floating cranes and cranes traveling on guide rails.Introductionto types of Industrial Lifts.

Unit-IV

Conveying machinery: Working of traction type conveyors such as belt conveyors, chainconveyors, Working of traction less type conveyors such as gravity type conveyors, vibrating andoscillating conveyors, screw conveyors, monorail conveyors, pneumatic and hydraulic conveyors,hoppers, gates and feeders.

Surface transport equipment–functions–working of trackless equipment such as hand operatedtrucks, powered trucks, tractors, AGV (Automatic Guided vehicle), industrial trailers Function,working of cross handling equipment such as winches, capstans, turntables, transfer tables.

Text Books:

1. Material Handling Equipment – N.Rundenko (Peace Publisher, Moscow)
2. Material Handling Equipment -M.P. Alexandrow (MIR Publishers, Moscow)
3. Material Handling Equipment -R.B. Chowdary&G.N.R.Tagore (Khanna Publishers,Delhi)
4. Plant layout & Material Handling-Apple J.M (John Wiley Publishers)

References:

1. Material Handling (Principles &Practice)-Allegri T.H (CBS Publisher, Delhi)
2. Material Handling -Immer J.R (McGraw Hill, Newyork
3. Material Handling Equipment-Parameswaran M.A (CDC in Mech. Engg., I.I.T.Chennai).
4. Conveyors and related equipments – Spivakovsy A.O. and Dyachkov V.K Volumes Iand II (MIR publishers)
5. Boltzharol, A.,"Materials Handling Handbook", The Ronald press company 1958.

No. of Lectures	Cumulative No. of Lectures	TOPIC
1	1	**Unit-I** **Materials Handling Equipment:** Introduction to Material Handling Equipment
1	2	Objectives of MHE, Essential requirements of a good materials handling system
1	3	Functional scope of materials handling, Importance of Material Handling
2	5	Principles of Material Handling
1	6	Criteria for selection of Material HandlingEquipment's, Guidelines for Effective utilization of MaterialHandling Equipment's
1	7	Detailclassification of MHE

2	9	**Factors effecting choice of material handling equipment's:** type of loads, hourly capacity,direction and length of travel
1	10	method of stacking at initial intermediate and final pointspoints-specificload conditions
2	12	Basic kind of material handling problems, Various methods to analyze material handling problems
1	13	Economics of material handling systems
2	15	**Unit-II** **Components of material handling systems:** Flexible hoisting appliances such as welded chains,roller chains
2	17	hemp ropes, and steel wire ropes, fastening methods of wire and chains
2	19	Appliancesfor suspending hooks-crane grab for unit and piece loads.
2	21	**Lifting Methods:** Lifting tackles, lifting and rigging Load handling attachments
1	22	Various types ofhooks-forged, eye bolts, eye hook
2	24	electric lifting magnet, vacuum lifter, grabbing attachment forloose materials
2	26	crane attachment for handling liquids/ molten metal's.
2	28	Safety requirements for design of a material handling system
2	30	Precautions in Material Handling: those should be taken by workers when moving materials: 1) Manually; 2) Mechanically.
2	32	Precautions must be taken by workers to avoid storage hazards Safeguards must be followed by workers when stacking materials
2	34	**Unit-III** Hoisting machinery and equipment's: Introduction, Working of different types of hoists
2	36	lever operated hoist, portable hand chain hoist
2	38	differential hoist, worm geared and spur geared hoist
2	40	Electric and pneumatic hoists.
1	41	Working of different types of cranes and Industrial Lifts: rotary cranes
1	42	trackless cranes, mobile cranes
1	43	bridge cranes, cable cranes,
2	45	Floating cranes and cranes traveling on guide rails.
1	46	Introduction to types of Industrial Lifts.
2	48	**Unit-IV** **Conveying machinery:**Introduction. Working of traction type conveyors
2	50	belt conveyors, chainconveyors
2	52	Working of traction less type conveyors such as gravity type conveyors
1	53	vibrating andoscillating conveyors
1	54	screw conveyors
1	55	monorail conveyors
1	56	pneumatic and hydraulic conveyors
1	57	Hoppers, gates and feeders.
1	58	**Surface transport equipment**–Introduction, functions
1	59	working of trackless equipment such as hand operatedtrucks
1	60	powered trucks, tractors

1	61	AGV (Automatic Guided vehicle)
1	62	Industrial trailers Function
2	64	Working of cross handling equipment such as winches, capstans, turntables, transfer tables.

COURSE CONTENT (Syllabus):

Unit-I

Materials Handling Equipment: Introduction to material handling Equipment, Detailclassification of MHE, Application and their selection. Criteria for selection of Material HandlingEquipment's,

Factors effecting choice of material handling equipments: type of loads, hourly capacity,direction and length of travel, method of stacking at initial intermediate and final points-specificload conditions, Basic kind of material handling problems, Various methods to analyze materialHandling problems, Economics of material handling systems.

Unit-II

Components of material handling systems: Flexible hoisting appliances such as welded chains,roller chains, hemp ropes, and steel wire ropes, fastening methods of wire and chains, Appliancesfor suspending hooks-crane grab for unit and piece loads.

Lifting Methods: Lifting tackles, lifting and rigging Load handling attachments Various types ofhooks-forged, eye bolts, eye hook, electric lifting magnet, vacuum lifter, grabbing attachment forloose materials, crane attachment for handling liquids/ molten metal's.

Unit-III

Hoisting machinery and equipments: Working of different type of hoists such as lever operatedhoist, portable hand chain hoist, differential hoist, worm geared and spur geared hoist, electric andpneumatic hoists.

Working of different types of cranes and Industrial Lifts: rotary cranes, trackless cranes, mobilecranes, bridge cranes, cable cranes, floating cranes and cranes traveling on guide rails.Introductionto types of Industrial Lifts.

Unit-IV

Conveying machinery: Working of traction type conveyors such as belt conveyors, chainconveyors, Working of traction less type conveyors such as gravity type conveyors, vibrating andoscillating conveyors, screw conveyors, monorail conveyors, pneumatic and hydraulic conveyors,hoppers, gates and feeders.

Surface transport equipment–functions–working of trackless equipment such as hand operatedtrucks, powered trucks, tractors, AGV (Automatic Guided vehicle), industrial trailers Function,working of cross handling equipment such as winches, capstans, turntables, transfer tables.

Text Books:

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2. Material Handling Equipment -M.P. Alexandrow (MIR Publishers, Moscow)
3. Material Handling Equipment -R.B. Chowdary&G.N.R.Tagore (Khanna Publishers,Delhi)

4. Plant layout & Material Handling-Apple J.M (John Wiley Publishers)

References:

1. Material Handling (Principles &Practice)-Allegri T.H (CBS Publisher, Delhi)

2. Material Handling -Immer J.R (McGraw Hill, Newyork

3. Material Handling Equipment-Parameswaran M.A (CDC in Mech. Engg., I.I.T.Chennai).

4. Conveyors and related equipments – Spivakovsy A.O. and Dyachkov V.K Volumes Iand II (MIR publishers)

5. Boltzharol, A.,"Materials Handling Handbook", The Ronald press company 1958.

No. of Lectures	Cumulative No. of Lectures	TOPIC
1	1	**Unit-I** **Materials Handling Equipment:** Introduction to Material Handling Equipment
1	2	Objectives of MHE, Essential requirements of a good materials handling system
1	3	Functional scope of materials handling, Importance of Material Handling
2	5	Principles of Material Handling
1	6	Criteria for selection of Material HandlingEquipment's, Guidelines for Effective utilization of MaterialHandling Equipment's
1	7	Detailclassification of MHE
2	9	**Factors effecting choice of material handling equipment's:** type of loads, hourly capacity,direction and length of travel
1	10	method of stacking at initial intermediate and final pointspoints-specificload conditions
2	12	Basic kind of material handling problems, Various methods to analyze material handling problems
1	13	Economics of material handling systems
2	15	**Unit-II** **Components of material handling systems:** Flexible hoisting appliances such as welded chains,roller chains
2	17	hemp ropes, and steel wire ropes, fastening methods of wire and chains
2	19	Appliancesfor suspending hooks-crane grab for unit and piece loads.
2	21	**Lifting Methods:** Lifting tackles, lifting and rigging Load handling attachments
1	22	Various types ofhooks-forged, eye bolts, eye hook
2	24	electric lifting magnet, vacuum lifter, grabbing attachment forloose materials
2	26	crane attachment for handling liquids/ molten metal's.
2	28	Safety requirements for design of a material handling system
2	30	Precautions in Material Handling: those should be taken by workers when moving materials: 1) Manually; 2) Mechanically.
2	32	Precautions must be taken by workers to avoid storage hazards Safeguards must be followed by workers when stacking materials
2	34	**Unit-III** Hoisting machinery and equipment's: Introduction, Working of different types of hoists
2	36	lever operated hoist, portable hand chain hoist
2	38	differential hoist, worm geared and spur geared hoist
2	40	Electric and pneumatic hoists.

1	41	Working of different types of cranes and Industrial Lifts: rotary cranes
1	42	trackless cranes, mobile cranes
1	43	bridge cranes, cable cranes,
2	45	Floating cranes and cranes traveling on guide rails.
1	46	Introduction to types of Industrial Lifts.
2	48	**Unit-IV** **Conveying machinery:**Introduction. Working of traction type conveyors
2	50	belt conveyors, chainconveyors
2	52	Working of traction less type conveyors such as gravity type conveyors
1	53	vibrating andoscillating conveyors
1	54	screw conveyors
1	55	monorail conveyors
1	56	pneumatic and hydraulic conveyors
1	57	Hoppers, gates and feeders.
1	58	**Surface transport equipment**–Introduction, functions
1	59	working of trackless equipment such as hand operatedtrucks
1	60	powered trucks, tractors
1	61	AGV (Automatic Guided vehicle)
1	62	Industrial trailers Function
2	64	Working of cross handling equipment such as winches, capstans, turntables, transfer tables.

Year: II

DESIGN OF MACHINE ELEMENTS-I

Name of the Program: Bachelor of Technology	**Academic Year: 2020 - 2021**
Branch: Mechanical Engineering	**Year & Semester: II-II**
Name of the Course:DESIGN OF MACHINE MEMBERS-I	**Regulation: NRIA18**
Course Area/Module: DESIGN	**No. of students registered:**
Course Coordinator: Mr.G.DURGAPRASAD **Designation:Associate Professor**	**Course Instructors :** **Mr.G.DURGAPRASAD**
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. The student shall gain appreciation and understanding of the design function in mechanical engineering, the steps involved in designing and the relation of design activity with manufacturing activity
2. Selection of proper materials to different machine elements based on their physical and mechanical properties.

3.	Learn and understanding of the different types of failure modes and criteria.
4.	Procedure for the different machine elements such as fasteners, shafts, couplings, keys, springs, axially loaded joints etc.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Estimate safety factors of machine members subjected to static and dynamic loads.
2. Apply multidimensional static failure criteria in the analysis and design of mechanicalcomponents.
3. Identify the loads, the machine members subjected and calculate static and dynamicstresses to ensure safe design.
4. Design fasteners subjected to variety ofloads.
5. Select standard machine elements such as keys, shafts, couplings.
6. Analyze and design of mechanical springs.

COURSE DESCRIPTION:

Communicate the results of analysis and design - with attention to safety, reliability, and The main objective of this course is to require the student to prepare professional quality solutions and presentations to effectively societal and fiscal aspects.

COURSE CONTENT (Syllabus):

UNIT - I

INTRODUCTION: General considerations in the design of Engineering Materials and theirproperties - selection -Manufacturing consideration in design, tolerances and fits -BIS codes ofsteels.

STRESSES IN MACHINE MEMBERS: simple stresses - combined stresses - torsional andbending stresses - impact stresses - stress strain relation - various theories of failure - factor ofsafety - design for strength and rigidity - preferred numbers. The concept of stiffness in tension,bending, torsion and combined situations.

UNIT-II

STRENGTH OF MACHTNE ELEMENTS: stress concentration - theoretical stressconcentration factor - fatigue stress concentration factor notch sensitivity - design for fluctuatingstresses - endurance limit - estimation of endurance strength – Goodman’s line - Soderberg, line - modified Goodman's line.

BOLTED JOINTS - Design of bolts with pre-stresses * design ofjoints under eccentric loading -locking devices.

UNIT-III

RIVETED AND WELDED JOINTS - Design ofjoints with initial stresses - eccentric loading.

KEYS, COTTERS and KNUCKLE JOTNTS: Design of keys-stresses in keys-cotter joints-spigot and socket – knucklejoints.

UNIT-IV

SHAFTS: Design of solid and hollow shafts for; strength and rigidity, design of shafts for combined bending and axial loads - shaft sizes.

Shaft Couplings: Rigid couplings - muff and flange couplings, flexible couplings –modified flange coupling.

MECHANICAL SPRINGS: Stresses and deflections of helical springs -compression springs - energy storage capacity - helical torsion springs - co-axial springs, leaf springs.

Note: Design data book is NOT Permitted for examination

Text Books:

I. Machine Design/V.Bandari/ TMH Publishers

2. Machine design / NC Pandya & CS Shah/Charotar Publishing House Pvt. Limited

3. Design data book ofEngineers

References:

I. Design of Machine Elements / V.M. Faires/McMillan

2. Machine design / Schaum Series/McGrawHill Professional

3. Machine Design/ Shigley, J.E/McGraw Hill.

4. Design data handbook/ K.Mahadevan& K. Balaveera Reddy/ CBS publishers.

5. Design of machine elements-Spotts/Pearson Publications

6. Machine Design -Norton/ Pearson publishers.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	2	General considerations in the design of Engineering Materials –their properties	
2	4	Tolerances and Fits	
3	6	Selection of materials, Manufacturing consideration in design	
4	7	BIS codes of steels.	
5	8	Types of stresses	
6	9	Torsional and Bending stresses	
7	10	Combined stresses	
8	11	Impact stresses-Stress strain relation	
9	13	Theories of failure	
10	14	Factor of safety-Design for strength and rigidity	
11	15	Preferred numbers	
12	16	The concept of stiffness in tension, Bending, torsion and combined situations	
13	17	Stress concentration	
14	18	Theoretical stress concentration factor	
15	19	Fatigue stress concentration factor and notch sensitivity	
16	20	Design for fluctuating stresses	
17	21	Endurance limit And Estimation of endurance strength	
18	22	Goodman’s line	
19	23	Modified goodman’s line.	
20	24	Soderberg’s line	
21	25	Bolted joints	
22	27	Design of bolts with pre-stresses	
23	30	Design of joints under eccentric loading	
24	31	Locking devices	

25	34	Riveted and welded joints	
26	36	Design of joints with initial stresses	
27	39	Eccentric loading.	
28	41	Design of keys-Stresses in keys	
29	44	Design of Spigot and socket	
30	46	Design of knuckle joints	
31	48	Shafts: Design of solid and hollow shafts for strength and rigidity	
32	49	Design of shafts for combined bending and axial loads-Shaft sizes	
33	51	Shaft coupling: Rigid couplings-Muff couplings	
34	52	Design of Split muff couplings	
35	53	Design of Flange couplings	
36	54	Design of Flexible couplings	
37	56	Design of Flange coupling (modified).	
38	57	Design of Mechanical springs:	
39	58	Extension of helical springs	
40	59	Design of Compression springs	
41	60	Design of Springs for fatigue loading	
42	61	Energy storage capacity	
43	62	Design of Helical torsion springs	
44	63	Design of Co-axial springs	
45	64	Design of Leaf springs.	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	1		1			2	2	2
CO2	3	3	3	2	1		1			2	2	2
CO3	3	3	3	2	1		1			2	2	2
CO4	3	3	3	2	1		1			2	2	2
CO5	3	3	3	2	1		1			2	2	2
CO6	3	3	3	2	1		1			2	2	2
Total	18	18	18	12	6		6			12	12	12
Avg.	3	3	3	2	1		1			2	2	2

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,2,3,4,,5,7,10,11,12	1,2
CO-2	1,2,3,4,,5,7,10,11,12	1,2
CO-3	1,2,3,4,,5,7,10,11,12	1,2
CO-4	1,2,3,4,,5,7,10,11,12	1,2

CO-5	1,2,3,4,,5,7,10,11,12	1,2
CO-6	1,2,3,4,,5,7,10,11,12	1,2

FLUID MECHANICS & HYDRAULIC MACHINES

Name of the Program: Bachelor of Technology	**Academic Year:** 202 - 2021
Branch: Mechanical Engineering	**Year & Semester:** II Year & II Semester
Name of the Course: FM & HM	**Regulation:** NRIA 18
Course Area/Module: Design	**No. of students registered**
Course Coordinator: Dr.K.Prasada Rao **Designation:** Professor	**Course Instructor:** **Dr.K.PRASADA RAO**
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:** 01
Credits:03	

COURSE OBJECTIVES:

After studying students will:

1.	know the concept of fluid and its properties, manometry, hydrostatic forces acting on different surfaces and also problem solving techniques.
2.	be exposed to the basic laws of fluids, flow patterns, viscous flow through Pipes and their corresponding problems.
3.	be aware of the concepts related to boundary layer theory and dimensional analysis.
4.	know the hydrodynamic forces acting on vanes and their performance evaluation
5.	be in a position to evaluate the performance characteristics of hydraulic turbines.
6.	be aware of the importance, function and performance of hydro machinery.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Define fluid properties and explain procedure of dimensional analysis
2. Explain procedure of measurement of fluid pressure and manometry
3. Apply laws of conservation of mass, momentum and energy to fluid flow
4. Analyze flow through different pipes
5. Analyze the impact of jet on the vanes
6. Evaluate performance of hydraulic machines

COURSE DESCRIPTION:

This course offers basic knowledge on fluid statics, dynamics and hydraulic machines. The objective of this course is to enable the student to understand laws of fluid mechanics and evaluate pressure, velocity and acceleration fields for various fluid flows and performance parameters for hydraulic machinery.

COURSE CONTENT (Syllabus):

UNIT I

Fluid statics:

Physical properties of fluids- specific gravity, viscosity, surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure –measurement of pressure Piezometer, U-tube and differential manometers. Total pressure, center of pressure,

Hydro Static Forces on surfaces and submerged bodies: hydrostatic forces on vertical, inclined and curved surfaces, Buoyancy, center of buoyancy, Meta center Stability of floating bodies and applications.

UNIT II

Fluid Kinematics:

Classification of flows, Stream line, path line and streak lines and stream tube, differential equation of continuity, Acceleration.

Fluid dynamics: Surface and body forces –Eule's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend, Viscous flow through pipe, Dimensional analysis, Boundary layer, displacement thickness, momentum thickness, energy thickness Navier-stokes equation

UNIT III

Flow through Pipes:

Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: pilot tube, venturimeter and orifice meter.

Basics of turbo machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency flow over radial vanes

UNIT IV

Hydraulic Turbines:

Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies, hydraulic design – draft tube theory-functions and efficiency. Geometric similarity, Unit and specific quantities, characteristic curves, selection of turbine, cavitation, surge tank, water hammer.

Hydraulic Pumps: Classification of pumps, Centrifugal pumps-work done, efficiency, specific speed, characteristic curves, Reciprocating pumps, -work done Slip and indicator diagram

TEXT BOOKS

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH. standard book house.
2. Frank M.White, "Fluid Mechanics", McGraw-Hill, 7th Edition, New Delhi, 2011.

REFERENCE BOOKS

1. Fluid Mechanics and Hydraulic Machines by Rajput. S. Chand Publishers
2. Fluid mechanics and hydraulic machines by R. K. Bansal, Laxmi Publications Ltd.,
3. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
4. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
5. Fluid Mechanics and Hydraulic Machines by Domkundwar & Domkundwar, Dhanpatrai & Co.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	**Unit – I:** Dimensions and Units: physical properties of fluids –Density, Specific weight, Specific Volume, Specific gravity & Problems	--

1	2	Viscosity – Units, Kinematic Viscosity, Newton's Laws of Viscosity & Problems	--
1	3	Significance of Viscosity, Types of fluids & Problems	--
1	4	Surface Tension – Liquid Droplet, Hollow Bubble & Liquid Jet; Capillarity – Rise, Fall expressions	--
1	5	Problems on Surface Tension & Capillarity	--
1	6	Problems	--
1	7	Vapor pressure & Cavitation; Problems	--
1	8	Pascal's Law; Hydrostatic Law & Problem	--
1	9	Absolute Pressure, Gauge Pressure & Vacuum Pressure; Problem; Measurement of Pressure	--
1	10	Simple Manometers – Piezometer & U-Tube Manometers; Problems	--
1	11	Single Column Manometer – Vertical & Inclined Manometers & Problems	--
1	12	Differential Manometers – U-Tube & Inverted U-Tube Manometers; Problems	--
1	13	Buoyancy; Centre of Buoyancy; Problems	--
1	14	Meta Centre; – Meta Centre Height; Analytical Method for Meta Centre Height; Experimental Method for Meta Centric Height	--
1	15	Stability of Floating Body & Sub-merged Body & Conditions of Equilibrium; Problem	--
1	16	Problems on Meta Centric height	--
1	17	**Unit – II:** Fluid Kinematics; Methods of describing Fluid Motion; Types of Fluid Flow; Discharge; Continuity Equation; Problem	--
1	18	Problems on Discharge/Continuity Equation	--
1	19	Problems	--
1	20	Velocity Potential Function; Condition for Irrotational flow; Stream Function; Relation between them;	--
1	21	Circulation, Rotation, Vorticity, Stream Line, Path line, Streak line, Stream tube, Flow net, Vortex flow – Forced & Free; Source Flow, Sink Flow, Doublet	--
1	22	Problems on Velocity Potential Function & Stream Function	--
1	23	Fluid dynamic; Equations of motion; Euler's Equation of motion	--
1	24	Problems	--
1	25	Assumptions in Bernoulli's equations; Bernoulli's equations for Ideal & Real Fluids; Problem	--
1	26	Problems	--
1	27	Momentum Equation; Force on Pipe bend; Problems	--
1	28	Problems	--
1	29	Introduction; Methods of Dimensional Analysis; Rayleigh's method; Buckingham's π – Theorem; Problem	--
1	30	Boundary Layer Theory; Laminar Boundary Layer; Turbulent Boundary Layer; Boundary Layer Thickness; Displacement Thickness	--
1	31	Momentum Thickness; Energy Thickness; Problems	--
1	32	Navier Stokes Equation; Problems	--
1	33	**Unit – III:** Hydraulic Co-Efficient; Reynolds number; Laminar Flow; Turbulent Flow; Reynolds Experiment	--
1	34	Darcy – Weisbach equation; Problems	--
1	35	Flow through pipes- Minor Losses –Sudden enlargement & Sudden Contraction	--
1	36	Flow through pipes in Series; Problems	--
1	37	Flow through Parallel pipes; Problems	--

1	38	Hydraulic Gradient Line & Total Energy Line; Problems	--
1	39	Measurement of flow; Pitot tube; Problems	--
1	40	Venturimeter; Problems	--
1	41	Orifice meter; Problems	--
1	42	Introduction; Force Exerted by the Jet on :- Stationary Vertical Flat Plate; Vertical Flat Plate Moving in the direction of the Jet; Problems	--
1	43	Force Exerted by the Jet on :- Stationary Inclined Plate; Inclined Flat Plate Moving in the direction of the Jet; Problems	--
1	44	Force Exerted by the Jet on :- Stationary Curved Plate striking at the Centre; Force Exerted by the Jet on :- Curved Plate striking at the Centre moving in the direction of the Jet; Problems	--
1	45	Force Exerted by the Jet on :- Stationary Curved Plate striking at one end tangentially when the plate is symmetrical; Stationary Curved Plate striking at one end tangentially when the plate is unsymmetrical; Problems	--
1	46	Force Exerted by the Jet on :- Moving Curved Plate striking at one end tangentially when the plate is unsymmetrical	--
1	47	Force, Workdone & Efficiency on a series of Radial Vanes	--
1	48	**Unit – IV:** Introduction; Gross Head; Net Head; Efficiencies of Turbine; Classification of Hydraulic Turbines	--
1	49	Pelton Turbine; Problem	--
1	50	Inward Flow Reaction Turbine – Francis Turbine; Problem	--
1	51	Axial Flow Reaction Turbine – Kaplan Turbine; Problem	--
1	52	Draft Tube; Theory; Efficiency; Problem	--
1	53	Specific Speed; Problems	--
1	54	Unit Quantities – Unit Speed, Unit Discharge, Unit Power; Problem	--
1	55	Characteristic Curves – Main, Operating, Muschel Curves; Governing of Turbines; Fluidics Introduction	--
1	56	Cavitation; Surge Tank; Water Hammer; Hydraulic Press; Hydraulic Ram; Hydraulic Lift; Hydraulic Coupling, Problem	--
1	57	Introduction; Main Parts; Work Done; Suction Head; Delivery Head; Static Head; Manometric Head; Efficiencies	--
1	58	Pumps in Series; Pumps in Parallel; Problems	--
1	59	Problems on Pumps; Specific Speed; Problem on Specific Speed	--
1	60	Problem on Specific Speed; Priming of Centrifugal Pump;	--
1	61	Characteristic Curves of Centrifugal Pumps;	--
1	62	Cavitation; Effects of Cavitation;	--
1	63	Introduction; Main Parts; Working of Reciprocating Pump; Discharge; Workdone; Slip; Negative Slip	--
1	64	Indicator Diagram; Problem	--

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	**2**	2	**	**	**	**	**	**	**	**	**
CO2	3	**2**	1	**	**	**	**	**	**	**	**	**
CO3	1	**3**	2	**	**	**	**	**	**	**	**	**
CO4	3	**3**	2	**	**	**	**	**	**	**	**	**
CO5	3	**3**	2	**	**	**	**	**	**	**	**	**
CO6	3	**3**	2	**	**	**	**	**	**	**	**	**
Total	16	16	11	**	**	**	**	**	**	**	**	**

Avg.	2.66	2.66	1.83	**	**	**	**	**	**	**	**	**

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	PO1, PO2, PO3	PSO-1, PSO-2
CO-2	PO1, PO2, PO3	PSO-1, PSO-2
CO-3	PO1, PO2, PO3	PSO-1, PSO-2
CO-4	PO1, PO2, PO3	PSO-1, PSO-2
CO-5	PO1, PO2, PO3	PSO-1, PSO-2
CO-6	PO1, PO2, PO3	PSO-1, PSO-2

KINEMATICS OF MACHINES

Name of the Program: B-Tech	Academic Year: 2019 - 2020
Branch: Mechanical Engineering	Year & Semester: II-II
Name of the Course: Kinematics of Machinery	Regulation: R16
Course Area/Module: DESIGN	No. of students registered: 180
Course Coordinator: Mr.J.LEELA KRISHNA	Course Instructor: Mr.J.LEELA KRISHNA Designation: Associate Professor
No. of Lecture Hours per week: 4	No. of Tutorial Hours per week: 1
Credits: 3	

Course Objectives:

1. The objective of this unit is to make student understand the purpose of kinematics, Kinematic joint and mechanism and to study the relative motion of parts in a machine without taking into consideration the forces involved. And various mechanisms for straight line motion and their applications.
2. The objective of this unit is to make student understand the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain. To understand the application of slider crank mechanism etc. and study of plane motion of the body
3. The objective of this unit is to make student understand the theories involved in cams. Further the students are exposed to the applications of cams and their working principles. And understand various power transmission mechanisms and methodologies and working principles. Students are exposed to merits and demerits of each drive. To help the students develop effective writing skills through paragraph writing.
4. The objective of this unit is to make student understand gears, power transmission through different types of gears including gear profiles and its efficiency.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1	Understand Kinematic joint and mechanism and study the relative motion of parts in a machine without taking into consideration the forces involved.
CO2	Understand various mechanisms for straight line motion and their applications.
CO3	Draw the velocity and acceleration of four bar chain and slider crank chain graphically.
CO4	Apply working principles of cams and also design the profile of cams.
CO5	Decide the no of teeth on a gear and also select the gear teeth depending on the application in the unit of Gears.
CO6	Understand various power transmission mechanisms and methodologies and working principles. Students are exposed to merits and demerits of each drive.

COURSE CONTENT (Syllabus):

UNIT I

MECHANISMS : Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematic pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs –

closed and open pairs – constrained motion – completely, partially or successfully constrained and incompletely constrained.

Grublers criterion , Grashoff's law , Degrees of freedom, Kutzbach criterion for planar mechanisms,

Mechanism and machines – classification of machines – kinematic chain – inversion of mechanism – inversions of quadric cycle chain – single and double slider crank chains.

LOWER PAIR MECHANISM: Exact and approximate copiers and generated types – Peaucellier, Hart and Scott Russel – Grasshopper – Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

UNIT II

KINEMATICS: Velocity– Motion of a link in machine – Determination of Velocity diagrams – Instantaneous centre of rotation, centroids and axodes – relative motion between two bodies – Three centres in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms ,Graphical method – Application of relative velocity method four bar chain.
Acceleration – Determination acceleration diagrams – Graphical method –acceleration analysis of for a given mechanism, Coriolis acceleration, determination of Coriolis component of acceleration.

UNIT III

CAMS Definitions of cam and followers – their uses – Types of followers and cams – Terminology –Types of follower motion: Uniform velocity, Simple harmonic motion and uniform acceleration and retardation. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases. Analysis of motion of followers: Roller follower – circular cam with straight flank.
Power Transmissions : Introduction, Belt and rope drives, selection of belt drive- types of belt drives,V-belts, materials used for belt and rope drives, velocity ratio of belt drives, slip of belt, creep of belt, tensions for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, Chains- length, angular speed ratio, classification of chains.

UNIT IV

GEARS Higher pairs, friction wheels and toothed gears–types – law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact – Introduction to Helical, Bevel and worm gearing.
GEARS TRAINS Introduction to gear Trains, Train value, Types – Simple and reverted wheel train – Epicyclic gear Train. Methods of finding train value or velocity ratio – Epicyclic gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS:

1. Theory of Mechanisms and machines – A.Ghosh & A.K.Malik – East West Press Pvt. Ltd.
2. Theory of Machines – S. S Rattan- TMH
3. Theory of machines and Mechanisms – J.J Uicker, G.R.Pennock & J.E.Shigley - Oxford

REFERENCE BOOKS:

1. Theory of Machines Sadhu Singh, Pearsons Edn
2. Theory of machines and Machinery /Vickers /Oxford .
3. Theory of Machines by Thomas Bevan/ CBS
4. Kinematics of Machinery through Hyper Works – J.S. Rao – Springer Publ

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1										
CO2	2	3	1	1								

CO3	1	2	3	3	3							
CO4	1	2	3	3	3							
CO5	1	3	3	3	3							
CO6	1	1	2	3	3							

IC ENGINES & GAS TURBINES

Name of the Program: Bachelor of Technology	**Academic Year:** 2020 - 2021
Branch: Mechanical Engineering	**Year & Semester:** II Year & II Semester
Name of the Course: ICE&GT	**Regulation:** R-18
Course Area/Module: THERMAL	**No. of students registered:**
Course Coordinator: Mr.S.Venkateswara Rao **Designation:** Assistant Professor	**Course Instructor:** Mr.S.Venkateswara Rao
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:** 01
Credits:03	

COURSE OBJECTIVES:

After studying students will:

7. To provide an insight of fundamentals and salient features of internal combustion engines.
8. To impart the basic combustion phenomenon in both SI and CI engines.
9. To enable the students the concepts of actual cycles and their analysis
10. To imbibe the knowledge of testing and performance characteristics of IC engines.
11. To enable the students learn basics and working of Gas turbines.
12. To impart the knowledge of Rockets and jet propulsion systems.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Understand the working of various internal combustion engine components and their working Principles.
2. Analyze the combustion phenomenon of SI engines and CI engines.
3. Comprehend the air standard, fuel air and actual cycles.
4. Compute the two stroke and four stroke engine performance characteristics.
5. Describe the components, functioning and performance of gas turbines.
6. Apply the principles of gas turbines and jet propulsion systems.

COURSE DESCRIPTION:

This course provides an insight of fundamentals and salient features of internal combustion engines & systems, performance analysis, gas turbines, jet and rocket propulsion systems.

COURSE CONTENT (Syllabus):

UNIT I

INTRODUCTION: Heat engine, Classification of IC Engines, Basic Engine Components and Nomenclature, Working principles of 4-Stroke and 2-Stroke Spark Ignition and Compression Ignition Engines, Valve and Port timing diagrams, Applications of I.C. Engines.

ENGINE SYSTEMS: Introduction, Layout of Fuel supply system for SI Engine-Simple Carburetor, Fuel supply system for CI Engine-Solid Injection-Individual pump type, Common rail type only. Super charging and turbo charging of IC engines. Cooling systems, Air cooling, Water cooling, Comparison, Radiators and cooling fans, Lubricating systems, Mist lubrication, Wet sump lubrication, and Dry sump lubrication system, Ignition systems, Battery, Magneto and Electronic ignition system. Principle of wankle engine.

UNIT II

COMBUSTION IN SI ENGINES: Introduction, Homogeneous and Heterogeneous mixture, stages of combustion in SI engines, flame front propagation, factors influencing the flame speed, Normal combustion, Abnormal combustion, phenomenon of knock in SI engines, effect of engine variables on knock, combustion chambers for SI engines- Fuel requirement and fuel rating, anti knock additives.

COMBUSTION IN CI ENGINES: Introduction, stages of combustion in CI engines, factors affecting the delay period, phenomenon of knock in CI engines, comparison of knock in SI and CI engines, Combustion Chambers for CI engines, Nozzles, Fuel requirement and fuel rating.

UNIT III

ACTUAL CYCLES AND THEIR ANALYSIS: Introduction, composition of cylinder gases, dissociation, comparison of air-standard and fuel-air cycles. comparison of air-standard and actual cycles, time loss factor, heat loss factor, exhaust blow down, loss due to rubbing friction, actual and fuel-air cycles of engines.

ENGINE TESTING AND PERFORMANCE: Introduction, Parameters of performance- measurement of cylinder pressure, Measurement of Fuel consumption, Air intake, Brake power, Determination of Frictional power and Indicated power, Performance tests, Heat Balance sheet. Engines exhaust emissions- CO, NOx, SOx, HC, and Soot.

UNIT IV

GAS TURBINES: Introduction, Classification of Gas Turbines, Simple Gas Turbine Plant-Ideal Cycle, Closed Cycle -Open Cycle - Efficiency, Work Ratio and Optimum Pressure Ratio For Simple Gas Turbine Cycle and Basic Problems. Actual Cycle, Analysis Of Simple Cycles & Cycles With Inter Cooling, Reheating and Regeneration.

JET PROPULSION SYSTEMS: Introduction- Working of Turbojet, Turbo Fan, Turboprop, Ramjet, applications

TEXT BOOKS

1. V.Ganesan, Internal Combustion Engines – Tata McGraw-Hill, 3rd Edition 2008.
2. P.W.Gill ,J.H.Smith&Ziurys ,Fundamentals of I.C.Engines - IBH & Oxford publications, 4th Edition 1959.
3. Mahesh M. Rathode, Thermal Engineering, Tata McGraw-Hill, 5th Edition 2010.
4. R.K.Rajput, Thermal Engineering, Laxmi publications, 5th Edition, 2005.

REFERENCE BOOKS

1. John B.Heywwod, Internal Combustion Engine Fundamentals ,Tata McGraw- Hill,2012.
2. M.L.Mathur&R.P.Sharma, A Course in I.C. Engines ,DhanpatRai New Delhi, 7th Edition 2000.
3. Pulkrabek, Engineering Fundamentals of I.C.Engines – PHI 2nd Edition 2004.
4. T.D Eastop and A. McConkey, Applied Thermodynamics, Pearson 5th Edition 2013.
5. R. Yadav ,Thermodynamics and Heat Engines,Vol-II,Central Book Depot,5th Edtn,1999.
6. R.S.Khurmi ,Thermal Engineering , S.Chand & Company, 1st Edition , 2012.
7. Thermal Engineering / PL Ballaney, Khanna Publishers.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	**UNIT-I** Introduction: Heat Engine	--
1	2	Classifications of IC engines	--
1	3	Basic Engine Components and Nomenclature	--
1	4	Working principles of 4-Stroke SI engines & Valve Timing Diagrams	--

1	5	Working principles of 4-Stroke CI engines& Valve Timing Diagrams	--
1	6	Working principles of 2-Stroke SI engines& Port Timing Diagrams	--
1	7	Applications of I.C. Engines.	--
1	8	ENGINE SYSTEMS: Introduction	--
1	9	Layout of Fuel supply system for SI Engine	--
1	10	Simple Carburetor	--
1	11	Fuel supply system for CI Engine-Solid Injection Individual pump type, Common rail type only	--
2	13	Super charging and turbo charging of IC engines	--
1	14	Cooling systems, Air cooling, Water cooling, Comparison, Radiators and cooling fans,	--
2	16	Lubricating systems, Mist lubrication, Wet sump lubrication, and Dry sump lubrication system	--
2	18	Ignition systems, Battery, Magneto and Electronic ignition system	--
1	19	Principle of wankle engine.	--
1	20	**UNIT-II Combustion in S.I. Engines** : Introduction, Homogeneous and Heterogeneous mixture	--
2	22	stages of combustion in SI engines	--
1	23	flame front propagation, factors influencing the flame speed	--
1	24	Normal combustion, Abnormal combustion	--
2	26	phenomenon of knock in SI engines	--
1	27	effect of engine variables on knock, combustion chambers for SI engines	--
2	29	Fuel requirement and fuel rating, anti knock additives.	--
2	31	**Combustion in C.I. Engines** : Introduction, stages of combustion in CI engines	--
1	32	factors affecting the delay period	--
1	33	phenomenon of knock in CI engines, comparison of knock in SI and CI engines	--
1	34	Combustion Chambers for CI engines	--
2	35	Nozzles, Fuel requirement and fuel rating	--
1	36	**UNIT-III** ACTUAL CYCLES AND THEIR ANALYSIS: Introduction, composition of cylinder gases, dissociation	--
1	37	comparison of air-standard and fuel-air cycles	--
1	38	comparison of air-standard and actual cycles	--
2	40	time loss factor, heat loss factor, exhaust blow down, loss due to rubbing friction	--
2	43	ENGINE TESTING AND PERFORMANCE: Introduction, Parameters of performance	--
1	44	measurement of cylinder pressure, Measurement of Fuel consumption, Air intake, Brake power	--
3	47	Determination of Frictional power and Indicated power, Performance tests	--
2	49	Heat Balance sheet	--
1	50	Engines exhaust emissions- CO, NOx, SOx, HC, and Soot.	--
1	51	**UNIT-IV** GAS TURBINES: Introduction, Classification of Gas Turbines	--
2	53	Simple Gas Turbine Plant-Ideal Cycle, Closed Cycle -Open Cycle	--

2	55	Efficiency, Work Ratio and Optimum Pressure Ratio For Simple Gas Turbine Cycle	--
2	57	Basic Problems	--
1	58	Actual Cycle, Analysis Of Simple Cycles	--
2	60	Cycles With Inter Cooling, Reheating and Regeneration	--
1	61	JET PROPULSION SYSTEMS: Introduction	--
1	62	Working of Turbojet	--
1	63	Turbo Fan, Turboprop	--
1	64	Ramjet, applications	--

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1					1					
CO2	3	1				1	1					
CO3	3	2	1				1					
CO4	2	2	2	1								
CO5	1	2	1									
CO6	2					1	1					
Total												
Avg.												

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	PO1, PO2, PO7	PSO-1, PSO-2
CO-2	PO1, PO2, PO6, PO7	PSO-1, PSO-2
CO-3	PO1, PO2, PO3, PO7	PSO-1, PSO-2
CO-4	PO1, PO2, PO3, PO4	PSO-1, PSO-2
CO-5	PO1, PO2, PO3	PSO-1, PSO-2
CO-6	PO1, PO6, PO7	PSO-1, PSO-2

PROFESSIONAL ETHICS & HUMAN VALUES

Name of the Program: Bachelor of Technology	**Academic Year: 2020 - 2021**
Branch: Mechanical Engineering	**Year & Semester: III-II**
Name of the Course: PROFESSIONAL ETHICS AND HUMAN VALUES	**Regulation: NRIA 18**
Course Area/Module: MANAGEMENT	**No. of students registered: 116**
Course Coordinator: Mrs. P. PRIYANKA **Designation: ASSISTENT PROFESSOR**	**Course Instructors:** **1.** Mrs. P. PRIYANKA
No. of Lecture Hours per week: 2	**No. of Tutorial Hours per week: -**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1.	To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
2.	Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

13. Behave professionally with good human values.
14. Understand & Follow the Principles for Harmony:
15. Follow Engineering Ethics with Social Experimentation
16. Remember Engineers' Responsibilities towards Safety and Risk and act accordingly
17. Get Acquainted with Engineers' Duties and Rights
18. Gain Knowledge on various Global Issues

COURSE DESCRIPTION:

The main objective of this course is to give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality. Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

COURSE CONTENT (Syllabus):

UNIT – I

Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT – II

Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias - Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT – III

History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism – Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology-Types of Inquiry –Kohlberg's Theory - Gilligan's Argument –Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past –Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT – IV

Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/s Involuntary Risk – Consequences – Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk - Delayed v/s Immediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT – V

Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights –Confidential and

Proprietary Information - Conflict of Interest-Ethical egoism - Collective Bargaining – Confidentiality - Gifts and Bribes – Problem solving-Occupational Crimes- Industrial Espionage- Price Fixing-Whistle Blowing.

UNIT – VI

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics - Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights.

- Related Cases Shall be dealt where ever necessary.

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana - Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M. Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill – 2013
9. Human Values And Professional Ethics by Jayashree Suresh and B. S. Raghavan, S.Chand Publications

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	**UNIT I : Introduction**	
1	2	Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics	
1	3	Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing	
1	4	Honesty –Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality-Character.	
1	5	**UNIT II : Introduction** Truthfulness – Customs and Traditions -Value Education – Human Dignity	
1	6	Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias	
1	7	Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness	
1	8	**UNIT III : Introduction** History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism	

1	9	Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology-Types of Inquiry	
1	10	Kohlberg's Theory - Gilligan's Argument –Heinz's Dilemma - Comparison with Standard Experiments	
1	11	Learning from the Past –Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law	
1	12	Role of Codes – Codes and Experimental Nature of Engineering	
1	13	**UNIT IV : Introduction** Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/s Involuntary Risk –	
1	14	Consequences – Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk	
1	15	Delayed v/s Immediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents	
1	16	**UNIT V : Introduction** Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty	
1	17	Consensus and Controversy - Professional and Individual Rights –Confidential and Proprietary Information - Conflict of Interest-Ethical egoism	
1	18	Collective Bargaining – Confidentiality - Gifts and Bribes – Problem solving-Occupational Crimes	
1	19	Industrial Espionage- Price Fixing-Whistle Blowing	
1	20	**UNIT VI : Introduction**	
1	21	Globalization and MNCs –Cross Culture Issues	
1	22	Business Ethics – Media Ethics - Environmental Ethics	
1	23	Endangering Lives - Bio Ethics - Computer Ethics - War Ethics	
1	24	Research Ethics -Intellectual Property Rights.	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	3	-	-	-	2
CO2	-	-	-	-	-	-	-	3	-	-	-	-
CO3	-	-	-	-	-	-	-	3	-	-	-	2
CO4	-	-	-	-	-	2	-	3	-	-	-	-
CO5	-	-	-	-	-	2	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	2

Total	-	-	-	-	-	4	-	18	-	-	-	6
Avg.	-	-	-	-	-	0.67	-	3	-	-	-	1

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	8,12	-
CO-2	8	-
CO-3	8,12	2
CO-4	6,8	2
CO-5	6,8	2
CO-6	8,12	-

Academic Year: 2020-21 I Semester

Year: IV

MECHATRONICS

Name of the Program: Bachelor of Technology	**Academic Year:** 2020 - 2021
Branch: Mechanical Engineering	**Year & Semester:** IV Year & I Semester
Name of the Course: MECHATRONICS	**Regulation:** R-18
Course Area/Module: Design & Manufacturing	**No. of students registered:**
Course Coordinator: Mr. O.N.V.P.BHAGAVAN KUMAR **Designation:** ASSISTANT PROFESSOR	**Course Instructors:** Mr. O.N.V.P.BHAGAVAN KUMAR
No. of Lecture Hours per week:04	**No. of Tutorial Hours per week:** 01
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1. Introduce to integrative nature of Mechatronics
2. Describe the different components and devices of mechatronics systems
3. Differentiate various types of sensors and transducers
4. Design various Hydraulic and Pneumatic circuits
5. Relate different logic gates and their role in Programmable logic controllers
6. Design of various electro-mechanical systems

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Describe mechatronics system and differentiate various sensors and transducers
2. Understand solid state electronic devices, analog signal conditioning devices and amplifiers
3. Demonstrate hydraulic and pneumatic actuating systems
4. Explain micro processors and micro controllers and applications of PLC.
5. Define data acquisition systems and digital signal processing
6. Design mechatronics systems relate logic gates and their role in PLC.

COURSE DESCRIPTION:

Mechatronics is an interdisciplinary engineering field of science which includes the study of mechanical engineering, electronics engineering, computer engineering, telecommunications, system engineering and control engineering. It focuses on different aspects of mechatronics like modeling, real-time computer interfacing, sensors, controllers and actuators. After completing the course graduates can work on different aspects like sensing and control systems, automation and robotics, artificial intelligence and expert systems, transportation and vehicular systems and computer integrated manufacturing systems.

COURSE CONTENT (Syllabus):

UNIT – I

Mechatronics systems – elements & levels of mechatronics system, Mechatronics design process, system, measurement systems, control systems, microprocessor-based controllers, advantages and disadvantages of mechatronics systems.

Sensors and transducers, types, displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT – II

Solid state electronic devices - PN junction diode, BJT, FET, DIAC, TRIAC and LEDs. Analog signal conditioning, operational amplifiers, noise reduction, filtering.

UNIT – III

Hydraulic and pneumatic actuating systems - Fluid systems, Hydraulic systems, and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems. Mechanical actuating systems and electrical actuating systems – basic principles and elements.

UNIT – IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT – V

System and interfacing and data acquisition – Data Acquisition Systems, Analog to Digital and Digital to Analog conversions; Digital Signal Processing – data flow in DSPs, block diagrams, typical layouts, Interfacing motor drives.

UNIT – VI

Dynamic models and analogies, System response. Process Controllers – Digital Controllers, Programmable Logic Controllers, Design of mechatronics systems & future trends.

Text Books:

1. MECHATRONICS Integrated Mechanical Electronics Systems/KP Ramachandran, GK Vijaya Raghavan & MS Balasundaram/WILEY India Edition

References:

1. Mechatronics /Smaili A, Mrad F/ Oxford Higher Education, Oxford University Press
2. Mechatronics Source Book / Newton C Braga/Thomson Publications,Chennai.
3. Mechatronics – N. Shanmugam / Anuradha Agencies Publishers.
4. Mechatronics System Design / Devdas shetty/Richard/Thomson.
5. Mechatronics/M.D.Singh/J.G.Joshi/PHI.
6. Mechatronics – Electronic Control Systems in Mechanical and Electrical Engg. 4th Edition / W. Bolton/Pearson, 2012
7. Mechatronics – Principles and Application / Godfrey C. Onwubolu/Elsevier, Indian print

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	**UNIT-I** MECHATRONICS SYSTEMS Elements & levels of mechatronics system	
1	2	Mechatronics design process, system, measurement system	
2	4	Control systems	
1	5	Micro-processor based controllers, advantages and disadvantages of mechatronics systems.	
1	6	Sensors and transducers, types	
2	8	Displacement, position, proximity , velocity	
2	10	Motion, force, acceleration, torque, fluid pressure	
2	12	Liquid flow, liquid level, temperature and light sensors	
1	13	**UNIT – II** SOLID STATE ELECTRONIC DEVICES PN junction diode	
1	14	BJT	
1	15	FET	
1	16	DIAC, TRIAC	
1	17	LEDs	
1	18	Analog signal conditioning	
1	19	Operational amplifiers	
1	20	Noise reduction, filtering	
2	22	**UNIT – III** HYDRAULIC AND PNEUMATIC ACTUATING SYSTEMS Fluid systems, hydraulic systems and pneumatic systems	
2	24	Components, control valves	

2	26	Electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems	
2	28	Mechanical Actuating systems	
2	30	Electrical actuating systems	
2	32	Basic principles and elements	
2	34	**UNIT – IV** DIGITAL ELECTRONICS AND SYSTEMS Digital logic control	
2	36	Micro processors and micro controllers, programming	
2	38	Process controllers, programmable logic controllers	
2	40	PLCs versus computers, Application of PLCs for control	
2	42	**UNIT – V** SYSTEM INTERFACING AND DATA ACQUISITION Data acquisition systems	
3	45	Analog to digital and digital to analog conversions	
3	48	Digital signal processing	
2	50	Data flow in DSPs, block diagrams, typical layouts	
2	52	Interfacing motor drives	
3	55	**UNIT – VI** Dynamic models and analogies	
3	58	System response	
2	60	Process controllers, digital controllers	
2	62	Programmable logic controllers	
2	64	Design of mechatronics systems & future trends	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	—	—	—	—	—	—	—	—	—	—	—
CO2	3	—	—	—	—	—	—	—	—	—	—	—
CO3	2	—	2	—	2	—	—	—	—	—	—	—
CO4	2	—	—	—	2	—	—	—	—	—	—	—
CO5	1	—	—	—	—	—	—	—	—	—	—	—
CO6	1	—	2	—	2	—	—	—	—	—	—	—
Total	12	—	4	—	6	—	—	—	—	—	—	—
Avg.	2	—	0.67	—	1	—	—	—	—	—	—	—

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	PO1	PSO1
CO-2	PO1	PSO1
CO-3	PO1,PO3,PO5	PSO1,PSO3
CO-4	PO1,PO5	PSO1
CO-5	PO1	PSO1

CO-6	PO1,PO3,PO5	PSO1,PSO3

CAD/CAM

Name of the Program: Bachelor of Technology	**Academic Year:** 2020 - 2021
Branch: Mechanical Engineering	**Year & Semester:** IV Year & I Semester
Name of the Course: CAD/CAM	**Regulation:** R-18
Course Area/Module: Design & Manufacturing	**No. of students registered:**
Course Coordinator: Mr.G.GOPICHANDU BABU **Designation:** Assistant Professor	**Course Instructors:** Mr.G.GOPICHANDU BABU
No. of Lecture Hours per week:05	**No. of Tutorial Hours per week:** 01
Credits:03	

COURSE OBJECTIVES:

Students will be able to:

1. Understand the basic fundamentals of computer aided design and manufacturing. To learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc.,
2. Understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication.
3. Learn the part programming, distinguish between NC (Numerical Control), CNC & DNC in CAD/CAM
4. Understand the group technology approaches for manufactories industries.
5. Interpret the importance of CAQC(Computer Aided Quality Control)
6. Learn the overall configuration and elements of computer integrated manufacturing systems.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Observe the various input and output devices used in CAD/CAM systems. Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix
2. To construct the database models and geometric modeling features- drafting and modeling systems used in CAD/CAM- Solid modeling features and applications. List the various commands in the CAD.
3. Write the programs for different models by using NC part programming, distinguish between NC, CNC & DNC in CAD/CAM
4. Analyze the Group Technology (GT), CAPP & FMS and can be able to describe the use of GT and CAPP for the product development
5. Differentiate various computer–based applications in manufacturing system and quality control (CQAC) aspects.
6. Identify the various elements and their activities in the Computer Integrated Manufacturing Systems, differentiate various material-handling systems and can summarize the CIM implementation strategies.

COURSE DESCRIPTION:

This is an introductory course that demonstrates the integration of Computer-Aided-Design (CAD) and Computer-Aided-Manufacturing (CAM). This course teaches students the principles and applications of CAD/CAM in product and manufacturing design and is highly relevant to future trends in automation and manufacturing processes. It teaches the underlying theory of CAD/CAM, but most importantly teaches students the skills needed to design using CAD/CAM. The course teaches the essential steps that one takes to develop a product from concept to manufacture starting with CAD, and progressing to simulation, using CAM software support. This course will enable students to explore and gain further understanding of how CAD/CAM can be used in Manufacturing Industry. Hands-on experience for the students is attained through Simulation laboratory and CNC machine tool laboratory.

COURSE CONTENT (Syllabus):

UNIT – I

Computers in industrial manufacturing, product cycle, CAD / CAM Hardware, basic structure, CPU, memory types, input devices, display devices, hard copy devices, storage devices.

COMPUTER GRAPHICS: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, mathematics of projections, clipping, hidden surface removal.

UNIT – II

GEOMETRIC MODELING: Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired.

DRAFTING AND MODELING SYSTEMS: Basic geometric commands, layers, display control commands, editing, dimensioning and solid modeling.

UNIT – III

PART PROGRAMMING FOR NC MACHINES: NC, NC modes, NC elements, CNC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming: fundamentals, manual part programming methods, Computer Aided Part Programming. Direct Numerical Control, Adaptive Control.

UNIT – IV

GROUP TECHNOLOGY: Part family, coding and classification, production flow analysis, types and advantages. Computer aided processes planning – importance, types. FMS-Introduction, Equipment, Tool management systems, Layouts, FMS Control

UNIT – V

COMPUTER AIDED QUALITY CONTROL: Terminology used in quality control, use of computers in Quality control. Inspection methods- contact and noncontact types, computer aided testing, integration of CAQC with CAD/CAM

UNIT – VI

COMPUTER INTEGRATED MANUFACTURING SYSTEMS: Types of manufacturing systems, machine tools and related equipment, material handling systems, material requirement planning, computer control systems, human labor in manufacturing systems, CIMS benefits.

Text Books:

1. CAD / CAM Principles and Applications/PN Rao / McGraw-Hill
2. Automation, Production systems & Computer integrated Manufacturing/ M.P. Groover/Pearson Education

References:

1. Mastering CAD / CAM / Ibrahim Zeid / McGraw-Hill
2. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
3. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson learning, Inc
4. Product manufacturing and cost estimation using CAD/CAE/ Kuang Hua Chang/Elsevier Publishers

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks

1	1	**Unit – I:** Computer in industrial manufacturing- introduction	--
1	2	Product cycle	--
1	3	CAD/CAM Hardware: Basic structure, CPU, Memory types, Input devices	--
1	4	Display devices	--
1	5	Hard copy devices, storage devices.	--
1	6	**COMPUTER GRAPHICS:** Virtual Reality, Raster Scan, Random Scan & Applications of Computer graphics	--
1	7	Line generation Algorithm – DDA Algorithm with example	--
1	8	Line generation Algorithm – Bresenham algorithm with example	--
1	9	Antialiasing Lines, Coordinate Systems, database structure for graphics modeling	--
1	10	Transformation of geometry: 2D transformation with example	--
1	11	3D transformations	--
1	12	Mathematics of Projections	--
1	13	Clipping, Hidden Surface removal: Back face removal & Z-buffer	--
1	14	**Unit – II: GEOMETRIC MODELING:** Introduction, Requirements, Geometric models	--
1	15	Geometric Construction models	--
1	16	Curve representation methods – Hermite Cubic spline	--
1	17	Bezier curve and Problems	--
1	18	B-spline and problems	--
1	19	Surface representation methods-Plane Surface	--
1	20	Surface of evaluation, tabulated cylinder	--
1	21	Solid modeling-Boundary representation	--
1	22	Modeling facilities desired	--
1	23	**DRAFTING AND MODELING SYSTEMS:** Basic geometric commands, layers, display control commands,	--
1	24	Editing, dimensioning, solid modeling	--
1	25	**Unit – III: PART PROGRAMMING FOR NC MACHINES:** Introduction, NC objectives, Advantages, Disadvantages, NC elements	--
1	26	CNC machine tools, Structure	--
1	27	Features of Machining center, turning center	--
1	28	CNC Part Programming: Fundamentals, manual part programming methods, Computer Aided Part Programming	--
1	29	Direct Numerical Control, Adaptive Control	--
1	30	Programming	--
1	31	Programming	--
1	32	Programming	--
1	33	**UNIT – IV: GROUP TECHNOLOGY:** Introduction, Part family	--
1	34	Parts classification and Coding	--

1	35	Production flow analysis, types and advantages	--
1	36	Benefits, Advantages & Disadvantages of GT	--
1	37	Computer aided processes planning – importance, types.	--
1	38	Retrieval type and Generative type, Benefits of CAPP	--
1	39	FMS-Introduction, Elements of FMS	--
1	40	Equipment, Tool management systems, Types of FMS	--
1	41	FMS Layouts	--
1	42	FMS Control	--
1	43	**UNIT – V: COMPUTER AIDED QUALITY CONTROL:** Introduction, Objectives, Terminology used in quality control	--
1	44	Use of computers in Quality control, Inspection & Testing, Offline and Online Inspection	--
1	45	Inspection methods- contact and noncontact types, Contact Inspection methods: CMM & Benefits	--
1	46	Flexible Inspection Systems, Inspection Probes	--
1	47	Non-Contact Inspection methods: Optical methods	--
1	48	Non-Contact Inspection methods: Non-Optical methods, Computer Aided Testing	--
1	49	Integration of CAQC with CAD/CAM	--
1	50	Statistical Quality Control	--
1	51	Statistical Process Control	--
1	52	Total Quality Management	--
1	53	**UNIT – VI: COMPUTER INTEGRATED MANUFACTURING SYSTEMS:** Introduction, Integration & Rationalization	--
1	54	Sequence of functions in CIM, Elements of CIM	--
1	55	Types of manufacturing systems	--
1	56	Machine tools and related equipment	--
1	57	CIM Implementation, Benefits of CIM	--
1	58	Material handling systems – Introduction, material handling equipment	--
1	59	Principles of Material handling, Selection of Material handling equipment	--
1	60	AGV's, material requirement planning	--
1	61	computer control systems, human labor in manufacturing systems	--
1	62	Computer Programming (Revision)	--
1	63	Computer Programming (Revision)	--
1	64	Computer Programming (Revision)	--

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	3	1	-	-	-	-	-	1

CO2	3	2	1	2	3	1	-	-	-	-	-	1
CO3	2	2	1	2	3	1	-	-	-	-	-	1
CO4	2	2	1	2	3	2	-	-	-	-	-	1
CO5	2	2	1	2	3	2	-	-	-	-	-	1
CO6	1	2	1	2	3	2	-	-	-	-	-	1
Total	13	12	6	12	18	9	-	-	-	-	-	6
Avg.	2.16 6	2	1	2	3	1.5	-	-	-	-	-	1

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	PO1,PO2,PO3,PO4,PO5,PO6,PO12	PSO1, PSO2
CO-2	PO1,PO2,PO3,PO4,PO5,PO6,PO12	PSO1, PSO2
CO-3	PO1,PO2,PO3,PO4,PO5,PO6,PO12	PSO2, PSO3
CO-4	PO1,PO2,PO3,PO4,PO5,PO6,PO12	PSO1, PSO2
CO-5	PO1,PO2,PO3,PO4,PO5,PO6,PO12	PSO2, PSO3
CO-6	PO1,PO2,PO3,PO4,PO5,PO6,PO12	PSO2, PSO3

FINITE ELEMENT METHODS

Name of the Program: B. Tech.	**Academic Year: 2020-2021**
Branch: Mechanical	**Year & Semester: IV-I**
Name of the Course: Finite Element Methods	**Regulation: R18**
Course Area/Module: Design / Mechanical	**No. of students registered: 90**
Course Coordinator: Mr.V.MOHAN MANOJ **Designation: Assistant Professor**	**Course Instructors:** Mr.V.MOHAN MANOJ
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. To learn basic principles of finite element analysis procedure
2. To learn the theory and characteristics of finite elements that represent engineering structures
3. To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses performed by others
4. Learn to model complex geometry problems and solution techniques.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1.Understand the concepts behind variational methods and weighted residual methods in FEM
2. Identify the application and characteristics of FEA elements such as bars, applications to structural and heat transfer problems.
3. Formulate finite element modeling of truss and frame elements along with the concepts of transformation from local to global matrices
4. Develop stiffness matrix for a plane stress & plane strain conditions on a CST, Axisymmetric elements by interpolating shape functions in natural coordinate system
5. Interpolate the shape functions of Isoperimetric elements and use numerical integration to evaluate the element matrices in typical 2D problems. Formulate finite element model to steady state heat transfer analysis using one & two dimensional elements.
6. Formulate mass and stiffness matrices of 1D & beam elements to establish Eigen values &Eigen vectors using Lagrangian and Hamilton principles.

COURSE DESCRIPTION:

Finite Element Method (FEM) is a numerical technique for solving differential equations that describe many engineering problems. Main reason for its popularity is that the method results in computer codes which are versatile in nature that can solve many practical problems with minimum training.

COURSE CONTENT (Syllabus):

UNIT-I

Introduction to finite element method, stress and equilibrium, strain – displacement relations, stress – strain relations, plane stress and plane strain conditions, variational and weighted residual methods, concept of potential energy, one dimensional problems.

UNIT – II

Discretization of domain, element shapes, discretization procedures, assembly of stiffness matrix, band width, node numbering, mesh generation, interpolation functions, local and global coordinates, convergence requirements, treatment of boundary conditions.

UNIT – III

Analysis of Trusses: Finite element modelling, coordinates and shape functions, assembly of global stiffness matrix and load vector, finite element equations, treatment of boundary conditions, stress, strain and support reaction calculations. Analysis of Beams: Element stiffness matrix for Hermite beam element, derivation of load vector for concentrated and UDL, simple problems on beams.

UNIT – IV

Finite element modelling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions, formulation of axisymmetric problems.

UNIT-V

Higher order and isoparametric elements: One dimensional quadratic and cubic elements in natural coordinates, two dimensional four noded isoparametric elements and numerical integration.

UNIT – VI

Steady state heat transfer analysis : one dimensional analysis of a fin and two dimensional analysis of thin plate, analysis of a uniform shaft subjected to torsion. Dynamic Analysis: Formulation of finite element model, element consistent and lumped mass matrices, evaluation of eigen values and eigen vectors, free vibration analysis.

Text Books:

4. The Finite Element Methods in Engineering / SS Rao / Pergamon.
5. An introduction to Finite Element Method / JN Reddy / McGraw Hill

References:

6. Finite Element Method with applications in Engineering / YM Desai, Eldho & Shah /Pearson publishers
7. The Finite Element Method for Engineers – Kenneth H. Huebner, Donald L. Dewhirst, Douglas E. Smith and Ted G. Byrom / John Wiley & sons (ASIA) Pte Ltd.
8. Finite Element Analysis: Theory and Application with Ansys, Saeed Moaveniu, Pearson Education
9. Finite Element Methods / Chen
10. Finite Element Analysis: for students & Practicing Engineers / G.Lakshmi Narasaiah / BSP Books Pvt.Ltd.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
		UNIT-1	
2	2	INTRODUCTION TO FEM	
3	4	STRESS- STRAIN, STRAIN- DISPLACEMENT, EQUILIBRIUM AND COMPATIBILITY EQUATIONS	
2	6	PLANE STRESS & PLANE STRAIN CONCEPTS	
2	8	FUNCTIONAL APPROXIMATION METHODS [PROBLEMS]	
1	9	PRINCIPLE OF MINIMUM POTENTIAL ENERGY CONCEPTS	
1	10	INTRODUCTION TO 1-D FINITE ELEMENTS	
		UNIT-2	
1	11	CONCEPTS OF DICRETIZATION & PROCEDURES	
2	13	LOAD,STRESS,STRAIN,DISPLACEMENT & THEIR RELATIONS	
1	14	FORMATION OF STIFFNESS MATRIX	

3	**17**	FORMULATION OF FINITE ELEMENT EQUATIONS [PROBLEMS]	
1	**18**	BAND WIDTH, NODE NUMBERING, MESH GENERATION	
1	**19**	INTERPOLATION FUNCTIONS [PASCALS TRIANGLE]	
		UNIT-3	
2	**21**	ANALYSIS OF TRUSSES	
1	**22**	FORMATION OF STIFFNESS MATRIX & LOAD VECTOR	
1	**23**	ANALYSING PROCEDURE FOR TRUSS ELEMENTS [K][Q]=[F]	
2	**25**	CALUCULATION OF STRESS,STRAIN & SUPPORT REACTIONS [PROBLEMS]	
2	**27**	ANALYSIS OF BEAMS	
2	**29**	FORMATION OF HERMITE SHAPE FUNCTION & STIFFNESS MATRIX	
3	**32**	DERIVATION OF LOAD VECTOR FOR UDL & PROBLEMS	
2	**34**	NUMERICAL PROBLEMS	
2	**36**	NUMERICAL PROBLEMS	
		UNIT-4	
1	**37**	INTRODUCTION TO 2-D FINITE ELEMENTS [CST]	
1	**38**	DERIVATION OF SHAPE FUNCTION	
1	**39**	STRESS- STRAIN, STRAIN- DISPLACEMENT RELATIONS	
1	**40**	STIFFNESS MATRIX DERIVATION [CST]	
2	**42**	PROBLEMS ON CST ELEMENT	
1	**43**	INTRODUCTION TO AXI-SYMMETRIC PROBLEMS	
1	**44**	DERIVATION OF SHAPE FUNCTION & STIFFNESS MATRIX	
1	**45**	ELASTICITY RELATIONS FOR AXI-SYMMETRIC ELEMENTS	
2	**47**	PROBLEMS ON AXI-SYMMETRIC ELEMENTS	
		UNIT – 5	
1	**48**	INTRODUCTION TO ISOPARAMETRIC ELEMENTS	
1	**49**	FORMATION OF SHAPE FUNCTION, STIFFENESS MATRIX FOR 1-D QUADRATIC & CUBIC ELEMENTS USING NATURAL CO-ORDINATE SYSTEM	
1	**50**	DERIVATION OF SHAPE FUNCTION FOR 4-NODED QUADRILATERAL ELEMENT USING NATURAL CO-ORDINATE SYSTEM	
1	**51**	INTRODUCTION TO NUMERICAL INTEGRATION	

		[GAUSS QUADRATURE METHOD]	
2	**53**	GAUSS METHOD OF INTEGRATION FOR 1-D PROBLEMS	
2	**55**	TWO DIMENSIONAL INTEGRALS & STRESS CALCULATIONS	
		UNIT - 6	
1	**56**	INTRODUCTION TO STEADY STATE THERMAL ANALYSIS	
2	**58**	1-D ANALYSIS OF A FIN	
2	**60**	2-D ANALYSIS OF A THIN PLATE	
2	**62**	PROBLEMS ON FIN	
2	**64**	PROBLEMS ON THIN PLATE	
1	**65**	ANALYSIS OF A UNIFORM SHAFT SUBJECTED TO TORSION.	
1	**66**	PROBLEMS ON TORSION	
1	**67**	DYNAMIC ANALYSIS FOR STRUCTURAL PROBLEMS	
2	**69**	FORMULATION OF ELEMENT CONSISTENT AND LUMPED MASS MATRICES	
1	**70**	EVALUATION OF EIGEN VALUES & EIGEN VECTORS	
3	**73**	PROBLEMS ON NATURAL FRQUENCIES & MODES	
1	**74**	REVISION	
1	**75**	REVISION	
1	**76**	REVISION	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3										
CO2	3	3	2	2								
CO3	3	3										3
CO4	2	2	2	1								
CO5	3	3	3	2								
CO6	3	3	3	2	3							3
Total	17	17	10	7	3							6
Avg.	3	3	2.5	1.6	3							3

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2	1,2
CO2	1,2,3,4	1,2
CO3	1,2,12	1,2

CO4	1,2,3,4	1,2
CO5	1,2,3,4	1,2
CO6	1,2,3,4,12	1,2

POWER PLANT ENGINEERING

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Mechanical	**Year & Semester: IV-1**
Name of the Course: Power plant engineering	**Regulation: R-18**
Course Area/Module: Thermal	**No. of students registered:**
Course Coordinator: V.Lakshmikanth **Designation: Associate Professor**	**Course Instructors:** **1. V.Lakshmikanth** **2.**
No. of Lecture Hours per week : 4	**No. of Tutorial Hours per week:**
Credits: 3	

COURSE OBJECTIVES:

1.This course is intended to provide basic knowledge of power generation through different prime movers viz steam, hydro, nuclear and hybrid systems along with their economics and environmental considerations
2.Understanding of Thermal Power Plant Operation, turbine governing, different types of high pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems.
3.Design of chimney in thermal power plants, knowledge of cooling tower operation, numerical on surface condenser design.
4. Basic knowledge of Different types of Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor.
5.Understanding of Power Plant Economics, Energy Storage including compressed air energy and pumped hydro etc.
6. Discussing environmental and safety aspects of power plant operation

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

CO1	Describe and analyze different types of sources of energy related with power plant operationenergy . related with power plant operation. Analyze the working and layout of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts.

CO2	Combine concepts of previously learnt courses to define the working principle of diesel power pla nt, its layout, safety principles and compare it with plants of other types
CO3	Discuss the working principle and basic components of the hydro electric plants and the economic principles and safety precautions involved with it
CO4	Describe the working principle and basic components of the nuclear power plant and the econom ic and safety principles involved with it.
CO5	Understand about measurement and instrumentations in power plants and coordination of different types of power plants
CO6	Discuss and analyse on measurement and instrumentations in power plants and coordination of different types of power plants

COURSE DESCRIPTION:

Power Plant Engineering basically focuses on power generation principles for real world applications. More specifically this course is focused on application of energy principles and power generation cycles. The main purpose of implementing this course in curriculum is to learn about how the power is generated in a power plant and its applications.

SYLLABUS:

UNIT I

Introduction to the sources of energy – resources and development of power in India.

STEAM POWER PLANT: Plant layout, working of different circuits, fuel and handling equipment's, types of coals, coal handling, choice of handling equipment, coal storage, ash handling systems. Combustion: properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction , dust collectors, cooling towers and heat rejection. corrosion and feed water treatment.

UNIT II:

INTERNAL COMBUSTION AND GAS TURBINE POWER PLANTS:

DIESEL POWER PLANT: Plant layout with auxiliaries – fuel supply system, air starting equipment, super charging.

GAS TURBINE PLANT: Introduction – classification - construction – layout with auxiliaries, combined cycle power plants and comparison.

UNIT III:

HYDRO ELECTRIC POWER PLANT: Water power – hydrological cycle / flow measurement – drainage area characteristics – hydrographs – storage and pondage – classification of dams and spill ways.

HYDRO PROJECTS AND PLANT: Classification – typical layouts – plant auxiliaries – plant operation pumped storage plants.

UNIT IV:

NUCLEAR POWER STATION: Nuclear fuel – breeding and fertile materials – nuclear reactor – reactor operation.

TYPES OF REACTORS: Pressurized water reactor, boiling water reactor, sodium-graphite reactor, fast breeder reactor, homogeneous reactor, gas cooled reactor, radiation hazards and shielding – radioactive waste disposal.

UNIT V:

COMBINED OPERATIONS OF DIFFERENT POWER PLANTS: Introduction, advantages of combined working, load division between power stations, storage type hydro-electric plant in combination with steam plant,run-of-river plant in combination with steam plant, pump storage plant in combination with steam or nuclear power plant, co-ordination of hydro-electric and gas turbine stations, co-ordination of hydro-electric and nuclear power stations, co-ordination of different types of power plants.

POWER PLANT INSTRUMENTATION AND CONTROL: Importance of measurement and instrumentationin power plant, measurement of water purity, gas analysis, O2 and CO2 measurements, measurement of smoke and dust, measurement of moisture in carbon dioxide circuit,

UNIT VI:

POWER PLANT ECONOMICS AND ENVIRONMENTAL CONSIDERATIONS: Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, load curves, load duration curve,definitions of connected load, maximum demand, demand factor, average load, load factor, diversity factor –related exercises. effluents from power plants and Impact on environment – pollutants and pollution standards –methods of pollution control.

TEXT BOOKS:

1. A course in Power Plant Engineering /Arora and Domkundwar/Dhanpatrai & Co.
2. Power Plant Engineering /P.C.Sharma / S.K.Kataria Pub

REFERENCE BOOKS:

3. 1. Power Plant Engineering: P.K.Nag/ II Edition /TMH.
4. 2. Power station Engineering – ElWakil / McGrawHill.
5. 3. An Introduction to Power Plant Technology / G.D. Rai/Khanna Publishers
6. 4 .Power Plant Engineering, P.K. Nag, Tata McGraw Hill.
7. 5. Power Plant Engineering, F.T. Morse, Affiliated East-West Press Pvt. Ltd, New Delhi/Madras 6.Power Plant Technology El-Vakil, McGraw Hill.

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
2	2	Introduction to the sources of energy – resources and development of power in india	
2	4	Plant layout, working of different circuits	
2	6	fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, ash handling systems.	
4	10	fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, ash handling systems.	

1	11	Traveling grate stokers, spreader stokers, retort stokers	
2	13	Cyclone furnace, design and construction, dust collectors, cooling towers and heat rejection.. corrosion and feed water treatment	
2	15	corrosion and feed water treatment	
2	17	**DIESEL POWER PLANT:** Plant layout with auxiliaries –	
2	19	fuel supply system, air starting equipment,	
2	21	super charging.	
2	23	**GAS TURBINE PLANT:** Introduction – classification - construction – layout with auxiliaries,	
2	25	combined cycle power plants and comparison.	
2	27	**HYDRO ELECTRIC POWER PLANT:** Water power, hydrological cycle / flow measurement – drainage area characteristics	
2	29	hydrographs – storage and pondage	
2	31	classification of dams and spill ways	
2	33	**HYDRO PROJECTS AND PLANT:** ClassificatioN	
2	35	typical layouts , plant auxiliaries	
2	37	plant operatic pumped storage plants.	
3	40	**NUCLEAR POWER STATION:** Nuclear fuel — nuclear reactor – reactor operation.	
2	42	**TYPES OF REACTORS:** Pressurized water reactor, boiling water reactor,	
2	44	Sodium-graphite reactor, fast breeder reactor, homogeneous reactor	
2	46	Gas cooled reactor, radiation hazards and shielding.	
2	48	radioactive waste disposal	
2	50	**COMBINED OPERATIONS OF DIFFERENT POWER PLANTS:** Introduction, advantages of combined working, run-of-river plant in combination with steam plant,	
1	51	load division between power stations, storage type hydro-electric plant in combination with steam plant	
2	53	pump storage plant in combination with steam or nuclear power plant,	
2	55	co-ordination of hydro-electric and gas turbine stations, co-ordination of hydro-electric and nuclear power stations	
2	57	co-ordination of different types of power plants	
2	59	**POWER PLANT INSTRUMENTATION AND CONTROL:** Importance of measurement and instrumentation in power plant,	

2	61	measurement of water purity, gas analysis, O_2 and CO_2 measurement	
1	62	, measurement of smoke and dust, measurement of moisture in carbon dioxide circuit, nuclear measurements	
2	64	Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, load curves, load duration curve	
1	65	definitions of connected load, maximum demand, demand factor, average load, load factor, diversity factor	
1	66	Effluents from power plants and Impact on environment	
1	67	Pollutants and pollution standards – methods of pollution control.	
1	68	Revision	
1	69	Revision	
2	71	Tutorial	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	2	2		2	1	2	1	3
CO2	2		3	1		2	2		1		1	2
CO3	2		2	1		1	3		1		1	2
CO4	2		3	1		1	2		1		1	2
CO5	2		2	1		1	2	2	1		1	2
CO6	2	2	1	2	1	2	1	1	1	2	1	3
Total	12	5	13	9	3	9	10	5	6	4	6	14
Avg.	2	2.5	2.16	1.5	1.5	1.5	2	1.6	1	2	1	2.3

CO INDEX	POs MAPPED	PSOs MAPPED
CO 1	1,2,3,4,5,6,8,9,10,11,12	1,2,3
CO 2	1,3,4,6,7,9,,11,12	1,2,3
CO 3	1,3,4,6,7,9,,11,12	1,2,3
CO 4	1,3,4,6,7,9,,11,12	1,2,3
CO 5	1,3,4,6,7,8,9,,11,12	1,2,3
CO 6	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3

ADDITIVE MANUFACTURING

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Mechanical	**Year & Semester: IV-I**
Name of the Course: Additive manufacturing	**Regulation: R18**
Course Area/Module: Manufacturing	**No. of students registered:**

Course Coordinator Mr.R.VIJAY KRISHNA **Designation: Associate Professor**	**Course Instructors:** **Mr.R.VIJAY KRISHNA**
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Understand Rapid proto typing and their classification and learn models,specifications,process and principle,of SLA and SGC Process.
2. Learn models, specifications,process and principle,of LOM and FDM Process.
3. Learn models,specifications,process and principle,of SLS and 3DP Process.
4. Understand about Rapid tooling
5. Understand about R.P data formats and softwares
6. Learn the R.P applications

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Summarize Rapid prototyping and give their classification.
2. Discuss the models, specifications,process and principle,of LOM and FDM Process.
3. Describe models,specifications,process and principle,of SLS and 3DP Process.
4. Discuss the Rapid tooling
5. Describe the R.P data formats and softwares
6. Summarize R.P applications.

COURSE DESCRIPTION:

This course provides the student an in-depth understanding of the key factors that govern the design and selection of materials for use in advanced engineering applications, as well as their processing, properties and stability. Focusing on Additive manufacturing, advanced manufacturing and engineering applications, the student will explore the technologies used in the manufacturing and processing of advanced materials and develop an understanding of the relationships between additive manufacturing processing and performance. This course aimed at students who wish to have a strong materials background, gain more specialized knowledge of the principles, structure, processing and design of additive manufacturing.

COURSE CONTENT (Syllabus):

UNIT – I

INTRODUCTION: Prototyping fundamentals, historical development, fundamentals of rapid prototyping, advantages and limitations of rapid prototyping, commonly used terms, classification of RP process.

LIQUID-BASED RAPID PROTOTYPING SYSTEMS: Stereo lithography Apparatus (SLA): models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages, case studies. Solid Ground Curing (SGC): models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-II

SOLID-BASED RAPID PROTOTYPING SYSTEMS: Laminated object manufacturing (LOM) - models and specifications, process, working principle, applications, advantages and disadvantages, case studies. Fused deposition modelling (FDM) - models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT – III

POWDER BASED RAPID PROTOTYPING SYSTEMS: Selective laser sintering (SLS): models and specifications, process, working principle, applications, advantages and disadvantages, case studies. Three dimensional printing (3DP): models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-IV

RAPID TOOLING: Introduction to rapid tooling (RT), conventional tooling Vs RT, Need for RT. rapid tooling classification: indirect rapid tooling methods: spray metal deposition, RTV epoxy tools, Ceramic tools, investment casting, spin casting, die casting, sand casting, 3D Keltool process. Direct rapid tooling: direct AIM, LOM Tools, DTM Rapid Tool Process, EOS Direct Tool Process and Direct Metal Tooling using 3DP.

UNIT – V

RAPID PROTOTYPING DATA FORMATS: STL Format, STL File Problems, consequence of building valid and invalid tessellated models, STL file Repairs: Generic Solution, other Translators, Newly Proposed Formats.

RAPID PROTOTYPING SOFTWARE'S: Features of various RP software's like Magics, Mimics, Solid View, View Expert, 3 D View, Velocity 2, Rhino, STL View 3 Data Expert and 3 D doctor.

UNIT –VI

RP APPLICATIONS: Application in engineering, analysis and planning, aerospace industry, automotive industry, jewelry industry, coin industry, GIS application, arts and architecture. RP medical and bioengineering applications: planning and simulation of complex surgery, customized implants & prosthesis, design and

production of medical devices, forensic science and anthropology, visualization of bimolecular.

Text Books:

1. Rapid prototyping: Principles and Applications /Chua C.K., Leong K.F. and LIM C.S/World Scientific publications

References:

1. Rapid Manufacturing / D.T. Pham and S.S. Dimov/Springer

2. Wohlers Report 2000 /Terry T Wohlers/Wohlers Associates

3. Rapid Prototyping & Manufacturing / Paul F.Jacobs/ASME Press

4. Rapid Prototyping / Chua & Liou

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Prototyping fundamentals	
1	2	Historical development	
1	3	Fundamentals of rapid prototyping	
1	4	Advantages and limitations of rapid prototyping	
1	5	Commonly used terms in RP and classification of RP process	
2	7	**LIQUID BASED RP SYSTEMS**: Stereo lithography (SLA) Apparatus: models and specifications	
1	8	Process, Working principle of SLA	
1	9	Photopolymers, photo polymerization	
1	10	Layering technology, laser and laser scanning	
1	11	Applications, advantages and disadvantages	
1	12	Case studies	
1	13	Solid ground curing (SGC):Models and specifications	
1	14	Process and Working principle of SGC	
2	16	Applications, advantages and disadvantages	
1	17	Case studies	
1	18	Laminated object manufacturing (LOM)- models and specifications	
1	19	Process and Working principle of LOM	
2	21	Applications , Advantages and disadvantages of LOM	
2	22	Case studies on LOM	
2	24	Fused deposition modeling (FDM)- models and specifications	
1	25	Process, Working principle of FDM	
1	26	Applications, Advantages and disadvantages of FDM	
1	27	Case studies on FDM	
1	28	Selective laser sintering (SLS)- models and specifications	
1	29	Process, working principle of SLS	
1	30	Applications, Advantages and disadvantages of SLS	
2	32	Case studies on SLS	
3	35	3D Printing: models and specifications	
1	36	Process,working Principle of 3D printing	
3	39	Applications , Advantages and disadvantages of 3D printing	

2	41	Case studies on 3D printing	
1	42	Revision	
1	43	Introduction to rapid tooling	
1	44	Conventional tooling vs rapid tooling	
2	46	Need for rapid tooling	
2	48	Rapid tooling classification- Indirect and direct rapid tooling	
1	49	Indirect RT methods-Spray metal deposition and RTV epoxy tools	
1	50	Ceramic tools and investment casting	
3	53	Spin casting and die casting	
1	54	Sand casting and 3D keltool process	
2	56	Direct rapid tooling method :Direct AIM and LOM tools	
1	57	DTM rapid tool process and EOS direct tool process	
2	59	Direct metal tooling using 3D printing	
1	60	STL format and STL file problems	
1	61	Consequence of building Valid and invalid tessellated models	
1	62	STL file repairs :Generic solution, other translators	
1	63	Newly proposed formats.	
2	65	**RP SOFTWARE'S**: Features of Magic's , Mimic's	
2	67	Solid view ,view expert ,3D view	
1	68	velocity 2, rhino ,STL view 3Data Expert and 3D doctor.	
1	69	Applications in engineering, analysis and planning	
1	70	Application in aerospace industry, Applications in automotive industry	
1	71	Applications in jewelry and coin industry	
1	72	GIS applications	
1	73	Arts and architecture	
1	74	RP medical and bioengineering applications	
1	75	Planning and simulation of complex surgery,	
1	76	Customized implants & prosthesis	
1	77	Design and production of medical devices	
1	78	Forensic science and anthropology	
1	79	Visualization of bimolecular.	

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1			1	1					1
CO2	1	1	1			1	1					1

CO3	1	1	1			1	1					1
CO4	3	1	1	1		1	1					1
CO5	1	1	1			1	1					1
CO6	1	1	1			1	1					1
Total	8	6	6	1		6	6					6
Avg.	2	1	1	1		1	1					1

CO INDEX	**POs MAPPED**	**PSOs MAPPED**
CO1	1,3,5	1,2,3
CO2	1,3,5	1,2,3
CO3	1,3,5	1,2,3
CO4	1,3,5	1,2,3
CO5	1,3,5	1,2,3
CO6	1,3,5	1,2,3

ADVANCED MATERIALS

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Mechanical	**Year & Semester: IV-I**
Name of the Course: Advanced Materials	**Regulation: R18**
Course Area/Module: Manufacturing	**No. of students registered:**
Course Coordinator: J.Leela krishna **Designation:Associate Professor**	**Course Instructors:** **J.Leela krishna**
No. of Lecture Hours per week:5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Understand composite materials and their classification.
2. Learn classification, properties, processing methods and application of composite materials.
3. Understand manufacturing methods of composite materials.
4. Learn mechanics of composite materials.
5. Understand properties, manufacturing methods and applications of functionally graded materials and shape memory alloys.
6. Learn the concept of nano materials.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Summarize composite materials and give their classification.
2. Discuss the classification, properties, processing methods and application of composite materials.
3. Describe the manufacturing methods of composite materials.
4. Discuss the mechanics of composite materials.
5. Describe the properties, manufacturing methods and applications of functionally graded materials and shape memory alloys.
6. Summarize nano materials, their properties and applications.

COURSE DESCRIPTION:

This course provides the student an in-depth understanding of the key factors that govern the design and selection of materials for use in advanced engineering applications, as well as their processing, properties and stability.Focusing on composites, advanced alloys and engineering ceramics, the student will explore the technologies used in the manufacturing and processing of advanced materials and develop an understanding of the relationships between composition, microstructure, processing and performance.This course aimed at students who wish to have a strong materials background, gain more specialized knowledge of the principles, structure, processing and design of advanced engineering materials.

COURSE CONTENT (Syllabus):

UNIT-I : INTRODUCTION TO COMPOSITE MATERIALS: Introduction, classification: Polymer matrix composites, metal matrix composites, ceramic matrix composites, carbon–carbon composites, fiber- reinforced composites and nature-made composites, and applications. **REINFORCEMENTS:**Fibres- glass, silica, kevlar, carbon, boron, silicon carbide, and born carbide fibres.

UNIT-II : polymer composites, thermoplastics, thermosetting plastics, manufacturing of PMC, MMC & CCC and their applications.

UNIT-III : MANUFACTURING METHODS: Autoclave, tape production, moulding methods, filament winding, man layup, pultrusion, RTM.

UNIT-IV : MACROMECHANICAL ANALYSIS OF A LAMINA: Introduction, generalized hooke's law, reduction of hooke's law in three dimensions to two dimensions, relationship of compliance and stiffness matrix to engineering elastic constants of an orthotropic lamina, laminate-laminate code.

UNIT-V : FUNCTIONALLY GRADED MATERIALS: Types of functionally graded materials-classification-different systems-preparation-properties and applications of functionally graded materials.

SHAPE MEMORY ALLOYS: Introduction-shape memory effect- classification of shape memory alloys-composition-properties and applications of shape memory alloys.

UNIT-VI : NANO MATERIALS: Introduction-properties at nano scales-advantages & disadvantages-applications in comparison with bulk materials (nano – structure, wires, tubes, composites). state of art nano advanced- topic delivered by student.

TEXT BOOKS

1. Nano material by A.K. Bandyopadyay, New age Publishers.
2. Material science and Technology- Cahan.
3. Engineering Mechanics of Composite Materials by Isaac and M Daniel, Oxford University Press.

REFERENCES

1. R. M. Jones, Mechanics of Composite Materials, Mc Graw Hill Company, New York, 1975.
2. L. R. Calcote, Analysis of Laminated Composite Structures, Van Nostrand Rainfold.
3. B. D. Agarwal and L. J. Broutman, Analysis and performance of fibre Composites, Wiley-Interscience, New York, 1980.
4. Mechanics of Composite Materials, Second Edition (Mechanical Engineering), AutarK.Kaw, Publisher: CRC.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction, Classification, Polymer matrix composites,	
1	2	Ceramic matrix composites	
1	3	Carbon-carbon composites	
1	4	Fiber reinforced composites	
1	5	Nature made composites	
2	7	Applications	
1	8	Tutorial	
1	9	Kelvar, carbon	
1	10	boron, silicon carbide, boron carbide fibers	
1	11	Polymer composites	
1	12	Thermo plastics	
1	13	Tutorial	
1	14	Manufacturing of PMC	
2	16	Manufacturing of MMC	
1	17	Manufacturing of CCC	
1	18	Applications	
1	19	Tutorial	
2	21	Autoclave	
2	22	Tape production	
2	24	moulding methods	

1	25	Tutorial	
1	26	Filament winding	
1	27	hand layup	
1	28	pultrusion	
1	29	RTM	
1	30	Tutorial	
2	32	Introduction, Generalized Hookes law	
3	35	Reduction of Hookes law in three dimensions to two dimensions	
1	36	Tutorial	
3	39	relationship of complianc and stiffness matrix to engineering elastic constantsof an orthotropic lamina	
2	41	laminate-laminate code	
1	42	Tutorial	
1	43	Types of Functionally graded materials	
1	44	classification	
2	46	different systems	
2	48	Preparation	
1	49	Properties	
1	50	Tutorial	
3	53	Applications	
1	54	Introduction to shape memory alloys	
2	56	shape memory effect, classification	
1	57	Tutorial	
2	59	composition and properties	
1	60	Applications	
1	61	Introduction, properties at nano scales	
1	62	Tutorial	
1	63	advantages, disadvantages	
2	65	applications in comparison with bulk materials	
2	67	State of art of nano advanced	
1	68	Tutorial	
3	71	topic delivered by student	

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1			1	1					1
CO2	1	1	1			1	1					1

CO3	1	1	1			1	1					1
CO4	3	1	1	1		1	1					1
CO5	1	1	1			1	1					1
CO6	1	1	1			1	1					1
Total	8	6	6	1		6	6					6
Avg.	2	1	1	1		1	1					1

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,3,6,7,12	1,2,3
CO2	1,2,3,6,7,12	1,2,3
CO3	1,2,3,6,7,12	1,2,3
CO4	1,2,3,4,6,7,12	1,2,3
CO5	1,2,3,6,7,12	1,2,3
CO6	1,2,3,6,7,12	1,2,3

Year: III

DESIGN OF MACHINE MEMBERS-II

Name of the Program: Bachelor of Technology	**Academic Year: 2020 - 2021**
Branch: Mechanical Engineering	**Year & Semester: III-I**
Name of the Course:DESIGN OF MACHINE MEMBERS-II	**Regulation: R18**
Course Area/Module: DESIGN	**No. of students registered:**
Course Coordinator: Mr. G. DURGA PRASAD **Designation: ASSOCIATE PROFESSOR**	**Course Instructor:** Mr. G. DURGA PRASAD
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

	1. This course gives the insight of slider and roller bearings and the life prediction.
	2. Learn to design I.C engine parts.
	3. To know the procedure how design the curved beams using Data book
	4. Design the mechanical systems for power transmission elements such as Belt, Ropes & Chains, Gears, Levers, Shaves and Drums.
	5. To introduce students to the design and theory of common machine elements and to give students experience in solving design problems involving machine elements.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Select the suitable bearing based on the application of the loads and predict the life of the bearing.
2. Design of IC Engines parts.
3. Design of curved beams of different crosses sections
4. Design power transmission elements such as Belt, Ropes & Chains, Gears, Levers and Power Screws.
5. Utilize design data hand book and design the elements for strength, stiffness and fatigue.

COURSE DESCRIPTION:

The main objective of this course is to require the student to prepare professional quality solutions and presentations to effectively communicate the results of analysis and design - with attention to safety, reliability, and societal and fiscal aspects.

COURSE CONTENT (Syllabus):

UNIT – I

BEARINGS: Classification of bearings- applications, types of journal bearings – lubrication – bearing modulus – full and partial bearings – clearance ratio – heat dissipation of bearings, bearing materials – journal bearing design – ball and roller bearings – static loading of ball & roller bearings, bearing life.

UNIT – II

ENGINE PARTS: Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – cranks and crank shafts, strength and proportions of over hung and center cranks – crank pins, crank shafts.

Pistons, forces acting on piston – construction design and proportions of piston, cylinder, cylinder liners.

UNIT – III

Design of curved beams: introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and t-section, design of crane hooks, c –clamps.

UNIT – IV

POWER TRANSMISSIONS SYSTEMS, PULLEYS: Transmission of power by belt and rope drives, transmission efficiencies, belts – flat and v types – ropes - pulleys for belt and rope drives, materials, chain drives

DESIGN OF POWER SCREWS: Design of screw, square ACME, buttress screws, design of nut, compound screw, differential screw, ball screw - possible failures.

UNIT – V

SPUR & HELICAL GEAR DRIVES: Spur gears- helical gears – load concentration factor – dynamic load factor, surface compressive strength – bending strength – design analysis of spur gears – estimation of centre distance, module and face width, check for plastic deformation, check for dynamic and wear considerations.

UNIT – VI

MACHINE TOOL ELEMENTS: Levers and brackets: design of levers – hand levers-foot lever – cranked lever – lever of a lever loaded safety valve - rocker arm straight – angular- design of a crank pin – brackets- hangers- wall boxes.

Wire Ropes : Construction, Designation, Stresses in wire ropes, rope sheaves and drums.

Text Books:

1. Machine Design, V.Bandari, TMH Publishers
2. Machine Design, NC Pandya & CS Shaw, Charotar publishers

References:

4. Machine Design / R.N. Norton/Pearson
5. Mech. Engg. Design / JE Shigley TMH
6. Design of machine elements – spots/pearson
7. Data Books : (i) P.S.G. College of Technology.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
2	2	Classification of bearings and its applications	
1	3	Types of Journal bearings	
1	4	Bearing Modulus, full and partial bearings	
2	6	Heat dissipation of bearings	
1	7	Bearing Materials	
2	9	Lubrication - Clearance ratio	
1	10	Journal Bearing Design	
1	11	Ball and Roller Bearings	
2	13	Static Loading of Ball & Roller Bearings, Bearing Life.	
2	15	Introduction of engine parts	
2	17	Thrust in Connecting Rod	
1	18	Stress Due to Whipping Action on Connecting Rod ends	
1	19	Stress Due to Cranks and Crank Shafts	
2	21	Strength and Proportions of Over Hung and Center Cranks	
2	23	Crank Pins, Crank Shafts	
1	24	Introduction of Pistons	
1	25	Forces Acting on Piston	
1	26	Construction Design and Proportions of Piston	
2	28	Construction Design and Proportions of Cylinder	
1	29	Construction Design and Proportions of Cylinder Liners	
1	30	Introduction of Curved Beams	
2	32	Stresses in Curved Beams	
1	33	Expression for Radius of Neutral Axis for Rectangular	
1	34	Expression for Radius of Neutral Axis for Circular	

1	35	Expression for Radius of Neutral Axis for Trapezoidal	
1	36	Expression for Radius of Neutral Axis for T-Section	
2	38	Design of Crane Hook, C –Clamps	
1	39	Transmission of power by Belt	
1	40	Transmission of power by Rope drives	
1	41	Transmission Efficiencies of Belt (flat and v types)	
1	42	Transmission Efficiencies of ropes	
2	44	Pulleys for Belt and Rope Drives, Materials	
1	45	Chain Drives	
1	46	Introduction of Design of screws	
1	47	Design of Square Acme, Buttress Screws	
2	49	Design of Nut, Compound Screw, Differential Screw	
1	50	Ball Screw Possible Failures	
1	51	Spur Gears- Helical Gears – Load Concentration Factor	
2	53	Dynamic Load Factor, Surface Compressive Strength	
1	54	Bending Strength	
1	55	Design Analysis of Spur Gears	
2	57	Estimation of Centre Distance, Module and Face Width	
1	58	Check for Dynamic and Wear Considerations	
1	58	Design Analysis of Helical Gears	
1	59	Check for Dynamic and Wear Considerations	
2	61	Levers and Brackets: Design of Levers	
1	62	Hand Levers-Foot Lever	
1	63	Cranked Lever, Lever of A Lever Loaded	
1	64	Safety Valve Rocker Arm Straight, Angular	
2	66	Design of a Wall Boxes	
1	67	Construction and Designation of wire ropes	

1	68	Stresses in wire ropes	
1	69	*Rope sheaves*	
1	70	Drums	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	-	-	-	-	1	-	-	2
CO2	3	2	3	1	-	-	2	-	-	-	-	1
CO3	3	2	3	1	-	-	-	-	-	-	-	1
CO4	3	2	3	1	-	-	-	-	1	-	-	1
CO5	3	2	1	1	-	-	1	-	1	-	-	2
CO6	3	3	2	2	2	1	1	-	-	-	-	3
Total	18	13	15	7	2	1	4	1	3	-	-	10
Avg.	3	2.16	2.6	1.16	0.33	0.16	0.66	0.16	0.5	-	-	1.66

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,2,3,4,9,12	1,2
CO-2	1,2,3,4,7,12	1,2
CO-3	1,2,3,4,12	1,2
CO-4	1,2,3,4,9,12	1,2
CO-5	1,2,3,4,7,9,12	1,3
CO-6	1,2,3,4,5,6,7,12	1,3

DYNAMICS OF MACHINERY

Name of the Program: Bachelor of Technology	**Academic Year: 2020 - 2021**
Branch: Mechanical Engineering	**Year & Semester: III-I**
Name of the Course: DYNAMICS OF MACHINARY	**Regulation: R18**
Course Area/Module: DESIGN	**No. of students registered:**
Course Coordinator: Mr.G.S.R.N.MALLESWARA RAO **Designation: ASSOCIATE PROFESSOR**	**Course Instructors:** Mr.G.S.R.N.MALLESWARA RAO
No. of Lecture Hours per week: 5	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

13. Develop understanding of dynamic analysis like gyroscopic forces and moments, friction of fixed axis rotation of rigid bodies.

14. Determine the dynamic behavior principles and operations of clutches, breaks, dynamometers.
15. Determine the dynamic behavior principles and operations of flywheels.
16. Determine the dynamic behavior principles and operations of governers.
17. Develop knowledge of analytical and graphical methods for calculating balancing of rotary and reciprocating masses.
18. Develop understanding of vibrations and its significance on engineering design

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

19. Analyze stabilization of sea vehicles, aircrafts and automobile vehicles.
20. Compute frictional losses, torque transmission of mechanical systems.
21. Analyze dynamic force analysis of slider crank mechanism and design of flywheel.
22. Describe the operation and analyze governors.
23. Compute balancing of reciprocating and rotary masses.
24. Interpret the natural frequencies of continuous systems starting from the general equation of displacement.

COURSE DESCRIPTION:

The main objective of this course is to familiarize the standard mechanisms used for speed and stability control under the effects of vibrations.

COURSE CONTENT (Syllabus):

UNIT – I

PRECESSION: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships, static and dynamic force analysis of planar mechanisms, (Demonstration of models in video show).

UNIT – II

FRICTION: Inclined plane, friction of screw and nuts, pivot and collar, uniform pressure, uniform wear, friction circle and friction axis: lubricated surfaces, boundary friction, film lubrication.

CLUTCHES: Friction clutches- single disc or plate clutch, multiple disc clutch, cone clutch, centrifugal clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, internal expanding brake, band brake of vehicle. General description and operation of dynamometers: Prony, Rope brake, Epicyclic, Bevis Gibson and belt transmission,

UNIT – III

TURNING MOMENT DIAGRAMS: Dynamic force analysis of slider crank mechanism**,** inertia torque, angular velocity and acceleration of connecting rod, crank effort and turning moment diagrams – fluctuation of energy – fly wheels and their design.

UNIT-IV

GOVERNERS: Watt, porter and proell governors, spring loaded governors – Hartnell and Hartung with auxiliary springs. sensitiveness, isochronism and hunting.

UNIT – V

BALANCING: Balancing of rotating masses single and multiple – single and different planes, use analytical and graphical methods. Primary, secondary, and higher balancing of reciprocating masses. analytical and graphical methods, unbalanced forces and couples – examination of "V" multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing, hammer blow, swaying couple, variation of tractive effort.

UNIT – VI

VIBRATIONS: Free Vibration of spring mass system –Natural frequency-types of damping – damped free vibration, Simple problems on forced damped vibration, vibration isolation and transmissibility transverse loads, vibrations of beams with concentrated and distributed loads. Dunkerly's methods, Raleigh's method, whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

Text Books:

1. Theory of Machines / S.S Rattan/ Mc. Graw Hill
2. Mechanism and machine theory /Ashok G. Ambedkar/PHI Publications.

References:

1. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
2. Theory of Machines / Shigley / MGH
3. Theory of Machines / Thomas Bevan / CBS Publishers
4. Theory of machines / Khurmi/S.Chand.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Gyroscopes	
2	3	Effect of precession motion on the stability of moving aero planes	
2	5	Effect of precession motion on the stability of moving ships	
2	7	Effect of precession motion on the stability of moving Four wheeler and Motor cycle,	
1	8	Torque required to move a body on Inclined plane	
1	9	Friction of screw and nuts	
2	11	Pivot and collar	
2	13	Uniform pressure	
1	14	Uniform wear	
1	15	Friction circle and friction axis: lubricated surfaces	
1	16	Boundary friction	
2	18	Film lubrication	

2	20	Friction clutches- single disc or plate clutch	
1	21	Multiple disc clutch	
2	23	Cone clutch	
1	24	Centrifugal clutch.	
1	25	Simple block brakes	
2	27	Internal expanding brake	
1	28	Band brake of vehicle. General description and operation of dynamometers: Prony	
1	29	Epicyclic, Bevis Gibson and belt transmission	
2	31	Rope brake	
2	33	Dynamic force analysis of slider crank mechanism	
1	34	Inertia torque	
2	36	Angular velocity and acceleration of connecting rod	
1	37	Fluctuation of energy – fly wheels and their design.	
1	38	GOVERNERS: Watt, porter and proell governors,	
2	40	Spring loaded governors Mechanical Engineering,	
2	42	Hartnell and Hartung with auxiliary springs.	
1	43	Sensitiveness, isochronism and hunting.	
2	45	Balancing of rotating masses single and multiple	
2	47	Single and different planes, use analytical and graphical methods	
1	48	Primary, secondary, and higher balancing of reciprocating masses.	
1	49	Analytical and graphical methods	
1	50	Unbalanced forces and couples – examination of "V" multi cylinder in line and radial engines for primary and secondary balancing	
2	52	Locomotive balancing, hammer blow, swaying couple	
2	54	Variation of tractive effort	
1	55	Free Vibration of spring mass system – oscillation of pendulums	
2	57	Centers of oscillation and suspension.	
2	59	Transverse loads	
1	60	Vibrations of beams with concentrated and distributed loads	
1	61	Dunkerly's methods, Raleigh's method	
1	62	Whirling of shafts	
2	64	Critical speeds	
1	65	Torsional vibrations	

2	67	Two and three rotor systems	
1	68	Simple problems on forced damped vibration	
2	70	Vibration isolation and transmissibility	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	-	-	-	-	1	-	-	2
CO2	3	2	3	1	-	-	2	-	-	-	-	1
CO3	3	2	3	1	-	-	-	-	-	-	-	1
CO4	3	2	3	1	-	-	-	-	1	-	-	1
CO5	3	2	1	1	-	-	1	-	1	-	-	2
CO6	3	3	2	2	2	1	1	-	-	-	-	3
Total	18	13	15	7	2	1	4	1	3	-	-	10
Avg.	3	2.16	2.6	1.16	0.33	0.16	0.66	0.16	0.5	-	-	1.66

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,2,3,4,9,12	1,2
CO-2	1,2,3,4,7,12	1,2
CO-3	1,2,3,4,12	1,2
CO-4	1,2,3,4,9,12	1,2
CO-5	1,2,3,4,7,9,12	1,3
CO-6	1,2,3,4,5,6,7,12	1,3

Year: II

MATERIAL SCIENCE AND ENGINEERING

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Mechanical Engineering	**Year & Semester: II - I**
Name of the Course: Material Science and Engineering	**Regulation: NRIA-18**
Course Area/Module: Metallurgy	**No. of students registered:**
Course Coordinator: Ms K.Bhargavi **Designation:Assistant Professor**	**Course Instructors:** Ms K.Bhargavi
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week:1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Acquire knowledge of basic structure and crystal arrangement of materials.
2. Understand the phase and importance of the phase diagram.
3. Acquire awareness of the ferrous and non-ferrous materials.
4. Gain the knowledge of heat treatment and various methods.
5. Know how the powder metallurgy processes and applications of composites.
6. Acquire knowledge of all the materials useful to the research and ultimately reaches the society

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Estimate the properties of the metals and alloys based on structures.
2. Classify, construct and analyze equilibrium diagrams.
3. Analyze and distinguish various ferrous, non-ferrous metals and alloys.
4. Identify the influence of mechanical working and heat treatment principles on materials.
5. Classify, analyze and suggest the suitable manufacturing method for composite materials and Powder metallurgy.
6. Able to suggest the suitable material for any applications demand by the society

COURSE DESCRIPTION:

A course concerned with different materials and their cooling curves. Areas covered include atom structures, bonding, phases of materials, phase diagrams, cooling curves, heat treatments, ferrous and non-ferrous materials, plastics, ceramics, composites and manufacturing process of powder metallurgy.

COURSE CONTENT (Syllabus):

UNIT I: Structure of Metals: Crystal Structures: Unit cells, Metallic crystal structures, Bonds in Solids – Metallic bond–solid solutions, Hume Rotherys rules.Imperfection in solids: Point, Line, interstitial and volume defects.

Constitution of Alloys: Necessity of Alloying, substitutional and interstitial solid solutions- Phase diagrams: Interpretation of binary phase diagrams and microstructure development; eutectic, peritectic, peritectoid reactions. Iron-Iron-carbide diagram and microstructural aspects of ferrite, cementite, austenite, ledeburite, and cast iron

UNIT II: Steels: Plain carbon steels, use and limitations of plain carbon steels. classification of steels and alloys steels. Micro structure, properties and applications of stainless steels and tool steels.
Cast irons: Micro structure, properties and applications of white cast iron, malleable cast iron, grey cast iron, nodular cast iron and alloy cast irons.

UNIT III: Heat Treatment of Steels: Annealing, tempering, normalizing and spheroidizing, isothermal transformation diagrams for Fe-Fe_3C alloys and microstructure development. Continuous cooling curves and interpretation of final microstructures and properties- austempering, martempering, case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening.

Non-ferrous Metals and Alloys: Micro structure, properties and applications of copper and its alloys, aluminium and its alloys.

UNIT IV: Ceramics, Polymers and Composites: Structure, properties and applications of ceramics, polymers and composites.

Powder Metallurgy: Powder metallurgy process, preparation of powders, characteristics of metal powders, mixing, compacting, sintering, Applications of Powder Metallurgy.

Text Books:

1. V.D.Kotgire, S.V.Kotgire, Material Science and Metallurgy, Everest Publishing House, 4thEdition,2008.
2. Sidney H. Avener, Introduction to Physical Metallurgy, Tata McGraw-Hill, 3rdEdition,2011.
3. William and callister, Materials Science and engineering, Wiley India private Ltd.,2011

References:

1. Richard A.Flinn, Paul K.Trojan, Engineering Materials and Their Applications, Jaico Publishing House, 4thEdition,1999.
2. Raghavan.V, " Material Science and Metallurgy,FifthEdition, PHI Learning Pvt Limited,2013.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction	
1	2	**Structure of Metals:** Crystal Structures:	
1	3	Unit cells, Metallic crystal structures,	
1	4	Bonds in Solids,	
1	5	Imperfection in solids	
1	6	Point, Line, interstitial and volume defects	
1	7	**Types of bonds and defects in solids**	
1	8	Constitution of Alloys: introduction	
1	9	Necessity of Alloying, solid solutions	
1	10	Hume Rotherys rules	
1	11	**Alloys importance and HR- rules**	
1	12	Interpretation of binary phase diagrams	
1	13	eutectic, peritectic,	
1	16	peritectoid and monotectic reactions.	
1	20	microstructure development, iron and iron carbide diagram	

1	22	Iron-Iron-carbide diagram	
1	23	**Draw Iron-Iron-carbide diagram**	
1	24	microstructural aspects of ferrite, cementite, austenite, ledeburite& CI	
1	25	**Draw microstructures and properties**	
1	26	UNIT-II introduction	
	26	classification of steels	
1	27	use and limitations of plain carbon steels.	
	27	Classification of alloys steels.	
	27	**Classification of Steels & alloy Steels**	
1	28	Micro structure, properties and applications of alloy steels-stainless steels and tool steels.	
	28	**Cast irons:** Micro structure, properties and applications of white cast iron, malleable cast iron.	
1	29	**Properties and applications of cast iron**	
1	30	Micro structure, properties and applications of grey cast iron, nodular cast iron and alloy cast irons.	
1	31	**Microstructure of cast iron**	
2	33	UNIT-III introduction	
2	35	Heat Treatment of Steels	
2	37	Annealing, tempering,	
1	38	normalizing and spheroidizing,	
1	39	**Properties of heat treatment of steels**	
1	40	isothermal transformation for Fe-Fe_3Calloys and microstructure development.	
1	41	Continuous cooling curves	
1	42	**Draw IT Fe-Fe_3c diagram**	
	42	properties-Austempering, martempering,	
1	43	case hardening, carburizing, nitriding	
1	44	**Tempering and carburizing**	
2	46	cyaniding, carbo-nitriding, flame and induction hardening	
1	47	cyaniding, carbo-nitriding, flame and induction hardening	
2	49	**Nitriding and hardening**	
1	50	Structure,Properties and applications of ceramics.	
1	51	Structure, properties and applications of polymers.	
1	52	Structure, properties and applications of composites.	
1	53	**Non-ferrous Metals and Alloys:** Micro structure, properties and applications of copper and its alloys.	

1	54	Micro structure, properties and applications of aluminum and its alloys	
	54	UNIT-IV INTRODUCTION	
1	55	**Structure properties and applications of Ceramics, Polymers and Composites**	
1	56	Introduction to Powder metallurgy	
	56	Powder metallurgy process	
1	57	**Process of powder metallurgy**	
	57	Preparation of powders.	
1	58	characteristics of metal powders	
	58	mixing, compacting, sintering.	
1	59	**Preparation of powders**	
1	60	Applications of Powder Metallurgy	
	60	**Applications of Powder Metallurgy**	

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3									2			1	2	
CO2		3	3				3						2	1	
CO3		3	3	2									2	1	
CO4		3	3	3		2							1	2	
CO5				3		2	2						1	2	
CO6		3	3	3									1	2	
Total	3	12	12	11	0	4	5	0	0	2	0	0	1	2	
Avg.	3	3	3	2.75		2	2.5			2					

3.

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,10	1,2
CO-2	2,3,7	1,2
CO-3	2,3,4	1,2
CO4	2,3,4,6	1,2
C05	4,6,7	1,2
CO6	2,3,4	1,2

MECHANICS OF MATERIALS

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Mechanical Engineering	**Year & Semester: II & I**
Name of the Course: Mechanics of Materials	**Regulation: NRIA-18**

Course Area/Module: Design	**No. of students registered:**
Course Coordinator: Dr.K.PRASADA RAO **Designation: Professor**	**Course Instructors:** Dr.K.PRASADA RAO
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week:1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Gain a fundamental understanding of the concepts of stress and strain by analysing different solids and structures
2. Analyze and beams, to determine axial forces, torque, shear forces, and bending moments
3. Analyze the beams of different shapes for finding out the shear stress and bending stress distribution.
4. Develop the governing differential equation for the elastic curve, and apply different techniques for finding out the deflection at required points.
5. Analyze determinate and indeterminate axial members, torsional members
6. Calculate the buckling load for columns with different end conditions.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Determine and illustrate principal stresses, principal strains, maximum shearing stress, and simple stresses acting on structural members.
2. Analyze bending stresses and shear stresses in structural members subjected to flexural loadings and draw the distribution diagrams.
3. Estimate the stresses and strains in circular torsion members
4. Determine the deflections and slopes produced in beams under loading conditions.
5. Analyze slender, long columns subjected to axial loads
6. Assess hoop and longitudinal stresses in thin and thick cylinders.

COURSE DESCRIPTION:

To give an ability to apply the knowledge of *strength of materials* on engineering applications and design problems.

COURSE CONTENT (Syllabus):

UNIT I :

SIMPLE STRESSES: Concept of stress and strain, Hooke's law - Tension, Compression, and Shear, stress-strain diagram for mild steel – Factor of safety, Poisson's ratio, elastic constants and their relationship - Deformation of simple and compound bars. Thermal stresses – simple and Composite bars.

PRINCIPAL STRESSES: Principal planes, principal stress, maximum shearing stress on an inclined plane under Uniaxial, biaxial state of stress - Mohr's circle for plane stresses.

UNIT II

SHEAR FORCE AND BENDING MOMENT: Types of beams and loads – concept of shear force and bending moment, relation between SF, BM and rate of loading at a section of a beam, shear force and bending moment diagrams for cantilevers, simply supported and over hanging beams subjected to point loads, UDL, UVL and combination of these loads.

BENDING STRESSES: Theory of pure bending, bending equation derivation- determination of bending stress in beams across sections like rectangular, circular, I, T, angle and channel sections. Shear stress derivation, shear stress distribution across beams of various sections (rectangular, circular, I, T, angle and channel sections).

UNIT III

TORSION: Theory of pure torsion, transmission of power in solid and hollow circular shafts, shafts in series and parallel, combined bending and torsion.

DEFLECTION OF BEAMS: Differential equations of the deflection curve, Slope and deflection of cantilever, simply supported beams by double integration method - Macaulay's method - Moment area method. Application to simple cases including overhanging beams, Statically Indeterminate Beams and their solution methods.

UNIT IV

Columns and struts: Buckling, Stability, Member subjected to different support conditions, Euler's theory, Rankine's theory.

Cylinders and Shells: Longitudinal and circumferential stress and strains, Thin cylinder, thin spherical shells under internal pressure, changes in diameter and volume of cylinders –Riveted boiler shells, Thick cylinders - Lame's equation thick cylinders subjected to inside and outside pressures, compound cylinders.

TEXT BOOKS:

1. Solid Mechanics, by Popov
2. Strength of materials /GH Ryder/ Mc Millan publishers India Ltd
3. Strength of Materials by S. Ramamrutham, R. Narayanan

REFERENCES:

1. Strength of materials by R.K. Bansal
2. Strength of Materials by S.S. Rattan, Tata McGraw Hill Education Pvt., Ltd.,
3. Strength of materials by R.K. Rajput, S. Chand & Co, New Delhi
4. Strength of Materials -By Jindal, Umesh Publications.
5. Strength of Materials by S.Timoshenko
6. Strength of Materials by Andrew Pytel and Ferdinond L. Singer Longman.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	**UNIT-I** Mechanics of Solids course outline, Introduction	
1	2	Elasticity and plasticity, Types of stresses & strains	
1	3	Hooks law, stress – strain diagram for mild steel	
1	4	**Types of stress and strains**	
1	5	Working stress, Factor of safety – Lateral strain, Problems	
1	6	Poisson's ratio volumetric strain, Elastic moduli & the relationship between them, Problems	
1	7	Deformation of simple and compound bars.	

1	8	problems	
1	9	Thermal stresses – simple and Composite bars.	
1	10	**Principal planes, Shear stress**	
1	11	Transformation of plane stress into normal and shear stresses on inclined plane	
1	12	principal planes, Problems	
3	13	Mohr's circle, Problems	
1	16	**SHEAR FORCE AND BENDING MOMENT:**	
1	20	Types of beams and loads	
1	22	concept of shear force and bending moment	
1	23	relation between SF, BM and rate of loading at a section of a beam	
1	24	shear force and bending moment diagrams for cantilevers	
1	25	simply supported and over hanging beams subjected to point loads	
1	26	UDL, UVL and combination of these loads	
	26	problems	
1	27	**BENDING STRESSES:** Theory of pure bending	
	27	bending equation derivation- determination of bending stress in beams across sections - rectangular	
	27	bending stress - circular, I,	
1	28	T, angle and channel sections. Shear stress derivation	
	28	shear stress distribution across beams of various sections (rectangular, circular, I, T, angle and channel sections	
1	29	shear stress distribution across beams of various section channel sections	
1	30	Problems.	
1	31	**TORSION:** Theory of pure torsion, transmission of power in solid and hollow circular shafts.	
4	35	shafts in series and parallel, combined bending and torsion	
2	37	problems	
2	39	**DEFLECTION OF BEAMS:** Differential equations of the deflection curve, Slope and deflection of cantilever.	
1	41	simply supported beams by double integration method - Macaulay's method - Moment area method	
1	42	Problems	
1	43	Application to simple cases including overhanging beams.	
1	44	problems	
1	45	Statically Indeterminate Beams and their solution methods	
	45	problems	

1	46	**Columns and struts:** Buckling, Stability, Member subjected to different support conditions	
1	47	Member subjected to different support conditions	
2	49	problems	
1	50	Euler's theory.	
2	50	Rankine's theory.	
1	51	**Cylinders and Shells:** Longitudinal and circumferential stress and strains,	
1	52	**problems**	
1	53	Thin cylinder, thin spherical shells under internal pressure,	
1	54	changes in diameter and volume of cylinders	
1	55	Riveted boiler shells	
1	56	problems	
1	57	Thick cylinders - Lame's equation thick cylinders subjected to inside and outside pressures,	
1	58	Lame's equation	
1	59	problems	
1	60	Compound cylinders-problems	

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	--	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-
CO5	-	3	--	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-
Total	6	18	-	-	-	-	-	-	-	-	-	-
Avg.	2	3	-	-	-	-	-	-	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,2	1
CO-2	2	1
CO-3	1,2	1
CO4	1,2	1
C05	2	1
CO6	2	1

BASIC THERMODYNAMICS

Name of the Program: B.TECH	**Academic Year: 2020-2021**
Branch: Mechanical	**Year & Semester: II-I**
Name of the Course: Basic Thermodynamic	**Regulation: NRIA18**
Course Area/Module: Thermal	**No. of students registered:**
Course Coordinator: S. Venkateswara Rao **Designation: Assistant Professor**	**Course Instructors:** **Mr. S. Venkateswara Rao**
No. of Lecture Hours per week:3	**No. of Tutorial Hours per week: 1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. To understand the basic concepts of energy conversions and fundamentals of thermodynamics and its application.
2. To acquire the knowledge of first law of thermodynamics and its analysis.
3. To learn the second law of thermodynamics and significance of entropy principles.
4. To learn the concepts of pure substance and vapour power cycles.
5. To learn the concepts of reactant, non-reactant gas mixtures and gas power cycles.
6. To understand the significance of various thermal cycles.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Uunderstand the basic concepts of thermodynamics.
2. Understand the first law of thermodynamics and its applications.
3. Understand the second law of thermodynamics, use of Maxwells relations and thermodynamic functions and concept of entropy.
4. Understand the formation of steam and calculate the quality of steam.
5. Understand the working of vapour power cycels and calculate their performance.
6. Understand the Concept of standard cycles and should be able to calculate the efficiency and performance parameters

COURSE DESCRIPTION:

This course provides the student an in-depth understanding of the key factors that covers principles of classical thermodynamics and its applications. Develops understanding of mass, energy, heat, work, efficiency, ideal and real thermodynamic cycles and processes. Covers first and second laws of thermodynamics, entropy, perfect gas law, properties of real gases, and the general energy equation for close, open systems and applications to thermodynamic systems operating at steady state conditions properties and behavior of pure substances, vapour and gas power cycles. This course aimed at students who wish to gain knowledge on the principles of energy conservation, steam & gas properties and Thermal cycles.

COURSE CONTENT (Syllabus):

UNIT – I: Introduction: Basic Concepts : System, boundary, Surrounding, control volume, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Work and Heat, Point and Path function.

Zeroth Law of Thermodynamics: Concept of Temperature – Principles of Thermometry –Reference Points – Const. Volume gas Thermometer Scales of Temperature. Ideal gas scale-Deviations from perfect gas model-Vander waals equation of state- Compressibility charts-Variable specific heats-Gas Tables.

First law of Thermodynamics: Joule's Experiments, Corollaries and PMM-I First law applied to a Process – applied to a flow system – Steady Flow Energy Equation and its applications. Throttling and free expansion processes, first law for non flow systems.

UNIT – II:Second Law of Thermodynamics: Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance,Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature.

Entropy: Principle of Entropy Increase – Energy Equation, Availability and Irreversibility, Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations, Elementary Treatment of the Third Law of Thermodynamics.

UNIT – III: Properties of Pure Substances: P-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations – Triple point at critical state properties during change of phase, Dryness Fraction . Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry. Clausius – clapeyron Equation- Property Tables.

Vapour Power Cycles: Carnot Vapour Cycle, Working of simple Rankine Cycle. Description and representation on P–V and T-S diagram, Thermal Efficiency.

UNIT – IV: Mixtures of perfect Gases : Mole Fraction, Mass friction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction , Volume fraction and partial pressure, Equivalent Gas const. And Molecular Internal Energy, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases and Vapour.

Gas Power Cycles: Introduction, Analysis of Power Cycles- Carnot, Otto, Diesel, Dual, Brayton Cycle, Ericcson Cycle, Lenoir Cycle and Atkinson cycle.

Text Books :

1. Engineering Thermodynamics , PK Nag 4th Edn , TMH.

2. Thermodynamics – An Engineering Approach with student resources DVD – Y.A.Cengel & M.A.Boles , 7th Edn - McGrawHill

3. Fundamentals of Thermodynamics by Claus Borgnakke Richard E. Sonntag, seventh edition, John Wiley & Sons, Inc.

References :

1. Engineering Thermodynamics – Jones & Dugan PHI

2. Thermodynamics – J.P.Holman , McGrawHill

3. Basic Engineering Thermodynamics – A.Venkatesh – Universities press.

4. An Introduction to Thermodynamics - Y.V.C.Rao – Universities press.

5. Thermodynamics – W.Z.Black & J.G.Hartley, 3rd Edn Pearson Publ.

6. Engineering Thermodynamics – D.P.Misra, Cengage Publ.

7. Engineering Thermodynamics – P.Chattopadhyay – Oxford Higher Edn Publ.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction to Thermodynamics, System, boundary, Surroundings	
1	2	Control volume, Universe, Types of Systems, Macroscopic and Microscopic viewpoints	
1	3	Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process	
2	5	Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Types,	
1	6	Work and Heat, Point and Path function	
1	7	Zeroth Law of Thermodynamics – Concept of Temperature – Principles of Thermometry	
1	8	Reference Points – Const. Volume gas Thermometer –Scales of Temperature,	
1	9	Ideal Gas Scale – Deviations from perfect gas model	
1	10	Vander waals equation of state	
1	11	Compressibility charts Variable specific heats-Gas Tables	
1	12	First law of Thermodynamics– Joule's Experiments	
1	13	First law of Thermodynamics – Corollaries and PMM-I	
2	15	First law applied to a Process – applied to a flow system – Steady Flow Energy Equation and its applications.	
1	16	Throttling and free expansion processes	
1	17	first law for non flow systems	
2	19	Problems	
1	20	Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump,	
1	21	Problems on Heat Engine, Heat pump	
2	23	Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries,	
1	24	PMM of Second kind,	
1	25	Carnot's principle, Carnot cycle and its specialties	
1	26	Problems on Carnot cycle	
2	28	Thermodynamic scale of Temperature, Clausius	

		Inequality, Entropy, Principle of Entropy Increase – Energy Equation	
2	30	Availability and Irreversibility –Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations	
1	31	Elementary Treatment of the Third Law of Thermodynamics	
2	33	Pure Substances, P-V-T- surfaces, T-S and h-s diagrams	
1	34	Mollier Charts, Phase Transformations – Triple point at critical state properties during change of phase	
1	35	Dryness Fraction – Clausius – Clapeyron Equation Property tables	
2	37	Problems	
2	39	Mollier charts – Various Thermodynamic processes and energy Transfer	
2	41	Steam Calorimetry	
1	42	Problems on Steam Calorimetry	
1	43	Vapour Power Cycles: Introduction	
1	44	Carnot Vapour Cycle	
2	46	Working of simple Rankine Cycle	
2	48	Description and representation on P–V and T-S diagram, Thermal Efficiency	
2	50	Problems	
2	52	Mole Fraction, Mass friction Gravimetric and volumetric Analysis, Problems	
3	55	Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction , Volume fraction and partial pressure, Equivalent Gas const	
2	57	Molecular Internal Energy, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases and Vapour	
1	58	Introduction, Analysis of Power Cycles	
2	60	Carnot,Otto, Diesel and problems	
2	62	Dual Combustion cycles, Brayton Cycle	
1	63	Lenoir Cycle , Ericcson Cycle	
1	64	Atkinson Cycle	

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1				1	1					1
CO2	1	1	1	1		1						1
CO3	2	1	1	1		1						1
CO4	2	1	1	1		1	1					1
CO5	1	1	1	1		1	1					1
CO6	2	2	2	1		1	1					1
Total	10	7	6	5		6	4					6
Avg.	2	1	1	1		1	1					1

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,6,7,12	1,2,3
CO2	1,2,3,4,6,12	1,2,3
CO3	1,2,3,4,6,12	1,2,3
CO4	1,2,3,4,6,7,12	1,2,3
CO5	1,2,3,4,6,7,12	1,2,3
CO6	1,2,3,4,6,7,12	1,2,3

ESSENTIAL ELECTRICAL & ELECTRONIC ENGINEERING

Name of the Program: Under graduation(B.Tech)	**Academic Year: 2020-2021**
Branch: Mechanical Engineering	**Year & Semester: II & I**
Name of the Course: Essential Electrical and electronics Engineering	**Regulation: NRIA-18**
Course Area/Module: Electrical and Electronics Engineering	**No. of students registered:**
Course Coordinator: L.V.Mahesh Babu **Designation: Assistant Professor**	**Course Instructors:** **1. L.V.Mahesh Babu**
No. of Lecture Hours per week: 04	**No. of Tutorial Hours per week: 01**
Credits: 03	

<u>COURSE OBJECTIVES:</u>

Students will be able to:

1. To learn the basic principles of electrical law’s and analysis of networks.
2. To understand the principle of operation and construction details of DC and AC Machines.
3. To understand the principle of operation and construction details of transformer.
4. To study the operation of PN junction diode, half wave, full wave rectifiers and Transistors.

<u>COURSE OUTCOMES:</u>

At the end of the course, the students will develop ability to:

1. Analyze the various electrical networks.
2. Understand the principle of operation of DC and AC machines
3. Understand the principle of operation of transformer.
4. Analyze the operation of half wave, full wave rectifiers and Transistor configurations

COURSE DESCRIPTION:

Essential Electrical and Electronics Engineering course gives the basic idea about how the solve the Electrical circuits to analyze the currents, voltages in different branches of the Electrical circuits and give the over view on the different electrical machines like DC Motors, DC generators, AC Generators and AC motor and electrical device like transformer and also it provides basic information about electronics devices like Transistors, diodes and Operational Amplifiers.

COURSE CONTENT (Syllabus):

UNIT I:

FUNDAMENTALS OF ELECTRICAL CIRCUITS :

Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, inductive networks, capacitive networks, series, parallel circuits and star-delta and delta-star transformations.

UNIT II:

OVERVIEW OF GENERATORS AND MOTORS:

DC Machines: Principle of operation of DC generator – emf equation -types – DC motor types –torque equation – applications – Swinburne's Test, speed control methods.

AC Machines: Principle of operation of alternators – regulation by synchronous impedance method – principle of operation of 3-Phase induction motor – slip-torque characteristics - efficiency – applications

UNIT III:

OVER VIEW OF TRANSFORMERS:

Principle of operation of single phase transformers – emf equation – losses –efficiency and regulation. OC and SC test.

UNIT IV:

FUNDAMENTALS OF DIODES AND TRANSISTERS:

PN junction diodes, diode applications (Half wave and bridge rectifiers). PNP and NPN junction transistor, transistor as an amplifier, configurations (CE,CB,CC).Relations between α,β and γ.

Text Books:

1. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
2. Elec., Technology by Edward Hughes
3. Electronics Devices and Circuits , S.Salivahanan ,N.SureshKumar,A.Vallava Raj, TMH publications , 4th edition

References:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications.
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
4. Industrial Electronics by G.K. Mittal, PHI.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Basic definitions	

1	2	Types of network elements	
1	3	Ohm's Law	
1	4	Problems	
1	5	Kirchhoff's Laws	
1	6	Problems	
1	7	Problems	
1	8	Problems	
1	9	Inductive Networks	
1	10	Problems	
1	11	Capacitive Networks	
1	12	Problems	
1	13	Series circuits	
1	14	Problems	
1	15	Parallel networks	
1	16	Problems	
1	17	Star to delta networks	
1	18	Delta to star Networks	
1	19	Problems	
1	20	Problems	
1	21	Problems	
1	22	Principle of peration of DC generator	
1	23	EMF equation	
1	24	Problems	
1	25	Types of DC generator	
1	26	Problems	
1	27	Types of DC Motors	
1	28	Problems	
1	29	Torque equation	
1	30	Applications of dc generators and motors	
1	31	Swinburne's test	
1	32	Problems	
1	33	Problems	
1	34	Speed control methods	
1	35	Principle of alternator	
1	36	Regulation by synchronous impedance method	
1	37	Principle of 3 phase induction motor	
1	38	Slip-torque charecteristics	

1	39	Efficiency and applications	
1	40	Principle of operation of transformer	
1	41	Principle of operation of transformer	
1	42	Emf equation of the transformer	
1	43	Problems	
1	44	Problems	
1	45	Losses	
1	46	Problems	
1	47	Efficiency and Applications	
1	48	Problems	
1	49	Problems	
1	50	Problems	
1	51	PN junction diodes	
1	52	PN junction diodes	
1	53	Half wave rectifier	
1	54	Bridge rectifier	
1	55	Bridge rectifier	
1	56	PNP transistors	
1	57	NPN transistors	
1	58	Transistor as an amplifier	
1	59	CE configuration	
1	60	CB configuration	
1	61	CC configuration	
1	62	Relation between **α,β and γ.**	
1	63	OP-Amp and applications of OP-Amp	
1	64	OP-Amp and applications of OP-Amp	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	--	--	--	--	--	--	--	--	--	2	
CO2	3	2		--	--	--	--	--	--	--	--	--	2	
CO3	2	1	--	--	--	--	--	--	--	--	--	--	2	
CO4	3	3	--	--	--	--	--	--	--	--	--	--	--	
Total	11	9	1	--	--	--	--	--	--	--	--	--	6	
Avg.	2.75	2.25	0.25	--	--	--	--	--	--	--	--	--	1.5	

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	1,2,3	1
CO2	1,2	1
CO3	1,2	1
CO4	1,2	--

MATHEMATICS-III

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: MECHANICAL	**Year & Semester: II/I**
Name of the Course: ENGG.MATHEMAICS-III	**Regulation: NRIA18**
Course Area/Module: MATHEMATICS	**No. of students registered:**
Course Coordinator: Mr. K.V.Pavankumar **Designation: Asst.Professor**	**Course Instructors:** **Mr. K.V.Pavankumar**
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week:1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. To familiarize the techniques in complex variables.
2.To familiarize the techniques in Fourier series.
3.To familiarize the techniques in partial differential equations.
4. To equip the students to solve application problems in their disciplines.

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. write an analytic function if either real part or imaginary part is known and by **using** Cauchy-Riemann equations or **apply** Milne-Thompson method**(L3)**
2.evaluate the integral of complex function over the region bounded by the closed curves by **apply** either Cauchy-Goursat theorem or Cauchy’s integral formula or Cauchy’s Residue theorem**(L5)**
3. write the infinite series expansion of complex function by **apply** Taylor’s/Maclaurin’s/Laurent’s series**(L3)**
4.write a Fourier series expansion of a periodic function by **using** Euler’s formulae **(L3)**
5.Solve the Partial difference equations **(L3)**
6. solve one dimensional wave and heat equations by using partial differential equations **(L3)**

COURSE CONTENT (Syllabus):

UNIT:I

Complex Variable – Differentiation & Integration

Complex function , Real and Imaginary parts of Complex function, Limit**,** Continuity and Derivative of complex function, Cauchy-Riemann equations, Analytic function, entire function, singular point, conjugate function**,** Harmonic functions, Milne-Thomson method**.**

Line integral of a complex function, Cauchy's theorem(only statement) ,Cauchy's Integral Formula.

UNIT-II

Complex Variable- Series expansion, Residue Theorem & Evaluation of Real Integrals

Absolutely convergent and uniformly convergent of series of complex terms, Radius of convergence**,** Taylor's series, Maclaurin's series expansion, Laurent's series.

Zeros of an analytic function, Singularity, Isolated singularity, Removable singularity, Essential singularity, pole of order m, simple pole, Residues, Residue theorem, Calculation of residues, Residue at a pole of order m**,** Evaluation of real definite integrals: Integration around the unit circle**,** Integration around semi circle.

UNIT-III

Fourier Series

Introduction- Periodic functions – Fourier series of -periodic function - Dirichlet's conditions – Even and odd functions –Change of interval– Half-range sine and cosine series.

UNIT-IV

Partial Differentials Equations & Applicatiions

Introduction,Formation of PDE, Solutiion of PDE, Linear equations of first order, Non-linear equations of first order. Applications: Method of seperatiion of Variables, One dimensional Wave and Heat equations.

Text Books:

6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.
7. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

References:

8. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7/e, Mc-Graw Hill, 2004.
9. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Introduction to complex analysis	
1	2	Real and imaginary parts of a complex function	
1	3	Limit and continuity of a complex function	
1	4	Derivative of a complex function	
3	7	Cauchy Riemann equations derivation, problems	
1	8	Analytic, entire, singular points, Conjugate ,harmonic functions	
2	10	Problems on Milne Thomson method	
3	13	Problems on line integral of a complex function	
2	15	Problems on Cauchy's theorem	

3	18	Problems on Cauchy integral formula	
1	19	Revision in unit-1	
1	20	Class test-1	
1	21	Absolutely convergent and uniformly convergent of a series of complex terms	
1	22	Radius of convergence	
2	24	Problems on Taylors series expansions	
1	25	Problems on Maclarurin's series expansions	
3	28	Problems on Laurent series expansions	
1	29	Revision in unit-2	
1	30	Introduction Fourier series , conditions	
2	32	Fourier series expansions problems in $[0, 2\pi]$	
2	34	Fourier series expansions problems in $[-\pi, \pi]$	
2	36	Functions having points of Discontinuity	
2	38	Problems on Even and Odd functions	
2	40	Problems on Half Range Fourier series	
2	42	Problems on Change of Interval $[0, 2l]$	
2	44	Fourier series expansions problems in $[-l, l]$	
2	46	Problems on Half Range Fourier series	
1	47	Revision in unit-3	
1	48	Class test -2	
1	49	Introduction to PDE	
2	51	Formulation of PDE	
3	54	Solution of PDE	
2	56	Linear equations of first order	
2	58	Nonlinear equations of first order	
2	60	Method of separation of variables	
2	62	One dimensional wave and heat equations	

COURSE OUTCOMES vs. PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	-	-	-	-
CO2	3	3	2	2	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-
CO6	3	3	2	2	-	-	-	-	-	-	-	-
Total	18	18	12	12	-	-	-	-	-	-	-	-
Avg.	3	3	2	2	-	-	-	-	-	-	-	-

CO INDEX	POs MAPPED	PSOs MAPPED
CO1	PO1,PO2,PO3,PO4	-----
CO2	PO1,PO2,PO3,PO4	-----
CO3	PO1,PO2,PO3,PO4	-----
CO4	PO1,PO2,PO3,PO4	-----
CO5	PO1,PO2,PO3,PO4	-----
CO6	PO1,PO2,PO3,PO4	-----

MANUFACTURING PROCESSES

Name of the Program: B.Tech	**Academic Year: 2020-2021**
Branch: Mechanical Engineering	**Year & Semester: II & I**
Name of the Course: MANUFACTURING PROCESS	**Regulation: NRIA-18**
Course Area/Module: PRODUCTION	**No. of students registered:**
Course Coordinator: Ch. Karthik sai **Designation: Assistant Professor**	**Course Instructors:** Ch. Karthik sai
No. of Lecture Hours per week: 4	**No. of Tutorial Hours per week:1**
Credits: 3	

COURSE OBJECTIVES:

Students will be able to:

1. Acquire knowledge to understand about the primary manufacturing processes.
2. Understand the practical knowledge on casting, joining.
3. Acquire awareness on current manufacturing industry
4. Understand the practical knowledge on bulk forming, sheet metal forming
5. To introduce processing methods of plastics and unconventional machining processes.
6. Acquire knowledge of all the manufacturing processes useful to the research and ultimately reaches the society

COURSE OUTCOMES:

At the end of the course, the students will develop ability to:

1. Understand the Technology of the casting processes.
2. Differentiate various casting methods and their applications.
3. Differentiate various joining processes with applications
4. Understand various bulk metal forming and sheet metal processes
5. Understand Various Plastic operations
6. Evaluate the manufacturing processes being utilized in the present industrial scenario.

COURSE DESCRIPTION:

A course concerned with different primary manufacturing processes such as casting, joining, bulk forming, sheet metal forming and their relevance in current manufacturing industry; To introduce processing methods of plastics and unconventional machining processes.

COURSE CONTENT (Syllabus):

UNIT I: Introduction: Importance and selection of manufacturing processes.

Casting Processes: Introduction to casting process, process steps; pattern: types, materials and allowance; Moulding materials, equipment, Preparation, control and testing of moulding sands. Cores: Types of cores, core prints, principles and design of gating system; Solidification of casting: Concept, solidification of pure metal and alloy, short & long freezing range alloys.

Special casting processes: Shell casting, investment casting, die casting, centrifugal casting, casting defects and remedies.Methods of melting and types of furnaces-Cupola Furnace: Description, operation and zones, Electric Arc furnace.

UNIT II: Metal Joining Processes: Classification of welding processes, types of welded joints and their Characteristics, Gas welding, Different types of flames and uses, Oxy – Acetylene Gas cutting. Basic principles of Arc welding, weld bead geometry, Manual metal arc welding, submerged arc welding, and Inert Gas welding- TIG & MIG welding.

Solid state welding processes- Friction welding, Friction stir welding, Forge welding, Explosive welding; Thermit welding, Plasma welding, Laser welding, electron beam welding, Soldering & Brazing. Heat affected zones in welding; pre & post heating, Weldability of metals, welding defects – causes and remedies.

UNIT III: Metal Forming and Plastic Processing

Metal Forming: Introduction, nature of plastic deformation, hot and cold working of metals, mechanics of metal forming; Rolling: Principle, types of rolling mill and products, roll passes, forces in rolling and power requirements; Extrusion: Basic extrusion process and its characteristics, hot extrusion and cold extrusion, wire drawing, tube drawing**.**

Forging: Principles of forging, tools and dies. Types: Smith forging, drop forging, forging hammers, rotary forging and forging defects. Sheet metal forming: Mechanics of sheet metal working, blanking, piercing, bending, stamping.

Plastics: Types, properties and their applications, processing of plastics, injection molding, and blow molding.

UNIT IV: Unconventional Machining Processes

Unconventional Machining Processes: Electrical discharge machining (EDM), principle and processes parameters, electro-chemical machining (ECM) Laser beam machining (LBM), plasma arc machining (PAM) and electron beam machining Principles and process parameters of Abrasive jet machining (AJM), water jet machining, ultrasonic machining.

Text Books:

[1] Manufacturing Technology by PN RaoVol.1,Edition-3,2009, TMH

[2] Principles of Metal Casting by Heine, Loper, Rosenthal.33rd Reprint,2008,TMH

[3] A course in Work shop technology Vol-I by B.S.Raghuwamshi, 2011, Dhanpatrai& sons.

[4] Mechanical Metallurgy by George. E. Dieter, SI Metric Edition 2000, McGraw Hills.

Reference Books:

[1] Welding and welding Technology by Richard L.Little,1973, McGraw Hill
[2] Workshop Technology Vol.1 by S.K.HazraChowdary. Khanna publishers
[3] S. Kalpakjain, S.R.Schmid, Manufacturing Engineering and Technology, Pearson Edu.,4thEdition, 2001.
[4] R.K. Jain , Production Technology /Khanna Publishers, 17thEdition, 2012.
[5] Lindberg, Process and materials of manufacturing, PE.
[6] Sarma P C, Production Technology, S Chand & Company Ltd, 3rdEdition, 2012.

LESSON PLAN

No. of Lectures	Cumulative No. of Lectures	TOPIC	Remarks
1	1	Importance and selection of manufacturing processes.	
1	2	Steps involved in making a casting	
1	3	Patterns and Pattern making – Types of patterns	
1	4	Materials used for patterns, and properties	
1	5	pattern allowances and their construction	
1	6	Construction of patterns	
1	7	Molding materials, equipment,	
2	9	Preparation, control and testing of moulding sands	
1	10	Cores: Types of cores, core prints	
1	11	Importance and selection of manufacturing processes.	
1	12	Importance and selection of manufacturing processes.	
1	13	Steps involved in making a casting	
1	14	Patterns and Pattern making – Types of patterns	
1	15	Materials used for patterns, and properties	
1	16	pattern allowances and their construction	
1	17	Construction of patterns	
1	18	Molding materials, equipment,	
1	19	Preparation, control and testing of moulding sands	
1	20	Cores: Types of cores, core prints	
1	21	Methods of melting and types of furnaces	
1	22	Cupola Furnace: Description, operation and zones	
1	23	Electric Arc furnace.	
1	24	**Introduction to Metal Joining Processes**	
1	25	Classification of welding processes	
1	26	types of welded joints and their Characteristics,	
1	27	Gas welding, Different types of flames and uses	
1	28	Oxy – Acetylene Gas cutting	
1	29	Basic principles of Arc welding	
1	30	weld bead geometry	

2	31	Manual metal arc welding, submerged arc welding	
1	32	SMAW and Inert Gas welding-	
1	33	TIG welding.	
1	34	MIG welding	
1	35	**Solid state welding processes**	
1	36	Friction welding, Friction stir welding	
1	37	Forge welding, Explosive welding;	
1	38	Thermit welding, Plasma welding	
1	39	Laser welding, electron beam welding,	
1	40	Soldering & Brazing	
1	41	Heat affected zones in welding; pre & post heating,	
1	43	Weld ability of metals, welding defects – causes and remedies.	
1	44	**Metal Forming: Introduction**	
1	45	nature of plastic deformation, hot and cold working of metals	
1	46	mechanics of metal forming;	
1	48	Rolling: Principle, types of rolling mill and products, roll passes	
1	49	forces in rolling and power requirements;	
1	50	Extrusion: Basic extrusion process and its characteristics	
1	51	hot extrusion and cold extrusion	
1	52	Wire drawing, tube drawing.	
1	53	**Forging**: Principles of forging, Tools and dies.	
1	54	Types: Smith forging, drop forging,defects	
1	55	Sheet metal forming: Mechanics of sheet metal working	
1	56	blanking, piercing, bending, stamping,applications	
1	57	Processing of plastics, injection molding, and blow molding	
1	58	Electrical discharge machining (EDM), (ECM), (PAM)	
1	59	Laser beam machining (LBM), plasma arc machining	
1	60	electron beam machining Principles, WJM	
1	61	Abrasive jet machining (AJM)	

COURSE OUTCOMES vs.PROGRAM OUTCOMES (CO-PO) MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	1	2	1								1	2	

CO2	2	**1**		**1**	**1**								2	1	
CO3	3	**2**	2										2	1	
CO4	3	**1**	2				1						1	2	
CO5	2	**2**	1		**1**								1	2	
CO6	3		2		**1**								1	2	
Tota l	**17**	**7**	**8**	**3**	**4**	**1**	**2**						**1**	**2**	
Avg.	**2.8**	**1.4**	**1.6**	**1.5**	**1.0**	**1.0**	**1.0**					**1.0**			

CO INDEX	POs MAPPED	PSOs MAPPED
CO-1	1,2,3,4,5	1,2
CO-2	1,2,4,5	1,2
CO-3	1,2,3	1,2
CO4	1,2,3	1,2
CO5	1,2,3,5	1,2
CO6	1,,3,5	1,2

ID	uid	branch	section	yearr	s_code	topic	hrs	unit	type
626971	nripharm21	PHARMACY	B	2021	Human Anatomy and Physiology I	bleeding time	3	Experme nt 1	LAB
627481	NRICSE606	CSE	A	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory
627482	NRICSE606	CSE	A	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory
627483	NRICSE606	CSE	A	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
627484	NRICSE606	CSE	A	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory
627485	NRICSE606	CSE	A	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory
627486	NRICSE606	CSE	A	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
627487	NRICSE606	CSE	A	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory
627488	NRICSE606	CSE	A	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory
627489	NRICSE606	CSE	A	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory

627490	NRICSE606	CSE	A	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory
627491	NRICSE606	CSE	A	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
627492	NRICSE606	CSE	A	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory
627493	NRICSE606	CSE	A	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
627494	NRICSE606	CSE	A	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory
627495	NRICSE606	CSE	A	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory

627496	NRICSE606	CSE	A	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory
627497	NRICSE606	CSE	A	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
627498	NRICSE606	CSE	A	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory
627499	NRICSE606	CSE	A	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
627500	NRICSE606	CSE	A	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
627501	NRICSE606	CSE	B	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory
627502	NRICSE606	CSE	B	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory

627503	NRICSE606	CSE	B	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
627504	NRICSE606	CSE	B	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory
627505	NRICSE606	CSE	B	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory
627506	NRICSE606	CSE	B	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
627507	NRICSE606	CSE	B	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory
627508	NRICSE606	CSE	B	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory
627509	NRICSE606	CSE	B	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory
627510	NRICSE606	CSE	B	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory

627511	NRICSE606	CSE	B	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
627512	NRICSE606	CSE	B	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory
627513	NRICSE606	CSE	B	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
627514	NRICSE606	CSE	B	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory
627515	NRICSE606	CSE	B	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory
627516	NRICSE606	CSE	B	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory

627517	NRICSE606	CSE	B	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
627518	NRICSE606	CSE	B	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory
627519	NRICSE606	CSE	B	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
627520	NRICSE606	CSE	B	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
627530	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Inclined plane	1	UNIT -I	Theory
627531	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Friction of screw and nuts	1	UNIT -I	Theory
627532	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Pivot and collar, uniform pressure, uniform wear	1	UNIT -I	Theory
627533	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	lubricated surfaces, boundary friction, film lubrication.	1	UNIT -I	Theory
627534	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Friction clutches-single disc or plate clutch	1	UNIT -I	Theory
627535	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Multiple disc clutch	1	UNIT -I	Theory
627536	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Cone clutch, Centrifugal clutch.	1	UNIT -I	Theory
627537	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Centrifugal clutch.	1	UNIT -I	Theory

627538	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	BRAKES AND DYNAMOMETERS: Simple block brakes,	1	UNIT -I	Theory
627539	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Internal expanding brake	1	UNIT -I	Theory
627540	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	band brake of vehicle.	1	UNIT -I	Theory
627541	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	General description and operation of dynamometers: Prony,	1	UNIT -I	Theory
627542	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Rope brake	1	UNIT -I	Theory
627543	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Epicyclic	1	UNIT -I	Theory
627544	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Bevis Gibson and belt transmission	1	UNIT -I	Theory
627545	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Dynamic force analysis of four bar mechanism	1	UNIT -II	Theory
627546	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Dynamic force analysis of slider crank mechanism	1	UNIT -II	Theory
627547	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Inertia torque, Angular velocity of connecting rod	1	UNIT -II	Theory
627548	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Acceleration of connecting rod, crank effort	1	UNIT -II	Theory
627549	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Turning moment diagrams	1	UNIT -II	Theory
627550	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Fluctuation of energy	1	UNIT -II	Theory
627551	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Fly wheels and their design	1	UNIT -II	Theory
627552	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Problems	1	UNIT -II	Theory
627553	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Gyroscope: Gyroscopic couple	1	UNIT -III	Theory
627554	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Gyroscopic stabilization	1	UNIT -III	Theory

627555	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Automobiles two-wheeler	1	UNIT -III	Theory
627556	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Automobiles four-wheeler	1	UNIT -III	Theory
627557	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Airplanes	1	UNIT -III	Theory
627558	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Ships	1	UNIT -III	Theory
627559	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Governors: Types	1	UNIT -III	Theory
627560	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Centrifugal governors	1	UNIT -III	Theory
627561	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Gravity controlled centrifugal governors	1	UNIT -III	Theory
627562	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	spring controlled centrifugal governors	1	UNIT -III	Theory
627563	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Sensitiveness	1	UNIT -III	Theory
627564	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	isochronism	1	UNIT -III	Theory
627565	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Hunting Characteristics	1	UNIT -III	Theory
627566	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Effect of friction	1	UNIT -III	Theory
627567	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses - Static and dynamic balancing	1	UNIT -IV	Theory
627568	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses single- single plane	1	UNIT -IV	Theory
627569	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses single- different planes	1	UNIT -IV	Theory
627570	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses multiple- single and plane	1	UNIT -IV	Theory

627571	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses multiple- different planes	1	UNIT -IV	Theory
627572	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing of reciprocating masses	1	UNIT -IV	Theory
627573	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing a single cylinder Engine	1	UNIT -IV	Theory
627574	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Primary and secondary unbalanced forces	1	UNIT -IV	Theory
627575	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Balancing Multi cylinder,	1	UNIT -IV	Theory
627576	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Inline and V-engines	1	UNIT -IV	Theory
627577	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Partial balancing in engines	1	UNIT -IV	Theory
627578	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Locomotive balancing	1	UNIT -IV	Theory
627579	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Hammer blow	1	UNIT -IV	Theory
627580	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Swaying couple	1	UNIT -IV	Theory
627581	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Variation of tractive effort	1	UNIT -IV	Theory
627582	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Free Vibration of spring mass system	1	UNIT -V	Theory
627583	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Natural frequency-types of damping	1	UNIT -V	Theory
627584	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Damped free vibration	1	UNIT -V	Theory
627585	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Simple problems on forced damped vibration	1	UNIT -V	Theory
627586	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	vibration isolation	1	UNIT -V	Theory
627587	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Damped vibration– Torsional vibration of shaft	1	UNIT -V	Theory
627588	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Transmissibility transverse loads	1	UNIT -V	Theory

627589	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Problems	1	UNIT -V	Theory
627590	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Vibrations of beams with concentrated loads	1	UNIT -V	Theory
627591	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Dunkerly’s methods, Raleigh’s method	1	UNIT -V	Theory
627592	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Whirling of shafts, Critical speeds	1	UNIT -V	Theory
627593	NRIME341	ME	A	2021	DYNAMICS OF MACHINERY	Torsional vibrations of two and three rotor systems.	1	UNIT -V	Theory
627594	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	band brake of vehicle.	1	UNIT -I	Theory
627595	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Inclined plane	1	UNIT -I	Theory
627596	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Friction of screw and nuts	1	UNIT -I	Theory
627597	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Pivot and collar, uniform pressure, uniform wear	1	UNIT -I	Theory
627598	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	lubricated surfaces, boundary friction, film lubrication.	1	UNIT -I	Theory
627599	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Friction clutches-single disc or plate clutch	1	UNIT -I	Theory
627600	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Multiple disc clutch	1	UNIT -I	Theory
627601	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Cone clutch, Centrifugal clutch.	1	UNIT -I	Theory
627602	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Centrifugal clutch.	1	UNIT -I	Theory
627603	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	BRAKES AND DYNAMOMETERS: Simple block brakes,	1	UNIT -I	Theory
627604	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Internal expanding brake	1	UNIT -I	Theory

627605	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	General description and operation of dynamometers: Prony,	1	UNIT -I	Theory
627606	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Rope brake	1	UNIT -I	Theory
627607	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Epicyclic	1	UNIT -I	Theory
627608	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Bevis Gibson and belt transmission	1	UNIT -I	Theory
627609	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Dynamic force analysis of four bar mechanism	1	UNIT -II	Theory
627610	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Dynamic force analysis of slider crank mechanism	1	UNIT -II	Theory
627611	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Inertia torque, Angular velocity of connecting rod	1	UNIT -II	Theory
627612	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Acceleration of connecting rod, crank effort	1	UNIT -II	Theory
627613	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Turning moment diagrams	1	UNIT -II	Theory
627614	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Fluctuation of energy	1	UNIT -II	Theory
627615	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Fly wheels and their design	1	UNIT -II	Theory
627616	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Problems	1	UNIT -II	Theory
627617	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Gyroscope: Gyroscopic couple	1	UNIT -III	Theory
627618	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Gyroscopic stabilization	1	UNIT -III	Theory
627619	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Automobiles two-wheeler	1	UNIT -III	Theory
627620	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Automobiles four-wheeler	1	UNIT -III	Theory
627621	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Airplanes	1	UNIT -III	Theory

627622	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Gyroscopic effects in Ships	1	UNIT -III	Theory
627623	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Governors: Types	1	UNIT -III	Theory
627624	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Centrifugal governors	1	UNIT -III	Theory
627625	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Gravity controlled centrifugal governors	1	UNIT -III	Theory
627626	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	spring controlled centrifugal governors	1	UNIT -III	Theory
627627	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Sensitiveness	1	UNIT -III	Theory
627628	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	isochronism	1	UNIT -III	Theory
627629	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Hunting Characteristics	1	UNIT -III	Theory
627630	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Effect of friction	1	UNIT -III	Theory
627631	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses - Static and dynamic balancing	1	UNIT -IV	Theory
627632	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses single- single plane	1	UNIT -IV	Theory
627633	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses single- different planes	1	UNIT -IV	Theory
627634	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses multiple- single and plane	1	UNIT -IV	Theory
627635	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing of rotating masses multiple- different planes	1	UNIT -IV	Theory
627636	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing of reciprocating masses	1	UNIT -IV	Theory
627637	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing a single cylinder Engine	1	UNIT -IV	Theory

627638	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Primary and secondary unbalanced forces	1	UNIT -IV	Theory
627639	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Balancing Multi cylinder,	1	UNIT -IV	Theory
627640	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Inline and V-engines	1	UNIT -IV	Theory
627641	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Partial balancing in engines	1	UNIT -IV	Theory
627642	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Locomotive balancing	1	UNIT -IV	Theory
627643	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Hammer blow	1	UNIT -IV	Theory
627644	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Swaying couple	1	UNIT -IV	Theory
627645	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Variation of tractive effort	1	UNIT -IV	Theory
627646	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Free Vibration of spring mass system	1	UNIT -V	Theory
627647	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Natural frequency-types of damping	1	UNIT -V	Theory
627648	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Damped free vibration	1	UNIT -V	Theory
627649	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Simple problems on forced damped vibration	1	UNIT -V	Theory
627650	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	vibration isolation	1	UNIT -V	Theory
627651	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Damped vibration– Torsional vibration of shaft	1	UNIT -V	Theory
627652	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Transmissibility transverse loads	1	UNIT -V	Theory
627653	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Problems	1	UNIT -V	Theory
627654	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Vibrations of beams with concentrated loads	1	UNIT -V	Theory
627655	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Dunkerly’s methods, Raleigh’s method	1	UNIT -V	Theory

627656	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Whirling of shafts, Critical speeds	1	UNIT -V	Theory
627657	NRIME341	ME	B	2021	DYNAMICS OF MACHINERY	Torsional vibrations of two and three rotor systems.	1	UNIT -V	Theory
627682	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	introduction to BEE	1	UNIT -I	Theory
627683	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	INTRODUCTION TO THE ELECTRICAL ELEMENTS	2	UNIT -I	Theory
627728	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	introduction to the dc machine and construction of dc machine	1	UNIT -I	Theory
627888	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Digital systems – Introduction and Overview	1	UNIT -I	Theory
627889	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Number system – basic types	1	UNIT -I	Theory
627890	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Binary numbers – representation and examples, Octal and hexadecimal numbers – representation and examples	1	UNIT -I	Theory
627891	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Conversion of number system from one radix to another	3	UNIT -I	Theory
627892	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Complements of numbers	2	UNIT -I	Theory
627893	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Signed binary numbers , Arithmetic addition and subtraction	1	UNIT -I	Theory
627894	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	4 bit codes – types	1	UNIT -I	Theory
627895	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	BCD	1	UNIT -I	Theory
627896	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Excess 3	1	UNIT -I	Theory
627897	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Alphanumeric code	1	UNIT -I	Theory

627898	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	9’s complement	1	UNIT -I	Theory
627899	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	2421,etc.,	1	UNIT -I	Theory
627900	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Basic properties of Boolean algebra	1	UNIT -II	Theory
627901	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Basic theorems of Boolean algebra	2	UNIT -II	Theory
627902	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Boolean functions	1	UNIT -II	Theory
627903	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Min terms and max terms	1	UNIT -II	Theory
627904	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Canonical forms	1	UNIT -II	Theory
627905	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Standard forms	1	UNIT -II	Theory
627906	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	K Map method	1	UNIT -II	Theory
627907	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Three variable K map	1	UNIT -II	Theory
627908	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Four variable K map	1	UNIT -II	Theory
627909	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Products of sum simplification	1	UNIT -II	Theory
627910	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Sum of products simplification	1	UNIT -II	Theory
627911	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Don’t care conditions	1	UNIT -II	Theory
627912	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	NAND and NOR implementation	1	UNIT -II	Theory
627913	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Exclusive OR function	1	UNIT -II	Theory
627914	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Introduction, Analysis Procedure	1	UNIT -III	Theory
627915	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Binary adder – subtractor	2	UNIT -III	Theory
627916	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Binary multiplier	1	UNIT -III	Theory
627917	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Decoders	1	UNIT -III	Theory
627918	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Encoders	1	UNIT -III	Theory
627919	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Multiplexers	1	UNIT -III	Theory
627920	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Demultiplexers	1	UNIT -III	Theory

627921	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Priority encoder	1	UNIT -III	Theory
627922	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Code converters	1	UNIT -III	Theory
627923	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Magnitude comparator	1	UNIT -III	Theory
627924	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	HDL models of combinational circuits	3	UNIT -III	Theory
627925	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PROM	2	UNIT -III	Theory
627926	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PAL	2	UNIT -III	Theory
627927	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PLA	2	UNIT -III	Theory
627928	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Introduction to sequential circuits	1	UNIT -IV	Theory
627929	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Storage elements: Latches, Flip flops	1	UNIT -IV	Theory
627930	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	RS latch using NAND and NOR gates, Truth tables	2	UNIT -IV	Theory
627931	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Truth Tables	3	UNIT -IV	Theory
627932	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Excitation Tables	1	UNIT -IV	Theory
627933	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Conversion of flipflops	2	UNIT -IV	Theory
627934	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Registers, Shift registers	2	UNIT -V	Theory
627935	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Ripple counters	2	UNIT -V	Theory
627936	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Synchronous counters	2	UNIT -V	Theory
627937	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Ring counter, Johnson counter	1	UNIT -V	Theory

627938	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
627939	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
627940	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
627941	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
627942	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
627943	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
627944	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
627945	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
627946	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
627947	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
627948	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
627949	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
627950	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
627951	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
627952	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
627953	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
627954	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory

627955	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
627956	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
627957	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
627958	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
627959	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem , problems	1	UNIT -III	Theory
627960	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem, problems	1	UNIT -III	Theory
627961	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
627962	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
627963	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
627964	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
627965	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
627966	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
627967	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
627968	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
627969	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
627970	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	1	UNIT -IV	Theory
627971	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	1	UNIT -IV	Theory
627972	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	2	UNIT -IV	Theory

627973	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
627974	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
627975	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
627976	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
627977	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
627978	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	3	UNIT -V	Theory
627979	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
627980	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
627981	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
627982	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
627983	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
627984	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
627985	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
627986	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
627987	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
627988	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory

627989	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
627990	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
627991	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
627992	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
627993	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
627994	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
627995	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
627996	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
627997	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
627998	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
627999	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628000	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem , problems	1	UNIT -III	Theory
628001	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem, problems	1	UNIT -III	Theory
628002	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628003	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628004	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628005	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628006	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628007	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628008	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory

628009	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628010	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628011	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Taylor's and MacLaurin's series expansion of functions of two variables	1	UNIT -IV	Theory
628012	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	1	UNIT -IV	Theory
628013	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	2	UNIT -IV	Theory
628014	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Lagrange's multiplied method.	2	UNIT -IV	Theory
628015	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628016	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628017	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628018	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628019	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	3	UNIT -V	Theory
628028	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
628029	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
628030	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
628031	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
628032	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
628033	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
628034	NRISH715	CSE	B	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory

628035	NRISH715	CSE	B	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
628036	NRISH715	CSE	B	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
628037	NRISH715	CSE	B	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
628038	NRISH715	CSE	B	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory
628039	NRISH715	CSE	B	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
628040	NRISH715	CSE	B	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
628041	NRISH715	CSE	B	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
628042	NRISH715	CSE	B	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory
628043	NRISH715	CSE	B	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh’s criterion for resolving power	2	UNIT -I	Theory
628044	NRISH715	CSE	B	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
628045	NRISH715	CSE	B	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
628046	NRISH715	CSE	B	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory
628047	NRISH715	CSE	B	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
628048	NRISH715	CSE	B	2021	APPLIED PHYSICS	Nicol’s prism	1	UNIT -I	Theory
628049	NRISH715	CSE	B	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
628050	NRISH715	CSE	B	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory

628051	NRISH715	CSE	B	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
628052	NRISH715	CSE	B	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
628053	NRISH715	CSE	B	2021	APPLIED PHYSICS	Einstein’s coefficients , Population inversion	2	UNIT -II	Theory
628054	NRISH715	CSE	B	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
628055	NRISH715	CSE	B	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
628056	NRISH715	CSE	B	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory
628057	NRISH715	CSE	B	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
628058	NRISH715	CSE	B	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory
628059	NRISH715	CSE	B	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory
628060	NRISH715	CSE	B	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory
628061	NRISH715	CSE	B	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory

628062	NRISH715	CSE	B	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
628063	NRISH715	CSE	B	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
628064	NRISH715	CSE	B	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory
628065	NRISH715	CSE	B	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory
628066	NRISH715	CSE	B	2021	APPLIED PHYSICS	Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
628067	NRISH715	CSE	B	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
628068	NRISH715	CSE	B	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory
628069	NRISH715	CSE	B	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory
628070	NRISH715	CSE	B	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory
628071	NRISH715	CSE	B	2021	APPLIED PHYSICS	Quantum Free Electron Theory- Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
628072	NRISH715	CSE	B	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory

628073	NRISH715	CSE	B	2021	APPLIED PHYSICS	Bloch Theorem-Kronig Penny Model	2	UNIT -V	Theory
628074	NRISH715	CSE	B	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
628075	NRISH715	CSE	B	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory
628076	NRISH715	CSE	B	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory
628077	NRISH715	CSE	B	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
628078	NRISH715	CSE	B	2021	APPLIED PHYSICS	Drift and diffusion-Einstein’s equation	1	UNIT -V	Theory
628079	NRISH715	CSE	B	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
628080	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	Sonometer	3	Experme nt 1	LAB
628081	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experme nt 2	LAB
628082	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experme nt 3	LAB
628083	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experme nt 4	LAB
628084	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	Newton rings	3	Experme nt 5	LAB
628085	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experme nt 6	LAB
628086	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experme nt 7	LAB

628087	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628088	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628089	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628090	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628091	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628092	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628093	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628094	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628095	NRISH715	CSE	B	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experme nt 8	LAB
628096	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628097	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628098	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628099	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628100	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628101	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628102	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628103	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory

628104	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628105	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628106	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628107	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628108	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy's root test	1	UNIT -III	Theory
628109	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz's rule	1	UNIT -III	Theory
628110	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Rolle's Theorem	1	UNIT -III	Theory
628111	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange's mean value theorem	1	UNIT -III	Theory
628112	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy's mean value theorem	1	UNIT -III	Theory
628113	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Taylor's and Maclaurin's theorems with remainders	2	UNIT -III	Theory
628114	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628115	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628116	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628117	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Euler's theorem	1	UNIT -IV	Theory
628118	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628119	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628120	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628121	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Taylor's and MacLaurin's series expansion of functions of two variables	2	UNIT -IV	Theory
628122	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory

628123	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
628124	NRISH715	CSM	B	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory
628125	NRISH715	CSM	B	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
628126	NRISH715	CSM	B	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
628127	NRISH715	CSM	B	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
628128	NRISH715	CSM	B	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory
628129	NRISH715	CSM	B	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
628130	NRISH715	CSM	B	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
628131	NRISH715	CSM	B	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
628132	NRISH715	CSM	B	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory
628133	NRISH715	CSM	B	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh’s criterion for resolving power	2	UNIT -I	Theory
628134	NRISH715	CSM	B	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
628135	NRISH715	CSM	B	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
628136	NRISH715	CSM	B	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory
628137	NRISH715	CSM	B	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
628138	NRISH715	CSM	B	2021	APPLIED PHYSICS	Nicol’s prism	1	UNIT -I	Theory

628139	NRISH715	CSM	B	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
628140	NRISH715	CSM	B	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory
628141	NRISH715	CSM	B	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
628142	NRISH715	CSM	B	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
628143	NRISH715	CSM	B	2021	APPLIED PHYSICS	Einstein’s coefficients , Population inversion	2	UNIT -II	Theory
628144	NRISH715	CSM	B	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
628145	NRISH715	CSM	B	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
628146	NRISH715	CSM	B	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory
628147	NRISH715	CSM	B	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
628148	NRISH715	CSM	B	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory
628149	NRISH715	CSM	B	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory
628150	NRISH715	CSM	B	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory

628151	NRISH715	CSM	B	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory
628152	NRISH715	CSM	B	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
628153	NRISH715	CSM	B	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
628154	NRISH715	CSM	B	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory
628155	NRISH715	CSM	B	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory
628156	NRISH715	CSM	B	2021	APPLIED PHYSICS	Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
628157	NRISH715	CSM	B	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
628158	NRISH715	CSM	B	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory
628159	NRISH715	CSM	B	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory
628160	NRISH715	CSM	B	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory

628161	NRISH715	CSM	B	2021	APPLIED PHYSICS	Quantum Free Electron Theory-Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
628162	NRISH715	CSM	B	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory
628163	NRISH715	CSM	B	2021	APPLIED PHYSICS	Bloch Theorem-Kronig Penny Model	2	UNIT -V	Theory
628164	NRISH715	CSM	B	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
628165	NRISH715	CSM	B	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory
628166	NRISH715	CSM	B	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory
628167	NRISH715	CSM	B	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
628168	NRISH715	CSM	B	2021	APPLIED PHYSICS	Drift and diffusion-Einstein’s equation	1	UNIT -V	Theory
628169	NRISH715	CSM	B	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
628170	NRISH716	CSM	A	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory
628171	NRISH716	CSM	A	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
628172	NRISH716	CSM	A	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
628173	NRISH716	CSM	A	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
628174	NRISH716	CSM	A	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory

628175	NRISH716	CSM	A	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
628176	NRISH716	CSM	A	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
628177	NRISH716	CSM	A	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
628178	NRISH716	CSM	A	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory
628179	NRISH716	CSM	A	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh's criterion for resolving power	2	UNIT -I	Theory
628180	NRISH716	CSM	A	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
628181	NRISH716	CSM	A	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
628182	NRISH716	CSM	A	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory
628183	NRISH716	CSM	A	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
628184	NRISH716	CSM	A	2021	APPLIED PHYSICS	Nicol's prism	1	UNIT -I	Theory
628185	NRISH716	CSM	A	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
628186	NRISH716	CSM	A	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory
628187	NRISH716	CSM	A	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
628188	NRISH716	CSM	A	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
628189	NRISH716	CSM	A	2021	APPLIED PHYSICS	Einstein's coefficients , Population inversion	2	UNIT -II	Theory

628190	NRISH716	CSM	A	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
628191	NRISH716	CSM	A	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
628192	NRISH716	CSM	A	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory
628193	NRISH716	CSM	A	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
628194	NRISH716	CSM	A	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory
628195	NRISH716	CSM	A	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory
628196	NRISH716	CSM	A	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory
628197	NRISH716	CSM	A	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory
628198	NRISH716	CSM	A	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
628199	NRISH716	CSM	A	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
628200	NRISH716	CSM	A	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory

628201	NRISH716	CSM	A	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory
628202	NRISH716	CSM	A	2021	APPLIED PHYSICS	Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
628203	NRISH716	CSM	A	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
628204	NRISH716	CSM	A	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory
628205	NRISH716	CSM	A	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory
628206	NRISH716	CSM	A	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory
628207	NRISH716	CSM	A	2021	APPLIED PHYSICS	Quantum Free Electron Theory-Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
628208	NRISH716	CSM	A	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory
628209	NRISH716	CSM	A	2021	APPLIED PHYSICS	Bloch Theorem-Kronig Penny Model	2	UNIT -V	Theory
628210	NRISH716	CSM	A	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
628211	NRISH716	CSM	A	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory

628212	NRISH716	CSM	A	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory
628213	NRISH716	CSM	A	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
628214	NRISH716	CSM	A	2021	APPLIED PHYSICS	Drift and diffusion- Einstein’s equation	1	UNIT -V	Theory
628215	NRISH716	CSM	A	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
628216	NRISH716	CSE	A	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory
628217	NRISH716	CSE	A	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
628218	NRISH716	CSE	A	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
628219	NRISH716	CSE	A	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
628220	NRISH716	CSE	A	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory
628221	NRISH716	CSE	A	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
628222	NRISH716	CSE	A	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
628223	NRISH716	CSE	A	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
628224	NRISH716	CSE	A	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory
628225	NRISH716	CSE	A	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh’s criterion for resolving power	2	UNIT -I	Theory

628226	NRISH716	CSE	A	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
628227	NRISH716	CSE	A	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
628228	NRISH716	CSE	A	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory
628229	NRISH716	CSE	A	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
628230	NRISH716	CSE	A	2021	APPLIED PHYSICS	Nicol’s prism	1	UNIT -I	Theory
628231	NRISH716	CSE	A	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
628232	NRISH716	CSE	A	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory
628233	NRISH716	CSE	A	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
628234	NRISH716	CSE	A	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
628235	NRISH716	CSE	A	2021	APPLIED PHYSICS	Einstein’s coefficients , Population inversion	2	UNIT -II	Theory
628236	NRISH716	CSE	A	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
628237	NRISH716	CSE	A	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
628238	NRISH716	CSE	A	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory
628239	NRISH716	CSE	A	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
628240	NRISH716	CSE	A	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory

628241	NRISH716	CSE	A	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory
628242	NRISH716	CSE	A	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory
628243	NRISH716	CSE	A	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory
628244	NRISH716	CSE	A	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
628245	NRISH716	CSE	A	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
628246	NRISH716	CSE	A	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory
628247	NRISH716	CSE	A	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory
628248	NRISH716	CSE	A	2021	APPLIED PHYSICS	Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
628249	NRISH716	CSE	A	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
628250	NRISH716	CSE	A	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory

628251	NRISH716	CSE	A	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory
628252	NRISH716	CSE	A	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory
628253	NRISH716	CSE	A	2021	APPLIED PHYSICS	Quantum Free Electron Theory- Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
628254	NRISH716	CSE	A	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory
628255	NRISH716	CSE	A	2021	APPLIED PHYSICS	Bloch Theorem- Kronig Penny Model	2	UNIT -V	Theory
628256	NRISH716	CSE	A	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
628257	NRISH716	CSE	A	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory
628258	NRISH716	CSE	A	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory
628259	NRISH716	CSE	A	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
628260	NRISH716	CSE	A	2021	APPLIED PHYSICS	Drift and diffusion- Einstein’s equation	1	UNIT -V	Theory
628261	NRISH716	CSE	A	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
628262	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Java’s Lineage,	1	UNIT -I	Theory
628263	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Java’s Magic: The Byte code,	1	UNIT -I	Theory
628264	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	The Java Buzzwords.	1	UNIT -I	Theory

628265	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	An overview of Java: Object-Oriented Programming, A First Simple Program,	1	UNIT -I	Theory
628266	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	A Second Short Program, Two Control Statements.	1	UNIT -I	Theory
628267	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Java Is a Strongly Typed Language, Integers, Floating-Point Types,	1	UNIT -I	Theory
628268	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	factorial, fibonacci, linear search, gcd	3	Experme nt 1	LAB
628269	NRISH739	CSE	C	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory
628270	NRISH739	CSE	C	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
628271	NRISH739	CSE	C	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
628272	NRISH739	CSE	C	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
628273	NRISH739	CSE	C	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory
628274	NRISH739	CSE	C	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
628275	NRISH739	CSE	C	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
628276	NRISH739	CSE	C	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
628277	NRISH739	CSE	C	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory

628278	NRISH739	CSE	C	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh's criterion for resolving power	2	UNIT -I	Theory
628279	NRISH739	CSE	C	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
628280	NRISH739	CSE	C	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
628281	NRISH739	CSE	C	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory
628282	NRISH739	CSE	C	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
628283	NRISH739	CSE	C	2021	APPLIED PHYSICS	Nicol's prism	1	UNIT -I	Theory
628284	NRISH739	CSE	C	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
628285	NRISH739	CSE	C	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory
628286	NRISH739	CSE	C	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
628287	NRISH739	CSE	C	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
628288	NRISH739	CSE	C	2021	APPLIED PHYSICS	Einstein's coefficients , Population inversion	2	UNIT -II	Theory
628289	NRISH739	CSE	C	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
628290	NRISH739	CSE	C	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
628291	NRISH739	CSE	C	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory

628292	NRISH739	CSE	C	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
628293	NRISH739	CSE	C	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory
628294	NRISH739	CSE	C	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory
628295	NRISH739	CSE	C	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory
628296	NRISH739	CSE	C	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory
628297	NRISH739	CSE	C	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
628298	NRISH739	CSE	C	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
628299	NRISH739	CSE	C	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory
628300	NRISH739	CSE	C	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory

628301	NRISH739	CSE	C	2021	APPLIED PHYSICS	Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
628302	NRISH739	CSE	C	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
628303	NRISH739	CSE	C	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory
628304	NRISH739	CSE	C	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory
628305	NRISH739	CSE	C	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory
628306	NRISH739	CSE	C	2021	APPLIED PHYSICS	Quantum Free Electron Theory- Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
628307	NRISH739	CSE	C	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory
628308	NRISH739	CSE	C	2021	APPLIED PHYSICS	Bloch Theorem-Kronig Penny Model	2	UNIT -V	Theory
628309	NRISH739	CSE	C	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
628310	NRISH739	CSE	C	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory
628311	NRISH739	CSE	C	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory

628312	NRISH739	CSE	C	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
628313	NRISH739	CSE	C	2021	APPLIED PHYSICS	Drift and diffusion-Einstein’s equation	1	UNIT -V	Theory
628314	NRISH739	CSE	C	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
628315	NRISH739	CSM	C	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory
628316	NRISH739	CSM	C	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
628317	NRISH739	CSM	C	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
628318	NRISH739	CSM	C	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
628319	NRISH739	CSM	C	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory
628320	NRISH739	CSM	C	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
628321	NRISH739	CSM	C	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
628322	NRISH739	CSM	C	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
628323	NRISH739	CSM	C	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory
628324	NRISH739	CSM	C	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh’s criterion for resolving power	2	UNIT -I	Theory
628325	NRISH739	CSM	C	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
628326	NRISH739	CSM	C	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
628327	NRISH739	CSM	C	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory

628328	NRISH739	CSM	C	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
628329	NRISH739	CSM	C	2021	APPLIED PHYSICS	Nicol’s prism	1	UNIT -I	Theory
628330	NRISH739	CSM	C	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
628331	NRISH739	CSM	C	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory
628332	NRISH739	CSM	C	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
628333	NRISH739	CSM	C	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
628334	NRISH739	CSM	C	2021	APPLIED PHYSICS	Einstein’s coefficients , Population inversion	2	UNIT -II	Theory
628335	NRISH739	CSM	C	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
628336	NRISH739	CSM	C	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
628337	NRISH739	CSM	C	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory
628338	NRISH739	CSM	C	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
628339	NRISH739	CSM	C	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory
628340	NRISH739	CSM	C	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory

628341	NRISH739	CSM	C	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory
628342	NRISH739	CSM	C	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory
628343	NRISH739	CSM	C	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
628344	NRISH739	CSM	C	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
628345	NRISH739	CSM	C	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory
628346	NRISH739	CSM	C	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory
628347	NRISH739	CSM	C	2021	APPLIED PHYSICS	Types of polarizations-Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
628348	NRISH739	CSM	C	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
628349	NRISH739	CSM	C	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory
628350	NRISH739	CSM	C	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory

628351	NRISH739	CSM	C	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory
628352	NRISH739	CSM	C	2021	APPLIED PHYSICS	Quantum Free Electron Theory-Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
628353	NRISH739	CSM	C	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory
628354	NRISH739	CSM	C	2021	APPLIED PHYSICS	Bloch Theorem-Kronig Penny Model	2	UNIT -V	Theory
628355	NRISH739	CSM	C	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
628356	NRISH739	CSM	C	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory
628357	NRISH739	CSM	C	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory
628358	NRISH739	CSM	C	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
628359	NRISH739	CSM	C	2021	APPLIED PHYSICS	Drift and diffusion-Einstein’s equation	1	UNIT -V	Theory
628360	NRISH739	CSM	C	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
628361	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	Sonometer	3	Experme nt 1	LAB
628362	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experme nt 2	LAB
628363	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experme nt 3	LAB

628364	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experment 4	LAB
628365	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	Newton rings	3	Experment 5	LAB
628366	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experment 6	LAB
628367	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experment 7	LAB
628368	NRISH739	CSE	C	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experment 8	LAB
628369	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	Sonometer	3	Experment 1	LAB
628370	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experment 2	LAB
628371	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experment 3	LAB
628372	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experment 4	LAB
628373	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	Newton rings	3	Experment 5	LAB
628374	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experment 6	LAB
628375	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experment 7	LAB
628376	NRISH739	CSM	C	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experment 8	LAB
628377	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experment 1	LAB

628378	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB
628379	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experme nt 3	LAB
628380	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experme nt 4	LAB
628381	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experme nt 5	LAB
628382	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
628383	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB
628384	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experme nt 8	LAB

628385	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experment 1	LAB
628386	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experment 2	LAB
628387	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experment 3	LAB
628388	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experment 4	LAB
628389	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experment 5	LAB
628390	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experment 6	LAB
628391	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experment 7	LAB

628392	NRISH732	CE	A	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experment 8	LAB
628393	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experment 1	LAB
628394	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experment 2	LAB
628395	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experment 3	LAB
628396	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experment 4	LAB
628397	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experment 5	LAB

628398	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
628399	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB
628400	NRISH732	ME	A	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experme nt 8	LAB
628401	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experme nt 1	LAB
628402	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB
628403	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experme nt 3	LAB

628404	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experme nt 4	LAB
628405	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experme nt 5	LAB
628406	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
628407	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB
628408	NRISH732	CSM	A	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experme nt 8	LAB
628409	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experme nt 1	LAB
628410	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB

628411	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experment 3	LAB
628412	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experment 4	LAB
628413	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experment 5	LAB
628414	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experment 6	LAB
628415	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experment 7	LAB
628416	NRISH732	CSE	A	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experment 8	LAB
628417	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experment 1	LAB

628418	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB
628419	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experme nt 3	LAB
628420	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experme nt 4	LAB
628421	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experme nt 5	LAB
628422	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
628423	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB
628424	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experme nt 8	LAB

628425	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experme nt 1	LAB
628426	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB
628427	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experme nt 3	LAB
628428	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experme nt 4	LAB
628429	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experme nt 5	LAB
628430	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
628431	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB

628432	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experment 8	LAB
628433	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experment 1	LAB
628434	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experment 2	LAB
628435	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experment 3	LAB
628436	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experment 4	LAB
628437	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experment 5	LAB

628438	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
628439	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB
628440	NRISH702	CSE	C	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experme nt 8	LAB
628441	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experme nt 1	LAB
628442	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB
628443	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experme nt 3	LAB

628444	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experme nt 4	LAB
628445	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experme nt 5	LAB
628446	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
628447	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB
628448	NRISH702	ECE	B	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experme nt 8	LAB
628449	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Characters, The Primitive Types, Booleans,	1	UNIT -I	Theory
628450	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Variables, Type Conversion and Casting,	1	UNIT -I	Theory
628451	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Automatic Type Promotion in Expressions,	1	UNIT -I	Theory
628452	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Arrays.	1	UNIT -I	Theory
628453	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Class Fundamentals, Declaring Objects,	1	UNIT -II	Theory
628454	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Assigning Object Reference Variables,	1	UNIT -II	Theory
628455	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Introducing Methods,	1	UNIT -II	Theory

628456	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Constructors,	1	UNIT -II	Theory
628457	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	The this Keyword,	1	UNIT -II	Theory
628458	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Garbage Collection, A Stack Class.	1	UNIT -II	Theory
628459	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	A Closer Look at Methods and Classes: Overloading Methods,	1	UNIT -II	Theory
628460	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Using Objects as Parameters,	1	UNIT -II	Theory
628461	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	introduction to polymers	1	UNIT -I	Theory
628462	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.	1	UNIT -I	Theory
628463	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	introduction to polymers	1	UNIT -I	Theory

628464	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession	1	UNIT -I	Theory
628465	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social value. India as a mega diversity nation	1	UNIT -II	Theory
628466	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	types of polymerization	1	UNIT -I	Theory
628467	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. Endangered and endemic species of India – Conservation of biodiversity.	1	UNIT -II	Theory
628468	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	types of polymerization	1	UNIT -I	Theory

628469	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Natural Resources: Natural resources and associated problems. Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people	1	UNIT -III	Theory
628470	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.	1	UNIT -III	Theory
628471	NRISH721	EEE	A	2021	APPLIED CHEMISTRY LAB	Estimation of HCl	3	Experme nt 1	LAB
628472	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Energy resources: Growing energy needs, renewable energy resources	1	UNIT -III	Theory

628473	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	non-renewable energy sources use of alternate energy sources. Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	1	UNIT -III	Theory
628474	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Stud	1	UNIT -IV	Theory
628475	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	1	UNIT -IV	Theory

628476	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Social Issues and the Environment: Urban problems related to energy, rain water harvesting. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of	1	UNIT -V	Theory
628477	NRISH723	ECE	A	2021	ENVIRONMENTAL SCIENCES	Wildlife Protection Act -Forest Conservation Act. Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS. Ecotourism, Green Campus – Green business and Green politics	1	UNIT -V	Theory

628478	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.	1	UNIT -I	Theory
628479	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession	1	UNIT -I	Theory

628480	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social value. India as a mega diversity nation	1	UNIT -II	Theory
628481	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. Endangered and endemic species of India – Conservation of biodiversity.	1	UNIT -II	Theory
628482	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Natural Resources: Natural resources and associated problems. Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people	1	UNIT -III	Theory

628483	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.	1	UNIT -III	Theory
628484	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Energy resources: Growing energy needs, renewable energy resources	1	UNIT -III	Theory
628485	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	non-renewable energy sources use of alternate energy sources. Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	1	UNIT -III	Theory

628486	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Stud	1	UNIT -IV	Theory
628487	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	1	UNIT -IV	Theory

628488	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Social Issues and the Environment: Urban problems related to energy, rain water harvesting. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of	1	UNIT -V	Theory
628489	NRISH723	ECE	B	2021	ENVIRONMENTAL SCIENCES	Wildlife Protection Act -Forest Conservation Act. Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS. Ecotourism, Green Campus – Green business and Green politics	1	UNIT -V	Theory

628490	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.	1	UNIT -I	Theory
628491	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession	1	UNIT -I	Theory

628492	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social value. India as a mega diversity nation	1	UNIT -II	Theory
628493	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. Endangered and endemic species of India – Conservation of biodiversity.	1	UNIT -II	Theory
628494	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Natural Resources: Natural resources and associated problems. Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people	1	UNIT -III	Theory

628495	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.	1	UNIT -III	Theory
628496	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Energy resources: Growing energy needs, renewable energy resources	1	UNIT -III	Theory
628497	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	non-renewable energy sources use of alternate energy sources. Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	1	UNIT -III	Theory

628498	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Stud	1	UNIT -IV	Theory
628499	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	1	UNIT -IV	Theory

628500	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Social Issues and the Environment: Urban problems related to energy, rain water harvesting. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of	1	UNIT -V	Theory
628501	NRISH723	ECE	C	2021	ENVIRONMENTAL SCIENCES	Wildlife Protection Act -Forest Conservation Act. Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS. Ecotourism, Green Campus – Green business and Green politics	1	UNIT -V	Theory

628502	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.	1	UNIT -I	Theory
628503	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession	1	UNIT -I	Theory

628504	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social value. India as a mega diversity nation	1	UNIT -II	Theory
628505	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. Endangered and endemic species of India – Conservation of biodiversity.	1	UNIT -II	Theory
628506	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Natural Resources: Natural resources and associated problems. Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people	1	UNIT -III	Theory

628507	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.	1	UNIT -III	Theory
628508	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Energy resources: Growing energy needs, renewable energy resources	1	UNIT -III	Theory
628509	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	non-renewable energy sources use of alternate energy sources. Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	1	UNIT -III	Theory

628510	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Stud	1	UNIT -IV	Theory
628511	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	1	UNIT -IV	Theory

628512	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Social Issues and the Environment: Urban problems related to energy, rain water harvesting. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of	1	UNIT -V	Theory
628513	NRISH723	CE	A	2021	ENVIRONMENTAL SCIENCES	Wildlife Protection Act -Forest Conservation Act. Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS. Ecotourism, Green Campus – Green business and Green politics	1	UNIT -V	Theory

628514	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.	1	UNIT -I	Theory
628515	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession	1	UNIT -I	Theory

628516	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social value. India as a mega diversity nation	1	UNIT -II	Theory
628517	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. Endangered and endemic species of India – Conservation of biodiversity.	1	UNIT -II	Theory
628518	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Natural Resources: Natural resources and associated problems. Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people	1	UNIT -III	Theory

628519	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.	1	UNIT -III	Theory
628520	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Energy resources: Growing energy needs, renewable energy resources	1	UNIT -III	Theory
628521	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	non-renewable energy sources use of alternate energy sources. Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	1	UNIT -III	Theory

628522	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Stud	1	UNIT -IV	Theory
628523	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	1	UNIT -IV	Theory

628524	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Social Issues and the Environment: Urban problems related to energy, rain water harvesting. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of	1	UNIT -V	Theory
628525	NRISH723	EEE	A	2021	ENVIRONMENTAL SCIENCES	Wildlife Protection Act -Forest Conservation Act. Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS. Ecotourism, Green Campus – Green business and Green politics	1	UNIT -V	Theory

628526	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.	1	UNIT -I	Theory
628527	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession	1	UNIT -I	Theory

628528	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social value. India as a mega diversity nation	1	UNIT -II	Theory
628529	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. Endangered and endemic species of India – Conservation of biodiversity.	1	UNIT -II	Theory
628530	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Natural Resources: Natural resources and associated problems. Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people	1	UNIT -III	Theory

628531	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.	1	UNIT -III	Theory
628532	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Energy resources: Growing energy needs, renewable energy resources	1	UNIT -III	Theory
628533	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	non-renewable energy sources use of alternate energy sources. Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	1	UNIT -III	Theory

628534	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Stud	1	UNIT -IV	Theory
628535	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	1	UNIT -IV	Theory

628536	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Social Issues and the Environment: Urban problems related to energy, rain water harvesting. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of	1	UNIT -V	Theory
628537	NRISH723	ME	A	2021	ENVIRONMENTAL SCIENCES	Wildlife Protection Act -Forest Conservation Act. Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS. Ecotourism, Green Campus – Green business and Green politics	1	UNIT -V	Theory
628538	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	A Closer Look at Argument Passing, Returning Objects,	1	UNIT -II	Theory
628539	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Introducing Access Control,	1	UNIT -II	Theory
628540	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Understanding static,	1	UNIT -II	Theory

628541	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Introducing final, Using Command-Line Arguments.	1	UNIT -II	Theory
628542	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Java's Lineage,	1	UNIT -I	Theory
628543	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Java's Magic: The Byte code,	1	UNIT -I	Theory
628544	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	The Java Buzzwords.	1	UNIT -I	Theory
628545	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	An overview of Java: Object-Oriented Programming, A First Simple Program,	1	UNIT -I	Theory
628546	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	A Second Short Program, Two Control Statements.	1	UNIT -I	Theory
628547	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Java Is a Strongly Typed Language, Integers, Floating-Point Types,	1	UNIT -I	Theory
628548	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Characters, The Primitive Types, Booleans,	1	UNIT -I	Theory
628549	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Variables, Type Conversion and Casting,	1	UNIT -I	Theory
628550	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Automatic Type Promotion in Expressions,	1	UNIT -I	Theory
628551	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Arrays.	1	UNIT -I	Theory
628552	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Class Fundamentals, Declaring Objects,	1	UNIT -II	Theory
628553	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Assigning Object Reference Variables,	1	UNIT -II	Theory
628554	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Introducing Methods,	1	UNIT -II	Theory
628555	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Constructors,	1	UNIT -II	Theory

628556	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	The this Keyword,	1	UNIT -II	Theory
628557	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Garbage Collection, A Stack Class.	1	UNIT -II	Theory
628558	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	A Closer Look at Methods and Classes: Overloading Methods,	1	UNIT -II	Theory
628559	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Using Objects as Parameters,	1	UNIT -II	Theory
628560	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	A Closer Look at Argument Passing, Returning Objects,	1	UNIT -II	Theory
628561	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Introducing Access Control,	1	UNIT -II	Theory
628562	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Understanding static,	1	UNIT -II	Theory
628563	NRICSE603	ECE	B	2021	JAVA PROGRAMMING	Introducing final, Using Command-Line Arguments.	1	UNIT -II	Theory
628564	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Java's Lineage,	1	UNIT -I	Theory
628565	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Java's Magic: The Byte code,	1	UNIT -I	Theory
628566	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	The Java Buzzwords.	1	UNIT -I	Theory
628567	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	An overview of Java: Object-Oriented Programming, A First Simple Program,	1	UNIT -I	Theory
628568	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	A Second Short Program, Two Control Statements.	1	UNIT -I	Theory
628569	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Java Is a Strongly Typed Language, Integers, Floating-Point Types,	1	UNIT -I	Theory
628570	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Characters, The Primitive Types, Booleans,	1	UNIT -I	Theory

628571	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Variables, Type Conversion and Casting,	1	UNIT -I	Theory
628572	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Automatic Type Promotion in Expressions,	1	UNIT -I	Theory
628573	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Arrays.	1	UNIT -I	Theory
628574	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Class Fundamentals, Declaring Objects,	1	UNIT -II	Theory
628575	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Assigning Object Reference Variables,	1	UNIT -II	Theory
628576	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Introducing Methods,	1	UNIT -II	Theory
628577	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Constructors,	1	UNIT -II	Theory
628578	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	The this Keyword,	1	UNIT -II	Theory
628579	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Garbage Collection, A Stack Class.	1	UNIT -II	Theory
628580	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	A Closer Look at Methods and Classes: Overloading Methods,	1	UNIT -II	Theory
628581	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Using Objects as Parameters,	1	UNIT -II	Theory
628582	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	A Closer Look at Argument Passing, Returning Objects,	1	UNIT -II	Theory
628583	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Introducing Access Control,	1	UNIT -II	Theory
628584	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Understanding static,	1	UNIT -II	Theory
628585	NRICSE603	ECE	C	2021	JAVA PROGRAMMING	Introducing final, Using Command-Line Arguments.	1	UNIT -II	Theory
628586	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	INHERITANCE: Inheritance basics,	1	UNIT -III	Theory
628587	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Using super keyword,	1	UNIT -III	Theory

628588	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	method overriding,	1	UNIT -III	Theory
628589	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Dynamic method dispatch using final with inheritance,	1	UNIT -III	Theory
628590	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	abstract classes	1	UNIT -III	Theory
628591	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Defining a package,	1	UNIT -III	Theory
628592	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Finding packages and class path,	1	UNIT -III	Theory
628593	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Example, Access protection,	1	UNIT -III	Theory
628594	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	importing packages	1	UNIT -III	Theory
628595	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Interfaces: Defining Interface,	1	UNIT -III	Theory
628596	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Implementing Interface,	1	UNIT -III	Theory
628597	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Nested Interfaces,	1	UNIT -III	Theory
628598	NRICSE603	ECE	A	2021	JAVA PROGRAMMING	Applying interfaces, Variables in interface,	1	UNIT -III	Theory
628599	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628600	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628601	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628602	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	LAB DEMONISTRATION	3	Experme nt 1	LAB
628603	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628604	NRISH711	CE	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory

628605	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628606	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628607	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628608	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628609	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628610	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628611	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628612	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628613	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628614	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628615	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628616	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628617	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628618	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628619	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628620	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628621	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory

628622	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628623	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628624	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628625	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628626	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628627	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
628628	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628629	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628630	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628631	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628632	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628633	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628634	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628635	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628636	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628637	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628638	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
628639	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628640	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory

628641	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628642	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628643	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628644	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628645	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628646	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628647	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628648	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628649	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628650	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628651	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628652	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628653	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628654	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628655	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628656	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory

628657	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628658	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628659	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628660	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628661	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628662	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628663	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628664	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628665	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628666	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628667	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628668	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
628669	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628670	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628671	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628672	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628673	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628674	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628675	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628676	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628677	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory

628678	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628679	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
628680	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628681	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
628682	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628683	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628684	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628685	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628686	NRISH711	ME	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628687	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628688	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628689	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628690	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628691	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628692	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory

628693	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628694	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628695	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628696	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628697	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628698	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628699	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628700	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628701	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628702	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628703	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628704	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628705	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628706	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628707	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628708	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628709	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
628710	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628711	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory

628712	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628713	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628714	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628715	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628716	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628717	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628718	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628719	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628720	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
628721	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628722	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
628723	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628724	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628725	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628726	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628727	NRISH707	CSE	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory

628728	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628729	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628730	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628731	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628732	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628733	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628734	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628735	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628736	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628737	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628738	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628739	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628740	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628741	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628742	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628743	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628744	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory

628745	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628746	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628747	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628748	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628749	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628750	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
628751	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628752	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628753	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628754	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628755	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628756	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628757	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628758	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628759	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628760	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628761	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
628762	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628763	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory

628764	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628765	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628766	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628767	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628768	NRISH707	CSD	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628769	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628770	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628771	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628772	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628773	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628774	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628775	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628776	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628777	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628778	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628779	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory

628780	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628781	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628782	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628783	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628784	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628785	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628786	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628787	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Magnetization characteristics of D.C. Shunt generator	3	Experme nt 2	LAB
628788	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628789	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628790	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628791	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628792	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
628793	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628794	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628795	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628796	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628797	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628798	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628799	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory

628800	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628801	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628802	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628803	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Taylor's and MacLaurin's series expansion of functions of two variables	2	UNIT -IV	Theory
628804	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628805	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Lagrange's multiplied method.	2	UNIT -IV	Theory
628806	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628807	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628808	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628809	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628810	NRISH709	ECE	B	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628811	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Speed control of D.C.shuntmotor.	3	Experme nt 3	LAB
628812	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628813	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628814	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628815	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory

628816	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628817	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628818	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628819	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628820	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628821	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628822	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628823	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628824	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628825	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628826	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628827	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628828	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628829	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628830	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628831	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628832	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628833	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628834	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory

628835	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628836	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628837	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628838	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628839	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628840	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628841	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628842	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628843	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628844	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628845	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
628846	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628847	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
628848	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628849	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628850	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628851	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory

628852	NRISH738	ECE	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628853	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628854	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628855	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628856	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628857	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628858	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628859	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628860	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628861	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628862	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628863	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628864	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628865	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Brake test on DCshuntmotor	3	Experme nt 4	LAB
628866	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628867	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory

628868	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628869	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628870	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628871	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628872	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628873	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628874	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628875	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628876	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
628877	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628878	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628879	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
628880	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628881	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628882	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628883	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628884	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628885	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628886	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628887	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory

628888	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628889	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
628890	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628891	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628892	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628893	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628894	NRISH738	CSM	C	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628895	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628896	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628897	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628898	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628899	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628900	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628901	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628902	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Swinburne’s test onDCmachine	3	Experme nt 5	LAB
628903	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory

628904	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628905	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628906	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628907	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628908	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628909	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628910	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628911	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628912	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628913	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628914	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628915	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628916	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
628917	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
628918	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
628919	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
628920	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
628921	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory

628922	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628923	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628924	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628925	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
628926	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628927	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628928	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628929	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
628930	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628931	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
628932	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
628933	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628934	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628935	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628936	NRISH706	CSE	B	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628937	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory

628938	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628939	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628940	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628941	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628942	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628943	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Newton's Law of cooling	2	UNIT -I	Theory
628944	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628945	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628946	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
628947	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628948	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628949	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628950	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628951	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628952	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628953	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628954	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628955	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory

628956	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628957	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Cauchy's root test	1	UNIT -III	Theory
628958	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz's rule	1	UNIT -III	Theory
628959	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Rolle's Theorem	1	UNIT -III	Theory
628960	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Lagrange's mean value theorem	1	UNIT -III	Theory
628961	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Cauchy's mean value theorem	1	UNIT -III	Theory
628962	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Taylor's and Maclaurin's theorems with remainders	2	UNIT -III	Theory
628963	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
628964	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
628965	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
628966	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Euler's theorem	1	UNIT -IV	Theory
628967	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
628968	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
628969	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
628970	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Taylor's and MacLaurin's series expansion of functions of two variables	2	UNIT -IV	Theory
628971	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
628972	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Lagrange's multiplied method.	2	UNIT -IV	Theory
628973	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory

628974	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
628975	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
628976	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
628977	NRISH706	CSM	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
628978	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	. Load test on DCshuntgenerator	3	Experme nt 6	LAB
628979	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
628980	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
628981	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
628982	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
628983	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
628984	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
628985	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
628986	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
628987	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
628988	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory

628989	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
628990	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
628991	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
628992	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
628993	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
628994	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
628995	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
628996	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
628997	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
628998	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
628999	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
629000	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
629001	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
629002	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
629003	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
629004	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
629005	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
629006	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
629007	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
629008	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory

629009	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
629010	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
629011	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
629012	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
629013	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
629014	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
629015	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
629016	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
629017	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
629018	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
629019	NRISH706	EEE	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
629020	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Load test on DCseriesgenerator .	3	Experme nt 7	LAB
629021	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Separation of losses iun DCShuntmotor	3	Experme nt 8	LAB
629022	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	OC & SC tests onsingle-phasetransformer	3	Experme nt 9	LAB
629023	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Sumpner’s test on singlephasetransfo rmer	3	Experme nt 10	LAB

629024	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Brake test on 3-phase Inductionmotor.	3	Experme nt 11	LAB
629026	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING LAB	Regulation of alternator by synchronousimpe dancemethod.	3	Experme nt 12	LAB
629034	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Digital systems – Introduction and Overview	1	UNIT -I	Theory
629035	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Number system – basic types	1	UNIT -I	Theory
629036	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Binary numbers – representation and examples, Octal and hexadecimal numbers – representation and examples	1	UNIT -I	Theory
629037	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Conversion of number system from one radix to another	3	UNIT -I	Theory
629038	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Complements of numbers	2	UNIT -I	Theory
629039	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Signed binary numbers , Arithmetic addition and subtraction	1	UNIT -I	Theory
629040	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	4 bit codes – types	1	UNIT -I	Theory
629041	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	BCD	1	UNIT -I	Theory
629042	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Excess 3	1	UNIT -I	Theory
629043	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Alphanumeric code	1	UNIT -I	Theory
629044	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	9’s complement	1	UNIT -I	Theory
629045	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	2421,etc.,	1	UNIT -I	Theory
629046	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Basic properties of Boolean algebra	1	UNIT -II	Theory
629047	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Basic theorems of Boolean algebra	2	UNIT -II	Theory

629048	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Boolean functions	1	UNIT -II	Theory
629049	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Min terms and max terms	1	UNIT -II	Theory
629050	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Canonical forms	1	UNIT -II	Theory
629051	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Standard forms	1	UNIT -II	Theory
629052	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	K Map method	1	UNIT -II	Theory
629053	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Three variable K map	1	UNIT -II	Theory
629054	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Four variable K map	1	UNIT -II	Theory
629055	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Products of sum simplification	1	UNIT -II	Theory
629056	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Sum of products simplification	1	UNIT -II	Theory
629057	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Don’t care conditions	1	UNIT -II	Theory
629058	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	NAND and NOR implementation	1	UNIT -II	Theory
629059	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Exclusive OR function	1	UNIT -II	Theory
629060	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Introduction, Analysis Procedure	1	UNIT -III	Theory
629061	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Binary adder – subtractor	2	UNIT -III	Theory
629062	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Binary multiplier	1	UNIT -III	Theory
629063	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Decoders	1	UNIT -III	Theory
629064	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Encoders	1	UNIT -III	Theory
629065	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Multiplexers	1	UNIT -III	Theory
629066	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Demultiplexers	1	UNIT -III	Theory
629067	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Priority encoder	1	UNIT -III	Theory
629068	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Code converters	1	UNIT -III	Theory
629069	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Magnitude comparator	1	UNIT -III	Theory
629070	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	HDL models of combinational circuits	3	UNIT -III	Theory

629071	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PROM	2	UNIT -III	Theory
629072	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PAL	2	UNIT -III	Theory
629073	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PLA	2	UNIT -III	Theory
629074	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Introduction to sequential circuits	1	UNIT -IV	Theory
629075	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Storage elements: Latches, Flip flops	1	UNIT -IV	Theory
629076	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	RS latch using NAND and NOR gates, Truth tables	2	UNIT -IV	Theory
629077	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Truth Tables	3	UNIT -IV	Theory
629078	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Excitation Tables	1	UNIT -IV	Theory
629079	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Conversion of flipflops	2	UNIT -IV	Theory
629080	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Registers, Shift registers	2	UNIT -V	Theory
629081	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Ripple counters	2	UNIT -V	Theory
629082	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Synchronous counters	2	UNIT -V	Theory
629083	NRIECE161	CSM	A	2021	DIGITAL LOGIC DESIGN	Ring counter, Johnson counter	1	UNIT -V	Theory
629084	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Introduction to Electrical Circuits	1	UNIT -I	Theory
629085	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Resistance parameter, Inductance parameter, Capacitance parameter.	1	UNIT -I	Theory

629086	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Energy sources: Ideal, Non-ideal, Independent and dependent sources, Source transformation	1	UNIT -I	Theory
629087	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Kirchoff’s laws, Mesh analysis problem solving	2	UNIT -I	Theory
629088	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Nodal analysis problem solving	1	UNIT -I	Theory
629089	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Definitions of terms associated with periodic functions: Time period, Angular velocity and frequency, RMS value, Average value, Form factor and peak factor- problem solving,	2	UNIT -I	Theory
629090	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Phasor representation, Addition and subtraction of phasors	1	UNIT -I	Theory
629091	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Principal of Duality with examples	1	UNIT -I	Theory
629092	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Network Topology	2	UNIT -I	Theory
629093	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Tutorial	1	UNIT -I	Theory
629094	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	First order differential equations, Definition of time constants	1	UNIT -II	Theory
629095	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	R-L circuit, R-C circuit with DC excitation	1	UNIT -II	Theory
629096	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Evaluating initial conditions procedure	1	UNIT -II	Theory
629097	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	second order differential equations	1	UNIT -II	Theory

629098	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	homogeneous, non-homogenous	1	UNIT -II	Theory
629099	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	problem solving using R-L-C elements with DC excitation and AC excitation,	2	UNIT -II	Theory
629100	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Response as related to s-plane rotation of roots	1	UNIT -II	Theory
629101	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Solutions using Laplace transform method.	1	UNIT -II	Theory
629102	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Tutorial	1	UNIT -II	Theory
629103	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Impedance concept, phase angle	1	UNIT -III	Theory
629104	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	series R-L, R-C, R-L-C circuits problem solving	2	UNIT -III	Theory
629105	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis	2	UNIT -III	Theory
629106	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Star-Delta conversion, problem solving.	2	UNIT -III	Theory
629107	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Coupled Circuits: Self inductance, Mutual inductance,	1	UNIT -III	Theory
629108	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Coefficient of coupling, analysis of coupled circuits,	1	UNIT -III	Theory

629109	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Dot rule of coupled circuits, Conductively coupled equivalent circuits-problem solving	2	UNIT -III	Theory
629110	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Tutorial	1	UNIT -III	Theory
629111	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Introduction, Definition of Q,	1	UNIT -IV	Theory
629112	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Series resonance, Bandwidth of series resonance	1	UNIT -IV	Theory
629113	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Parallel resonance, Bandwidth of series resonance	1	UNIT -IV	Theory
629114	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Condition for maximum impedance, current in anti resonance	1	UNIT -IV	Theory
629115	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Thevinin’s Theorem and problem solving	2	UNIT -IV	Theory
629116	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Norton’s Theorem and problem solving	2	UNIT -IV	Theory
629117	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Milliman’s, Reciprocity and problem solving	2	UNIT -IV	Theory
629118	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Compensation, Substitution, Superposition	2	UNIT -IV	Theory
629119	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Max Power Transfer, Tellegens-problem solving	2	UNIT -IV	Theory
629120	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Relationship of two port networks, Z-parameters	1	UNIT -V	Theory
629121	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Y-parameters, Transmission line parameters,	2	UNIT -V	Theory
629122	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	h-parameters, Inverse h-parameters	2	UNIT -V	Theory

629123	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Relationship between parameter sets	1	UNIT -V	Theory
629124	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Parallel, Cascading and Series connection of two port networks	2	UNIT -V	Theory
629125	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	problem solving including dependent sources	2	UNIT -V	Theory
629126	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Tutorial	1	UNIT -V	Theory
629127	NRIECE147	ECE	A	2021	NETWORK ANALYSIS	Revision	2	UNIT -V	Theory
629128	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experme nt 1	LAB
629129	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB
629130	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experme nt 3	LAB

629131	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experment 4	LAB
629132	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experment 5	LAB
629133	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experment 6	LAB
629134	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experment 7	LAB
629135	NRISH740	ECE	A	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experment 8	LAB
629136	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experment 1	LAB
629137	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experment 2	LAB

629138	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experment 3	LAB
629139	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experment 4	LAB
629140	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experment 5	LAB
629141	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experment 6	LAB
629142	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experment 7	LAB
629143	NRISH740	CSM	B	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experment 8	LAB
629144	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Role Play I: Making Inquiries on the phone, thanking and responding to Thanks, Responding to Requests and asking for Directions	1	Experment 1	LAB

629145	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation	1	Experme nt 2	LAB
629146	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Role Play II: Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating, Apologising, Advising, Suggesting, Agreeing and Disagreeing	1	Experme nt 3	LAB
629147	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)	1	Experme nt 4	LAB
629148	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Debating	1	Experme nt 5	LAB
629149	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Stress in compound words, rhythm, intonation, accent neutralisation.	1	Experme nt 6	LAB
629150	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Group Discussions	1	Experme nt 7	LAB
629151	NRISH740	CSE	B	2021	COMMUNICATIVE ENGLISH LAB	Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.	1	Experme nt 8	LAB
629152	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Digital systems – Introduction and Overview	1	UNIT -I	Theory

629153	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Number system – basic types	1	UNIT -I	Theory
629154	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Binary numbers – representation and examples, Octal and hexadecimal numbers – representation and examples	1	UNIT -I	Theory
629155	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Conversion of number system from one radix to another	3	UNIT -I	Theory
629156	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Complements of numbers	2	UNIT -I	Theory
629157	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Signed binary numbers , Arithmetic addition and subtraction	1	UNIT -I	Theory
629158	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	4 bit codes – types	1	UNIT -I	Theory
629159	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	BCD	1	UNIT -I	Theory
629160	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Excess 3	1	UNIT -I	Theory
629161	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Alphanumeric code	1	UNIT -I	Theory
629162	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	9’s complement	1	UNIT -I	Theory
629163	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	2421,etc.,	1	UNIT -I	Theory
629164	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Basic properties of Boolean algebra	1	UNIT -II	Theory
629165	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Basic theorems of Boolean algebra	2	UNIT -II	Theory
629166	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Boolean functions	1	UNIT -II	Theory
629167	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Min terms and max terms	1	UNIT -II	Theory
629168	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Canonical forms	1	UNIT -II	Theory
629169	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Standard forms	1	UNIT -II	Theory
629170	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	K Map method	1	UNIT -II	Theory

629171	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Three variable K map	1	UNIT -II	Theory
629172	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Four variable K map	1	UNIT -II	Theory
629173	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Products of sum simplification	1	UNIT -II	Theory
629174	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Sum of products simplification	1	UNIT -II	Theory
629175	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Don’t care conditions	1	UNIT -II	Theory
629176	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	NAND and NOR implementation	1	UNIT -II	Theory
629177	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Exclusive OR function	1	UNIT -II	Theory
629178	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Introduction, Analysis Procedure	1	UNIT -III	Theory
629179	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Binary adder – subtractor	2	UNIT -III	Theory
629180	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Binary multiplier	1	UNIT -III	Theory
629181	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Decoders	1	UNIT -III	Theory
629182	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Encoders	1	UNIT -III	Theory
629183	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Multiplexers	1	UNIT -III	Theory
629184	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Demultiplexers	1	UNIT -III	Theory
629185	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Priority encoder	1	UNIT -III	Theory
629186	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Code converters	1	UNIT -III	Theory
629187	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Magnitude comparator	1	UNIT -III	Theory
629188	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	HDL models of combinational circuits	3	UNIT -III	Theory
629189	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PROM	2	UNIT -III	Theory
629190	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PAL	2	UNIT -III	Theory
629191	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PLA	2	UNIT -III	Theory

629192	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Introduction to sequential circuits	1	UNIT -IV	Theory
629193	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Storage elements: Latches, Flip flops	1	UNIT -IV	Theory
629194	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	RS latch using NAND and NOR gates, Truth tables	2	UNIT -IV	Theory
629195	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Truth Tables	3	UNIT -IV	Theory
629196	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Excitation Tables	1	UNIT -IV	Theory
629197	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Conversion of flipflops	2	UNIT -IV	Theory
629198	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Registers, Shift registers	2	UNIT -V	Theory
629199	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Ripple counters	2	UNIT -V	Theory
629200	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Synchronous counters	2	UNIT -V	Theory
629201	NRIECE160	IT	A	2021	DIGITAL LOGIC DESIGN	Ring counter, Johnson counter	1	UNIT -V	Theory
629202	NRICE202	CE	A	2021	THEORY OF MECHANICS	system of forces	6	UNIT -I	Theory
629203	NRICE202	CE	A	2021	THEORY OF MECHANICS	friction	6	UNIT -I	Theory
629204	NRICE202	CE	A	2021	THEORY OF MECHANICS	Equilibrium of system forces and FBD	6	UNIT -II	Theory
629205	NRICE202	CE	A	2021	THEORY OF MECHANICS	Lamis theorem and applications	6	UNIT -II	Theory
629206	NRICE202	CE	A	2021	THEORY OF MECHANICS	center of gravity	6	UNIT -III	Theory
629207	NRICE202	CE	A	2021	THEORY OF MECHANICS	center of gravity applications	3	UNIT -III	Theory
629208	NRICE202	CE	A	2021	THEORY OF MECHANICS	area moment of inertia	6	UNIT -IV	Theory
629209	NRICE202	CE	A	2021	THEORY OF MECHANICS	mass moment of inertia	3	UNIT -IV	Theory
629210	NRICE202	CE	A	2021	THEORY OF MECHANICS	kinematics of rigid bodies	7	UNIT -V	Theory
629211	NRICE202	CE	A	2021	THEORY OF MECHANICS	kinetics of rigid bodies	7	UNIT -V	Theory
629212	NRICE202	ME	A	2021	ENGINEERING MECHANICS	system of forces	6	UNIT -I	Theory

629213	NRICE202	ME	A	2021	ENGINEERING MECHANICS	friction	6	UNIT -I	Theory
629214	NRICE202	ME	A	2021	ENGINEERING MECHANICS	equilibrium of system of forces and FBD	6	UNIT -II	Theory
629215	NRICE202	ME	A	2021	ENGINEERING MECHANICS	lamis theorem and applications	6	UNIT -II	Theory
629216	NRICE202	ME	A	2021	ENGINEERING MECHANICS	center of gravitiy	6	UNIT -III	Theory
629217	NRICE202	ME	A	2021	ENGINEERING MECHANICS	center of gravity applications	3	UNIT -III	Theory
629218	NRICE202	ME	A	2021	ENGINEERING MECHANICS	area moment of inertia	6	UNIT -III	Theory
629219	NRICE202	ME	A	2021	ENGINEERING MECHANICS	mass moment of inertia	3	UNIT -III	Theory
629220	NRICE202	ME	A	2021	ENGINEERING MECHANICS	kinematics of riged bodies	7	UNIT -IV	Theory
629221	NRICE202	ME	A	2021	ENGINEERING MECHANICS	kinetics of riged bodies	7	UNIT -V	Theory
629222	NRISH742	CSD	A	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory
629223	NRISH742	CSD	A	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
629224	NRISH742	CSD	A	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
629225	NRISH742	CSD	A	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
629226	NRISH742	CSD	A	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory
629227	NRISH742	CSD	A	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
629228	NRISH742	CSD	A	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
629229	NRISH742	CSD	A	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
629230	NRISH742	CSD	A	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory

629231	NRISH742	CSD	A	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh's criterion for resolving power	2	UNIT -I	Theory
629232	NRISH742	CSD	A	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
629233	NRISH742	CSD	A	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
629234	NRISH742	CSD	A	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory
629235	NRISH742	CSD	A	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
629236	NRISH742	CSD	A	2021	APPLIED PHYSICS	Nicol's prism	1	UNIT -I	Theory
629237	NRISH742	CSD	A	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
629238	NRISH742	CSD	A	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory
629239	NRISH742	CSD	A	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
629240	NRISH742	CSD	A	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
629241	NRISH742	CSD	A	2021	APPLIED PHYSICS	Einstein's coefficients , Population inversion	2	UNIT -II	Theory
629242	NRISH742	CSD	A	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
629243	NRISH742	CSD	A	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
629244	NRISH742	CSD	A	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory

629245	NRISH742	CSD	A	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
629246	NRISH742	CSD	A	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory
629247	NRISH742	CSD	A	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory
629248	NRISH742	CSD	A	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory
629249	NRISH742	CSD	A	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory
629250	NRISH742	CSD	A	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
629251	NRISH742	CSD	A	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
629252	NRISH742	CSD	A	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory
629253	NRISH742	CSD	A	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory

629254	NRISH742	CSD	A	2021	APPLIED PHYSICS	Types of polarizations-Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
629255	NRISH742	CSD	A	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
629256	NRISH742	CSD	A	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory
629257	NRISH742	CSD	A	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory
629258	NRISH742	CSD	A	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory
629259	NRISH742	CSD	A	2021	APPLIED PHYSICS	Quantum Free Electron Theory-Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
629260	NRISH742	CSD	A	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory
629261	NRISH742	CSD	A	2021	APPLIED PHYSICS	Bloch Theorem-Kronig Penny Model	2	UNIT -V	Theory
629262	NRISH742	CSD	A	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
629263	NRISH742	CSD	A	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory
629264	NRISH742	CSD	A	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory

629265	NRISH742	CSD	A	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
629266	NRISH742	CSD	A	2021	APPLIED PHYSICS	Drift and diffusion-Einstein’s equation	1	UNIT -V	Theory
629267	NRISH742	CSD	A	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
629268	NRISH742	IT	A	2021	APPLIED PHYSICS	introduction to interference	1	UNIT -I	Theory
629269	NRISH742	IT	A	2021	APPLIED PHYSICS	Principle of superposition, Coherent sources, Interference in thin films by reflection	3	UNIT -I	Theory
629270	NRISH742	IT	A	2021	APPLIED PHYSICS	Newton’s Rings	2	UNIT -I	Theory
629271	NRISH742	IT	A	2021	APPLIED PHYSICS	Applications on Newton’s rings	2	UNIT -I	Theory
629272	NRISH742	IT	A	2021	APPLIED PHYSICS	and problems on Newton’s rings	2	UNIT -I	Theory
629273	NRISH742	IT	A	2021	APPLIED PHYSICS	Diffraction - Fresnel and Fraunhoffer diffractions	1	UNIT -I	Theory
629274	NRISH742	IT	A	2021	APPLIED PHYSICS	Fraunhoffer diffraction at a single slit	2	UNIT -I	Theory
629275	NRISH742	IT	A	2021	APPLIED PHYSICS	Fraunhofer diffraction at a double slit and circular aperture	2	UNIT -I	Theory
629276	NRISH742	IT	A	2021	APPLIED PHYSICS	Diffraction grating - Grating spectrum	1	UNIT -I	Theory
629277	NRISH742	IT	A	2021	APPLIED PHYSICS	Resolving power of a grating ,Rayleigh’s criterion for resolving power	2	UNIT -I	Theory
629278	NRISH742	IT	A	2021	APPLIED PHYSICS	Resolving power of microscope	1	UNIT -I	Theory
629279	NRISH742	IT	A	2021	APPLIED PHYSICS	Resolving power of Telescope	1	UNIT -I	Theory
629280	NRISH742	IT	A	2021	APPLIED PHYSICS	Polarization introduction	1	UNIT -I	Theory

629281	NRISH742	IT	A	2021	APPLIED PHYSICS	Types of polarized lights, Methods of Production of polarized light	2	UNIT -I	Theory
629282	NRISH742	IT	A	2021	APPLIED PHYSICS	Nicol's prism	1	UNIT -I	Theory
629283	NRISH742	IT	A	2021	APPLIED PHYSICS	Quarter Wave Plate & Half Wave Plate	1	UNIT -I	Theory
629284	NRISH742	IT	A	2021	APPLIED PHYSICS	Problems on QWP and HWP	1	UNIT -I	Theory
629285	NRISH742	IT	A	2021	APPLIED PHYSICS	Class test-1	1	UNIT -I	Theory
629286	NRISH742	IT	A	2021	APPLIED PHYSICS	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1	UNIT -II	Theory
629287	NRISH742	IT	A	2021	APPLIED PHYSICS	Einstein's coefficients , Population inversion	2	UNIT -II	Theory
629288	NRISH742	IT	A	2021	APPLIED PHYSICS	Ruby laser , Helium-Neon laser,	2	UNIT -II	Theory
629289	NRISH742	IT	A	2021	APPLIED PHYSICS	Introduction –Principle of optical fiber	1	UNIT -II	Theory
629290	NRISH742	IT	A	2021	APPLIED PHYSICS	Acceptance Angle	1	UNIT -II	Theory
629291	NRISH742	IT	A	2021	APPLIED PHYSICS	Numerical Aperture - Classification of optical fibers based on refractive index profile and modes	2	UNIT -II	Theory
629292	NRISH742	IT	A	2021	APPLIED PHYSICS	Propagation of electromagnetic wave through optical fibers	2	UNIT -II	Theory
629293	NRISH742	IT	A	2021	APPLIED PHYSICS	Applications and problems	1	UNIT -II	Theory

629294	NRISH742	IT	A	2021	APPLIED PHYSICS	Introduction - Origin of permanent magnetic moment	1	UNIT -III	Theory
629295	NRISH742	IT	A	2021	APPLIED PHYSICS	Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials	1	UNIT -III	Theory
629296	NRISH742	IT	A	2021	APPLIED PHYSICS	Domain concept for Ferromagnetism & Domain walls (Qualitative)	1	UNIT -III	Theory
629297	NRISH742	IT	A	2021	APPLIED PHYSICS	Hysteresis - soft and hard magnetic materials.	1	UNIT -III	Theory
629298	NRISH742	IT	A	2021	APPLIED PHYSICS	Introduction - Dielectric polarization	1	UNIT -III	Theory
629299	NRISH742	IT	A	2021	APPLIED PHYSICS	Dielectric polarizability, Susceptibility and Dielectric constant	1	UNIT -III	Theory
629300	NRISH742	IT	A	2021	APPLIED PHYSICS	Types of polarizations-Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations	2	UNIT -III	Theory
629301	NRISH742	IT	A	2021	APPLIED PHYSICS	Lorentz internal field- Clausius-Mossotti equation.	2	UNIT -III	Theory
629302	NRISH742	IT	A	2021	APPLIED PHYSICS	Introduction to Matter Waves, Schrodinger Time-Independent & Dependent Equations	2	UNIT -IV	Theory
629303	NRISH742	IT	A	2021	APPLIED PHYSICS	Particle in a box	1	UNIT -IV	Theory

629304	NRISH742	IT	A	2021	APPLIED PHYSICS	Drawbacks of Classical Free Electron Theory	1	UNIT -IV	Theory
629305	NRISH742	IT	A	2021	APPLIED PHYSICS	Quantum Free Electron Theory-Fermi Dirac & its dependence of temperature	1	UNIT -IV	Theory
629306	NRISH742	IT	A	2021	APPLIED PHYSICS	Fermi energy	1	UNIT -IV	Theory
629307	NRISH742	IT	A	2021	APPLIED PHYSICS	Bloch Theorem-Kronig Penny Model	2	UNIT -V	Theory
629308	NRISH742	IT	A	2021	APPLIED PHYSICS	Origin of Band Formation & Classification of materials	2	UNIT -V	Theory
629309	NRISH742	IT	A	2021	APPLIED PHYSICS	Concept of Effective mass of an electron & hole	2	UNIT -V	Theory
629310	NRISH742	IT	A	2021	APPLIED PHYSICS	Intrinsic semiconductor and carrier concentration, Equation of conductivity	1	UNIT -V	Theory
629311	NRISH742	IT	A	2021	APPLIED PHYSICS	Extrinsic semiconductor and carrier concentration	1	UNIT -V	Theory
629312	NRISH742	IT	A	2021	APPLIED PHYSICS	Drift and diffusion-Einstein’s equation	1	UNIT -V	Theory
629313	NRISH742	IT	A	2021	APPLIED PHYSICS	Hall effect & problems	1	UNIT -V	Theory
629314	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	Sonometer	3	Experme nt 1	LAB
629315	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experme nt 2	LAB
629316	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experme nt 3	LAB

629317	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experme nt 4	LAB
629318	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	Newton rings	3	Experme nt 5	LAB
629319	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experme nt 6	LAB
629320	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experme nt 7	LAB
629321	NRISH742	CSD	A	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experme nt 8	LAB
629322	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	Sonometer	3	Experme nt 1	LAB
629323	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experme nt 2	LAB
629324	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experme nt 3	LAB
629325	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experme nt 4	LAB
629326	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	Newton rings	3	Experme nt 5	LAB
629327	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experme nt 6	LAB
629328	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experme nt 7	LAB
629329	NRISH742	IT	A	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experme nt 8	LAB
629331	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Digital systems – Introduction and Overview	1	UNIT -I	Theory
629332	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Number system – basic types	1	UNIT -I	Theory
629333	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Binary numbers – representation and examples	1	UNIT -I	Theory
629334	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Octal and hexadecimal numbers – representation and examples	2	UNIT -I	Theory

629335	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Conversion of number system from one radix to another	3	UNIT -I	Theory
629336	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Complements of numbers	2	UNIT -I	Theory
629337	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Signed binary numbers,Arithmetic addition and subtraction	1	UNIT -I	Theory
629338	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	4 bit codes – types	1	UNIT -I	Theory
629339	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	BCD	1	UNIT -I	Theory
629340	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Excess 3	1	UNIT -I	Theory
629341	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Alphanumeric code	1	UNIT -I	Theory
629342	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	9’s complement	1	UNIT -I	Theory
629343	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	2421,etc.,	1	UNIT -I	Theory
629344	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Basic properties of Boolean algebra	1	UNIT -II	Theory
629345	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Basic theorems of Boolean algebra	2	UNIT -II	Theory
629346	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Boolean functions	1	UNIT -II	Theory
629347	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Min terms and max terms	1	UNIT -II	Theory
629348	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Canonical forms	1	UNIT -II	Theory
629349	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Standard forms	1	UNIT -II	Theory
629350	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Map method	1	UNIT -II	Theory
629351	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Three variable K map	1	UNIT -II	Theory
629352	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Four variable K map	1	UNIT -II	Theory
629353	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Products of sum simplification	1	UNIT -II	Theory
629354	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Sum of products simplification	1	UNIT -II	Theory
629355	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Don’t care conditions	1	UNIT -II	Theory
629356	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	NAND and NOR implementation	2	UNIT -II	Theory

629357	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Exclusive OR function	1	UNIT -II	Theory
629358	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Introduction, Analysis Procedure	1	UNIT -III	Theory
629359	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Binary adder – subtractor	2	UNIT -III	Theory
629360	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Binary multiplier	1	UNIT -III	Theory
629361	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Decoders	1	UNIT -III	Theory
629362	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Encoders	1	UNIT -III	Theory
629363	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Multiplexers	1	UNIT -III	Theory
629364	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Demultiplexers	1	UNIT -III	Theory
629365	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Priority encoder	1	UNIT -III	Theory
629366	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Code converters	2	UNIT -III	Theory
629367	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Magnitude comparator	1	UNIT -III	Theory
629368	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	HDL models of combinational circuits	3	UNIT -III	Theory
629369	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PROM	1	UNIT -III	Theory
629370	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PAL	1	UNIT -III	Theory
629371	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PLA	1	UNIT -III	Theory
629372	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Introduction to sequential circuits	1	UNIT -IV	Theory
629373	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Storage elements: Latches, Flip flops	1	UNIT -IV	Theory
629374	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	RS latch using NAND and NOR gates, Truth tables	2	UNIT -IV	Theory

629375	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Truth Tables	3	UNIT -IV	Theory
629376	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Excitation Tables	1	UNIT -IV	Theory
629377	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Conversion of flipflops	2	UNIT -IV	Theory
629378	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Registers, Shift registers	2	UNIT -V	Theory
629379	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Ripple counters	2	UNIT -V	Theory
629380	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Synchronous counters	2	UNIT -V	Theory
629381	NRIECE157	CSE	A	2021	DIGITAL LOGIC DESIGN	Ring counter,Johnson counter	1	UNIT -V	Theory
629383	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Principle of operation of DC generator	2	UNIT -I	Theory
629384	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Emf equation of dc machine	1	UNIT -I	Theory
629385	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	BCD,EXCESS 3,Alpha numeric codes	1	UNIT -I	Theory
629386	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	4 bit code types, 2421,etc..	1	UNIT -I	Theory
629387	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Min terms and Max terms, Canonical forms, Standard forms	1	UNIT -II	Theory
629388	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	HDL models of combinational circuits	2	UNIT -III	Theory
629389	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PROM	1	UNIT -III	Theory
629390	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PAL	1	UNIT -III	Theory
629391	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Realization of switching functions using PLA	1	UNIT -III	Theory

629392	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Introduction to sequential circuits, Storage elements: Latches, Flip flops	1	UNIT -IV	Theory
629393	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Truth Tables	2	UNIT -IV	Theory
629394	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	RS, JK, T and D Flip Flops Excitation Tables, Conversion of flipflops	2	UNIT -IV	Theory
629395	NRIECE154	CSE	B	2021	DIGITAL LOGIC DESIGN	Introduction, Analysis Procedure,Binary adder – subtractor	2	UNIT -III	Theory
629396	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Types of DC machines	1	UNIT -I	Theory
629397	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Torque equation of DC motor – applications	2	UNIT -I	Theory
629398	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Three point starter - losses and efficiency	2	UNIT -I	Theory
629399	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Swinburne’s test, speed control methods, OCC of DC generator	2	UNIT -I	Theory
629400	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Brake test on DC Shunt motor & numerical problems	2	UNIT -I	Theory
629401	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Transformers Principle of operation of single phase transformer	2	UNIT -II	Theory
629402	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Constructional features of Transformers	1	UNIT -II	Theory
629403	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	EMF equation – Losses and efficiency of transformer	1	UNIT -II	Theory

629404	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Regulation of transformer – OC & SC tests	2	UNIT -II	Theory
629405	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Predetermination of efficiency and regulations	1	UNIT -II	Theory
629406	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Sumpner's test-Numerical Problems	2	UNIT -II	Theory
629407	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Synchronous Generators Principle of operation	2	UNIT -III	Theory
629408	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Construction of alternators	1	UNIT -III	Theory
629409	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Types of alternators	2	UNIT -III	Theory
629410	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Regulation of alternator by synchronous impedance method	2	UNIT -III	Theory
629411	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	EMF equation of three phase alternator	1	UNIT -III	Theory
629412	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Synchronous Motors Construction of three phase synchronous motor	2	UNIT -III	Theory
629413	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Operating principle of Synchronous Motors	2	UNIT -III	Theory
629414	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Equivalent circuit of synchronous motor	2	UNIT -III	Theory
629415	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	3	UNIT -III	Theory
629416	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Induction Machine: Principle of operation and construction of three-phase induction motors	2	UNIT -IV	Theory

629417	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Slip ring and squirrel cage motors – slip-torque characteristics	2	UNIT -IV	Theory
629418	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Efficiency calculation – starting methods	2	UNIT -IV	Theory
629419	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Brake test on 3-Phase Induction Motor	1	UNIT -IV	Theory
629420	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	2	UNIT -IV	Theory
629421	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Special Machines: Principle of operation and construction	3	UNIT -V	Theory
629422	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Single phase induction motor	2	UNIT -V	Theory
629423	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Shaded pole motors	2	UNIT -V	Theory
629424	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Capacitor motors	2	UNIT -V	Theory
629425	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	AC servomotor	3	UNIT -V	Theory
629426	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	3	UNIT -V	Theory
629427	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Intoduction to BEE Lab	3	Experme nt 1	LAB
629428	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Magnetization characteristics of D.C. Shunt generator	3	Experme nt 1	LAB
629429	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Speed control of D.C. shunt motor	3	Experme nt 2	LAB
629430	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Brake test on DC shunt motor	3	Experme nt 3	LAB
629431	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Swinburne’s test on DC machine	3	Experme nt 4	LAB
629432	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Load test on DC shunt generator	3	Experme nt 5	LAB
629433	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Separation of losses in DC Shunt motor	3	Experme nt 6	LAB
629434	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	OC & SC tests on single-phase transformer	3	Experme nt 7	LAB

629435	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Sumpner's test on single phase transformer	3	Experme nt 8	LAB
629436	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Brake test on 3-phase Induction motor.	3	Experme nt 9	LAB
629437	NRIEEE522	ECE	B	2021	BASIC ELECTRICAL ENGINEERING LAB	Regulation of alternator by synchronous impedance method	3	Experme nt 10	LAB
629438	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	introduction to polymers	1	UNIT -I	Theory
629439	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	introduction to polymers	1	UNIT -I	Theory
629440	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
629441	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
629442	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
629443	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
629444	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
629445	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
629446	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
629447	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
629448	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
629449	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
629450	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
629451	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
629452	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory

629453	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
629454	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory
629455	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
629456	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
629457	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
629458	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
629459	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
629460	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory
629461	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory

629462	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory
629463	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
629464	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
629465	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory
629466	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory
629467	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
629468	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
629469	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory

629470	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory
629471	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
629472	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experment 1	LAB
629473	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experment 2	LAB
629474	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experment 3	LAB
629475	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experment 4	LAB
629476	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experment 5	LAB
629477	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experment 6	LAB
629478	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experment 7	LAB
629479	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experment 8	LAB
629480	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experment 9	LAB
629481	NRICSE615	CSE	A	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experment 10	LAB
629482	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory
629483	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory
629484	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory

629485	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
629486	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
629487	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory
629488	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory
629489	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
629490	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
629491	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory
629492	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory

629493	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
629494	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
629495	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
629496	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
629497	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
629498	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
629499	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
629500	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
629501	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
629502	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
629503	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
629504	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
629505	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
629506	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
629507	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
629508	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory

629509	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
629510	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
629511	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
629512	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
629513	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
629514	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory
629515	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory
629516	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory

629517	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
629518	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
629519	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory
629520	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory
629521	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
629522	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
629523	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory
629524	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory

629525	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
629526	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
629527	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
629528	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
629529	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
629530	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
629531	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
629532	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
629533	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
629534	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
629535	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
629536	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
629537	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
629538	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
629539	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
629540	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory

629541	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
629542	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
629543	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
629544	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
629545	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
629546	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experme nt 1	LAB
629547	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experme nt 2	LAB
629548	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experme nt 3	LAB
629549	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experme nt 4	LAB
629550	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experme nt 5	LAB
629551	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experme nt 6	LAB
629552	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experme nt 7	LAB
629553	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experme nt 8	LAB
629554	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experme nt 9	LAB
629555	NRICSE615	CSE	B	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experme nt 10	LAB
629556	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experme nt 1	LAB

629557	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experment 2	LAB
629558	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experment 3	LAB
629559	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experment 4	LAB
629560	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experment 5	LAB
629561	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experment 6	LAB
629562	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experment 7	LAB
629563	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experment 8	LAB
629564	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experment 9	LAB
629565	NRICSE615	CSE	C	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experment 10	LAB
629637	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	introduction to polymer technology	1	UNIT -I	Theory
629638	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	emulsion, suspension polymerization	1	UNIT -I	Theory
629639	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	plastics types	1	UNIT -I	Theory
629640	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	compounding of plastics	1	UNIT -I	Theory
629641	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	moulding techniques	1	UNIT -I	Theory
629642	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	PVC, Bakelite, Polycarbonates	1	UNIT -I	Theory
629643	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Rubbers, Preparation, properties and applications of Thikol, BUNA-S, Poly urethanes	1	UNIT -I	Theory
629644	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Bio degradable polymers	1	UNIT -I	Theory
629645	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Conducting polymers	1	UNIT -I	Theory
629646	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	FRP	1	UNIT -I	Theory
629647	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Basic concepts of Electro Chemistry	1	UNIT -II	Theory
629648	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	single Electrode potential, Measurement	1	UNIT -II	Theory

629649	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Electrochemical cell, Galvanic cell	1	UNIT -II	Theory
629650	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Electrochemical series, applications	1	UNIT -II	Theory
629651	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	SHE, Calomel Electrode	1	UNIT -II	Theory
629652	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Batteries, Dry Cell	1	UNIT -II	Theory
629653	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Li-Ion battery, Fuel cell	1	UNIT -II	Theory
629654	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Corrosion Definition,types	1	UNIT -II	Theory
629655	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Dry Corrosion	1	UNIT -II	Theory
629656	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	wet corrosion	1	UNIT -II	Theory
629657	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Types of corrosion	1	UNIT -II	Theory
629658	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Factors affecting the corrosion	1	UNIT -II	Theory
629659	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Galvanizing, tinning	1	UNIT -II	Theory
629660	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Electro platting, Electroless platting	1	UNIT -II	Theory
629661	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Super conductors, types	1	UNIT -III	Theory
629662	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Semi conductors Introduction, types	1	UNIT -III	Theory
629663	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	semiconductors preparation and applications	1	UNIT -III	Theory
629664	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Nano materials Introduction	1	UNIT -III	Theory
629666	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Preparation of nano materials	1	UNIT -III	Theory
629667	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	CNT types	1	UNIT -III	Theory
629668	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Preparation of CNTS	1	UNIT -III	Theory
629669	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Fullerenes, applications	1	UNIT -III	Theory
629670	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Liquid crystals, types, applications	1	UNIT -III	Theory

629671	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Spectroscopy-Introduction	1	UNIT -IV	Theory
629672	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Electromagnetic spectrum	1	UNIT -IV	Theory
629673	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	UV Basic principle and instrumentation and applications	1	UNIT -IV	Theory
629674	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Electronic spectroscopy, Chromophore, auxochrome	1	UNIT -IV	Theory
629675	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	basic principle and instrumentation of I R	1	UNIT -IV	Theory
629676	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Vibrational frequencies and its applications	1	UNIT -IV	Theory
629677	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Introduction to Non-Conventional energy sources	1	UNIT -IV	Theory
629678	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Solar energy	1	UNIT -IV	Theory
629679	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Hydro Electric Power plant	1	UNIT -IV	Theory
629680	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Geo thermal energy	1	UNIT -IV	Theory
629681	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	wave, Tidal energy	1	UNIT -IV	Theory
629682	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	OTEC	1	UNIT -IV	Theory
629683	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Introduction to computational chemistry	1	UNIT -V	Theory
629684	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Molecular modelling, Molecular Docking	1	UNIT -V	Theory
629685	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Molecular motors	1	UNIT -V	Theory
629686	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Molecular machines	1	UNIT -V	Theory
629687	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Rotaxanes, Catenanes	1	UNIT -V	Theory
629688	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Molecular Elevators	1	UNIT -V	Theory
629689	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Molecular Ekevators	1	UNIT -V	Theory

629690	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	Molecular shuttles	1	UNIT -V	Theory
629691	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	introduction to polymer technology	1	UNIT -I	Theory
629692	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	emulsion, suspension polymerization	1	UNIT -I	Theory
629693	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	plastics types	1	UNIT -I	Theory
629694	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	compounding of plastics	1	UNIT -I	Theory
629695	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	moulding techniques	1	UNIT -I	Theory
629696	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	PVC, Bakelite, Polycarbonates	1	UNIT -I	Theory
629697	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Rubbers, Preparation, properties and applications of Thikol, BUNA-S, Poly urethanes	1	UNIT -I	Theory
629698	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Bio degradable polymers	1	UNIT -I	Theory
629699	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Conducting polymers	1	UNIT -I	Theory
629700	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	FRP	1	UNIT -I	Theory
629701	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Basic concepts of Electro Chemistry	1	UNIT -II	Theory
629702	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	single Electrode potential, Measurement	1	UNIT -II	Theory
629703	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Electrochemical cell, Galvanic cell	1	UNIT -II	Theory
629704	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Electrochemical series, applications	1	UNIT -II	Theory
629705	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	SHE, Calomel Electrode	1	UNIT -II	Theory
629706	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Batteries, Dry Cell	1	UNIT -II	Theory
629707	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Li-Ion battery, Fuel cell	1	UNIT -II	Theory
629708	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Corrosion Definition,types	1	UNIT -II	Theory
629709	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Dry Corrosion	1	UNIT -II	Theory

629710	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	wet corrosion	1	UNIT -II	Theory
629711	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Types of corrosion	1	UNIT -II	Theory
629712	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Factors affecting the corrosion	1	UNIT -II	Theory
629713	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Galvanizing, tinning	1	UNIT -II	Theory
629714	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Electro platting, Electroless platting	1	UNIT -II	Theory
629715	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Super conductors, types	1	UNIT -III	Theory
629716	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Semi conductors Introduction, types	1	UNIT -III	Theory
629717	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	semiconductors preparation and applications	1	UNIT -III	Theory
629718	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Nano materials Introduction	1	UNIT -III	Theory
629719	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Preparation of nano materials	1	UNIT -III	Theory
629720	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	CNT types	1	UNIT -III	Theory
629721	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Preparation of CNTS	1	UNIT -III	Theory
629722	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Fullerenes, applications	1	UNIT -III	Theory
629723	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Liquid crystals, types, applications	1	UNIT -III	Theory
629724	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Spectroscopy-Introduction	1	UNIT -IV	Theory
629725	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Electromagnetic spectrum	1	UNIT -IV	Theory
629726	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	UV Basic principle and instrumentation and applications	1	UNIT -IV	Theory
629727	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Electronic spectroscopy, Chromophore, auxochrome	1	UNIT -IV	Theory
629728	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	basic principle and instrumentation of I R	1	UNIT -IV	Theory

629729	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Vibrational frequencies and its applications	1	UNIT -IV	Theory
629730	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Introduction to Non-Conventional energy sources	1	UNIT -IV	Theory
629731	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Solar energy	1	UNIT -IV	Theory
629732	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Hydro Electric Power plant	1	UNIT -IV	Theory
629733	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Geo thermal energy	1	UNIT -IV	Theory
629734	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	wave, Tidal energy	1	UNIT -IV	Theory
629735	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	OTEC	1	UNIT -IV	Theory
629736	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Introduction to computational chemistry	1	UNIT -V	Theory
629737	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Molecular modelling, Molecular Docking	1	UNIT -V	Theory
629738	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Molecular motors	1	UNIT -V	Theory
629739	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Molecular machines	1	UNIT -V	Theory
629740	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Rotaxanes, Catenanes	1	UNIT -V	Theory
629741	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Molecular Elevators	1	UNIT -V	Theory
629742	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Molecular Ekevators	1	UNIT -V	Theory
629743	NRISH737	ECE	C	2021	APPLIED CHEMISTRY	Molecular shuttles	1	UNIT -V	Theory
629744	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	introduction to polymer technology	1	UNIT -I	Theory
629745	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	emulsion, suspension polymerization	1	UNIT -I	Theory
629746	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	plastics types	1	UNIT -I	Theory
629747	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	compounding of plastics	1	UNIT -I	Theory
629748	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	moulding techniques	1	UNIT -I	Theory
629749	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	PVC, Bakelite, Polycarbonates	1	UNIT -I	Theory

629750	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Rubbers, Preparation, properties and applications of Thikol, BUNA-S, Poly urethanes	1	UNIT -I	Theory
629751	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Bio degradable polymers	1	UNIT -I	Theory
629752	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Conducting polymers	1	UNIT -I	Theory
629753	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	FRP	1	UNIT -I	Theory
629754	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Basic concepts of Electro Chemistry	1	UNIT -II	Theory
629755	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	single Electrode potential, Measurement	1	UNIT -II	Theory
629756	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Electrochemical cell, Galvanic cell	1	UNIT -II	Theory
629757	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Electrochemical series, applications	1	UNIT -II	Theory
629758	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	SHE, Calomel Electrode	1	UNIT -II	Theory
629759	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Batteries, Dry Cell	1	UNIT -II	Theory
629760	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Li-Ion battery, Fuel cell	1	UNIT -II	Theory
629761	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Corrosion Definition,types	1	UNIT -II	Theory
629762	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Dry Corrosion	1	UNIT -II	Theory
629763	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	wet corrosion	1	UNIT -II	Theory
629764	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Types of corrosion	1	UNIT -II	Theory
629765	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Factors affecting the corrosion	1	UNIT -II	Theory
629766	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Galvanizing, tinning	1	UNIT -II	Theory
629767	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Electro platting, Electroless platting	1	UNIT -II	Theory
629768	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Super conductors, types	1	UNIT -III	Theory

629769	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Semi conductors Introduction, types	1	UNIT -III	Theory
629770	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	semiconductors preparation and applications	1	UNIT -III	Theory
629771	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Nano materials Introduction	1	UNIT -III	Theory
629772	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Preparation of nano materials	1	UNIT -III	Theory
629773	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	CNT types	1	UNIT -III	Theory
629774	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Preparation of CNTS	1	UNIT -III	Theory
629775	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Fullerenes, applications	1	UNIT -III	Theory
629776	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Liquid crystals, types, applications	1	UNIT -III	Theory
629777	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Spectroscopy-Introduction	1	UNIT -IV	Theory
629778	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Electromagnetic spectrum	1	UNIT -IV	Theory
629779	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	UV Basic principle and instrumentation and applications	1	UNIT -IV	Theory
629780	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Electronic spectroscopy, Chromophore, auxochrome	1	UNIT -IV	Theory
629781	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	basic principle and instrumentation of I R	1	UNIT -IV	Theory
629782	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Vibrational frequencies and its applications	1	UNIT -IV	Theory
629783	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Introduction to Non-Conventional energy sources	1	UNIT -IV	Theory
629784	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Solar energy	1	UNIT -IV	Theory
629785	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Hydro Electric Power plant	1	UNIT -IV	Theory
629786	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Geo thermal energy	1	UNIT -IV	Theory
629787	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	wave, Tidal energy	1	UNIT -IV	Theory

629788	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	OTEC	1	UNIT -IV	Theory
629789	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Introduction to computational chemistry	1	UNIT -V	Theory
629790	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Molecular modelling, Molecular Docking	1	UNIT -V	Theory
629791	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Molecular motors	1	UNIT -V	Theory
629792	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Molecular machines	1	UNIT -V	Theory
629793	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Rotaxanes, Catenanes	1	UNIT -V	Theory
629794	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Molecular Elevators	1	UNIT -V	Theory
629795	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Molecular Ekevators	1	UNIT -V	Theory
629796	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Molecular shuttles	1	UNIT -V	Theory
629797	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	introduction to polymer technology	1	UNIT -I	Theory
629798	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	emulsion, suspension polymerization	1	UNIT -I	Theory
629799	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	plastics types	1	UNIT -I	Theory
629800	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	compounding of plastics	1	UNIT -I	Theory
629801	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	moulding techniques	1	UNIT -I	Theory
629802	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	PVC, Bakelite, Polycarbonates	1	UNIT -I	Theory
629803	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Rubbers, Preparation, properties and applications of Thikol, BUNA-S, Poly urethanes	1	UNIT -I	Theory
629804	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Bio degradable polymers	1	UNIT -I	Theory
629805	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Conducting polymers	1	UNIT -I	Theory
629806	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	FRP	1	UNIT -I	Theory
629807	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Basic concepts of Electro Chemistry	1	UNIT -II	Theory

629808	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	single Electrode potential, Measurement	1	UNIT -II	Theory
629809	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Electrochemical cell, Galvanic cell	1	UNIT -II	Theory
629810	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Electrochemical series, applications	1	UNIT -II	Theory
629811	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	SHE, Calomel Electrode	1	UNIT -II	Theory
629812	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Batteries, Dry Cell	1	UNIT -II	Theory
629813	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Li-Ion battery, Fuel cell	1	UNIT -II	Theory
629814	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Corrosion Definition,types	1	UNIT -II	Theory
629815	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Dry Corrosion	1	UNIT -II	Theory
629816	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	wet corrosion	1	UNIT -II	Theory
629817	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Types of corrosion	1	UNIT -II	Theory
629818	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Factors affecting the corrosion	1	UNIT -II	Theory
629819	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Galvanizing, tinning	1	UNIT -II	Theory
629820	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Electro platting, Electroless platting	1	UNIT -II	Theory
629821	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Super conductors, types	1	UNIT -III	Theory
629822	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Semi conductors Introduction, types	1	UNIT -III	Theory
629823	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	semiconductors preparation and applications	1	UNIT -III	Theory
629824	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Nano materials Introduction	1	UNIT -III	Theory
629825	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Preparation of nano materials	1	UNIT -III	Theory
629826	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	CNT types	1	UNIT -III	Theory
629827	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Preparation of CNTS	1	UNIT -III	Theory
629828	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Fullerenes, applications	1	UNIT -III	Theory

629829	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Liquid crystals, types, applications	1	UNIT -III	Theory
629830	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Spectroscopy-Introduction	1	UNIT -IV	Theory
629831	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Electromagnetic spectrum	1	UNIT -IV	Theory
629832	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	UV Basic principle and instrumentation and applications	1	UNIT -IV	Theory
629833	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Electronic spectroscopy, Chromophore, auxochrome	1	UNIT -IV	Theory
629834	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	basic principle and instrumentation of I R	1	UNIT -IV	Theory
629835	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Vibrational frequencies and its applications	1	UNIT -IV	Theory
629836	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Introduction to Non-Conventional energy sources	1	UNIT -IV	Theory
629837	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Solar energy	1	UNIT -IV	Theory
629838	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Hydro Electric Power plant	1	UNIT -IV	Theory
629839	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Geo thermal energy	1	UNIT -IV	Theory
629840	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	wave, Tidal energy	1	UNIT -IV	Theory
629841	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	OTEC	1	UNIT -IV	Theory
629842	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Introduction to computational chemistry	1	UNIT -V	Theory
629843	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Molecular modelling, Molecular Docking	1	UNIT -V	Theory
629844	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Molecular motors	1	UNIT -V	Theory
629845	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Molecular machines	1	UNIT -V	Theory
629846	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Rotaxanes, Catenanes	1	UNIT -V	Theory

629847	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Molecular Elevators	1	UNIT -V	Theory
629848	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Molecular Ekevators	1	UNIT -V	Theory
629849	NRISH736	EEE	A	2021	APPLIED CHEMISTRY	Molecular shuttles	1	UNIT -V	Theory
629850	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	emulsion polymerisation	1	UNIT -I	Theory
629851	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	suspension polymerization	1	UNIT -I	Theory
629852	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	emulsion polymerisation	1	UNIT -I	Theory
629853	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	suspension polymerisation	1	UNIT -I	Theory
629858	NRIIT407	CSM	A	2021	DATA STRUCTURES	binary search	2	UNIT -I	Theory
629915	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory
629916	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory
629917	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory
629918	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
629919	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory

629920	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory
629921	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory
629922	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
629923	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
629924	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory
629925	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory
629926	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
629927	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
629928	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
629929	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
629930	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory

629931	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
629932	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
629933	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
629934	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
629935	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
629936	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
629937	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
629938	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
629939	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
629940	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
629941	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
629942	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory
629943	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
629944	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
629945	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory

629946	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
629947	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
629948	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experme nt 1	LAB
629949	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experme nt 2	LAB
629950	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experme nt 3	LAB
629951	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experme nt 4	LAB
629952	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experme nt 5	LAB
629953	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experme nt 6	LAB
629954	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experme nt 7	LAB
629955	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experme nt 8	LAB
629956	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experme nt 9	LAB
629957	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experme nt 10	LAB
629958	NRICSE452	CSM	B	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
629959	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory
629960	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory

629961	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory
629962	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
629963	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
629964	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory
629965	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory
629966	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
629967	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
629968	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory

629969	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory
629970	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
629971	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
629972	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
629973	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
629974	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
629975	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
629976	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
629977	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
629978	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
629979	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
629980	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
629981	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
629982	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
629983	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
629984	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
629985	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
629986	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory

629987	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
629988	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
629989	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
629990	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
629991	NRICSE631	IT	A	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
629992	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experment 1	LAB
629993	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experment 2	LAB
629994	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experment 3	LAB
629995	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experment 4	LAB
629996	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experment 5	LAB
629997	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experment 6	LAB
629998	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experment 7	LAB
629999	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experment 8	LAB
630000	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experment 9	LAB
630001	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experment 10	LAB
630002	NRICSE631	IT	A	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experment 1	LAB

630007	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory
630008	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory
630009	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory
630010	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
630011	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
630012	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory

630013	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory
630014	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
630015	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
630016	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory
630017	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory
630018	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
630019	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
630020	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
630021	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
630022	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
630023	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
630024	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
630025	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
630026	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
630027	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory

630028	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
630029	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
630030	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
630031	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
630032	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
630033	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
630034	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory
630035	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
630036	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
630037	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
630038	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
630039	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
630040	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experme nt 1	LAB
630041	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experme nt 2	LAB

630042	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experme nt 3	LAB
630043	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experme nt 4	LAB
630044	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experme nt 5	LAB
630045	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experme nt 6	LAB
630046	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experme nt 7	LAB
630047	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experme nt 8	LAB
630048	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experme nt 9	LAB
630049	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experme nt 10	LAB
630050	NRICSE631	AIM	A	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
630051	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experme nt 1	LAB
630052	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experme nt 2	LAB
630053	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experme nt 3	LAB
630054	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experme nt 4	LAB
630055	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experme nt 5	LAB
630056	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experme nt 6	LAB
630057	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experme nt 7	LAB
630058	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experme nt 8	LAB
630059	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experme nt 9	LAB
630060	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experme nt 10	LAB
630061	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
630062	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory

630063	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory
630064	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory
630065	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
630066	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
630067	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory
630068	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory

630069	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
630070	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
630071	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory
630072	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory
630073	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
630074	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
630075	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
630076	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
630077	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
630078	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
630079	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
630080	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
630081	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
630082	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
630083	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
630084	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
630085	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
630086	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory

630087	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
630088	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
630089	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory
630090	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
630091	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
630092	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
630093	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
630094	NRICSE631	CSD	A	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
630095	NRICSE656	CSE	C	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory
630096	NRICSE656	CSE	C	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory

630097	NRICSE656	CSE	C	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
630098	NRICSE656	CSE	C	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory
630099	NRICSE656	CSE	C	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory
630100	NRICSE656	CSE	C	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
630101	NRICSE656	CSE	C	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory
630102	NRICSE656	CSE	C	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory
630103	NRICSE656	CSE	C	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory
630104	NRICSE656	CSE	C	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory

630105	NRICSE656	CSE	C	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
630106	NRICSE656	CSE	C	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory
630107	NRICSE656	CSE	C	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
630108	NRICSE656	CSE	C	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory
630109	NRICSE656	CSE	C	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory
630110	NRICSE656	CSE	C	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory

630111	NRICSE656	CSE	C	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
630112	NRICSE656	CSE	C	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory
630113	NRICSE656	CSE	C	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
630114	NRICSE656	CSE	C	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
630115	NRICSE673	AIM	A	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory
630116	NRICSE673	AIM	A	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
630117	NRICSE673	AIM	A	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory
630118	NRICSE673	AIM	A	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory

630119	NRICSE673	AIM	A	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory
630120	NRICSE673	AIM	A	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory
630121	NRICSE673	AIM	A	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
630122	NRICSE673	AIM	A	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory
630123	NRICSE673	AIM	A	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
630124	NRICSE673	AIM	A	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory

630125	NRICSE673	AIM	A	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory
630126	NRICSE673	AIM	A	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory
630127	NRICSE673	AIM	A	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
630128	NRICSE673	AIM	A	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory
630129	NRICSE673	AIM	A	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
630130	NRICSE673	AIM	A	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
630131	NRICSE673	AIM	A	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory

630132	NRICSE673	AIM	A	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory
630133	NRICSE673	AIM	A	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
630134	NRICSE673	AIM	A	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory
630135	NRICSE673	CSM	B	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory
630136	NRICSE673	CSM	B	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
630137	NRICSE673	CSM	B	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory
630138	NRICSE673	CSM	B	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory
630139	NRICSE673	CSM	B	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory
630140	NRICSE673	CSM	B	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory

630141	NRICSE673	CSM	B	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
630142	NRICSE673	CSM	B	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory
630143	NRICSE673	CSM	B	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
630144	NRICSE673	CSM	B	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory
630145	NRICSE673	CSM	B	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory
630146	NRICSE673	CSM	B	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory

630147	NRICSE673	CSM	B	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
630148	NRICSE673	CSM	B	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory
630149	NRICSE673	CSM	B	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
630150	NRICSE673	CSM	B	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
630151	NRICSE673	CSM	B	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory
630152	NRICSE673	CSM	B	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory
630153	NRICSE673	CSM	B	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
630154	NRICSE673	CSM	B	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory

630155	NRICSE673	IT	A	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory
630156	NRICSE673	IT	A	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
630157	NRICSE673	IT	A	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory
630158	NRICSE673	IT	A	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory
630159	NRICSE673	IT	A	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory
630160	NRICSE673	IT	A	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory
630161	NRICSE673	IT	A	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
630162	NRICSE673	IT	A	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory

630163	NRICSE673	IT	A	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
630164	NRICSE673	IT	A	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory
630165	NRICSE673	IT	A	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory
630166	NRICSE673	IT	A	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory
630167	NRICSE673	IT	A	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
630168	NRICSE673	IT	A	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory

630169	NRICSE673	IT	A	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
630170	NRICSE673	IT	A	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
630171	NRICSE673	IT	A	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory
630172	NRICSE673	IT	A	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory
630173	NRICSE673	IT	A	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
630174	NRICSE673	IT	A	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory

630176	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write a recursive C program to find the Factorial of an integer. b. Write a recursive C program to calculate the GCD of two numbers. c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the	3	Experment 1	LAB
630177	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write a recursive and non-recursive C program to implement Linear Search technique. b. Write a recursive and non-recursive C program to implement Binary Search technique	3	Experment 2	LAB
630178	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write C program that implement Insertion sort, to sort elements in an ascending order. b. Write C program that implement Merge sort, to sort elements in an ascending order. c. Write C program that implement Quick sort, to sort elements in an ascending	3	Experment 3	LAB

630179	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write a C program to insert a node in a Single Linked List. b. Write a C program to delete a node in a Single Linked List.	3	Experme nt 4	LAB
630180	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	c. Write a C program to reverse elements in a Single Linked List. d. Write a C program to insert a node in a Doubly Linked List	3	Experme nt 4	LAB
630181	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	Write C program that implement Stack (its operations) using arrays. b. Write C program that implement Queue (its operations) using arrays	3	Experme nt 5	LAB
630182	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	c. Write C program that implement Queue using Two Stacks	3	Experme nt 5	LAB
630184	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write C program that implement Stack using Linked List. b. Write C program that implement Queue using Linked List.	3	Experme nt 6	LAB
630185	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	c. Write a C program to implement the Circular Queue.	3	Experme nt 6	LAB

630186	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write a C program to insert elements in a Binary Search Tree (BST). b. Write a C program to delete element in a Binary Search Tree (BST).	3	Experme nt 7	LAB
630187	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder	3	Experme nt 7	LAB
630188	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Max Heap. b. Write C program that implement Heap sort, to sort elements in an ascending order.	3	Experme nt 8	LAB
630189	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Breadth First Search technique on a Graph. b. Write a C program to implement the Depth First Search technique on a Graph.	3	Experme nt 9	LAB

630190	NRICSE673	IT	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Prim’s algorithm to construct Minimum Spanning Tree. b.Write a C program to implement the Kruskal’s algorithm to construct Minimum Spanning Tree	3	Experme nt 10	LAB
630191	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write a recursive C program to find the Factorial of an integer. b. Write a recursive C program to calculate the GCD of two numbers. c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the	3	Experme nt 1	LAB
630192	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write a recursive and non-recursive C program to implement Linear Search technique. b. Write a recursive and non-recursive C program to implement Binary Search technique	3	Experme nt 2	LAB

630193	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write C program that implement Insertion sort, to sort elements in an ascending order. b. Write C program that implement Merge sort, to sort elements in an ascending order. c. Write C program that implement Quick sort, to sort elements in an ascending	3	Experment 3	LAB
630194	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write a C program to insert a node in a Single Linked List. b. Write a C program to delete a node in a Single Linked List.	3	Experment 4	LAB
630195	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	c. Write a C program to reverse elements in a Single Linked List. d. Write a C program to insert a node in a Doubly Linked List	3	Experment 4	LAB
630196	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	Write C program that implement Stack (its operations) using arrays. b. Write C program that implement Queue (its operations) using arrays	3	Experment 5	LAB

630197	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	c. Write C program that implement Queue using Two Stacks	3	Experment 5	LAB
630198	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write C program that implement Stack using Linked List. b. Write C program that implement Queue using Linked List.	3	Experment 6	LAB
630199	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	c. Write a C program to implement the Circular Queue.	3	Experment 6	LAB
630200	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write a C program to insert elements in a Binary Search Tree (BST). b. Write a C program to delete element in a Binary Search Tree (BST).	3	Experment 7	LAB
630201	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder	3	Experment 7	LAB
630202	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Max Heap. b. Write C program that implement Heap sort, to sort elements in an ascending order.	3	Experment 8	LAB

630203	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Breadth First Search technique on a Graph. b. Write a C program to implement the Depth First Search technique on a Graph.	3	Experment 9	LAB
630204	NRICSE656	CSE	C	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Prim's algorithm to construct Minimum Spanning Tree. b.Write a C program to implement the Kruskal's algorithm to construct Minimum Spanning Tree	3	Experment 10	LAB
630205	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write a recursive C program to find the Factorial of an integer. b. Write a recursive C program to calculate the GCD of two numbers. c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the	3	Experment 1	LAB

630206	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write a recursive and non-recursive C program to implement Linear Search technique. b. Write a recursive and non-recursive C program to implement Binary Search technique	3	Experment 2	LAB
630207	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write C program that implement Insertion sort, to sort elements in an ascending order. b. Write C program that implement Merge sort, to sort elements in an ascending order. c. Write C program that implement Quick sort, to sort elements in an ascending	3	Experment 3	LAB
630208	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write a C program to insert a node in a Single Linked List. b. Write a C program to delete a node in a Single Linked List.	3	Experment 4	LAB

630209	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	c. Write a C program to reverse elements in a Single Linked List. d. Write a C program to insert a node in a Doubly Linked List	3	Experme nt 4	LAB
630210	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	Write C program that implement Stack (its operations) using arrays. b. Write C program that implement Queue (its operations) using arrays	3	Experme nt 5	LAB
630211	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	c. Write C program that implement Queue using Two Stacks	3	Experme nt 5	LAB
630212	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write C program that implement Stack using Linked List. b. Write C program that implement Queue using Linked List.	3	Experme nt 6	LAB
630213	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	c. Write a C program to implement the Circular Queue.	3	Experme nt 6	LAB
630214	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write a C program to insert elements in a Binary Search Tree (BST). b. Write a C program to delete element in a Binary Search Tree (BST).	3	Experme nt 7	LAB

630215	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder	3	Experment 7	LAB
630216	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Max Heap. b. Write C program that implement Heap sort, to sort elements in an ascending order.	3	Experment 8	LAB
630217	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Breadth First Search technique on a Graph. b. Write a C program to implement the Depth First Search technique on a Graph.	3	Experment 9	LAB
630218	NRICSE454	CSE	B	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Prim's algorithm to construct Minimum Spanning Tree. b.Write a C program to implement the Kruskal's algorithm to construct Minimum Spanning Tree	3	Experment 10	LAB

630219	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write a recursive C program to find the Factorial of an integer. b. Write a recursive C program to calculate the GCD of two numbers. c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the	3	Experme nt 1	LAB
630220	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write a recursive and non-recursive C program to implement Linear Search technique. b. Write a recursive and non-recursive C program to implement Binary Search technique	3	Experme nt 2	LAB
630221	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write C program that implement Insertion sort, to sort elements in an ascending order. b. Write C program that implement Merge sort, to sort elements in an ascending order. c. Write C program that implement Quick sort, to sort elements in an ascending	3	Experme nt 3	LAB

630222	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write a C program to insert a node in a Single Linked List. b. Write a C program to delete a node in a Single Linked List.	3	Experme nt 4	LAB
630223	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	c. Write a C program to reverse elements in a Single Linked List. d. Write a C program to insert a node in a Doubly Linked List	3	Experme nt 4	LAB
630224	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	Write C program that implement Stack (its operations) using arrays. b. Write C program that implement Queue (its operations) using arrays	3	Experme nt 5	LAB
630225	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	c. Write C program that implement Queue using Two Stacks	3	Experme nt 5	LAB
630226	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write C program that implement Stack using Linked List. b. Write C program that implement Queue using Linked List.	3	Experme nt 6	LAB
630227	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	c. Write a C program to implement the Circular Queue.	3	Experme nt 6	LAB

630228	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write a C program to insert elements in a Binary Search Tree (BST). b. Write a C program to delete element in a Binary Search Tree (BST).	3	Experme nt 7	LAB
630229	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder	3	Experme nt 7	LAB
630230	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Max Heap. b. Write C program that implement Heap sort, to sort elements in an ascending order.	3	Experme nt 8	LAB
630231	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Breadth First Search technique on a Graph. b. Write a C program to implement the Depth First Search technique on a Graph.	3	Experme nt 9	LAB

630232	NRICSE446	CSE	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Prim’s algorithm to construct Minimum Spanning Tree. b.Write a C program to implement the Kruskal’s algorithm to construct Minimum Spanning Tree	3	Experme nt 10	LAB
630233	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write a recursive C program to find the Factorial of an integer. b. Write a recursive C program to calculate the GCD of two numbers. c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the	3	Experme nt 1	LAB
630234	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write a recursive and non-recursive C program to implement Linear Search technique. b. Write a recursive and non-recursive C program to implement Binary Search technique	3	Experme nt 2	LAB

630235	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write C program that implement Insertion sort, to sort elements in an ascending order. b. Write C program that implement Merge sort, to sort elements in an ascending order. c. Write C program that implement Quick sort, to sort elements in an ascending	3	Experment 3	LAB
630236	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write a C program to insert a node in a Single Linked List. b. Write a C program to delete a node in a Single Linked List.	3	Experment 4	LAB
630237	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	c. Write a C program to reverse elements in a Single Linked List. d. Write a C program to insert a node in a Doubly Linked List	3	Experment 4	LAB
630238	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	Write C program that implement Stack (its operations) using arrays. b. Write C program that implement Queue (its operations) using arrays	3	Experment 5	LAB

630239	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	c. Write C program that implement Queue using Two Stacks	3	Experme nt 5	LAB
630240	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write C program that implement Stack using Linked List. b. Write C program that implement Queue using Linked List.	3	Experme nt 6	LAB
630241	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	c. Write a C program to implement the Circular Queue.	3	Experme nt 6	LAB
630242	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write a C program to insert elements in a Binary Search Tree (BST). b. Write a C program to delete element in a Binary Search Tree (BST).	3	Experme nt 7	LAB
630243	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder	3	Experme nt 7	LAB
630244	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Max Heap. b. Write C program that implement Heap sort, to sort elements in an ascending order.	3	Experme nt 8	LAB

630245	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Breadth First Search technique on a Graph. b. Write a C program to implement the Depth First Search technique on a Graph.	3	Experment 9	LAB
630246	NRICSE673	CSM	B	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Prim's algorithm to construct Minimum Spanning Tree. b.Write a C program to implement the Kruskal's algorithm to construct Minimum Spanning Tree	3	Experment 10	LAB
630247	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write a recursive C program to find the Factorial of an integer. b. Write a recursive C program to calculate the GCD of two numbers. c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the	3	Experment 1	LAB

630248	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write a recursive and non-recursive C program to implement Linear Search technique. b. Write a recursive and non-recursive C program to implement Binary Search technique	3	Experment 2	LAB
630249	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write C program that implement Insertion sort, to sort elements in an ascending order. b. Write C program that implement Merge sort, to sort elements in an ascending order. c. Write C program that implement Quick sort, to sort elements in an ascending	3	Experment 3	LAB
630250	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write a C program to insert a node in a Single Linked List. b. Write a C program to delete a node in a Single Linked List.	3	Experment 4	LAB

630251	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	c. Write a C program to reverse elements in a Single Linked List. d. Write a C program to insert a node in a Doubly Linked List	3	Experment 4	LAB
630252	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	Write C program that implement Stack (its operations) using arrays. b. Write C program that implement Queue (its operations) using arrays	3	Experment 5	LAB
630253	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	c. Write C program that implement Queue using Two Stacks	3	Experment 5	LAB
630254	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write C program that implement Stack using Linked List. b. Write C program that implement Queue using Linked List.	3	Experment 6	LAB
630255	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	c. Write a C program to implement the Circular Queue.	3	Experment 6	LAB
630256	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write a C program to insert elements in a Binary Search Tree (BST). b. Write a C program to delete element in a Binary Search Tree (BST).	3	Experment 7	LAB

630257	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder	3	Experme nt 7	LAB
630258	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Max Heap. b. Write C program that implement Heap sort, to sort elements in an ascending order.	3	Experme nt 8	LAB
630259	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Breadth First Search technique on a Graph. b. Write a C program to implement the Depth First Search technique on a Graph.	3	Experme nt 9	LAB
630260	NRICSE673	AIM	A	2021	DATA STRUCTURES LAB	a. Write a C program to implement the Prim’s algorithm to construct Minimum Spanning Tree. b.Write a C program to implement the Kruskal’s algorithm to construct Minimum Spanning Tree	3	Experme nt 10	LAB
630261	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	POLYMERS- Methods of polymerisation	1	UNIT -I	Theory

630262	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	1. Create a java application that implements the concept of classes and objects.	2	Experme nt 1	LAB
630263	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	2. Develop Java Application using inheritance.	2	Experme nt 2	LAB
630264	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	3. Use interfaces and develop a java application.	2	Experme nt 3	LAB
630265	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	4. Create a package and access members from a package.	2	Experme nt 4	LAB
630266	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	5. Develop Java Application using Method overloading and method overriding.	2	Experme nt 5	LAB
630267	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	6. Create a java application to copy content from one file to another using IO streams.	2	Experme nt 6	LAB
630268	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	7. Develop Java Application to use String and String Buffer classes	2	Experme nt 7	LAB
630269	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	8. Implement Exception handling in a given application.	2	Experme nt 8	LAB
630270	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	9. Develop java application using Multithreading	2	Experme nt 9	LAB
630271	NRICSE603	ECE	A	2021	OOPS THROUGH JAVA LAB	10. GUI Application using applets	2	Experme nt 10	LAB

630272	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	1. Create a java application that implements the concept of classes and objects.	2	Experme nt 1	LAB
630273	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	2. Develop Java Application using inheritance.	2	Experme nt 2	LAB
630274	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	3. Use interfaces and develop a java application.	2	Experme nt 3	LAB
630275	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	4. Create a package and access members from a package.	2	Experme nt 4	LAB
630276	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	5. Develop Java Application using Method overloading and method overriding.	2	Experme nt 5	LAB
630277	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	6. Create a java application to copy content from one file to another using IO streams.	2	Experme nt 6	LAB
630278	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	7. Develop Java Application to use String and String Buffer classes	2	Experme nt 7	LAB
630279	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	8. Implement Exception handling in a given application.	2	Experme nt 8	LAB
630280	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	9. Develop java application using Multithreading	2	Experme nt 9	LAB
630281	NRICSE603	ECE	B	2021	OOPS THROUGH JAVA LAB	10. GUI Application using applets	2	Experme nt 10	LAB

630282	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	1. Create a java application that implements the concept of classes and objects.	2	Experment 1	LAB
630283	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	2. Develop Java Application using inheritance.	2	Experment 2	LAB
630284	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	3. Use interfaces and develop a java application.	2	Experment 3	LAB
630285	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	4. Create a package and access members from a package.	2	Experment 4	LAB
630286	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	5. Develop Java Application using Method overloading and method overriding.	2	Experment 5	LAB
630287	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	6. Create a java application to copy content from one file to another using IO streams.	2	Experment 6	LAB
630288	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	7. Develop Java Application to use String and String Buffer classes	2	Experment 7	LAB
630289	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	8. Implement Exception handling in a given application.	2	Experment 8	LAB
630290	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	9. Develop java application using Multithreading	2	Experment 9	LAB
630291	NRICSE603	ECE	C	2021	OOPS THROUGH JAVA LAB	10. GUI Application using applets	2	Experment 10	LAB
630292	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Principle of operation of DC generator and emf quation	1	UNIT -I	Theory

630293	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	Sonometer	3	Experme nt 1	LAB
630294	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experme nt 2	LAB
630295	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experme nt 3	LAB
630296	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experme nt 4	LAB
630297	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	Newton rings	3	Experme nt 5	LAB
630298	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experme nt 6	LAB
630299	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experme nt 7	LAB
630300	NRISH716	CSE	A	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experme nt 8	LAB
630301	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	Sonometer	3	Experme nt 1	LAB
630302	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experme nt 2	LAB
630303	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experme nt 3	LAB
630304	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experme nt 4	LAB
630305	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	Newton rings	3	Experme nt 5	LAB
630306	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experme nt 6	LAB
630307	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experme nt 7	LAB
630308	NRISH716	CSM	A	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experme nt 8	LAB
630309	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	Sonometer	3	Experme nt 1	LAB
630310	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	I-V characteristics of semiconductor diode	3	Experme nt 2	LAB

630311	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	I-v characteristics of Zener diode	3	Experment 3	LAB
630312	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	Determination of magnetic field along the axis of of the circular coil	3	Experment 4	LAB
630313	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	Newton rings	3	Experment 5	LAB
630314	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	Parallel fringes	3	Experment 6	LAB
630315	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	Diffraction Gratting	3	Experment 7	LAB
630316	NRISH715	CSM	B	2021	APPLIED PHYSICS LAB	Dispersive power of a prism	3	Experment 8	LAB
630319	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY LAB	Estimation of HCl	3	Experment 1	LAB
630320	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY LAB	Estimation of HCl	3	Experment 1	LAB
630321	NRISH721	EEE	A	2021	APPLIED CHEMISTRY LAB	Determination of total alkalinity	3	Experment 2	LAB
630322	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY LAB	Determination of total alkalinity	3	Experment 2	LAB
630323	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY LAB	Determination of total alkalinity	3	Experment 2	LAB
630324	NRICSE453	CSM	C	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory
630325	NRICSE453	CSM	C	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory
630326	NRICSE453	CSM	C	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
630327	NRICSE453	CSM	C	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory
630328	NRICSE453	CSM	C	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory

630329	NRICSE453	CSM	C	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
630330	NRICSE453	CSM	C	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory
630331	NRICSE453	CSM	C	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory
630332	NRICSE453	CSM	C	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory
630333	NRICSE453	CSM	C	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory
630334	NRICSE453	CSM	C	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
630335	NRICSE453	CSM	C	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory

630336	NRICSE453	CSM	C	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
630337	NRICSE453	CSM	C	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory
630338	NRICSE453	CSM	C	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory
630339	NRICSE453	CSM	C	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory
630340	NRICSE453	CSM	C	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
630341	NRICSE453	CSM	C	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory

630342	NRICSE453	CSM	C	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
630343	NRICSE453	CSM	C	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
630344	NRICSE453	CSD	A	2021	DATA STRCTURES	Data Structures: Definition, Types of Data Structures,	1	UNIT -I	Theory
630345	NRICSE453	CSD	A	2021	DATA STRCTURES	Arrays, structures, self-referential structures Operations	1	UNIT -I	Theory
630346	NRICSE453	CSD	A	2021	DATA STRCTURES	Algorithm analysis Time Complexity and Space Complexity.	2	UNIT -I	Theory
630347	NRICSE453	CSD	A	2021	DATA STRCTURES	Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion	2	UNIT -I	Theory
630348	NRICSE453	CSD	A	2021	DATA STRCTURES	Searching: Linear Search, Binary Search.	2	UNIT -I	Theory
630349	NRICSE453	CSD	A	2021	DATA STRCTURES	Sorting: Basic concepts, Divide-and-Conquer approach	2	UNIT -I	Theory
630350	NRICSE453	CSD	A	2021	DATA STRCTURES	Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.	4	UNIT -I	Theory

630351	NRICSE453	CSD	A	2021	DATA STRCTURES	Linked Lists: Introduction, types of Linked Lists	2	UNIT -II	Theory
630352	NRICSE453	CSD	A	2021	DATA STRCTURES	operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List,	3	UNIT -II	Theory
630353	NRICSE453	CSD	A	2021	DATA STRCTURES	inserting, deleting, and searching a node in Double Linked List.	3	UNIT -II	Theory
630354	NRICSE453	CSD	A	2021	DATA STRCTURES	Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List,	3	UNIT -III	Theory
630355	NRICSE453	CSD	A	2021	DATA STRCTURES	Expression Conversion: Infix to Postfix, Infix to Prefix.	2	UNIT -III	Theory
630356	NRICSE453	CSD	A	2021	DATA STRCTURES	Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues	4	UNIT -III	Theory
630357	NRICSE453	CSD	A	2021	DATA STRCTURES	Basic Tree Concepts, Terminology, operations, Tree traversals,	2	UNIT -IV	Theory

630358	NRICSE453	CSD	A	2021	DATA STRCTURES	Binary Trees: definition, properties, Binary Tree representations, operations,	3	UNIT -IV	Theory
630359	NRICSE453	CSD	A	2021	DATA STRCTURES	Binary Search Tree: definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,	3	UNIT -IV	Theory
630360	NRICSE453	CSD	A	2021	DATA STRCTURES	Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,	3	UNIT -IV	Theory
630361	NRICSE453	CSD	A	2021	DATA STRCTURES	Heaps: Definition of a Max Heap, properties	3	UNIT -IV	Theory
630362	NRICSE453	CSD	A	2021	DATA STRCTURES	Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations	3	UNIT -V	Theory
630363	NRICSE453	CSD	A	2021	DATA STRCTURES	Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations	3	UNIT -V	Theory
630364	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Types of DC machines	1	UNIT -I	Theory
630365	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Torque equation of DC motor – applications	2	UNIT -I	Theory

630366	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Three point starter - losses and efficiency	2	UNIT -I	Theory
630367	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Swinburne's test, speed control methods, OCC of DC generator	2	UNIT -I	Theory
630368	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Brake test on DC Shunt motor & numerical problems	2	UNIT -I	Theory
630369	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Transformers Principle of operation of single phase transformer	2	UNIT -II	Theory
630370	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Constructional features of Transformers	1	UNIT -II	Theory
630371	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	EMF equation – Losses and efficiency of transformer	1	UNIT -II	Theory
630372	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Regulation of transformer – OC & SC tests	2	UNIT -II	Theory
630373	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Predetermination of efficiency and regulations	1	UNIT -II	Theory
630374	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Sumpner's test- Numerical Problems	2	UNIT -II	Theory
630375	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Synchronous Generators Principle of operation	2	UNIT -III	Theory
630376	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Construction of alternators	1	UNIT -III	Theory
630377	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Types of alternators	2	UNIT -III	Theory
630378	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Regulation of alternator by synchronous impedance method	2	UNIT -III	Theory
630379	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	EMF equation of three phase alternator	1	UNIT -III	Theory

630380	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Synchronous Motors Construction of three phase synchronous motor	2	UNIT -III	Theory
630381	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Operating principle of Synchronous Motors	2	UNIT -III	Theory
630382	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Equivalent circuit of synchronous motor	2	UNIT -III	Theory
630383	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	3	UNIT -III	Theory
630384	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Induction Machine: Principle of operation and construction of three-phase induction motors	2	UNIT -IV	Theory
630385	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Slip ring and squirrel cage motors – slip-torque characteristics	2	UNIT -IV	Theory
630386	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Efficiency calculation – starting methods	2	UNIT -IV	Theory
630387	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Brake test on 3-Phase Induction Motor	1	UNIT -IV	Theory
630388	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	2	UNIT -IV	Theory
630389	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Special Machines: Principle of operation and construction	3	UNIT -V	Theory
630390	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Single phase induction motor	2	UNIT -V	Theory
630391	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Shaded pole motors	2	UNIT -V	Theory
630392	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Capacitor motors	2	UNIT -V	Theory
630393	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	AC servomotor	3	UNIT -V	Theory

630394	NRIEEE521	ECE	C	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	3	UNIT -V	Theory
630397	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Principle of operation of DC generator	2	UNIT -I	Theory
630398	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Emf equation of dc machine	1	UNIT -I	Theory
630399	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Types of DC machines	1	UNIT -I	Theory
630400	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Torque equation of DC motor – applications	2	UNIT -I	Theory
630401	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Three point starter - losses and efficiency	2	UNIT -I	Theory
630402	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Swinburne’s test, speed control methods, OCC of DC generator	2	UNIT -I	Theory
630403	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Brake test on DC Shunt motor & numerical problems	2	UNIT -I	Theory
630404	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Transformers Principle of operation of single phase transformer	2	UNIT -II	Theory
630405	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Constructional features of Transformers	1	UNIT -II	Theory
630406	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	EMF equation – Losses and efficiency of transformer	1	UNIT -II	Theory
630407	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Regulation of transformer – OC & SC tests	2	UNIT -II	Theory
630408	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Predetermination of efficiency and regulations	1	UNIT -II	Theory
630409	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Sumpner’s test- Numerical Problems	2	UNIT -II	Theory
630410	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Synchronous Generators Principle of operation	2	UNIT -III	Theory

630411	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Construction of alternators	1	UNIT -III	Theory
630412	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Types of alternators	2	UNIT -III	Theory
630413	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Regulation of alternator by synchronous impedance method	2	UNIT -III	Theory
630414	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	EMF equation of three phase alternator	1	UNIT -III	Theory
630415	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Synchronous Motors Construction of three phase synchronous motor	2	UNIT -III	Theory
630416	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Operating principle of Synchronous Motors	2	UNIT -III	Theory
630417	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Equivalent circuit of synchronous motor	2	UNIT -III	Theory
630418	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	3	UNIT -III	Theory
630419	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Induction Machine: Principle of operation and construction of three-phase induction motors	2	UNIT -IV	Theory
630420	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Slip ring and squirrel cage motors – slip-torque characteristics	2	UNIT -IV	Theory
630421	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Efficiency calculation – starting methods	2	UNIT -IV	Theory
630422	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Brake test on 3-Phase Induction Motor	1	UNIT -IV	Theory
630423	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	2	UNIT -IV	Theory

630424	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Special Machines: Principle of operation and construction	3	UNIT -V	Theory
630425	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Single phase induction motor	2	UNIT -V	Theory
630426	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Shaded pole motors	2	UNIT -V	Theory
630427	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Capacitor motors	2	UNIT -V	Theory
630428	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	AC servomotor	3	UNIT -V	Theory
630429	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING	Numerical Problems	3	UNIT -V	Theory
630431	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
630432	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
630433	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
630434	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
630435	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
630436	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory
630437	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Newton’s Law of cooling	2	UNIT -I	Theory
630438	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
630439	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
630440	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
630441	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory

630442	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
630443	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
630444	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
630445	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
630446	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
630447	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
630448	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
630449	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
630450	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
630451	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s root test	1	UNIT -III	Theory
630452	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz’s rule	1	UNIT -III	Theory
630453	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Rolle’s Theorem	1	UNIT -III	Theory
630454	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s mean value theorem	1	UNIT -III	Theory
630455	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Cauchy’s mean value theorem	1	UNIT -III	Theory
630456	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and Maclaurin’s theorems with remainders	2	UNIT -III	Theory
630457	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
630458	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
630459	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
630460	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Euler’s theorem	1	UNIT -IV	Theory
630461	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
630462	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory

630463	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
630464	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Taylor’s and MacLaurin’s series expansion of functions of two variables	2	UNIT -IV	Theory
630465	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
630466	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Lagrange’s multiplied method.	2	UNIT -IV	Theory
630467	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
630468	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
630469	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
630470	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
630471	NRISH705	IT	A	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory
630472	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Differential equations of first order and first degree introduction	1	UNIT -I	Theory
630473	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Linear differential equatons	1	UNIT -I	Theory
630474	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Bernoulli differential equatons	2	UNIT -I	Theory
630475	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Exact differential equatons	1	UNIT -I	Theory
630476	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Non-Exact differential equatons	4	UNIT -I	Theory
630477	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Orthogonal trajectories	2	UNIT -I	Theory

630478	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Newton's Law of cooling	2	UNIT -I	Theory
630479	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Law of natural growth and decay	2	UNIT -I	Theory
630480	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Non-homogeneous equations of higher order with constant coefficients	1	UNIT -II	Theory
630481	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type e ax	1	UNIT -II	Theory
630482	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type sinax / cosax	2	UNIT -II	Theory
630483	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	with RHS term of the type X , e ax v(x) , x v(x) .	2	UNIT -II	Theory
630484	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Variation of parameters	2	UNIT -II	Theory
630485	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Legendre differential equations	2	UNIT -II	Theory
630486	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Cauchy differential equations	2	UNIT -II	Theory
630487	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Sequences and Series	1	UNIT -III	Theory
630488	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Convergences and divergence	1	UNIT -III	Theory
630489	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Ratio test	1	UNIT -III	Theory
630490	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Comparison tests	1	UNIT -III	Theory
630491	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Integral test	1	UNIT -III	Theory
630492	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Cauchy's root test	1	UNIT -III	Theory
630493	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Alternate series– Leibnitz's rule	1	UNIT -III	Theory
630494	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Rolle's Theorem	1	UNIT -III	Theory
630495	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Lagrange's mean value theorem	1	UNIT -III	Theory
630496	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Cauchy's mean value theorem	1	UNIT -III	Theory

630497	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Taylor's and Maclaurin's theorems with remainders	2	UNIT -III	Theory
630498	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Problems and applications on the above theorem.	1	UNIT -III	Theory
630499	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Introduction	1	UNIT -IV	Theory
630500	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Homogeneous function	1	UNIT -IV	Theory
630501	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Euler's theorem	1	UNIT -IV	Theory
630502	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Total derivative	1	UNIT -IV	Theory
630503	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Chain rule	1	UNIT -IV	Theory
630504	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Jacobian – Functional dependence	1	UNIT -IV	Theory
630505	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Taylor's and MacLaurin's series expansion of functions of two variables	2	UNIT -IV	Theory
630506	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Maxima and Minima of functions of two variables	3	UNIT -IV	Theory
630507	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Lagrange's multiplied method.	2	UNIT -IV	Theory
630508	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Double and Triple integrals	2	UNIT -V	Theory
630509	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Change of order of integration in double integrals	2	UNIT -V	Theory
630510	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Change of variables to polar coordinates.	2	UNIT -V	Theory
630511	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	cylindrical and spherical coordinates	3	UNIT -V	Theory
630512	NRISH705	ECE	C	2021	ENGINEERING MATHEMATICS-II	Applications: Finding Areas and Volumes	2	UNIT -V	Theory

630568	NRISH703	CSM	C	2021	COMMUNICATIVE ENGLISH LAB	INTRODUCTION TO cOMMUNICATIVE ENGLISH	1	Experment 10	LAB
630569	NRISH703	ECE	C	2021	COMMUNICATIVE ENGLISH LAB	INTRODUCTION TO COMMUNICATIVE ENGLISH	1	Experment 10	LAB
630570	NRISH703	EEE	A	2021	COMMUNICATIVE ENGLISH LAB	INTRODUCTION TO COMMUNICATIVE ENGLISH	1	Experment 10	LAB
630571	NRIEEE502	EEE	A	2021	ELECTRICAL CIRCUIT ANALYSIS-I	Resistance, Inductance and Capacitance, voltage and current relationship	1	UNIT -I	Theory
630572	NRIEEE502	EEE	A	2021	ELECTRICAL CIRCUIT ANALYSIS-I	Energy Sources(Dependent and Independent Sources)	1	UNIT -I	Theory
630573	NRIEEE505	ECE	A	2021	BASIC ELECTRICAL ENGINEERING LAB	Introduction to BEE lab	3	Experment 1	LAB
630638	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	thermoplastic & thermosetting plastic	1	UNIT -I	Theory
630639	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	compounding of plastic	1	UNIT -I	Theory
630640	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	thermoplastic & thermosetting plastic	1	UNIT -I	Theory
630642	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	compounding of plastic	1	UNIT -I	Theory
630644	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
630645	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
630646	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
630647	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
630648	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
630649	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory

630650	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
630651	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
630652	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
630653	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
630654	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory
630655	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
630656	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
630657	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
630658	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
630659	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory
630660	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
630661	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
630662	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
630663	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory

630664	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
630665	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory
630666	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory
630667	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory
630668	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
630669	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
630670	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory

630671	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory
630672	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
630673	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
630674	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory
630675	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory
630676	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
630677	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
630678	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experme nt 1	LAB
630679	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experme nt 2	LAB
630680	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experme nt 3	LAB
630681	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experme nt 4	LAB
630682	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experme nt 5	LAB
630683	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experme nt 6	LAB
630684	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experme nt 7	LAB
630685	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experme nt 8	LAB
630686	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experme nt 9	LAB
630687	NRICSE605	CSM	A	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experme nt 10	LAB

630688	NRICSE658	EEE	A	2021	JAVA PROGRAMMING	The History And Evaluation Of Java, Java LIneage	1	UNIT -I	Theory
630689	NRICSE658	CE	A	2021	PROGRAMMING AND PROBLEM SOLVING WITH C	Introduction	1	UNIT -I	Theory
630693	NRICSE605	AIM	A	2021	Introudction to A.I	Foundations and History of Artificial Intelligence	2	UNIT -I	Theory
630694	NRICSE605	AIM	A	2021	Introudction to A.I	Applications of Artificial Intelligence	2	UNIT -I	Theory
630695	NRICSE605	AIM	A	2021	Introudction to A.I	Intelligent Agents	2	UNIT -I	Theory
630696	NRICSE605	AIM	A	2021	Introudction to A.I	Structure of Intelligent Agents	2	UNIT -I	Theory
630697	NRICSE605	AIM	A	2021	Introudction to A.I	Searching for solutions	1	UNIT -II	Theory
630698	NRICSE605	AIM	A	2021	Introudction to A.I	Uniformed search strategies	1	UNIT -II	Theory
630699	NRICSE605	AIM	A	2021	Introudction to A.I	Informed search strategies	2	UNIT -II	Theory
630700	NRICSE605	AIM	A	2021	Introudction to A.I	Local search algorithms and optimistic problems	2	UNIT -II	Theory
630701	NRICSE605	AIM	A	2021	Introudction to A.I	Adversarial Search	2	UNIT -II	Theory
630702	NRICSE605	AIM	A	2021	Introudction to A.I	Propositional logic	2	UNIT -III	Theory
630703	NRICSE605	AIM	A	2021	Introudction to A.I	Theory of first order logic	1	UNIT -III	Theory
630704	NRICSE605	AIM	A	2021	Introudction to A.I	Inference in First order logic	1	UNIT -III	Theory
630705	NRICSE605	AIM	A	2021	Introudction to A.I	Forward & Backward chaining	1	UNIT -III	Theory
630706	NRICSE605	AIM	A	2021	Introudction to A.I	Resolution	2	UNIT -III	Theory
630707	NRICSE605	AIM	A	2021	Introudction to A.I	Probabilistic reasoning	2	UNIT -III	Theory
630708	NRICSE605	AIM	A	2021	Introudction to A.I	Planning: simple planning agent	2	UNIT -IV	Theory
630709	NRICSE605	AIM	A	2021	Introudction to A.I	problem solving to planning	2	UNIT -IV	Theory
630710	NRICSE605	AIM	A	2021	Introudction to A.I	representation of planning	2	UNIT -IV	Theory

630711	NRICSE605	AIM	A	2021	Introudction to A.I	Practical Planning overview	2	UNIT -IV	Theory
630712	NRICSE605	AIM	A	2021	Introudction to A.I	Planning and acting : Conditional planning	2	UNIT -IV	Theory
630713	NRICSE605	AIM	A	2021	Introudction to A.I	Uncertainty	2	UNIT -V	Theory
630714	NRICSE605	AIM	A	2021	Introudction to A.I	Probabilistic Reasoning systems	2	UNIT -V	Theory
630715	NRICSE605	AIM	A	2021	Introudction to A.I	Making Simple Decisions	2	UNIT -V	Theory
630716	NRICSE605	AIM	A	2021	Introudction to A.I	Making Complex Decisions	2	UNIT -V	Theory
630717	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	MOULDING TECH	2	UNIT -I	Theory
630718	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	MOULDING TECH	2	UNIT -I	Theory
630719	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	ESTIMATION OF HCl	3	Experme nt 2	LAB
630720	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Introduction	1	UNIT -I	Theory
630721	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	History of Java	1	UNIT -I	Theory
630722	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Importance of java to Internet	1	UNIT -I	Theory
630723	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Byte code	1	UNIT -I	Theory
630724	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	JAVA Features, Data types, variables, scope and life time of variables	1	UNIT -I	Theory
630725	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	arrays	1	UNIT -I	Theory
630726	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	operators	1	UNIT -I	Theory
630727	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	control statements, type conversion and casting	1	UNIT -I	Theory
630728	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	classes, objects	1	UNIT -I	Theory
630729	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	constructors	1	UNIT -I	Theory
630730	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	methods, access control, this	1	UNIT -I	Theory

630731	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	keyword	1	UNIT -I	Theory
630732	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	garbage collection	1	UNIT -I	Theory
630733	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	overloading methods	1	UNIT -I	Theory
630734	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Exploring the String class, String Buffer Class, String Tokenizer	1	UNIT -I	Theory
630735	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Inheritance basics	2	UNIT -II	Theory
630736	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Using super keyword, method overriding, Dynamic method dispatch using final with inheritance	3	UNIT -II	Theory
630737	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	abstract classes	2	UNIT -II	Theory
630738	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Creating and Accessing a Package, importing packages	2	UNIT -II	Theory
630739	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces..	3	UNIT -II	Theory
630740	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Exception handling Fundamentals	2	UNIT -III	Theory
630741	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	exception hierarchy, usage of try, catch, throw, throws and finally,	2	UNIT -III	Theory

630742	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	built in exceptions, creating own exceptions. Differences between multi threading and multitasking	2	UNIT -III	Theory
630743	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	thread life cycle, creating threads, Concurrency utilities.	3	UNIT -III	Theory
630744	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets.	3	UNIT -III	Theory
630745	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	EVENT HANDLING: Delegation event model, Events, Event sources,	2	UNIT -IV	Theory
630746	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	Event classes, Event Listeners, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy: labels, button, scrollbars, text components	2	UNIT -IV	Theory
630747	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	check box, check box groups, choices, list boxes. Layout manager types: border, grid, flow, card and grid bag.	2	UNIT -IV	Theory

630748	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	SWINGS: Introduction, limitations of AWT,	2	UNIT -V	Theory
630749	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	components, containers EXPLORING	2	UNIT -V	Theory
630750	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	SWINGS JApplet, JFrame and JComponent, text components	2	UNIT -V	Theory
630751	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	buttons – The JButton	2	UNIT -V	Theory
630752	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA	class, Check boxes, Radio buttons, Combo boxes. JTabbedPane.	2	UNIT -V	Theory
630753	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Sample Program	1	Experme nt 1	LAB
630754	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 1	3	Experme nt 1	LAB
630755	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 2	3	Experme nt 2	LAB
630756	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 3	3	Experme nt 3	LAB
630757	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 4	3	Experme nt 4	LAB
630758	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 5	3	Experme nt 5	LAB
630759	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 6	3	Experme nt 6	LAB
630760	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 7	3	Experme nt 7	LAB
630761	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 8	3	Experme nt 8	LAB
630762	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 9	3	Experme nt 9	LAB
630763	NRIMCA02	CSM	C	2021	OOPS THROUGH JAVA LAB	Exercise 10	3	Experme nt 10	LAB
630771	NRIEEE502	EEE	A	2021	ELECTRICAL CIRCUIT ANALYSIS-I	Kirchoff Laws-KCL and KVL, Network Reduction Technique	2	UNIT -I	Theory
630772	NRIECE115	ECE	B	2021	ELECTRONIC WORKSHOP LAB	Introduction to Electronics	3	Experme nt 1	LAB
630773	NRIECE115	ECE	B	2021	ELECTRONIC WORKSHOP LAB	Identification of Components	3	Experme nt 2	LAB

630774	NRIECE115	ECE	B	2021	ELECTRONIC WORKSHOP LAB	Laboratory Equipment	3	Experme nt 3	LAB
630775	NRIECE115	ECE	B	2021	ELECTRONIC WORKSHOP LAB	Soldering Practice	3	Experme nt 4	LAB
630776	NRIECE115	ECE	B	2021	ELECTRONIC WORKSHOP LAB	PCB Layout and Design	3	Experme nt 5	LAB
630777	NRIECE115	ECE	B	2021	ELECTRONIC WORKSHOP LAB	Testing of components	3	Experme nt 6	LAB
630778	NRIECE115	ECE	B	2021	ELECTRONIC WORKSHOP LAB	Operation of CRO	3	Experme nt 7	LAB
630821	NRISH737	ECE	A	2021	APPLIED CHEMISTRY	alkalinity of water	3	Experme nt 2	LAB
630822	NRISH734	AIM	A	2021	COMMUNICATIVE ENGLISH LAB	GROUP DISCUSSION	1	Experme nt 1	LAB
630823	NRISH734	AIM	A	2021	COMMUNICATIVE ENGLISH LAB	GROUP DISCUSSION	5	Experme nt 1	LAB
630824	NRISH734	AIM	A	2021	COMMUNICATIVE ENGLISH LAB	GROUP DISCUSSION	6	Experme nt 1	LAB
630825	NRISH734	AIM	A	2021	COMMUNICATIVE ENGLISH LAB	ROLE PLAY	6	Experme nt 2	LAB
630826	NRISH734	CSD	A	2021	COMMUNICATIVE ENGLISH LAB	ROLE PLAY	3	Experme nt 1	LAB
630827	NRISH734	CSD	A	2021	COMMUNICATIVE ENGLISH LAB	GROUP DISCUSSION	3	Experme nt 2	LAB
630828	NRISH734	CSD	A	2021	COMMUNICATIVE ENGLISH LAB	GROUP DISCUSSION	4	Experme nt 2	LAB
630829	NRISH734	IT	A	2021	COMMUNICATIVE ENGLISH LAB	VOWELS AND CONSONANTS	5	Experme nt 1	LAB
630830	NRISH734	IT	A	2021	COMMUNICATIVE ENGLISH LAB	COMMON ERRORS IN PRONUNCIATION	6	Experme nt 2	LAB
630831	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	poly urethanes, Bakelite	1	UNIT -I	Theory
630832	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	introduction to polymers	1	UNIT -I	Theory
630833	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Emulsion polymerization & Suspension polymerization	1	UNIT -I	Theory
630834	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Plastics– Introduction	1	UNIT -I	Theory
630835	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Thermoplastics and Thermosetting plastics	1	UNIT -I	Theory
630836	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Compression & injection Moulding	1	UNIT -I	Theory

630837	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Transfer & extrusion Moulding	1	UNIT -I	Theory
630838	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Compounding of plastics	1	UNIT -I	Theory
630839	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Preparation, properties and applications of PVC, Bakelite and Poly Urethane	2	UNIT -I	Theory
630840	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Preparation, properties and applications of Buna S, Buna N and Poly Carbonatesd Thiokol	2	UNIT -I	Theory
630841	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Conducting polymers	2	UNIT -I	Theory
630843	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Fiber reinforced plastics	1	UNIT -I	Theory
630844	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Biodegradable polymers	1	UNIT -I	Theory
630846	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Class test-1	1	UNIT -II	Theory
630851	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	: ELECTROCHEMICAL CELLS : Introduction	1	UNIT -II	Theory
630853	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Single electrode potential	1	UNIT -II	Theory
630855	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	electrochemical series and uses of series	1	UNIT -II	Theory
630857	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	standard hydrogen electrode, calomel electrode	1	UNIT -II	Theory
630858	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	batteries (Dry cell, liquid Li ion battery)	1	UNIT -II	Theory
630860	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	fuel cells (H2-O2).	1	UNIT -II	Theory

630862	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Corrosion:- Definition, theories of corrosion (chemical and electrochemical)	2	UNIT -II	Theory
630864	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	dry corrosion	1	UNIT -II	Theory
630865	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	wet corrosion	2	UNIT -II	Theory
630866	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	galvanic corrosion, differential aeration corrosion	1	UNIT -II	Theory
630867	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	factors influencing rate of corrosion	1	UNIT -II	Theory
630868	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	Protective coatings (Galvanizing, tinning	1	UNIT -II	Theory
630869	NRISH720	AIM	A	2021	APPLIED CHEMISTRY	electroplating and electroless plating [nickel])	1	UNIT -II	Theory
630993	NRISH734	AIM	A	2021	COMMUNICATIVE ENGLISH LAB	GROUP DISSCUSSION	2	Experme nt 1	LAB
631013	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	Estimation of HCl	3	Experme nt 2	LAB
631014	NRIEEE502	EEE	A	2021	ELECTRICAL CIRCUIT ANALYSIS-I	Current and Voltage Division rule, Mesh Analysis	2	UNIT -I	Theory
631015	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	PVC,Bakelite	1	UNIT -I	Theory
631016	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	PVC, Bakelite	1	UNIT -I	Theory
631021	NRISH734	CSD	A	2021	COMMUNICATIVE ENGLISH LAB	TYPES OF CONSONANTS	3	Experme nt 3	LAB
631022	NRISH734	CSD	A	2021	COMMUNICATIVE ENGLISH LAB	ROLE PLAY	4	Experme nt 4	LAB
631024	NRIECE162	CSE	C	2021	DIGITAL ELECTRONICS AND LOGIC DESIGN	bcd CODES	4	UNIT -I	Theory
631025	NRIECE162	CSM	B	2021	DIGITAL LOGIC DESIGN	bcd cODES	4	UNIT -I	Theory
631061	NRIECE163	ECE	B	2021	NETWORK ANALYSIS	introduction on NA	1	UNIT -I	Theory

631062	NRIECE163	ECE	B	2021	NETWORK ANALYSIS	classifications of Network Elements	1	UNIT -I	Theory
631063	NRIECE163	ECE	B	2021	NETWORK ANALYSIS	series and parallel combinations of passive elements	2	UNIT -I	Theory
631065	NRIECE163	ECE	B	2021	NETWORK ANALYSIS	voltage divider rule	2	UNIT -I	Theory
631078	NRISH734	IT	A	2021	COMMUNICATIVE ENGLISH LAB	TYPES OF CONSONANTS	5	Experme nt 3	LAB
631079	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	biodegradable polymers & FRPs	1	UNIT -I	Theory
631080	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	biodegradable polymers & FRPs	1	UNIT -I	Theory
631099	NRISH720	AIM	A	2021	APPLIED CHEMISTRY LAB	Determination of HCl	3	Experme nt 2	LAB
631100	NRISH720	AIM	A	2021	APPLIED CHEMISTRY LAB	Determination of total alkalinity	3	Experme nt 3	LAB
631101	NRISH720	ECE	C	2021	APPLIED CHEMISTRY LAB	Determination of HCl	3	Experme nt 2	LAB
631102	NRISH720	ECE	C	2021	APPLIED CHEMISTRY LAB	Determination of total alkalinity	3	Experme nt 3	LAB
631111	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Stones: Classification of Stones	1	UNIT -I	Theory
631112	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Properties of stones in structural requirements	1	UNIT -I	Theory
631113	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Bricks: Composition of good brick earth,	1	UNIT -I	Theory
631114	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Various methods of manufacturing of bricks	1	UNIT -I	Theory
631115	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Characteristics of good tile	1	UNIT -I	Theory
631116	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Manufacturing methods, Types of tiles	1	UNIT -I	Theory
631117	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Structure – Properties	1	UNIT -I	Theory
631118	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Seasoning of timber	1	UNIT -I	Theory

631119	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Classification of various types of woods used in buildings	1	UNIT -I	Theory
631120	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Defects in timber	1	UNIT -I	Theory
631121	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Paints: White washing and distempering	1	UNIT -I	Theory
631122	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Constituents of paint	1	UNIT -I	Theory
631123	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Types of paints – Painting of new and old wood – Varnish	1	UNIT -I	Theory
631124	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Types of paints – Painting of new and old wood – Varnish	1	UNIT -II	Theory
631125	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Physical properties of aggregate, bulking of sand,	1	UNIT -II	Theory
631126	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Deleterious substance in aggregate	1	UNIT -II	Theory
631127	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Soundness of aggregate, Alkali-Aggregate reaction	1	UNIT -II	Theory
631128	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Thermal properties, Sieve analysis	1	UNIT -II	Theory
631129	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Fineness modulus – Grading curves – Grading of fine and coarse aggregates as per relevant IS code, Maximum aggregate size	1	UNIT -II	Theory
631130	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Portland Cement: Chemical composition, Hydration	1	UNIT -II	Theory

631131	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Structure of hydrated cement	1	UNIT -II	Theory
631132	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Setting of cement, Fineness of cement, Tests for physical properties – Different grades of cements	1	UNIT -II	Theory
631133	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Supplementary cementitious materials: Fly ash, GGBS, Silica fume, Rice husk ash, Calcinated ash (Basic properties and their contribution to concrete strength)	1	UNIT -II	Theory
631134	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Admixtures: Mineral and Chemical admixtures	1	UNIT -II	Theory
631135	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Manufacture of concrete – Mixing and vibration of concrete	1	UNIT -III	Theory
631136	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Workability – Segregation and bleeding	1	UNIT -III	Theory
631137	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Factors affecting workability	1	UNIT -III	Theory
631138	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Measurement of workability by different tests,	1	UNIT -III	Theory
631139	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Effect of time and temperature on workability	1	UNIT -III	Theory
631140	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Quality of mixing water, Ready mix concrete, Shotcrete	1	UNIT -III	Theory

631141	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Water / Cement ratio – Abram's law	1	UNIT -IV	Theory
631142	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Gel space ratio, Nature of strength of concrete	1	UNIT -IV	Theory
631143	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Maturity concept, Strength in tension and compression	1	UNIT -IV	Theory
631144	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Properties of Hardened Concrete (Elasticity, Creep, Shrinkage, Poisson's ratio, Water absorption, Permeability, etc.)	3	UNIT -IV	Theory
631145	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Relating between compression and tensile strength, Curing	1	UNIT -IV	Theory
631146	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	factors affecting properties of Hardened concrete	1	UNIT -V	Theory
631147	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Compression tests, Tension tests, Flexure tests	1	UNIT -V	Theory
631148	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Non-destructive testing methods	1	UNIT -V	Theory
631149	NRICE234	CE	A	2021	BUILDING MATERIAL AND CONCRETE TECHNOLOGY	Codal provisions for NDT – Rebound hammer and UPV method	1	UNIT -V	Theory
631150	NRIME314	ME	A	2021	WORKSHOP PRACTICE LAB	T-LAP JOINT	3	Experme nt 1	LAB
631151	NRIME314	ME	A	2021	WORKSHOP PRACTICE LAB	CROSS LAP JOINT	3	Experme nt 2	LAB
631152	NRIME314	ME	A	2021	WORKSHOP PRACTICE LAB	V- FIT	3	Experme nt 3	LAB

631153	NRIME314	ME	A	2021	WORKSHOP PRACTICE LAB	SQUARE FIT	3	Experment 4	LAB
631154	NRIME314	ME	A	2021	WORKSHOP PRACTICE LAB	TINSMITHY-SQUARE BOX	3	Experment 5	LAB
631155	NRIME314	ME	A	2021	WORKSHOP PRACTICE LAB	OPEN SCOOP	3	Experment 6	LAB
631156	NRIIT407	CSM	A	2021	DATA STRUCTURES	introduction to linked lists	1	UNIT -II	Theory
631157	NRIIT407	CSM	A	2021	DATA STRUCTURES	types or recursion	1	UNIT -I	Theory
631158	NRISH734	AIM	A	2021	COMMUNICATIVE ENGLISH LAB	DEBATE	1	Experment 3	LAB
631159	NRISH734	CSD	A	2021	COMMUNICATIVE ENGLISH LAB	Plural makers, Past tense makers, syllable	3	Experment 5	LAB
631176	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	ELASTOMERS	1	UNIT -I	Theory
631177	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	ELASTOMERS	1	UNIT -I	Theory
631178	NRISH734	AIM	A	2021	COMMUNICATIVE ENGLISH LAB	TYPES OF CONSONANTS	6	Experment 4	LAB
631196	NRISH736	ECE	B	2021	APPLIED CHEMISTRY	class test -1	1	UNIT -I	Theory
631198	NRISH716	CSE	A	2021	APPLIED PHYSICS	Class test 1	1	UNIT -I	Theory
631209	NRIEEE502	EEE	A	2021	ELECTRICAL CIRCUIT ANALYSIS-I	Star to Delta and Delta to Star Transformation	2	UNIT -I	Theory
631340	NRIECE162	CSE	C	2021	DIGITAL LOGIC DESIGN	Digital systems – Introduction and Overview	1	UNIT -I	Theory
631341	NRIEEE502	EEE	A	2021	ELECTRICAL CIRCUIT ANALYSIS-I	Nodal Analysis and problems	2	UNIT -I	Theory
631346	NRIIT407	CSM	A	2021	DATA STRUCTURES	memory allocation of linkedlist	1	UNIT -II	Theory
631347	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	class test	2	UNIT -I	Theory
631349	NRICPT09	CSM	B	2021	ENGINEERING MATHEMATICS-II	class test	2	UNIT -IV	Theory
631388	NRICSE670	ECE	A	2021	Python Programming	PYTHON INTRODUCTION	1	UNIT -I	Theory
631389	NRICSE670	ECE	B	2021	Python Programming	PYTHON INTRODUCTION	1	UNIT -I	Theory
631390	NRICSE670	ECE	C	2021	Python Programming	PYTHON INTRODUCTION	1	UNIT -I	Theory
631391	NRICSE670	ECE	A	2021	Python Programming	python interpreter,interactive mode	1	UNIT -I	Theory

631392	NRICSE670	ECE	B	2021	Python Programming	python interpreter,interactive mode	1	UNIT -I	Theory
631393	NRICSE670	ECE	C	2021	Python Programming	python interpreter,interactive mode	1	UNIT -I	Theory
631394	NRICSE670	ECE	A	2021	Python Programming	values and types:integer, float,boolean	1	UNIT -I	Theory
631395	NRICSE670	ECE	B	2021	Python Programming	values and types:integer, float,boolean	1	UNIT -I	Theory
631396	NRICSE670	ECE	C	2021	Python Programming	values and types:integer, float,boolean	1	UNIT -I	Theory
631397	NRICSE670	ECE	A	2021	Python Programming	strings and list,variables and expressions	1	UNIT -I	Theory
631398	NRICSE670	ECE	B	2021	Python Programming	strings and list,variables and expressions	1	UNIT -I	Theory
631399	NRICSE670	ECE	C	2021	Python Programming	strings and list,variables and expressions	1	UNIT -I	Theory
631400	NRICSE670	ECE	A	2021	Python Programming	statements,tuple assignment,precedence of operators	1	UNIT -I	Theory
631401	NRICSE670	ECE	B	2021	Python Programming	statements,tuple assignment,precedence of operators	1	UNIT -I	Theory
631402	NRICSE670	ECE	C	2021	Python Programming	statements,tuple assignment,precedence of operators	1	UNIT -I	Theory
631403	NRICSE670	ECE	A	2021	Python Programming	comments,modules and functions,function definition and use, flow of execution	1	UNIT -I	Theory

631404	NRICSE670	ECE	B	2021	Python Programming	comments,modules and functions,function definition and use, flow of execution	1	UNIT -I	Theory
631405	NRICSE670	ECE	C	2021	Python Programming	comments,modules and functions,function definition and use, flow of execution	1	UNIT -I	Theory
631406	NRICSE670	ECE	A	2021	Python Programming	parameters and arguments,exchange the values of two variables	1	UNIT -I	Theory
631407	NRICSE670	ECE	B	2021	Python Programming	parameters and arguments,exchange the values of two variables	1	UNIT -I	Theory
631408	NRICSE670	ECE	C	2021	Python Programming	parameters and arguments,exchange the values of two variables	1	UNIT -I	Theory
631409	NRICSE670	ECE	A	2021	Python Programming	control flow,functions,conditionals	1	UNIT -II	Theory
631410	NRICSE670	ECE	B	2021	Python Programming	control flow,functions,conditionals	1	UNIT -II	Theory
631411	NRICSE670	ECE	C	2021	Python Programming	control flow,functions,conditionals	1	UNIT -II	Theory
631412	NRICSE670	ECE	A	2021	Python Programming	boolean values and operators,if condition	1	UNIT -II	Theory
631413	NRICSE670	ECE	B	2021	Python Programming	boolean values and operators,if condition	1	UNIT -II	Theory
631414	NRICSE670	ECE	C	2021	Python Programming	boolean values and operators,if condition	1	UNIT -II	Theory
631415	NRICSE670	ECE	A	2021	Python Programming	alternative,chained conditional statements	1	UNIT -II	Theory
631416	NRICSE670	ECE	B	2021	Python Programming	alternative,chained conditional statements	1	UNIT -II	Theory

631417	NRICSE670	ECE	C	2021	Python Programming	alternative,chained conditional statements	1	UNIT -II	Theory
631424	NRISH741	AIM	A	2021	ENGINEERING MATHEMATICS-II	class test -1	1	UNIT -I	Theory
631425	NRISH741	CSE	C	2021	ENGINEERING MATHEMATICS-II	Class test-1	1	UNIT -I	Theory
631426	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY	conducting polymers	1	UNIT -I	Theory
631427	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY	conducting polymers	1	UNIT -I	Theory
631428	NRISH721	ME	A	2021	ENGINEERING CHEMISTRY LAB	Estimation of KMnO4	3	Experment 3	LAB
631429	NRISH721	CE	A	2021	ENGINEERING CHEMISTRY LAB	Estimation of KMnO4	3	Experment 3	LAB