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NRIA18 & NRIA20 CO-PO

NRI INSTITUTE OF TECHNOLOGY

Pothavarappadu(v), Agiripalli(M), VijayawadaRural-521 212

Reflection in Programme Outcomes (eg. B.Tech Programme)

Following are the Programme Outcome (PO) statements for all B.Tech Programmes. Highlighted POs has direct relates to the local, national, regional and global developmental needs

PO_01: Having an ability to apply mathematics and science in engineering applications.

PO_02: Having a clear understanding of the subject related concepts and of contemporary issues and apply them to identify, formulate and analyse complex engineering problems.

PO_03: Having an ability to design a component or a product applying all the relevant standards and with realistic constraints, including public health, safety, culture, society and environment

PO_04: Having an ability to design and conduct experiments, as well as to analyse and interpret data, and synthesis of information

PO_05: Having an ability to use techniques, skills, resources and modern engineering and IT tools necessary for engineering practice

PO_06: Having problem solving ability- to assess social issues (societal, health, safety, legal and cultural) and engineering problems

PO_07: Having adaptive thinking and adaptability in relation to environmental context and sustainable development

PO_08: Having a clear understanding of professional and ethical responsibility

PO_09: Having cross cultural competency exhibited by working as a member or in teams

PO_10: Having a good working knowledge of communicating in English – communication with engineering community and society

PO_11: Having a good cognitive load management skills related to project management and finance

PO_12: Having interest and recognise the need for independent and lifelong learning

18A2100201- COMPLEX VARIABLES AND FOURIER SERIES

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)**

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	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	-	-	-	-	-	-	-	-

18A2101401- STRENGTH OF MATERIALS

Course Outcomes:

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

CO1	Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy.
CO2	Develop shear force and bending moment diagrams for different load cases.
CO3	Compute the flexural stresses for different load cases and different cross-sections. Determine shear stresses for different cross-sections.
CO4	Knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
CO5	Understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes.
CO6	Can Analyze members subjected to torsion, combined torsion and bending moment & asses stresses in different engineering applications like springs subjected to different loading conditions

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	-	-	2	-	-	-	3	-	-	-	-
CO2	3	-	-	2	-	-	-	3	-	-	-	-
CO3	3	-	-	2	-	-	-	3	-	-	-	-
CO4	3	-	-	2	-	-	-	3	-	-	-	-
CO5	3	-	-	2	-	-	-	3	-	-	-	-
CO6	3	-	-	2	-	-	-	3	-	-	-	-

18A2101402- FLUID MECHANICS

Course Outcomes:

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

CO1	Understand the principles of fluid statics, kinematics and dynamics
CO2	Familiarize basic terms used in fluid mechanics
CO3	Understand flow characteristics and classify the flows
CO4	Apply the continuity, momentum and energy principles
CO5	Estimate various losses in flow through channels
CO6	Understand fundamentals of kinematics and equations Cartesian coordinates.

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	-	-	-	-	2	-	1	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	3	-	-	-	2	-	-	-	-
CO5	2	2	-	3	-	-	-	2	-	-	-	-
CO6	2	2	-	2	-	-	-	-	-	-	-	-

18A2101403- SURVEYING & GEOMATICS

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.
CO2	Apply the knowledge, techniques and survey tools in engineering practices
CO3	Calculate angles, distances and levels.
CO4	Translate the knowledge gained for implementation infrastructure facilities.
CO5	Correlate knowledge to frontiers like Hydrography, Electronic Distance Measurement, Global Positioning System, Photogrammetric and Remote Sensing.
CO6	Identify data collection methods and prepare field notes. Estimate errors in measurements and apply corrections

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	-	-	1	-	-	-	-	-	-	-
CO2	-	3	-	-	1	-	-	-	-	-	-	-
CO3	-	3	-	1	-	-	-	-	-	-	-	-
CO4	-	3	-	-	1	-	-	-	-	-	-	-
CO5	-	3	-	-	1	-	3	1	-	-	-	-
CO6	-	-	-	-	-	-	2	1	-	-	-	-

18A2101301- BUILDING PLANNING & DRAWING

Course Outcomes:

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

CO1	Student should be able to plan various buildings as per the building by-laws.
CO2	Student should know the minimum standards for various parts of buildings &characteristics.
CO3	The student should be able to distinguish the relation between the plan, elevationand cross section and identify the form and functions among the buildings.
CO4	The student is expected to learn the skills of drawing building elements and plan
CO5	Student should be able to understand various brick masonry & building elementsstandard drawings.
CO6	Student should be able to develop drawing of building plan, section and elevation.

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	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	2	-	-	-	-	-	-	-
CO4	1	2	-	-	3	-	-	-	-	-	-	-
CO5	-	1	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	3	-	-	-	-	-	-	-

18A2101404- BUILDING CONSRUCTION PRACTICE

Course Outcomes:

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

CO1	Get the knowledge of different construction materials and their properties
CO2	Know the classification of aggregates and their structural requirements.
CO3	Understand properties and the components of lime and cement
CO4	Understand the types of masonry , uses of timber and its properties
CO5	Identify components of building and types of floors and roof
CO6	Gain the knowledge of proofing materials and formworks

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	1	-	1	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	3	-	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	2	1	-	2	-	-	-	-	-	-	-	-
CO6	2	1	-	1	-	-	-	-	-	-	-	-

18A2101491- SURVEYING LAB

Course Outcomes:

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

CO1	Conduct survey and collect field data.
CO2	Prepare field notes from survey data
CO3	Interpret survey data and compute areas and volumes.

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	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	3	3	-	2	1	-	-	-	-	-	-	2

18A2101492- STRENGTH OF MATERIALS LAB

Course Outcomes:

CO1 Conduct tension test on steel
CO2 Conduct compression tests on spring, wood, brick and concrete
CO3 Conduct flexural and torsion test to determine elastic constants
CO4 Determine hardness of metals

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	1	2	-	-	-	-	2	-	-	-	2
CO2	3	1	2	-	-	-	-	2	-	-	-	2
CO3	3	1	2	-	-	-	-	2	-	-	-	-
CO4	3	1	2	-	-	-	-	2	-	-	-	2

18A2100801- PROFESSIONAL ETHICS AND HUMAN VALUES

Course Outcomes:

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

CO1	Grooms themselves ascetical, responsible and societal beings.
CO2	Discuss ethics in society and apply the ethical issues related to engineering.
CO3	Exhibit the understanding of ethical theories in professional environment.
CO4	Recognize their roe as social experimenters (engineers) and comprehend codes of ethics.
CO5	Identify the risks likely to come across in the professional world, analyzing them and find solutions.
CO6	Realize the responsibilities and rights of engineers in the society.

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	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

18A2200201-PROBABILITY AND STATISTICS

Course Outcomes:

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

CO1	Student will be able to measure the central tendency and relation between them.
CO2	Student will be able to Evaluate the correlation coefficient, rank coefficient and regression.
CO3	Students will be able to Understand probabilities of events and expectationsof random variables forelementary problems.
CO4	Students will be able to Solve problems related to binomial and passion distribution.
CO5	Student will be able to Compare situations in which it is appropriate to consider the relevance of theNormal distribution.
CO6	Student will be able to Construct hypothesis and carryout appropriate tests to checks its acceptability.

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	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	--	--	--	--	--	--	--	--

18A2201401- CONCRETE TECHNOLOGY

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 itsbehavior 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.

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	2	-	-	-	2	-	-	-	-
CO2	-	2	3	2	-	-	-	2	-	-	-	-
CO3	-	2	3	2	-	-	-	2	-	-	-	-
CO4	-	2	3	2	-	-	-	2	-	-	-	-
CO5	-	1	-	1	-	-	-	2	-	-	-	-
CO6	-	1	-	1	-	-	-	2	-	-	-	-

18A2201402- HYDRAULIC ENGINEERING

Course Outcomes:

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

CO1	Understand characteristics of laminar and turbulent flows.
CO2	Analyze characteristics for uniform flows in open channels.
CO3	Analyze characteristics for non-uniform flows in open channels.
CO4	Design different types of turbines
CO5	Design of centrifugal and multi stage pumps.
CO6	Design of reciprocating pump

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	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	1	-	-	2	2	-	-	-	-
CO3	3	-	-	1	-	-	2	2	-	-	-	-
CO4	2	-	-	3	-	-	1	2	-	-	-	-
CO5	2	-	-	3	-	-	1	2	-	-	-	-
CO6	2	-	-	3	-	-	1	2	-	-	-	-

18A2201403- ENGINEERING GEOLOGY

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.

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	-	-	-	-	-	-	-

18A2201404 - STRUCTURAL ANALYSIS

Course Outcomes:

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

CO1	Apply Rankine's & Euler's theories for analysis of columns & struts
CO2	Analyze indeterminate propped cantilever beams
CO3	Analyze fixed beams using compatibility method
CO4	Analyze continuous beams using Clapeyron's theorem of three moments Analysis
CO5	Analyze continuous beams using slope deflection equation
CO6	Identify the behavior of structures due to the expected loads, including the movingloads, acting on the structure. Estimate the bending moment and shear forces in beams for different fixity conditions

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	2	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	1	-	-	-	-
CO3	3	-	-	-	-	-	-	1	-	-	-	-
CO4	3	-	-	-	-	-	-	1	-	-	-	-
CO5	3	-	-	-	-	-	-	1	-	-	-	-
CO6	2	2	-	-	-	-	-	1	-	-	-	-

18A2201491- FLUID MECHANICS & HYDRAULIC MACHINES LAB

Course Outcomes:

CO1 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.

CO2 Students will have confidence in the hydraulic design of turbines and should be able to identify suitable pumps and turbines for different working conditions.

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	2	3	2	-	-	-	1	-	-	-	-
CO2	1	2	3	3	-	-	-	1	-	-	-	-

18A2201492- ENGINEERING GEOLOGY LAB

Course Outcomes:

1. Identify minerals and rocks
2. Measure strike and dip of the bedding planes
3. Interpret geological maps

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	3	2	1	1	1	-	-	-	-
CO2	2	3	2	2	2	1	2	2	-	-	-	-
CO3	1	3	2	2	2	-	1	1	-	-	-	-

18A2201493- ADVANCED SURVEYING LAB

Course Outcomes:

1. Conduct survey and collect field data.
2. Prepare field notes from survey data
3. Interpret survey data and compute areas and volumes.

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	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	3	3	-	2	1	-	-	-	-	-	-	2

18A2201494- SURVEY CAMP

Course Outcomes:

1. Conduct survey and collect field data.
2. Prepare field notes from survey data
3. Interpret survey data and compute areas and volumes.

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	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	3	3	-	2	1	-	-	-	-	-	-	2

18A2200801-IPR & Patents

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	Understand the importance of Trade secrets and maintaining trade secrets

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	2	-	-	-	-	-	3	-	-	-	-
CO2	3	-	-	-	-	-	-	3	-	2	-	-
CO3	2	-	2	-	-	-	-	3	-	-	-	-
CO4	2	-	-	2	-	-	-	3	-	-	-	-
CO5	2	-	2	-	-	-	-	3	-	-	-	-
CO6	2		-	-	-	-	-	3	2	2	-	-

Open Elective-1 (Offered by Department of civil engineering)

18A2201601- ELEMENTS OF CIVIL ENGINEERING

Course Outcomes:

Upon successful completion of the course, the student will beable to:

CO1	Attain basic knowledge on simple stress & strains and civil engineering materials.
CO2	Attain basic knowledge on sub-structure and super structure of a building.
CO3	Attain basic knowledge on principles of surveying, various types of surveying.
CO4	Attain basic knowledge on various types of transportation systems.
CO5	Attain basic knowledge on various types of bridges
CO6	Attain basic knowledge on purpose, components and various types of dams.

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	2	-	-	-	2	-	2	-	-	-	-
CO2	3	-	-	-	-	1	-	1	-	-	-	-
CO3	3	2	-	-	-	1	-	1	-	-	-	-
CO4	3	-	-	-	-	1	-	1	-	-	-	-
CO5	3	2	-	-	-	-	-	1	-	-	-	-
CO6	3	2	-	-	-	2	-	1	-	-	-	-

18A2201602-BASIC SURVEYING

Course Outcomes:

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

CO1 Understand the principles of surveying and types of scales

CO2 Understand the principles of chain surveying.

CO3 Attain basic knowledge on compass surveying and various types of compass.

CO4 Attain basic knowledge on bearings and included angles from bearings

CO5 Compute areas of a given section.

CO6 Compute volumes of a given section.

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	2	-	-	-	2	-	2	-	-	-	-
CO2	3	2	-	-	-	1	-	1	-	-	-	-
CO3	3	2	-	-	-	-	-	1	-	-	-	-
CO4	3	2	-	-	-	-	-	1	-	-	-	-
CO5	3	2	-	-	-	-	-	1	-	-	-	-
CO6	3	2	-	-	-	2	-	1	-	-	-	-

18A3101401-SOIL MECHANICS

Course Outcomes:

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

CO1	Identify various soils based on their characteristics.
CO2	Characterize and classify soils based on different limits.
CO3	Evaluate permeability and seepage of soils.
CO4	Determine the permeability of soils and stratified soils
CO5	Determine plasticity characteristics of various soils
CO6	Design consolidation process by predicting settlement of soils.

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	1	-	2	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	1	-	-	-	-
CO3	2	1	-	-	-	1	-	-	-	-	-	-
CO4	2	2	-	-	-	1	-	-	-	-	-	-
CO5	2	2	-	-	-	1	-	-	-	-	-	-
CO6	2	2	2	-	-	1	-	1	-	-	-	-

18A3101402-REINFORCED CONCRETE STRUCTURES

Course Outcomes:

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

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	2	3	-	-	2	-	2	-	-	-	-
CO2	3	3	3	-	-	2	-	2	-	-	-	-
CO3	3	3	3	-	-	2	-	2	-	-	-	-

CO4	3	3	3	-	-	2	-	2	-	-	-	-
CO5	3	3	3	-	-	2	-	2	-	-	-	-
CO6	3	3	3	-	-	2	-	2	-	-	-	-

18A3101403-WATER RESOURCE ENGINEERING-1

Course Outcomes:

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

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	2	3	-	-	1	-	1	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	-	1	-	1	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO6	2	1	-	-	-	-	-	-	-	-	-	-

18A3101401 -STRUCTURAL ANALYSIS-II

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 StiffnessMatrix method

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	-	-	-	2	-	1	-	-	-	-
CO2	3	3	-	-	-	2	-	1	-	-	-	-
CO3	3	3	-	-	-	2	-	1	-	-	-	-
CO4	3	3	-	-	-	2	-	1	-	-	-	-

CO5	3	3	-	-	-	2	-	1	-	-	-	-
CO6	3	3	-	-	-	2	-	1	-	-	-	-

PROFESSIONAL ELECTIVE-1
18A3101511-SUBSURFACE INVESTIGATION AND INSTRUMENTATION

Course Outcomes: Soil Mechanics

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

CO1	Plan and execute sub soil investigation programme.
CO2	Different exploration techniques
CO3	Handle both laboratory and in-situ testing techniques.
CO4	Carry out collection, handling and preservation of samples.
CO5	In situ exploration methods
CO6	Handle instruments during sub soil exploration process.

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	-	-	2	-	2	-	1	-	-	-	-
CO2	2	-	-	-	-	2	-	-	-	-	-	-
CO3	2	-	-	-	-	2	-	2	-	-	-	-
CO4	2	-	2	2	-	2	-	1	-	-	-	-
CO5	2	-	-	-	-	2	-	2	-	-	-	-
CO6	2	-	-	-	-	1	-	1	-	-	-	-

PROFESSIONAL ELECTIVE-1
18A3101512-ADVANCED CONCRETE TECHNOLOGY

Course Outcomes:

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

CO1	Understand the basic concepts of concrete.
CO2	Realise the importance of quality of concrete.
CO3	Familiarise the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
CO4	Fresh concrete properties and the hardened concrete properties.
CO5	Familiarise the basic concepts of special concrete and their production and applications.
CO6	Understand the behaviour of concrete in various environments.

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	-	-	-	-	-	-	1	-	-	-	-
CO2	2	-	-	-	-	1	-		-	-	-	-

CO3	2	-	-	2	-	2	-	1	-	-	-	-
CO4	2	-	-	-	-	-	-	1	-	-	-	-
CO5	2	-	-	-	-	-	-	1	-	-	-	-
CO6	2	-	-	-	-	-	-	1	-	-	-	-

PROFESSIONAL ELECTIVE-1

18A3101513-ENVIRONMENTAL POLLUTION AND CONTROL

Course Outcomes:

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

CO1	Identify the air pollutant control devices
CO2	Understand the fundamentals of solid waste management, practices adopted in his town/village and its importance in keeping the health of the city.
CO3	Identify the air pollutant control devices and have knowledge on the NAAQ standards and air emission standards.
CO4	Differentiate the treatment techniques used for sewage and industrial wastewater treatment.
CO5	Inventing the methods of environmental sanitation and the management of community facilities without spread of epidemics.
CO6	Appreciate the importance of sustainable development while planning a project or executing an activity.

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	-	-	-	-	-	2	1	-	-	-	-
CO2	2	-	-	-	-	-	2	1	-	-	-	-
CO3	2	-	-	-	-	-	2	1	-	-	-	-
CO4	2	-	-	-	-	-	2	1	-	-	-	-
CO5	2	-	-	-	2	-	2	1	-	-	-	-
CO6	2	2	-	-	-	-	2	1	-	-	-	-

18A3101514-AIRPORT PLANNING AND DESIGN

Course Outcomes:

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

CO1	Obtain a basic Knowledge of the fundamental issues in Airport engineering.
CO2	Demonstrate the clear understanding of the airport components.
CO3	Learn principles in airport components geometric
CO4	Learn the airport components capacity and delays
CO5	Learn critical factors consideration in airport design
CO6	Design and be able to apply these principles in field

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-

CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	-	3	-	-	2	-	2	-	-	-	-

18A3101515-URBAN HYDROLOGY

Course Outcomes:

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

CO1	Impact of urbanization on catchment hydrology
CO2	Develop intensity duration frequency curves for urban drainage systems.
CO3	Peak flow estimations
CO4	Develop design storms to size the various components of drainage systems.
CO5	Apply best management practices to manage urban flooding.
CO6	Develop master drainage plan for an urbanized area.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	3	-	-	2	-	1	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	3	-	-	2	-	1	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	2	3	-	-	2	-	1	-	-	-	-

Open Elective-2 (Offered by Department of civil engineering)

18A3101601-BUILDING MATERIALS

Course Outcomes:

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

CO1	Understand the process of making quality stones with its applications.
CO2	Understand the process of making quality bricks with its applications.
CO3	Assess quality of lime in a detailed manner on the usage in the present-day construction.
CO4	Assess quality of timber in a detailed manner on the usage in the present-day construction.
CO5	Assess quality of steel in a detailed manner on the usage in the present-day construction.
CO6	Acquire the knowledge about paints, varnishes, distempers

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	-	-	-	-	2	-	1	-	-	-	-
CO2	3	-	-	-	-	1	-	1	-	-	-	-
CO3	2	2	-	-	-	1	-	1	-	-	-	-

CO4	3	-	-	-	-	1	-	2	-	-	-	-
CO5	2	2	-	-	-	-	-	1	-	-	-	-
CO6	3	1	-	-	-	1	-	2	-	-	-	-

Open Elective-2 (Offered by Department of civil engineering)

18A3101602-AIR POLLUTION & ITS CONTROL

Course Outcomes:

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

CO1	Understand of contemporary pollution issues.
CO2	Analyze specific examples of various sources of air pollution.
CO3	Understand the properties of atmosphere
CO4	Comprehend the causes of key types of air pollution.
CO5	Comprehend the effects of key types of air pollution
CO6	Classify of different pollution control strategies

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	1	-	-	-	-	-	2	-	-	-	-
CO2	2	2	-	-	-	1	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	1	-	-	-	-
CO4	3	2	-	-	-	-	-	1	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	1	-	-	-	2	-	1	-	-	-	-

18A3101602-MANAGEMENT SCIENCE

Course Outcomes:

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

CO1	Design of organizational structure both industries and academia.
CO2	Analyze various functions of management that include operations management, material management, marketing management, HR management helpful in success of organizations.
CO3	Understand the importance of planning for the long-term through strategic management.
CO4	Understand quality control standards & contemporary management practices being followed both in industries and academia
CO5	Compare conceptual models of strategic management and to understand its applicability in understanding the constraints and opportunities in the sectors.
CO6	Understand the contemporary issues in the field of management science and their applicability in the real world at every level

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	-	-	-	-	-	-	-	2	-	3	-
CO2	2	-	-	-	-	-	-	-	1	-	3	-

CO3	2	-	-	-	-	-	-	-	2	-	3	-
CO4	2	-	-	-	-	-	-	-	1	-	3	-
CO5	2	-	-	-	-	-	-	-	2	-	3	-
CO6	2	-	-	-	-	-	-	-	2	-	3	V

18A3101491-Soil Mechanics Lab

Course Outcomes:

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

CO1	Determine index properties of soil and classify them.
CO2	Determine permeability of soils
CO3	Determine Compaction, Consolidation and shear strength characteristics

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	-	-	-	-

18A3101492-Concrete Technology Lab

Course Outcomes:

Upon successful completion of the course, the student will be able 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.
CO7	Determine the bulking of sand.
CO8	Understand the non-destructive testing procedures on concrete.

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	-	-	-	-

18A3100801-INDIAN CONSTITUTION

Type of Course: Audit Course

Course Outcomes:

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

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	2	-	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	2	-	-	-	-
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	-	-	3	-	-	-	-	2	-	-	-	2

18A3201401-FOUNDATION ENGINEERING

Course Outcomes:

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

CO1	Understand the methods of soil exploration.
CO2	Compile soil investigation report
CO3	Assess stability of slopes and earth retaining structures
CO4	Determine safe bearing capacity and settlement of shallow foundations.
CO5	Design pile foundations.
CO6	Design well foundations.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	2	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	2	3	3	-	-	2	-	1	-	-	-	-
CO6	2	3	3	-	-	2	-	1	-	-	-	-

18A3201402-HIGHWAY ENGINEERING

Course Outcomes:

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

CO1	Carry out highway surveying and planning.
CO2	Understand characteristics of highway materials.
CO3	Geometric design and alignment
CO4	Design components of highway.
CO5	Design highway intersections.
CO6	Design highway pavements

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-		-		-	-	-	-
CO3	2	3	3	-	-	2	-	1	-	-	-	-
CO4	2	3	3	-	-	2	-	1	-	-	-	-
CO5	2	3	3	-	-	2	-	1	-	-	-	-

CO6	2	3	3	-	-	2	-	1	-	-	-	-

18A3201403-ENVIRONMENTAL ENGINEERING

Course Outcomes:

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

CO1	Understand about quality of water and purification process
CO2	Select appropriate technique for treatment of waste water.
CO3	Assess the impact of air pollution
CO4	Understand consequences of solid waste and its management.
CO5	Design domestic plumbing systems.
CO6	Selection of suitable treatment flow for raw water treatments.

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	-	-	-	-	-	-	1	-	-	-	-
CO2	2	-	-	-	-	-	-	1	-	-	-	-
CO3	2	-	-	-	-	-	-	1	-	-	-	-
CO4	2	-	-	-	-	-	-	1	-	-	-	-
CO5	2	2	3	-	-	-	-	1	-	-	-	-
CO6	2	-	-	-	-	-	-	1	-	-	-	-

PROFESSIONAL ELECTIVE-II

18A3201511-GROUND IMPROVEMENT TECHNIQUES

Course Outcomes:

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

CO1	Perceive the knowledge of various methods of ground improvement and their suitability to different field situations.
CO2	Design a reinforced earth embankment and check its stability.
CO3	Understand the functions of Geo-synthetics and their applications in Civil Engineering practice.
CO4	Understand the concepts and applications of grouting.
CO5	Concept of dewatering
CO6	Stabilization of soils

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	-	-	-	-	1	-	1	-	-	-	-
CO2	2	-	-	-	-	1	-	1	-	-	-	-

CO3	2	-	-	-	-	1	-	1	-	-	-	-
CO4	2	-	-	-	-	1	-	1	-	-	-	-
CO5	2	-	-	-	-	1	-	1	-	-	-	-
CO6	2	-	-	-	-	1	-	1	-	-	-	-

18A3201512-WATER RESOURCE ENGINEERING-II

Course Outcomes:

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

CO1	Estimate irrigation water requirements
CO2	Design irrigation canals and canal network
CO3	Design irrigation canal structures
CO4	Plan and design diversion head works
CO5	Analyse stability of gravity and earth dams
CO6	Design ogee spillways and energy dissipation works

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	2	-	-	-	2	-	1	-	-	-	-
CO2	2	3	3	-	-	2	-	1	-	-	-	-
CO3	2	3	3	-	-	2	-	1	-	-	-	-
CO4	2	3	3	-	-	2	-	1	-	-	-	-
CO5	2	2	-	-	-	2	-	1	-	-	-	-
CO6	2	3	3	-	-	2	-	1	-	-	-	-

18A3201513-AIR POLLUTION ENGINEERING

Course Outcomes:

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

CO1	Evaluating the ambient air quality based on the analysis of air pollutants
CO2	Design particulate and gaseous control measures for an industry
CO3	Judge the plume behaviour in a prevailing environmental condition
CO4	Estimate carbon credits for various day to day activities
CO5	Pollution control methods
CO6	Properties of atmosphere

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	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	1	-	1	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-

CO4	2	2	-	-	-	1	-	1	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

18A3201514-RAILWAY ENGINEERING

Course Outcomes:

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

CO1	Explain components of Railway track, different Gauges.
CO2	Design Track Gradients as per given requirements.
CO3	Designing various types of Track Turnouts.
CO4	Discover purposes and facilities at railway stations.
CO5	Explain interlocking and modern signal systems.
CO6	Identify surface defects on Railway Track and their remedial measures.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	2	-	1	-	-	-	-
CO3	3	3	3	-	-	2	-	1	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

18A3201515-GREEN BUILDINGS AND SUSTAINABILITY

Course Outcomes:

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

CO1	Recognize what is a green building and green building materials.
CO2	Understand the Green Building Opportunities and Benefits
CO3	Differentiate different rating agencies and features of green buildings.
CO4	Recognize sources of carbon emissions and its impact on climate.
CO5	Understand the concept of Sustainable development and social ethics
CO6	Plan land use confirming to zonal regulations

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	-	-	-	-	-	2	1	-	-	-	-
CO2	2	-	-	-	-	-	2	1	-	-	-	-
CO3	2	-	-	-	-	-	2	1	-	-	-	-

CO4	2	-	-	-	-	-	2	1	-	-	-	-
CO5	2	-	-	-	-	-	2	1	-	-	-	-
CO6	2	-	-	-	-	-	2	1	-	-	-	-

PROFESSIONAL ELECTIVE-III

18A3201521-EXPANSIVE SOILS

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Demonstrate behaviour of expansive soils.
CO2	Explain need of foundation practice on expansive soils.
CO3	Perform methods of stabilization of expansive soils.
CO4	Select additives and methodology for stabilization.
CO5	Apply the gained knowledge for suitable performance.
CO6	Concepts of swelling

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	-	-	-	-	-	1	1	-	-	-	-
CO2	2	-	-	-	-	-	1	1	-	-	-	-
CO3	2	-	-	-	-	-	1	-	-	-	-	-
CO4	2	-	-	-	-	-	1	-	-	-	-	-
CO5	2	-	-	-	-	-	1	-	-	-	-	-
CO6	2	-	-	-	-	-	1	-	-	-	-	-

18A3201522-REPAIR AND REHABILITATION OF STRUCTURES

Course Outcomes:	
Upon successful completion of the course, the student will be able 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

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	-	-	-	2	-	-	-	-	-	-	-
CO2	2	3	3	-	2	1	-	1	-	-	-	-
CO3	2	-	-	-	2	-	-	-	-	-	-	-
CO4	2	-	-	-	2	-	-	-	-	-	-	-
CO5	2	-	-	-	2	-	-	-	-	-	-	-
CO6	2	-	-	-	2	-	-	-	-	-	-	-

18A3201523-INDUSTRIAL WASTE &WASTE-WATER ENGINEERING

Course Outcomes:

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

CO1	Design treatment methods for any industrial wastewater.
CO2	Examine the manufacturing process of various industries.
CO3	Assess need for common effluent treatment plant for an industry
CO4	Test and analyse BOD, COD, TSS and MPN in wastewater.
CO5	Understand options for waste water disposal.
CO6	Understand the character of waste water from Steel plants and refineries

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	-	-	1	-	1	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

18A3201524-DOCKS AND HARBOUR ENGINEERING

Course Outcomes:

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

CO1	Enhance the knowledge on Docks and Harbor Engineering for water transportation in the context of regional and intercontinental transportation.
CO2	Know techniques of planning the Infrastructures required for Harbor and Port area.
CO3	Know techniques of designing the Infrastructures required for Harbor and Port area.
CO4	Analyze cargo and passenger demand forecasting cargo handling capacity of ports and economic evaluation of port project.
CO5	Understand environmental and other impact impended due to water transportation and port activities.
CO6	Procedure to follow during planning of ports.

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	-	-	-	-	-	-	-	-	-	-	-

CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

18A3201525-WATER RESOURCES SYSTEM ANALYSIS

Course Outcomes:

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

CO1	Apply basic principles of system approach.
CO2	Judging Economics of water resources of multipurpose projects.
CO3	Apply optimization principles to single and multi crop applications.
CO4	Designing reservoir operation leading to optimum crop water application.
CO5	Apply optimization methods to solve problems related to water resource systems
CO6	Formulate optimization models for decision making in water resources systems.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	3	-	-	-	-	1	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	2	-	-	-	-	-	1	-	-	-	-

Open Elective-3 (Offered by Department of civil engineering)

18A3201601-GREEN BUILDINGS

Course Outcomes:

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

CO1	Understand why buildings should be made energy efficient.
CO2	Have a fuller grasp on Renewable Energy mechanisms such as Passive Solar heating and
CO3	Have a fuller grasp on Ground source heat pumps, and their adaption to green building
CO4	Understand the concepts of Site and Climate, Building Form, Building Fabric.
CO5	Understand the concepts of Infiltration and ventilation, Lighting, Heating.
CO6	Understand the concepts of Cooling, Energy Management and water conservation.

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	-	-	-	-	2	-	2	-	-	-	-

CO2	3	2	-	-	-	1	-	2	-	-	-	-
CO3	2	2	-	-	-	1	-	2	-	-	-	-
CO4	3	-	-	-	-	1	-	2	-	-	-	-
CO5	2	2	-	-	-	-	-	2	-	-	-	-
CO6	3	1	-	-	-	2	-	2	-	-	-	-

Open Elective-3 (Offered by Department of civil engineering)

18A3201602-BUILDING CONSTRUCTION

Course Outcomes:

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

CO1	Understand types of foundation
CO2	Understand stone and brick masonry for the different construction activities in the
CO3	Understand block masonry for the different construction activities in the building
CO4	Comprehend the floors & roofs and their types
CO5	Comprehend the application of damp proofing, scaffolding
CO6	Comprehend the application of shoring, underpinning and formwork.

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	2	-	-	-	-	-	2	-	-	-	-
CO2	2	2	-	-	-	2	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	1	-	-	-	-
CO4	3	2	-	-	-	-	-	1	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	1	-	-	-	1	-	1	-	-	-	-

18A3201491-HIGHWAY ENGINEERING LAB

Course Outcomes:

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

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	-	-	-	-
CO4	3	3	-	3	-	2	-	2	-	-	-	-

18A3201391-COMPUTER AIDED CIVIL ENGINEERING DRAWING

Course Outcomes:

Upon successful completion of the course, the student will be able 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.

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	-	-	-	-
CO4	3	3	-	3	-	2	-	2	-	-	-	-

18A3200801-ESSENCE OF INDIAN KNOWLEDGE AND TRADITIONS

Course Outcomes:

Upon successful completion of the course, the student will be able 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 organizational effectiveness.
CO6	Understand the broad scope of marketing, societal, ethical and other diverse aspects of marketing

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	-	-	-	-	-	-	2		-	-	-
CO2	2	-	-	-	-	-	-	2		-	-	-
CO3	2	-	-	-	-	-	-	2		-	-	-

18A4101401- PRESTRESSED CONCRETE

Course Outcomes:

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

CO1	Explain the concepts of pre-stressing and methods of pre stressing.
CO2	Compute losses of pre-stress in pre-stressed concrete members.
CO3	Design PSC beams under flexure.
CO4	Design PSC beams under shear.
CO5	Determine the short and long term deflections of PSC beams
CO6	Implement prestressing concepts for composite beams.

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	2	2	-	-	-	-	3	-	-	-	-
CO2	3	3	3	-	-	-	-	3	-	-	-	-
CO3	3	3	3	-	-	-	-	3	-	-	-	-
CO4	3	3	3	-	-	-	-	3	-	-	-	-
CO5	3	3	3	-	-	-	-	3	-	-	-	-
CO6	2	2	2	-	-	-	-	2	-	-	-	-

18A4101402-DESIGN OF STEEL STRUCTURES

Course Outcomes:

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

CO1	Explain different types of Connections and relevant IS code provision.
CO2	Design beams and columns.
CO3	Design of truss elements
CO4	Design of column bases
CO5	Design Plate Girders with curtailment of flanges.
CO6	Design principles of Gantry Girders with curtailment of flanges.

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	3	2	2	-	-	-	-	3	-	-	-	-
CO2	3	3	3	-	-	-	-	3	-	-	-	-
CO3	3	3	3	-	-	-	-	3	-	-	-	-
CO4	3	3	3	-	-	-	-	3	-	-	-	-
CO5	3	3	3	-	-	-	-	3	-	-	-	-
CO6	2	2	2	-	-	-	-	2	-	-	-	-

18A4101403- CONSTRUCTION TECHNOLOGY & PROJECT MANAGEMENT

Course Outcomes:

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

CO1	Explain the importance of construction planning
CO2	Assess the project management and construction techniques
CO3	Describe about project evaluation and review technique.
CO4	Explain the methods of production of aggregate products
CO5	Explain the functioning of various earth moving equipment
CO6	Explain Concreting and usage of machinery required for the works

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	-	-	-	-	-	-	1	-	-	3	-
CO2	1	-	-	-	-	-	-	1	-	-	3	-
CO3	3	-	-	-	-	-	-	1	-	-	3	-
CO4	2	-	-	-	-	-	-	1	-	-	3	-
CO5	1	-	-	-	-	-	-	1	-	-	3	-
CO6	1	-	-	-	-	-	-	1	-	-	3	-

18A4101404- QUANTITY SURVEYING & PUBLIC WORKS

Course Outcomes:

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

CO1	Explain the methods of Estimation
CO2	Evaluate the quantities for structural components
CO3	Prepare detailed and general specifications for a project
CO4	Prepare documents for different types of contracts
CO5	Explain procedures for entries in measurement books and its importance
CO6	Evaluate valuation of buildings.

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	3	3	-	-	-	2	-	1	-	-	-	-
CO2	3	3	-	-	-	2	-	1	-	-	-	-
CO3	3	2	-	-	-	2	-	1	-	-	-	-
CO4	3	1	-	-	-	2	-	1	-	-	-	-
CO5	3	2	-	-	-	2	-	1	-	-	-	-
CO6	3	2	-	-	-	2	-	1	-	-	-	-

PROFESSIONAL ELECTIVE-IV

18A4101511-FINITE ELEMENT METHODS

Course Outcomes:

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

CO1	Develop finite element formulations of 1D & 2D problems.
CO2	Solve complex problems using FEM.
CO3	Formulate isoparametric elements with different irregular boundaries.
CO4	Implement solution techniques for higher order problems in practice.
CO5	Explain concepts for carrying out research.
CO6	Explain concepts for modelling of non-linear materials and geometry

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	-	-	-	-	-	1	-	-	-	-
CO2	3	3	-	-	-	-	-	1	-	-	-	-
CO3	3	3	-	-	-	-	-	1	-	-	-	-
CO4	3	2	-	-	-	-	-	1	-	-	-	-
CO5	3	-	-	-	-	-	-	1	-	-	-	-
CO6	3	-	-	-	-	-	-	1	-	-	-	-

18A4101512- ADVANCED FOUNDATION ENGINEERING

Course Outcomes:

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

CO1	Compute the safe bearing capacity of footings subjected to vertical and inclined loads.
CO2	Explain the advanced methods of settlement computations and proportion foundation footings.
CO3	Explain the methods of computing the pull-out capacity and negative skin friction of piles and compute the settlements of pile groups in clays.
CO4	Evaluate the problems posed by expansive soils and the different foundation practices devised.
CO5	Differentiate between isolated footings and combined footings and mat foundations.
CO6	Design of piles and pile caps in different soils

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	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	1	1	-	-	-	-	-	-	-	-	-	-
CO4	3	3	1	-	-	-	-	-	-	-	-	-
CO5	1	1	-	-	-	-	-	-	-	-	-	-
CO6	3	3	3	-	-	-	-	-	-	-	-	-

18A4101513-ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcomes:

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

CO1	Explain the role of stakeholder and public hearing in the preparation of EIA.
CO2	Identify the risks and impacts of a project.
CO3	Choose an appropriate EIA methodology.
CO4	Evaluate the EIA report.
CO5	Estimate the cost benefit ratio of a project.
CO6	Prepare EMP, EIS, and EIA report.

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	2	-	-	-	-	3	-	-	-	-	-
CO2	3	-	-	1	-	-	3	-	-	-	-	-
CO3	3	-	-	1	-	-	3	2	-	-	-	-
CO4	3	-	1	-	-	-	3	-	-	-	-	-
CO5	3	-	2	-	-	-	3	-	-	-	2	-
CO6	3	-	-	1	-	2	3	3	-	-	-	-

18A4101514- TRAFFIC ENGINEERING

Course Outcomes:

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

CO1	Explain principles in estimating stopping and passing sight distance requirements.
CO2	Analyse Traffic Problems And Plan For Traffic Systems Various Uses.
CO3	Conduct different types of Traffic Surveys.
CO4	Explain traffic regulation and control devices.
CO5	Design Channels, Intersections, Signals and Parking Arrangements.
CO6	Develop Traffic Management Systems.

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	-	-	-	-	2	-	2	-	-	-	-
CO2	3	2	1	-	-	2	-	2	-	-	-	-
CO3	3	-	-	-	-	2	-	1	-	-	-	-
CO4	3	-	-	-	-	2	-	2	-	-	-	-
CO5	3	3	3	-	-	2	-	1	-	-	-	-
CO6	3	1	-	-	-	2	-	2	-	-	-	-

PROFESSIONAL ELECTIVE-IV

18A4101515- SUSTAINABLE WATER RESOURCES DEVELOPMENT

Course Outcomes:

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

CO1	Demonstrate role of water in national development
CO2	Explain the planning requirements of irrigation project.
CO3	Design distribution networks for irrigation flood control and power generation
CO4	Explain the water management strategies
CO5	Explain the importance of interlinking of rivers
CO6	Explain interstate water disputes and arrive at feasible solutions

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	-	-	-	-	2	2	-	-	-	-	-
CO2	3	-	-	-	-	2	2	-	-	-	-	-
CO3	3	2	3	-	-	2	2	-	-	-	-	-
CO4	3	-	-	-	-	-	2	-	-	-	-	-
CO5	3	-	-	-	-	-	2	-	-	-	-	-
CO6	3	-	-	-	-	-	2	-	-	-	-	-

Open Elective-4 (Offered by Department of civil engineering)

18A4101607- PROJECT MANAGEMENT

Course Outcomes:

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

CO1	Understand the project management and causes of failures
CO2	Knowledge on different methods of Planning
CO3	Knowledge on different methods of scheduling
CO4	Knowledge on project management through networks
CO5	A complete idea on developing networks using PERT method.
CO6	A complete idea on developing networks CPM method.

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	-	-	-	-	2	-	2	-	-	-	-
CO2	3	2	-	-	-	1	-	2	-	-	-	-
CO3	2	2	-	-	-	1	-	2	-	-	-	-
CO4	3	-	-	-	-	1	-	2	-	-	-	-
CO5	2	2	-	-	-	-	-	2	-	-	-	-
CO6	3	1	-	-	-	2	-	2	-	-	-	-

Open Elective-4 (Offered by Department of civil engineering)

18A4101608- REMOTE SENSING AND GIS TECHNIQUES

Course Outcomes:

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

CO1	Understand the aerial photographs, stereoscopy
CO2	Understand remote sensing sensors and platforms, their properties and calibration.
CO3	Understand the image processing sequence and its importance in Remote Sensing
CO4	Understand the geographical information system and its fundamental operation
CO5	Understand the classification of maps, types of projections.
CO6	Understand the GIS data representation and their types

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	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	2	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	1	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-
CO6	2	2	-	-	-	1	-	-	-	-	-	-

18A4101491-STRUCTURAL DESIGNING AND DRAWING USING SOFTWARE

Course Outcomes:

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

CO1	Evaluate cross sectional and reinforcement requirements of various structural elements by using STAAD.Pro

CO2	Evaluate quantities and prepare rate analysis for various works in construction of a building using Spread Sheets

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	-	-	3	-	3	3	-	-	3
CO2	3	3	3	-	-	3	-	3	3	-	-	3

18A4101492- ENVIRONMENTAL ENGINEERING LAB

Course Outcomes:

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

CO1	Determine some important characteristics of water and wastewater in the laboratory
CO2	Outline some conclusion and decide whether the water is potable or not.
CO3	Decide whether the water body is polluted or not with reference to the state parameters in the list of experiments
CO4	Determine strength of the sewage in terms of BOD and COD

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	3	-	-	3
CO2	3	3	-	-	-	3	-	2	3	-	-	3
CO3	3	3	-	-	-	3	-	2	3	-	-	3
CO4	3	3	-	-	-	3	-	2	3	-	-	3

18A4101791- PROJECT WORK-I

Course Outcomes:

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

CO1	Apply all levels of engineering knowledge in solving the Engineering problems

CO2 Work together with team spirit
CO3 Document the project

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	3	3	3	-	3	3	-	3	3
CO2	3	3	3	3	3	3	-	3	3	-	3	3
CO3	3	3	3	3	3	3	-	3	3	-	3	3

18A4100801- ENTREPRENEURSHIP

Course Outcomes:

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

CO1	Analyze the business environment
CO2	Analyze and identify business opportunities.
CO3	Identify the elements of success of entrepreneurial ventures.
CO4	Statutory legal and financial regulations to start a business.
CO5	Evaluate effectiveness of different entrepreneurial strategies.
CO6	Specify performance indicators of entrepreneurship

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	2	-	-	-	-	-	-	2	-	2	-
CO2	1	2	-	-	-	-	-	-	2	-	2	-
CO3	1	-	-	-	-	-	-	-	2	-	2	-
CO4	1	-	-	-	-	-	-	-	2	-	2	-
CO5	1	2	-	-	-	-	-	-	2	-	2	-
CO6	1	-	-	-	-	-	-	-	2	-	2	-

PROFESSIONAL ELECTIVE-V

18A4201511- CIVIL INFRASTRUCTURE FOR SMART CITY DEVELOPMENT (SWAYAM)

Course Outcomes:

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

CO1	Explore and understand the fundamental concepts of smart and sustainable cities.
CO2	Explain the component of smart cities and dwell into their technological advancement.
CO3	Explain the involvement of stake holders in the design and implementation of responsive smart cities.
CO4	Develop work break down structure, scheduling of smart cities
CO5	Explain the importance of different linkages and their roles including government, urban planners, universities, city developers and communities.
CO6	Identify and recognize the role of ICT and data analytics in addressing the urban challenges and key issues

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	-	-	-	-	2	-	-	-	-	-	-
CO2	3	-	-	-	-	2	-	-	-	-	-	-
CO3	3	-	2	-	-	2	-	-	-	-	-	-
CO4	3	-	2	-	-	2	-	-	-	-	-	-
CO5	3	-	-	-	-	2	-	-	-	-	-	-
CO6	3	-	2	-	-	2	-	-	-	-	-	-

18A4201512-GEO-TECHNIQUES FOR DESIGN OF UNDERGROUND STRUCTURES

Course Outcomes:

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

CO1	Compute the safe bearing capacity of footings subjected to vertical and inclined loads.
CO2	Explain the advanced methods of settlement computations and proportion foundation footings.
CO3	Identifying the methods of computing the pull-out capacity and negative skin friction of piles and compute the settlements of pile groups in clays.
CO4	Evaluate the problems posed by expansive soils and the different foundation practices devised.
CO5	Differentiate between isolated footings and combined footings and mat foundations.
CO6	Design of piles and pile caps in different soils

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	2	1	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	2	-	-	-	-	-	-
CO3	3	-	-	-	-	2	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-
CO6	3	3	3	-	-	2	-	-	-	-	-	-

18A4201513-REMOTE SENSING AND GIS

Course Outcomes:

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

CO1	Comparing with ground, air and satellite based sensor platforms.
CO2	Interpret the aerial photographs and satellite imageries.
CO3	Create and input spatial data for GIS application.
CO4	Explain RS concepts in water resources engineering.
CO5	Explain GIS concepts in water resources engineering.
CO6	Applications of various satellite data.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	2	-	-	-	-	-	-	-
CO3	2	-	-	-	2	-	-	-	-	-	-	-
CO4	2	-	-	-	2	-	-	-	-	-	-	-
CO5	2	-	-	-	2	-	-	-	-	-	-	-
CO6	2	-	-	-	2	-	-	-	-	-	-	-

18A4201514-ROAD SAFETY ENGINEERING

Course Outcomes:

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

CO1	Explain the road accidents and road safety improvement strategies
CO2	Analyze the crash data using statistical methods
CO3	Conduct road safety audits
CO4	Explain the mechanism needed for crash reconstruction based on case studies
CO5	Apply accident mitigation measures in view of safety of user on a highway
CO6	Explain the traffic management measures and its influence

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	-	-	-	-	-	-
CO2	3	2	-	3	-	3	-	-	-	-	-	-
CO3	3	-	-	-	-	3	-	-	-	-	-	-
CO4	3	-	-	-	-	3	-	-	-	-	-	-
CO5	3	-	-	-	-	3	-	-	-	-	-	-
CO6	3	-	-	-	-	3	-	-	-	-	-	-

18A4201515 -RIVER BASIN MANAGEMENT

Course Outcomes:

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

CO1	Summarize the concepts of river basin management.
CO2	Implement the techniques in river basin management.
CO3	Compare methods and tools in river basin management
CO4	Check the river basin to obtain most possible benefits.
CO5	Planning of river basin.
CO6	Management of river basin.

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	-	-	-	-	-	2	-	-	-	-	-
CO2	1	-	-	-	-	-	2	-	-	-	-	-
CO3	1	-	-	-	-	-	2	-	-	-	-	-
CO4	1	-	-	-	-	-	2	-	-	-	-	-
CO5	1	2	-	-	-	-	2	-	-	-	2	-
CO6	1	-	-	-	-	-	2	-	-	-	2	-

PROFESSIONAL ELECTIVE-VI

18A4201521-ADVANCED STRUCTURAL DESIGN

Course Outcomes:

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

CO1	Design of raft foundations
CO2	Design different types of RCC retaining walls
CO3	Carryout analysis and design of different types of RCC water tanks
CO4	Analyze and design Flat slabs
CO5	Solve the problems design of RCC Bunkers, Silos
CO6	Explain various types of transmission towers and loading on them.

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	-	-	3	-	3	-	-	-	-
CO2	3	3	3	-	-	3	-	3	-	-	-	-
CO3	3	3	3	-	-	3	-	3	-	-	-	-
CO4	3	3	3	-	-	3	-	3	-	-	-	-
CO5	3	3	3	-	-	3	-	3	-	-	-	-
CO6	3	3	3	-	-	2	-	3	-	-	-	-

18A4201522-GEOSYNTHETICS

Course Outcomes:

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

CO1	Explain geosynthetics.
CO2	Interpret the test methods of different materials of geosynthetics.
CO3	Interpret the test methods of Geotextiles& Geo-grids
CO4	Interpret the test methods of Geo-membranes
CO5	Explain the manufacturing and materials required
CO6	Explain the applications of geosynthetics in construction

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	-	-	-	-	2	-	-	-	-	-	-
CO2	3	-	-	-	-	2	-	-	-	-	-	-
CO3	3	-	-	-	-	2	-	-	-	-	-	-
CO4	3	-	-	-	-	2	2	-	-	-	-	-
CO5	3	-	-	-	-	2	-	-	-	-	-	-
CO6	3	-	-	-	-	2	-	-	-	-	-	-

18A4201523-ENVIRONMENTAL ECONOMICS

Course Outcomes:

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

CO1	Examine the environmental issues in relation to the theory of externalities
CO2	Examine the environmental issues in relation to the public goods, and welfare
CO3	Illustrate and examine economic principles concerning the choice of instruments for controlling pollution and the relative strength and weaknesses of environmental policies
CO4	Examine various approaches developed for valuing environmental goods and services.
CO5	Examine various methods developed for valuing environmental goods and services.
CO6	Examine issues in the contemporary environmental discourse from an economists' point of view.

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	2	-	-	-	-	2	-	-	-	-	-
CO2	2	2	-	-	-	-	2	-	-	-	-	-
CO3	2	-	-	-	-	-	2	-	-	-	-	-
CO4	2	-	-	-	-	-	2	-	-	-	-	-
CO5	2	-	-	-	-	-	2	-	-	-	-	-
CO6	2	-	-	-	-	-	2	-	-	-	-	-

18A4201524-URBAN TRANSPORTATION PLANNING

Course Outcomes:

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

CO1	Estimate travel demand for an urban area.
CO2	Plan the transportation network for a city.
CO3	Explain about collection of data and types of sources of data
CO4	Explain trip generation and distribution
CO5	Identify the corridor and plan for providing good transportation facilities.
CO6	Evaluate various alternative transportation proposals.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-
CO3	3	-	-	2	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-
CO6	3	2	3	-	-	-	-	-	-	-	-	-

18A4201525-WATER SHED MANAGEMENT

Course Outcomes:

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

CO1	Determine watershed parameters and analyse watershed characteristics to take appropriate management action.
CO2	Quantify soil erosion and design control measures.
CO3	Apply land grading techniques for proper land management.
CO4	Suggest suitable harvesting techniques for better watershed management.
CO5	Explain appropriate models for watershed management.
CO6	Explain concepts of watershed modelling.

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	2	1	-	-	-	2	-	-	-	-	-
CO2	3	2	1	-	-	-	2	-	-	-	-	-
CO3	3	-	-	-	-	-	2	-	-	-	-	-
CO4	3	-	-	-	-	-	2	-	-	-	-	-
CO5	3	-	-	-	-	-	2	-	-	-	-	-
CO6	3	-	-	-	-	-	2	-	-	-	-	-

18A4201791-PROJECT-II

Course Outcomes:

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

CO1	Apply all levels of engineering knowledge in solving the Engineering problems
CO2	Use Civil Engineering software at least one.
CO3	Work together with team spirit
CO4	Document the project

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	3	3	3	-	-	3	-	3	3
CO2	3	3	3	3	3	3	-	-	3	-	3	3
CO3	3	3	3	3	3	3	-	-	3	-	3	3
CO4	3	3	3	3	3	3	-	-	3	-	3	3

Head of The Department
CIVIL ENGINEERING
NRI Institute of Technology
POTHAVARAPPADU.

NRI INSTITUTE OF TECHNOLOGY
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Approved by AICTE, New Delhi: Permanently Affiliated to JNTUK, Kakinada
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All Courses CO – PO & CO – PSO attainment including I Year

For 2019-2023 Batch

DEPARTMENT OF CIVIL ENGINEERING

S.NO	NAME OF THE SUBJECT	SUBJECT CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	PROFESSIONAL ENGLISH-I	18A1100101						2.76	2.15	2.3		2.21		1.84
2	ENGLISH COMMUNICATION SKILLS LAB-I	18A1100191									1.65	1.26		1.89
3	ENGINEERING MATHEMATICS-I	18A1100201	1.64											
4	ENGINEERING CHEMISTRY	18A1100204	1.59	1.46	1.59	1.2			2.38					
5	ENGINEERING CHEMISTRY LAB	18A1100293	1.86	1.56	1.12	1.39			1.4					
6	BASIC ENGINEERING & IT WORKSHOP	18A1100391	0.99	0.99	1.96	0.99	2.45				0.99	0.99		
7	ENVIRONMENTAL STUDIES	18A1100801		1.75	1.46				2.63					1.75
8	ENGINEERING MECHANICS	18A1101401	3	2.5				1						
9	PROFESSIONAL ENGLISH-II	18A1200101						2.82	2.82	1.88	1.88	2.35		1.88
10	ENGLISH COMMUNICATION SKILLS LAB-II	18A1200191									1.7	1.22		2.18
11	ENGINEERING MATHEMATICS-II	18A1200201	1.51											
12	ENGINEERING PHYSICS	18A1200202	1.37	1.37										
13	ENGINEERING PHYSICS LAB	18A1200291		1.9		1.9	2.84				2.84			
14	ENGINEERING DRAWING	18A1201401		0.84	1.05	0.84	1.12	1.68			0.84	0.84		0.84
15	PROGRAMMING AND PROBLEM SOLVING WITH C	18A1205301	1.64	1.28	0.55									
16	PROGRAMMING AND PROBLEM SOLVING WITH C LAB	18A1205392	2.69	2.09	0.9									1.7
17	COMPLEX VARIABLES AND FOURIER SERIES	18A2100201	2.10	1.86	1.62	1.39	0.00	0.00	2.10	0.00	0.00	0.00	0.00	0.00
18	PROFESSIONAL ETHICS AND HUMAN VALUES	18A2100801	2.61	2.32	2.04	1.73	0.00	0.00	2.61	0.00	0.00	0.00	0.00	0.00
19	BUILDING PLANNING AND DRAWING	18A2101301	2.06	1.72	1.79	0.00	0.00	0.00	1.79	0.00	0.00	0.00	0.00	0.00
20	STRENGTH OF MATERIALS	18A2101401	2.56	2.28	2.00	1.73	0.00	0.00	2.56	0.00	0.00	0.00	0.00	0.00
21	FLUID MECHANICS	18A2101402	2.61	2.33	2.03	1.70	0.00	0.00	2.61	0.00	0.00	0.00	0.00	0.00
22	SURVEYING & GEOMATICS	18A2101403	2.74	2.43	2.11	1.79	0.00	0.00	2.74	0.00	0.00	0.00	0.00	0.00
23	BUILDING CONSTRUCTION AND PRACTICE	18A2101404	1.82	1.22	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	SURVEYING LAB	18A2101491	2.22	1.86	1.93	0.00	0.00	0.00	1.93	0.00	0.00	0.00	0.00	0.00
25	STRENGTH OF MATERIALS LAB	18A2101492	2.32	1.93	2.01	0.00	0.00	0.00	2.01	0.00	0.00	0.00	0.00	0.00
26	PROBABILITYAND STATISTICS	18A2200201	1.80	1.61	1.41	1.20	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00

27	SURVEYING CAMP	18A2201494	2.27	1.90	1.98	0.00	0.00	0.00	1.98	0.00	0.00	0.00	0.00	0.00
28	ADVANCED SURVEYING LAB	18A2201493	1.98	1.65	1.72	0.00	0.00	0.00	1.72	0.00	0.00	0.00	0.00	0.00
29	ENGINEERING GEOLOGY LAB	18A2201492	2.18	1.82	1.90	0.00	0.00	0.00	1.90	0.00	0.00	0.00	0.00	0.00
30	FLUID MECHANICS AND HYDRAULIC MACHINES LAB	18A2201491	2.32	1.94	2.02	0.00	0.00	0.00	2.02	0.00	0.00	0.00	0.00	0.00
31	STRUCTURAL ANALYSIS-I	18A2201404	2.51	2.23	1.95	1.64	0.00	0.00	2.51	0.00	0.00	0.00	0.00	0.00
32	ENGINEERING GEOLOGY	18A2201403	2.64	2.36	2.06	1.77	0.00	0.00	2.64	0.00	0.00	0.00	0.00	0.00
33	HYDRAULIC ENGINEERING	18A2201402	2.55	2.27	1.99	1.69	0.00	0.00	2.55	0.00	0.00	0.00	0.00	0.00
34	CONCRETE TECHNOLOGY	18A2201401	2.59	2.31	2.02	1.72	0.00	0.00	2.59	0.00	0.00	0.00	0.00	0.00
35	IPR & PATENTS	18A2200802	2.58	2.30	2.01	1.73	0.00	0.00	2.58	0.00	0.00	0.00	0.00	0.00
36	INDUSTRIAL MATERIALS	18A2203602	2.48	2.21	1.94	1.67	0.00	0.00	2.48	0.00	0.00	0.00	0.00	0.00
37	MANAGEMENT SCIENCE	18A3100601	2.65	2.38	2.07	1.79	0.00	0.00	2.65	0.00	0.00	0.00	0.00	0.00
38	INDIAN CONSTITUTION	18A3100801	2.64	2.36	2.06	1.78	0.00	0.00	2.64	0.00	0.00	0.00	0.00	0.00
39	SOIL MECHANICS	18A3101401	2.57	2.30	2.00	1.72	0.00	0.00	2.57	0.00	0.00	0.00	0.00	0.00
40	REINFORCED CONCRETE STRUCTURES	18A3101402	2.07	1.72	1.80	0.00	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00
41	WATER RESOURCE ENGINEERING-I	18A3101403	2.61	2.34	2.03	1.74	0.00	0.00	2.61	0.00	0.00	0.00	0.00	0.00
42	STRUCTURAL ANALYSIS-II	18A3101404	2.23	1.99	1.74	1.52	0.00	0.00	2.23	0.00	0.00	0.00	0.00	0.00
43	SOIL MECHANICS LAB	18A3101491	2.34	2.34	0.00	2.34	0.00	1.56	0.00	1.56	0.00	0.00	0.00	0.00
44	CONCRETE TECHNOLOGY LAB	18A3101492	2.05	1.37	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69
45	ENVIRONMENTAL POLLUTION AND CONTROL	18A3101513	2.06	1.72	1.79	0.00	0.00	0.00	1.79	0.00	0.00	0.00	0.00	0.00
46	ESSENCE OF INDIAN KNOWLEDGE AND TRADITIONS	18A3200801	2.72	2.41	2	1.83	0.00	0.00	2.72	0.00	0.00	0.00	0.00	0.00
47	COMPUTER AIDED CIVIL ENGINEERING DRAWING	18A3201391	2.26	1.89	1.97	0.00	0.00	0.00	1.97	0.00	0.00	0.00	0.00	0.00
48	FOUNDATION ENGINEERING	18A3201401	2.59	2.32	2.01	1.74	0.00	0.00	2.59	0.00	0.00	0.00	0.00	0.00
49	HIGHWAY ENGINEERING	18A3201402	2.50	2.23	1.96	1.67	0.00	0.00	2.50	0.00	0.00	0.00	0.00	0.00
50	ENVIRONMENTAL ENGINEERING	18A3201403	2.68	2.40	2.07	1.77	0.00	0.00	2.68	0.00	0.00	0.00	0.00	0.00
51	HIGHWAY ENGINEERING LAB	18A3201491	2.23	1.86	1.94	0.00	0.00	0.00	1.94	0.00	0.00	0.00	0.00	0.00
52	WATER RESOURCE ENGINEERING - II	18A3201512	2.60	2.34	2.03	1.75	0.00	0.00	2.60	0.00	0.00	0.00	0.00	0.00
53	REPAIR AND REHABILITATION OF STRUCTURES	18A3201522	2.53	2.24	1.95	1.62	0.00	0.00	2.53	0.00	0.00	0.00	0.00	0.00
54	HYDRAULICS AND PNEUMATICS SYSTEMS	18A3203606	2.59	2.325	2.025	1.76	0	0	2.59	0	0	0	0	0
55	ENTREPRENEURSHIP	18A4100801	2.60	2.33	2.04	1.75	0.00	0.00	2.60	0.00	0.00	0.00	0.00	0.00
56	PRE- STRESSED CONCRETE STRUCTURES	18A4101401	1.965	1.85	1.85	0	0	0	0	1.965	0	0	0	0
57	DESIGN OF STEEL STRUCTURES	18A4101402	2.09	1.74	1.82	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00	0.00
58	CONSTRUCTION TECHNOLOGY & PROJECT MANAGEMENT	18A4101403	2.36	2.09	1.83	1.56	0.00	0.00	2.36	0.00	0.00	0.00	0.00	0.00

59	QUANTITY SURVEYING &PUBLIC WORKS	18A4101404	2.00	1.67	1.74	0.00	0.00	0.00	1.74	0.00	0.00	0.00	0.00	0.00
60	STRUCTURAL DESIGNING & DRAWING USING SOFTWARES	18A4101491	2.21	1.85	1.92	0.00	0.00	0.00	1.92	0.00	0.00	0.00	0.00	0.00
61	ENVIRONMENTAL ENGINEERING LAB	18A4101492	2.16	1.80	1.87	0.00	0.00	0.00	1.87	0.00	0.00	0.00	0.00	0.00
62	ENVIRONMENTAL IMPACT ASSESMENT	18A4101513	2.53	2.26	1.98	1.69	0.00	0.00	2.53	0.00	0.00	0.00	0.00	0.00
63	NANO TECHNOLOGY	18A4103606	2.55	2.27	2.00	1.70	0.00	0.00	2.55	0.00	0.00	0.00	0.00	0.00
64	REMOTE SENSING AND GIS	18A4201513	2.18	1.82	1.90	0.00	0.00	0.00	1.90	0.00	0.00	0.00	0.00	0.00
65	WATER SHED MANAGEMENT	18A4201525	2.50	2.23	1.96	1.67	0.00	0.00	2.50	0.00	0.00	0.00	0.00	0.00
65	MAJOR PROJECT	18A4201791	3	2.5	2.6	-	-	-	2.6	-	-	-	-	-

Direct Assessment	2.29	1.99	1.79	1.10	0.12	0.19	2.13	0.15	0.18	0.16	0.00	0.23	0.04	0.00
Alumni Survey	2.83	2.61	2.45	2.36	2.48	2.4	2.48	2.41	2.54	2.46	2.41	2.37	2.45	2.37
Program Exit Survey	2.68	2.26	2.39	2.31	2.36	2.3	2.5	2.35	2.42	2.3	2.45	2.34	2.39	2.33
PO Attainment(80%DA+10%AS+10%PES)	2.38	2.08	1.92	1.35	0.58	0.62	2.20	0.60	0.64	0.61	0.49	0.65	0.52	0.47

SIGNATURE OF THE HOD

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: COMPLEX VARIABLES AND TRANSFORM TECHNIQUES			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
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
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
3.	Write the infinite series expansion of complex function by apply taylor's/maclaurin's/laurent's series
4.	Write a fourier series expansion of a periodic function by using euler's formulae
5.	Understand the concept of fourier transform and its properties
6.	Solve the difference equations using z-transforms and inverse z-transforms

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: BASIC ELECTRONIC DEVICES AND CIRCUITS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the basic concepts of semiconductor physics
2.	Understand the formation of p-n junction and how it can be used as diode in different modes of operation
3.	Know the construction ,working principles of rectifiers
4.	Understands the working principles of rectifiers with and without filters
5.	Understand the construction, principle of operation of BJT and their V-I characteristics.
6.	Understand the construction, principle of operation of FET and their V-I characteristics.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL CIRCUIT ANALYSIS-II			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the basic concepts of three phase electrical circuits
2.	Measure the power in balanced three phase circuits.
3.	Understand the basic concepts of three phase electrical circuits
4.	Measure the power in Unbalanced three phase circuits.
5.	Determine the transient response of R-L, R-C, R-L-C Series circuits with ac and dc excitation
6.	Calculate the parameters for a given two port network

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL MACHINES - I			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Analyze the basic operation of DC generators, their armature reaction.
2.	Analyze the conditions required for analyzing the performance of dc generators
3.	Analyze the operation of dc motors & the necessity of starters.
4.	Determine the performance of testing of dc motors.
5.	Determine the voltage regulation and efficiency of single phase transformer from test results
6.	Determine the operation of a poly phase transformers and their parallel operation.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: THERMAL AND HYDRO LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Test for the IC Engines valve/port timing diagram
2.	Test for an I.C. Engines- 4 -stroke Diesel engine
3.	Test on I.C. Engines 2-stroke petrol engine.
4.	Analyze by the Study of boilers
5.	Identify the Test conducted on Pelton Wheel, Francis Turbine, Kaplan Turbine
6.	Choose on Reciprocating Pump,and can Calibrate the Venturimeter

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Course Name: BASIC ELECTRONIC DEVICES AND CIRCUITS LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Determine the characteristics of PN junction diode, zever diode
2.	Experiment with rectifiers with and without C filters
3.	Determine the characteristics of BJT, FET, UJT and SCR
4.	Explain transistor biasing and CRO operation
5.	Examine the characteristics of various amplifiers such as BJT -CE, Emitter Follower CC, FET-CS
6.	Utilize several equipment such as Ammeters, Voltmeters, Active & Passive Electronic Components, Regulated Power supplies, CRO's, Function Generators, Digital Multimeters, Résistance Boxes/Rheostats, Decade Capacitance

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Course Name: ELECTRICAL CIRCUITS LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve different electrical networks by using Thevenin's, Norton's and superposition theorems
2.	Solve different electrical networks by using maximum power transfer, compensation, reciprocity and millman's theorems
3.	Solve different electrical networks by using series and parallel resonance
4.	Determine the self, mutual inductances and coefficient of coupling
5.	Analyze the networks by using Z, Y,ABCD,H parameters
6.	Measure the 3 phase power by two wattmeter method for unbalanced loads

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS			
REGULATION:	NRIA18	YEAR-SEM:	II-I

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Use the theory of managerial economics, demand, production analysis and forecasting theories.
2.	Analyse of production markets and pricing strategies. Functions and cost-price functions to manage markets & break-even point.
3.	Develop ability to identify, formulate and solve engineering problem by applying the knowledge of managerial economics.
4.	Theorize about characteristics features and types of industrial organization, concept of changing business environment in post-liberalization scenario.
5.	Enhance their capabilities in the interpretation of b/s that are followed in industries, organizational and industries.
6.	Apply financial analysis, capital budgeting techniques in evaluating various investment opportunities.

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Course Name: ELECTRO MAGNETIC FIELDS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
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.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: CONTROL SYSTEMS			
REGULATION:	NRIA18	YEAR-SEM:	II-II

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function
2.	Study the time response of first and second order systems and improvement of performance by proportional plus derivative and proportional plus integral controllers
3.	Study the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
4.	Present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion.
5.	Learn basic aspects of design of linear control systems using Bode plots.
6.	Study state models & analyze the systems and to present the concepts of Controllability & Observability

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL MACHINES -II			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the constructional details and principle of operation of induction machines
2.	Understand the starting methods of induction machines
3.	Understand the operation of constructional features and principle of operation of single phase induction motors.
4.	Understand the constructional details and principle of operation of synchronous generators.
5.	Analyze the construction and principle of operation of synchronous motor.
6.	Analyze the performance of the synchronous motor and its operation

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER SYSTEMS-I			
REGULATION:	NRIA18	YEAR-SEM:	II-II

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Identify the different components of thermal power plants and principle of operation.
2.	Identify the different components of nuclear Power plants and their principle of operation.
3.	Identify the different components of hydel power plants and their classification and principle of operation
4.	Identify the components of gas power station and their principle of operation.
5.	Identify different components of substation and their classification.
6.	Calculate the different tariffs applicable to consumers.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: DATA STRUCTURES			
REGULATION:	NRIA18	YEAR-SEM:	II-II

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the deletion and traversal array, strings, string opeartion
2.	Understand the operation of stack, queue and their application
3.	Analyze pointers,arrays, linked lists
4.	Identify the operation of trees, their representation and different types of trees
5.	Explain graph theory, warshall's algorithm
6.	Explain different search concepts, sorting and different types

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: PROFESSIONAL ETHICS AND HUMAN VALUES			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
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 role 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.

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Course Name: Electrical Machines-I Lab			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Evaluate the magnetization characteristics of a self excited DC generator
2.	Determine the characteristics of DC generators at load condition.
3.	summarize the efficiency of DC shunt machine both as generator and motor
4.	experiment with the performance of DC motors at load condition by brake test
5.	develop the Control the speed of DC shunt motor by applying the speed control methods
6.	Analyze the performance of DC series machines by Field's test

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: Control Systems Lab			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Tell the performance and working Magnetic amplifier, D.C. servo motors, A.C. Servo motors and synchronous motors.
2.	Illustrate P,PI,PD and PID controllers
3.	Build lag, lead and lag–lead compensators
4.	Examine the temperature using PID controller
5.	Determine the transfer function of D.C.motor
6.	Evaluate the position of D.C servo motor performance

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Course Name: ELECTRICAL MEASUREMENTS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	List the various measuring instruments available.
2.	Compare various electrical quantities and measure them.
3.	Design various instrument transformers.
4.	Test various instrument transformers.
5.	Design and Measure the passive elements R, L and C by using various bridges.
6.	Design the Digital meters and measure the electrical parameters.

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Course Name: SWITCHING THEORY AND LOGIC DESIGN			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Identify the features of various number systems.
2.	Identify the features of various binary codes.
3.	Apply the concepts of Boolean algebra for the analysis
4.	Design of various combinational & sequential logic circuits.
5.	Design various digital circuits starting from simple ordinary gates to complex programmable logic devices & arrays.
6.	Analyze various synchronous and asynchronous sequential circuits.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER SYSTEMS II			
REGULATION:	NRIA18	YEAR-SEM:	III-I

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Derive transmission line parameters for analyzing the behavior under different operating conditions.
2.	Analyze the performance of short & medium transmission lines.
3.	Analyze the performance of long transmission lines.
4.	Understand the surge propagation, reflection and refraction in transmission lines and design the level of insulation coordination at various high voltages.
5.	Utilize the knowledge on surge behavior of transmission line for protection of power equipment
6.	Formulate physical and geometrical parameters of transmission line useful for its safe and efficient performance.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER ELECTRONICS			
REGULATION:	NRIA18	YEAR-SEM:	III-I

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Demonstrate basic theory of operation of SCR, characteristics of power MOSFET & power IGBT and to design protection & Firing circuits.
2.	Explore and interpret 1-Φ Half Wave, Full wave converters, with the effect of source inductance and input harmonics.
3.	Analyze various 3-Φ uncontrolled & controlled rectifier circuits and Understand their Applications
4.	Analyze & design various BUCK,BOOST & BUCK – BOOST converters in different modes with ripple calculation & operation of different modes with ripple calculation & operation of fly back converter
5.	Analyze steady –state performance of 1-Φ & 3-Φ inverters & applications of PWM techniques ,operation of VSI & CSI
6.	Analyze the operation of 1-Φ & 3-Φ AC – AC Regulators, Static V-I characteristics of TRAIC & operation of Tap changing Transformer with Anti-parallel connection of Thyristors

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL MACHINES-II LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve the performance parameters of a single-phase transformer
2.	Categorize the different performance characteristics of a three-phase induction motor
3.	Measure the performance parameters of three-phase alternator
4.	Analyze V and Inverted V curves of a three-phase synchronous motor
5.	Contrast the performance parameters of single-phase induction motor
6.	Demonstrate three phase to single phase conversion using Scott transformers.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: INDIAN CONSTITUTION			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the spirit and origin of the fundamental law of the land.
2.	Understand how fundamental rights can be protected and understand the fundamental duties .
3.	Understand the structure and formation of the Indian Government at center as well as state.
4.	Understand when and how an emergency can be imposed and its consequences.
5.	Gain consciousness on the fundamental rights and duties.
6.	Be exposed to the reality of hierarchical Indian social structure and the ways the grievances of the deprived sections can be addressed to raise human dignity in a democratic way.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER ELECTRONICS LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Able to solve real world problems using OOP techniques.
2.	Able to understand the use of abstract classes and Packages in java.
3.	Able to develop and understand exception handling and Interfaces in java
4.	Able to understand multithreaded applications with synchronization and design GUI based applications and develop applets for web applications
5.	To introduce the concepts of exception handling and multithreading.
6.	To introduce the design of Graphical User Interface using applets.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL MEASUREMENTS LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Analze the energymeter and wattmeter.
2.	Make use of the three phase reactive power measurement.
3.	Analyze the PMMC ammeter and voltmeter using a potentiometer.
4.	Determine electrical parameters using different DC and AC bridges.
5.	Evaluate the dielectric strength of insulating oil.
6.	Determine characteristics of LVDT and Capacitive pick-up.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER ELECTRONIC CONTROLLERS & DRIVES			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Learn the fundamentals of electric drive and different electric braking methods.
2.	Analyse the operation of three phase converter controlled dc motors and four Quadrant operation of dc motors using dual converters.
3.	Discuss the converter control of dc motors in various quadrants
4.	Understand the concept of speed control of induction motor by using AC voltage Controllers and voltage source inverters.
5.	Learn the principles of static rotor resistance control and various slip power recovery schemes
6.	Understand the speed control mechanism of synchronous motors

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: INSTRUMENTATION			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve different electrical networks by using Thevenin's, Norton's and superposition theorems
2.	Solve different electrical networks by using maximum power transfer, compensation, reciprocity and millman's theorems
3.	Solve different electrical networks by using series and parallel resonance
4.	Determine the self, mutual inductances and coefficient of coupling
5.	Analyze the networks by using Z, Y,ABCD,H parameters
6.	Measure the 3 phase power by two wattmeter method for unbalanced loads

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MICROPROCESSOR AND MICROCONTROLLERS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Design circuits using operational amplifiers for various applications.
2.	Analyze and design amplifiers and active filters using Op-amp.
3.	Diagnose and trouble-shoot linear electronic circuits.
4.	Understand the gain-bandwidth concept.
5.	Understand the frequency response of the amplifier configurations.
6.	Understand thoroughly the operational amplifiers with linear integrated circuits.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER SYSTEM ANALYSIS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Explain the working principle and constructional features of different types of electromagnetic protective relays
2.	Compare different types of static relays with a view to application in the system.
3.	Relate the acquired in depth knowledge of faults that is observed in high power generator and transformers and protective schemes used for all protections
4.	Improve the ability to understand various types of protective schemes used for feeders and bus bar protection
5.	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6gas type
6.	Explain different types of over voltages appearing in the system, including existing protective schemes

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MANAGEMENT SCIENCE			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Design of organizational structure both industries and academia.
2.	Analyse various functions of management that include operations management, material management, marketing management, HR management helpful in success of organisations.
3.	Understand the importance of planning for the long-term through strategic management.
4.	Understand quality control standards & contemporary management practices being followed both in industries and academia
5.	Compare conceptual models of strategic management and to understand its applicability in understanding the constraints and opportunities in the sectors.
6.	Understand the contemporary issues in the field of management science and their applicability in the real world at every level

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: UTILIZATION OF ELECTRICAL ENERGY			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	To acquaint with the different types of heating techniques.
2.	Demonstrate the concepts of electric welding.
3.	To study the basic principles of illumination and its measurement.
4.	To understand different types of lightning system including design.
5.	To understand the basic principle of electric traction including speed-time curves of different traction services.
6.	To understand the method of calculation of various traction system for braking, acceleration and other related parameters, including demand side management of energy.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MPMC LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Write Assembly Language Program Using 8086 Micro Based On Arithmetic Operations
2.	Write Assembly Language Program Using 8086 Micro Based On Logical Operations
3.	Write Assembly Language Program Using 8086 Micro Based On Shift Operations
4.	Interface 8086 With I/O And Other Devices
5.	Do Parallel Communication Using 8051 Micro Controllers
6.	Do Serial Communication Using 8051 Micro Controllers

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL SIMULATION LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Simulate integrator circuit, differentiator circuit,
2.	Simulate transmission line by incorporating line, load and transformer models.
3.	Perform transient analysis of RLC circuit .
4.	Perform transient analysis single machine connected to infinite bus(SMIB).
5.	Simulate Boost converter, Buck converter.
6.	Simulate full convertor and PWM inverter

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: DIGITAL CONTROL SYSTEMS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Explain advantages of discrete time control systems and the "know how" of various associated accessories
2.	Evaluate mathematical analysis of discrete systems (Z-transforms)
3.	Represent the discrete–time systems in state–space model and evaluation of state transition matrix.
4.	Stability criterion for digital systems and methods adopted for testing the same are explained.
5.	Explain conventional method of analyzing digital control systems in the w–plane
6.	Design of state feedback control by "the pole placement method."

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: SWITCH GEAR AND PROTECTION			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Explain the working principle and constructional features of different types of electromagnetic protective relays
2.	Compare different types of static relays with a view to application in the system.
3.	Relate the acquired in depth knowledge of faults that is observed in high power generator and transformers and protective schemes used for all protections
4.	Improve the ability to understand various types of protective schemes used for feeders and bus bar protection
5.	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6gas type
6.	Explain different types of over voltages appearing in the system, including existing protective schemes

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: HVDC TRANSMISSION			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Learn different types of HVDC levels.
2.	Learn Basic Concepts of HVDC Transmission.
3.	Know the operation of converters.
4.	Acquire control 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.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL DISTRIBUTION SYSTEMS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Explain advantages of discrete time control systems and the "know how" of various associated accessories
2.	Evaluate mathematical analysis of discrete systems (Z-transforms)
3.	Represent the discrete–time systems in state–space model and evaluation of state transition matrix.
4.	Stability criterion for digital systems and methods adopted for testing the same are explained.
5.	Explain conventional method of analyzing digital control systems in the w–plane
6.	Design of state feedback control by "the pole placement method."

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: IPR & Patents			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the Intellectual Rights
2.	To know the importance which plays a vital role in advanced Technical disciplines.
3.	To know the importance which plays a vital role in advanced Scientific disciplines.
4.	Imparting IPR protections
5.	Imparting IPR regulations for further advancement
6.	Familiar with latest developments

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: LINEAR INTEGRATED CIRCUIT APPLICATIONS			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Design Differential amplifier circuits and gains knowledge in OP-AMPs
2.	Understand and gains knowledge in various applications of OP-AMPS
3.	Analyze amplifiers and active filters using Op-amp.
4.	Design amplifiers and active filters using Op-amp.
5.	Understand thoroughly the operational amplifiers with linear integrated circuits.
6.	Understand the structure of commercially available Analog & Digital converters

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Course Name: Electrical Machines-II Lab			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve the performance parameters of a single-phase transformer
2.	Categorize the different performance characteristics of a three-phase induction motor
3.	Measure the performance parameters of three-phase alternator
4.	Analyze V and Inverted V curves of a three-phase synchronous motor
5.	Contrast the performance parameters of single-phase induction motor
6.	Demonstrate three phase to single phase conversion using Scott transformers.

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Pothavarappadu (V), Agiripalli (M), Eluru District, A.P., India, Pin: 521 212
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER SYSTEMS LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Experiment With Three Phase Impedances Of Transformer And Alternator
2.	Determine Transmission Line Parameters
3.	Categorize Characteristics Of 3 Phase Alternator
4.	Experiment With Dielectric Stress Of Transformer Oil
5.	Explain About Tong Tester
6.	Illustrate Economic Load Dispatch

HEAD OF THE DEPARTMENT
Dr. N. SAMBASIVA RAO
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: Special Electrical Machines			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	To explain theory of operation and control of switched reluctance motor.
2.	To explain the performance and control of stepper motors, and their applications
3.	To describe the operation and characteristics of permanent magnet dc motor.
4.	To distinguish between brush dc motor and brush less dc motor.
5.	To explain the theory of travelling magnetic field
6.	To explain the applications of linear motors.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: Electrical Workshop LAB			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Experiment with lighting connections
2.	Experiment with different types of lights
3.	Experiment on staircase wiring, hospital wiring
4.	Different types of switch connections available
5.	Function of CRO and CRT
6.	Various Electrical Symbols

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: FACTS: Flexible Alternating Current Transmission Systems.			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand power flow control in transmission lines using FACTS controllers
2.	Explain operation and control of voltage source converter
3.	Analyze compensation methods to improve stability and reduce power oscillations in the transmission lines.
4.	Explain the method of shunt compensation using static VAR compensators.
5.	Understand the methods of compensations using series compensators.
6.	Explain operation of Unified Power Flow Controller (UPFC).

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: PROJECT			
REGULATION:	**NRIA18**	**YEAR-SEM:**	**IV-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Evaluate Real world problem identification
2.	Make use of Communication Skills
3.	Develop Presentation skills
4.	Improve Research Skills
5.	Interpret Learner Autonomy
6.	Develop Report writing skills

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2018-22 BATCH																
S.No	COURSE NAME	COURSE CODE	INDEX	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 I	PSO II
1.	PROFESSIONAL ENGLISH-I	18A1100101	C111	-	-	-	0.81	-	2.5	2.5	2.5	1.64	1.505	-	1.097	0.823333	1.653333
2.	ENGLISH COMMUNICATION SKILLS LAB-I	18A1100191	C112	1.85	1.04	1.55	-	-	-	-	-	-	-	-	-	0.63	0.63
3.	ENGINEERING MATHEMATICS-I	18A1100201	C113	2.06	1.14	0.96	0.70	0.71	1.92	1.94	-	-	-	2.02	1.94	1.79	1.52
4.	APPLIED CHEMISTRY	18A1100205	C114	0.91	0.84	0.83	0.82	0.54	-	-	-	-	-	-	-	0.61	0.61
5.	APPLIED CHEMISTRY LAB	18A1100294	C115	2.06	1.42	0.78	-	-	2.31	2.3117	2.3117	-	-	2.188	2.312	-	1.543333
6.	ENVIRONMENTAL STUDIES	18A1100801	C116	1.86	0.62	-	0.62	-	-	-	1.825	-	-	1.84	-	1.133333	1.143333
7.	FUNDAMENTALS OF ELECTRICAL ENGINEERING	18A1102301	C117	-	-	-	-	-	2.37	-	-	1.58	1.842	-	2.235	-	0.793333
8.	ENGINEERING GRAPHICS	18A1103301	C118	1.41	1.8	1.28	1.8	1.15	-	-	-	-	-	-	-	1.67	1.41
9.	PROFESSIONAL ENGLISH-II	18A1200101	C119	2.34	0.79	2.35	0.79	0.79	2.35	2.3433	2.34	1.876	-	-	2.34	2.186	2.08

10.	ENGLISH COMMUNICATION SKILLS LAB-II	18A1200191	C121	-	-	-	-	-	0.76	0.76	-	0.745	0.75	-	1.13	0.76	0.75
11.	ENGINEERING MATHEMATICS-II	18A1200201	C122	2.33	2.08	2.35	-	-	-	-	-	-	-	-	-	0.8	-
12.	APPLIED PHYSICS	18A1200203	C123	2.18	1.93	1.82	-	-	-	-	-	-	-	-	-	0.72	-
13.	APPLIED PHYSICS LAB	18A1200292	C124	-	-	-	-	-	1	-	-	1	1.67	-	1.17	-	1
14.	BASIC ENGINEERING AND IT WORKSHOP	18A1200391	C125	1.73	1.51	1.77	-	1.18	-	-	-	-	-	-	-	1.73	-
15.	ELECTRICAL CIRCUIT ANALYSIS-I	18A1202401	C126	1.685	1.12	0.75	0.56	0.56	1.7	-	1.69	0.58	-	-	-	1.501667	1.238
16.	PROGRAMMING AND PROBLEM SOLVING WITH C	18A1205301	C127	-	-	-	-	-	1	-	-	0.7967	0.792	-	2	-	1
17.	PROGRAMMING AND PROBLEM SOLVING WITH C LAB	18A1205392	C128	1.97	1.45	1.18	0.78	0.78	1.58	-	-	-	0.78	0.79	1.55	1.44	1.57

18.	COMPLX VARIABLE AND TRANSFORM TECH	18A2100202		3	3	1.5	3	-	-	-	-	0.79	-	-	-	2.5	2
19.	ELECTRICAL CIRCUITS ANALYSIS-II	18A2102401		1.49	1.27	1.44	1.05	1.06	-	-	-	-	-	-	-	1.35	1.32
20.	ELECTRICAL MACHINES-I	18A2102402		1.43	1.45	1.45	1.45	1.49	-	-	-	-	-	-	-	1.46	1.49
21.	ELECTRICAL CIRCUITS LAB	18A2102491		1.18	1.47	1.32	-	-	-	-	-	-	-	-	-	1.05	1.05
22.	THERMAL AND HYDRO PRIME MOVERS	18A2103302		1.85	1.94	1.46	2.15	-	-	-	-	-	-	-	-	1.64	1.43
23.	THERMAL AND HYDRO PRIME MOVERS LAB	18A2103391		1.39	1.39	1.4	1.4	1.38	-	-	-	-	-	-	-	1.39	1.39
24.	BASIC ELECTRONIC DEVICES AND CIRCUITS	18A2104301		-	2.19	-	-	1.97	-	1.92	1.96	-	-	-	1.21	-	1.2
25.	BASIC ELECTRONIC DEVICES AND CIRCUITS LAB	18A2104391		2.23	2.23	2.23	2.23	2.23	2.22	-	-	-	-	-	-	2.23	2.23

26.	MANAGERIAL ECONOMICS AND FINANCIAL	18A2200101		2.23	2.23	2.23	2.25	2.23	2.24	-	-	-	-	-	-	2.23	2.22
27.	PROFESSIONAL ETHICS AND HUMAN VALUE	18A2200801		1.65	1.38	1.38	-	-	-	-	-	-	-	-	-	1.6	1.38
28.	ELECTRO MAGNETIC FIELDS	18A2202401		3	2.67	2.75	2	2	-	-	-	-	-	-	-	2.67	-
29.	CONTROL SYSTEMS	18A2202402		2.4	2.2	2.33	-	2.33	-	-	-	-	-	-	-	2.5	2.5
30.	ELECTRIELCALMACHINES-II	18A2202403		2	2	2	2	2	-	-	-	-	-	-	-	2	2
31.	POWER SYSTEMS-I	18A2202404		2.33	2	2.33	3	-	-	-	-	-	-	-	-	2.6	2.67
32.	ELECTRICAL MACHINES-I LAB	18A2202491		-	-	-	-	-	1.03	1.1	1.03	1.03	-	1.03	1.03	-	1.15
33.	CONTROL SYSTEMS LAB	18A2202492		3	3	-	-	-	-	-	-	3	-	-	-	3	-
34.	DATA STRUCTURES	18A2205601		2.06	2.08	-	2.06	1.24	-	-	-	-	-	-	1.49	1.98	-
35.	INDIAN CONSTITUTION	18A3100801		1.91	1.73	1.34	2.08	1.39	-	-	-	-	-	-	-	1.68	1.33
36.	ELECTRICAL MEASUREMENTS	18A3102401		-	2	2	2	-	2	2	-	-	-	-	-	2	2

37.	POWER SYSTEMS-II	18A3102402		2.83	2.25	2	2.67	2.33	1	-	-	-	2	-	2	-	3
38.	POWER ELECTRONICS	18A3102403		2.67	2.33	2	2.17	-	-	-	-	-	-	-	-	2	2
39.	ELECTRICAL MACHINES-II LAB	18A3102491		1.33	1.36	1.31	1.41	1.35	-	-	-	-	-	-	-	1.34	1.39
40.	POWER ELECTRONICS LAB	18A3102492		1.74	1.49	1.24	1.49	0.99	-	-	-	1.25	-	-	-	1.61	1.49
41.	ELECTRICAL MEASUREMENTS LAB	18A3102493		2.24	2.12	2.25	2.25	2.3	-	-	-	-	-	-	-	2.23	2.23
42.	SWITCHING THEORY AND LOGIC DESIGN	18A3104301		3	3	-	-	-	-	-	-	3	-	-	-	3	3
43.	OOPS THROUGH JAVA	18A3105602		2.5	2.5	3	-	-	-	-	-	-	-	-	-	2	2
44.	MANAGEMENT SCIENCE	18A3200601		1.55	1.51	1.53	1.49	-	-	1.55	-	1.52	-	-	-	1.53	1.52
45.	MICROPROCESSORS AND MICRO CONTROLLERS	18A3202301		1.52	1.17	1.34	-	-	-	-	-	-	-	-	-	1.55	1.44
46.	MPMC LAB	18A3202391		2.28	1.52	0.77	0.77	1.52	-	-	-	-	-	-	-	0.77	-
47.	POWER ELECTRONIC CONTROLLERS AND DR	18A3202401		1.75	2	1.5	1.5	-	-	-	-	-	-	-	-	2	2

48.	INSTRUMENTATION	18A3202402		3	3	-	-	-	-	-	-	3	-	-	-	3	-
49.	POWER SYSTEM ANALYSIS	18A3202403		2.33	2.5	2.5	-	-	-	-	-	2.67	-	-	2.5	2.5	-
50.	UTILIZATION OF ELECTRICAL ENERGY	18A3202404		2.24	1.37	0.75	0.75	1.49	-	-	-	-	-	-	-	0.75	-
51.	ELECTRICAL SIMULATION LAB	18A3202491		1.69	2.56	1.89	2.13	-	-	-	-	-	-	-	-	1.41	1.69
52.	MINI PROJECT	18A3202791		1.47	1.32	1.93	1.37	1.3	-	-	-	-	-	-	-	1.3	1.33
53.	IPR& PATENTS	18A4100802		1.43	1.5	1.53	1.49	1.63	-	-	-	-	-	-	-	1.54	-
54.	SWITCH GEAR AND PROTECTION	18A4102401		1.73	2.05	2.16	-	2.34	-	-	-	-	-	-	-	1.67	-
55.	POWER SYSTEM OPERATION AND CONTROL	18A4102402		1.83	1.83	1.83	1.79	1.84	-	-	-	-	-	-	-	1.82	-
56.	DIGITAL CONTROL SYSTEMS	18A4102403		2.7	2.2	2.12	-	-	-	-	-	-	-	-	-	2.25	1.8
57.	POWER SYSTEMS LAB	18A4102491		3	3	3	-	-	-	-	-	3	-	-	-	3	3
58.	ELECTRICAL ENGINEERING WORKSHOP	18A4102492		1.76	1.81	-	-	-	-	-	-	1.25	-	-	-	1.88	2.21

59.	ELECTRICAL DISTRIBUTION SYSTEMS	18A4102511		1.81	1.8	-	1.84	-	1.82	-	-	-	-	1.82	-	1.81	1.81
60.	HVDC TRANSMISSION	18A4102521		1.84	-	1.76	-	-	-	-	-	-	1.68	1.68	-	2.02	1.75
61.	TERM PAPER	18A4102791		1.08	1.05	1	-	1.05	1.12	1.09	-	-	-	-	-	1.07	1.07
62.	TECHNICAL SEMINAR	18A4102792		2	2	2	2	2	-	-	-	-	-	-	-	2	2
63.	LINEAR INTEGRATED CIRCUITS AND APPL	18A4104609		1.65	1.65	1.51	1.24	-	-	-	-	-	-	-	-	1.65	1.65
64.	FLEXIBLE AC TRANSMISSION SYSTEMS	18A4202511		2.77	2.77	2.77	2.77	2.77	2.77	-	2.77	-	2.77	2.77	2.77	2.77	2.77
65.	SPECIAL ELECTRICAL MACHINES	18A4202522		2.32	1.755	2.11	-	-	-	-	-	-	-	-	-	1.783	1.776
66.	PROJECT	18A4202791		2	2	2	2	2	-	-	-	-	-	-	-	2	2
Total				115.742	108.34	89.034	63.87	49.94	29.19	15.015	13.9267	27.0877	12.28	14.138	25.68	102.472	86.94
Mapped Subjects				55	56	47	34	27	15	8	6	15	7	8	14	52	46
Total Subjects				66	66	66	66	66	66	66	66	66	66	66	66	66	66
% Contribution				83.33	84.84	71.21	51.51	40.91	22.72	12.12	9.09	22.72	10.61	12.12	21.21	78.78	69.69
AVERAGE				**2.11**	**1.95**	**1.89**	**1.89**	**1.84**	**1.97**	**1.89**	**2.24**	**1.84**	**1.82**	**1.87**	**1.81**	**1.97**	**1.91**

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I-I SEMESTER

18A1100101- Professional English-I

Course Outcomes:

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

CO1 Use grammar accurately in various formal and functional contexts.
CO2 Build good vocabulary and develop the ability to use in various contexts.
CO3 Comprehend, analyze and evaluate texts critically.
CO4 Develop effective reading and writing skills to enhance communicative competence.
CO5 Help the students to inculcate and apply human values and professional ethics in their academic, professional and social lives.
CO6 Read texts for pleasure and analyze them critically.

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	-	2
CO2	-	-	-	-	-	-	-	-	-	3	-	2
CO3	-	-	-	-	-	1	1	-	-	-	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	2
CO5	-	-	-	-	-	1	1	3	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	2

18A1100191- English Communication Skills Lab-I

Course Outcomes:

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

CO1 Understand the importance of communication skills and instill the need for life-long learning.

CO2 Express themselves fluently and appropriately in social and professional contexts.

CO3 Make sense of both verbal and non-verbal messages through selected listening activities.

CO4 Aware of the need of pronunciation and intonation in improving their speaking skills.

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	3	-	2
CO2	-	-	-	-	-	1	-	-	1	3	-	2
CO3	-	-	-	-	-	-	-	-	1	3	-	2
CO4	-	-	-	-	-	-	-	-	-	-	1	2

:

18A1100201- ENGINEERING MATHEMATICS-I

Course Outcomes:

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

CO1 Student will be able to

□□**solve** the linear system of homogeneous and non-homogeneous equations by **applying** using technology to facilitate row reduction determine the rank .

CO2 Student will be able to

□□**write** eigenvalues and eigenvectors, diagonal form and different factorizations of a matrix .

□□**identify** special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics.

CO3 Students will be able to

□□**find** an approximate root of algebraic and transcendental equations by **applying** Bisection, Regula-Falsi, Iteration and Newton-raphson methods.

□□**find** the function values without knowing function by **applying** interpolation(equal/unequal) techniques with the help of data..

CO4 Students will be able to

□□**evaluate** the definite integrals without knowing integrand by Trapezoidal, Simpson"s 1/3rd & 3/8th rules.

□□**solve** initial value ordinary differential equations by **applying** Taylor"s series, Pickard"s, Euler"s, Modified Euler"s & Runge-Kutta methods.

CO5 Student will be able to

□□find partial derivatives numerically and symbolically and use them to **analyze** and interpret the way a function varies. .

□□**acquire** the Knowledge maxima and minima of functions of several variable .

□□**Utilize** Jacobian of a coordinate transformation to deal with the problems in change of variables .

CO6 Student will be able to

□□**examine** the properties of Laplace transformation .

□□**apply** the Laplace and inverse Laplace transformations for different types of functions .

□□**evaluate** ordinary differential equations by using Laplace transformation technique .

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	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	-	-	-	-	-	-	-	-

18A1100202- ENGINEERING PHYSICS

Course Outcomes:

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

CO1 Impart Knowledge of Physical Optics phenomena like Interference, Diffraction and Polarization involving required to design instruments with higher resolution.

CO2 Teach Concepts of coherent sources, its realization and utility optical instrumentation.

CO3 Study the Structure-property relationship exhibited by solid crystal materials for their utility.

CO4 Know the generation and propagation of sound in architectural design

CO5 Understand about the production and detection of ultrasonic waves and its application in various fields.

CO6 To impart the knowledge of electric and magnetic materials with characteristic utility in appliances.

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	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	-	-	-	2	-	-	-	-	-	-	-
CO6	3	-	-	-	2	-	-	-	-	-	-	-

18A1100292 – Engineering Physics Lab

COURSE OUTCOMES: Upon successful completion of the course, the student will be able to:

CO1 Understand principle, concept, working of an instrument and can compare results with theoretical calculations.
CO2 Analyze the physical principle involved in the various instruments; also relate the principle to new application.
CO3 Understand design of an instrument with targeted accuracy for physical measurements.
CO4 Develop skills to impart practical knowledge in real time solution.
CO5 Acquires the Practical knowledge in the areas of optics, mechanics, Electricity and magnetism.
CO6 Think innovatively and also improve the creative skills that are essential for engineering.

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	PS 01	PS 02	PS 03
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2.00	2.00	-
CO2	3	3	-	3	-	-	-	-	3	-	-	-	2.00	2.00	-
CO3	3	3	1	3	-	-	-	-	3	-	-	-	2.00	2.00	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-	3.00	2.00	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	3.00	2.00	-
CO6	3	3	2	3	-	-	-	-	-	-	-	-	3.00	2.00	

18A1100801- ENVIRONMENTAL STUDIES

Course Outcomes:

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

CO1 Infer the existence of ecosystems in maintaining ecological balance.

CO2 Recall the importance of biodiversity and its conservation.

CO3 Summarize the role of natural resources for the sustenance of life on earth and recognize the need to conserve them.

CO4 Identify the environmental pollutants and the abatement devices to be used.

CO5 Interpret environmental related acts and social issues.

CO6 Illustrate the importance of sustainability in the progress of a nation.

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	2	2	-	-	2	3	2	-	-	2	2
CO2	3	2	2	-	-	2	3	2	-	-	2	2
CO3	3	2	2	-	-	2	3	2	-	-	2	2
CO4	3	2	2	-	-	2	3	2	-	-	2	2
CO5	3	2	2	-	-	2	3	2	-	-	2	2
CO6	3	2	2	-	-	2	3	2	-	-	2	2

18A1103401 – ENGINEERING DRAWING

COURSE OUTCOMES:

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

CO1 Graphically construct and understand the importance of mathematical curves, Polygons & Scales in Engineering applications

CO2 Draw the basic views related to projections of Points and Lines

CO3 Visualize and draw the orthographic projection of planes & solids at various positions with different reference planes.

CO4 Understand the transformation of orthographic views to Isometric views and vice versa.

CO5 Extract information from drawings and geometric models to solve engineering problems.

CO6 Improve their technical communication skill in the form of communicative drawings.

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	3	-	2	-	-	-	-	-	-	2	-	-
CO2	3	-	2	-	-	-	-	-	-	2	-	-
CO3	3	-	2	-	-	-	-	-	-	2	-	-
CO4	3	-	2	-	-	-	-	-	-	2	-	-
CO5	3	-	2	-	-	-	-	-	-	-	-	-
CO6	3	-	2	-	-	-	-	-	-	2	-	-

SEMESTER- II

18A1200101- Professional English-II

Course Outcomes:

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

CO1 Recognize the importance of the role of communication in the competitive world.

CO2 Acquire the competence to write effectively in various formal and academic contexts.

CO3 Acquire the jargon used in business communication and technical communication.

CO4 Develop the ability to evaluate texts by inferring the implied sense of such texts and apply such knowledge globally.

CO5 Gain knowledge about the significance of the universal human values through expression of human feelings of compassion and right understanding.

CO6 Understand the importance of making meaningful connections between the grammar being introduced and how it works in the writing being taught.

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	-	2
CO2	-	-	-	-	-	-	-	-	-	2	-	2
CO3	-	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	2
CO5	-	-	-	-	-	-	-	2	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	2

18A1200191- English Communication Skills Lab-II

Course Outcomes:

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

CO1 Attain better understanding of the nuances of English language to put into use in various situation and events.

CO2 Acquire speaking skills with clarity and confidence which in turn enhances their employability skills.

CO3 Communicate and present their ideas and sources accurately and effectively.

CO4 Enhance their employability skills and critical thinking skills with participation in mock interviews and group discussions

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	3	-	2
CO2	-	-	-	-	-	-	-	-	-	3	-	2
CO3	-	-	-	-	-	-	-	-	1	3	-	2
CO4	-	-	-	-	-	-	-	-	1	-	-	2

18A1200201- ENGINEERING MATHEMATICS-II

Course Outcomes:

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

CO1 Student will be able to

- **find** the General/Particular solutions of first order and first degree ordinary differential equations by **apply** different methods.
- **find** orthogonal trajectories of the given family of curves.

CO2 Student will be able to

- **identify** the essential characteristics of linear differential equations with constant coefficients .
- **solve** the linear differential equations with constant coefficients by appropriate method .

CO3 Student will be able to

- **evaluate** double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates.
- **evaluate** areas bounded by region by apply double integration techniques .
- **evaluate** volume of solids by apply triple integration techniques .

CO4 Student will be able to

- **find** length of the arc, volume of solid of revolution and surface area of solid of revolution.

CO5 Student will be able to

- **apply** del to Scalar and vector point functions .
- **illustrate** the physical interpretation of Gradient, Divergence and Curl .

CO6 Student will be able

- **find** the work done in moving a particle along the path over a force field .
- **evaluate** the rates of fluid flow along and across curves.
- **apply** Green"s, Stokes and Divergence theorem in evaluation of double and triple integrals.

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	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	-	-	-	-	-	-	-	-

18A1200204 - ENGINEERING CHEMISTRY

Course Outcomes:

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

CO1 understand and apply polymers and plastic technologies along with their utilization to solve the problems of the society.

CO2 Know cells and sensors utilized in many instruments in solving and applying to batteries and fuel cells.

CO3 Understand electrochemical cells which is essential in understanding corrosion along with the methods of controlling

CO4 Know about water and its hardness, boiler troubles and problems associated with the environment and its sustainability.

CO5 Understand fuels and energy, their advantages & disadvantages should be known to solve and understand engineering problems.

CO6 Know the design and analysis of materials should be understood in solving the complex problems of the society.

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	1	1	1	-	-	1	-	-	-	-	-
CO2	3	3	1	-	-	-	3	-	-	-	-	-
CO3	3	2	2	-	-	-	1	-	-	-	-	-
CO4	3	1	-	1	-	-	1	-	-	-	-	-
CO5	3	2	2	1	-	-	2	-	-	-	-	-
CO6	3	1	1	1	-	-	1	-	-	-	-	-

18A1200294 – ENGINEERINGCHEMISTRY LAB

Course Outcomes:

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

CO1 Know the basic laboratory fundamentals and their knowledge and analysis of substances can solve some of the problems of the society.

CO2 Understand neutralization reaction between acids & bases and alkalinity of water is performed and gains the knowledge in neutralization process.

CO3 Know redox reactions are the most observed reactions in chemistry & nature and exposed to few of them.

CO4 Understand complexometric reactions carried out by them as experiments and solve some of the engineering problems.

CO5 Understand different ions in the environment and their identification & estimation which enable them to assess the environmental problems.

CO6 Know conductivity and potentials in analysis of materials and should be able to develop and analyze the materials.

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	2	1	1	-	-	2	-	-	-	-	-
CO2	3	2	1	1	-	-	1	-	-	-	-	-
CO3	3	-	-	1	-	-	1	-	-	-	-	-
CO4	3	2	1	1	-	-	2	-	-	-	-	-
CO5	3	2	1	1	-	-	2	-	-	-	-	-
CO6	3	2	1	1	-	-	1	-	-	-	-	-

18A1201401 - ENGINEERING MECHANICS

Course Outcomes:

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

CO1 Construct free body diagrams and develop appropriate equilibrium equations.

CO2 Analyze system with concepts of friction & Determine the position of centroid.

CO3 Determine moment of inertia for Composite Sections.

CO4 Analyzing the rigid bodies under translation and rotation with and without considering forces.

CO5 Apply Newton"s laws and conservation laws to elastic collisions and motion of rigid bodies.

CO6 Apply D-Alembert,,s principle, work-energy method and Impulse Momentum principle to solve dynamics problems.

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	-	2	-	-	2	-	-	-	-	-	-
CO2	3	-	2	-	-	2	-	-	-	-	-	-
CO3	3	-	2	-	-	2	-	-	-	-	-	-
CO4	3	-	2	-	-	2	-	-	-	-	-	-
CO5	3	-	2	-	-	2	-	-	-	-	-	-
CO6	3	-	2	-	-	2	-	-	-	-	-	-

18A1205301- PROGRAMMING AND PROBLEM SOLVING WITH C

Course Outcomes:

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

CO1 Acquiring knowledge of basic terminologies, basic idea of writing and executing programs.

CO2 Understanding working of various control statements.

CO3 Apply concepts of Arrays, Modular Programming in solving problems.

CO4 Apply and analyze the concepts of pointers and dynamic memory allocation.

CO5 Understanding and Analyzing the concepts of strings and working of string manipulation functions.

CO6 Understand and applying different user defined data types, their usage and the concepts of files and file handling functions.

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
CO2	3	3	3	-	-	-	-	-	-	-	-	3
CO3	3	3	3	2	-	-	-	-	2	-	-	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3
CO5	3	3	3	-	-	-	-	-	2	-	-	3
CO6	3	3	-	-	-	-	-	-	-	-	-	3

18A1205392- PROGRAMMING AND PROBLEM SOLVING WITH C LAB

Course Outcomes:

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

CO1 Understand C programming development environment, compiling, debugging, linking and executing a program using the development environment

CO2 Program solutions for problems using conditional controlled statements

CO3 Differentiate the in-built and user defined functions and able to apply modular programming concepts in programming.

CO4 Analyze and program the concepts and applications of arrays, pointers and dynamic memory allocation.

CO5 Apply in-built string manipulation functions and design user-defined string manipulation functions.

CO6 Analyze and program the concepts of structures and apply the in-built concepts of files and file handling functions.

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	-	-	-	-	-	-	-	-	3
CO2	3	3	3	-	-	-	-	-	-	-	-	3
CO3	3	3	3	2	2	-	-	-	2	-	-	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3
CO5	3	3	3	2	-	-	-	-	2	-	-	3
CO6	3	3	3	-	-	-	-	-	-	-	-	3

2-1 SEMESTER

18A2100201-ENGG.MATHEMAICS-III

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)

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	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	-	-	-	-	-	-	-	-

18A2103301- Material Science and Engineering

Course Outcomes:

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

CO1 Estimate the properties of the metals and alloys based on structures.

CO2 Classify, construct and analyze equilibrium diagrams.

CO3 Analyze and distinguish various ferrous, non-ferrous metals and alloys.

CO4 Identify the influence of mechanical working and heat treatment principles on materials.

CO5 Classify, analyze and suggest the suitable manufacturing method for composite materials and Powder metallurgy.

CO6 Able to suggest the suitable material for any applications demand by the society

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	3	-	-	-	-	-	-	-	-	2	-	-
CO2	-	3	3	-	-	-	3	-	-	-	-	-
CO3	-	3	3	2	-	-	-	-	-	-	-	-
CO4	-	3	3	3	-	2	-	-	-	-	-	-
CO5	-	-	-	3	-	2	2	-	-	-	-	-
CO6	-	3	3	3	-	-	-	-	-	-	-	-

18A2103401-BASIC THERMODYNAMICS

Course Outcomes:

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

CO1 The student should be able to understand the basic concepts of thermodynamics.

CO2 The student should be able to understand the first law of thermodynamics and its applications.

CO3 The student should be able to understand the second law of thermodynamics, use of Maxwells relations and thermodynamic functions and concept of entropy.

CO4 The student should be able to understand the formation of steam and calculate the quality of steam. CO5 The student should be able to understand the working of vapour power cycels and calculate their performance.

CO6 The student should be able to understand the Concept of standard cycles and should be able to calculate the efficiency and performance parameters

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	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

18A2103402- Mechanics of Materials

Course Outcomes:

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

CO1 Determine and illustrate principal stresses, principal strains, maximum shearing stress, and simple stresses acting on structural members.

CO2 Analyze bending stresses and shear stresses in structural members subjected to flexural loadings and draw the distribution diagrams.

CO3 Estimate the stresses and strains in circular torsion members

CO4 Determine the deflections and slopes produced in beams under loading conditions.

CO5 Analyze slender, long columns subjected to axial loads

CO6 Assess hoop and longitudinal stresses in thin and thick cylinders.

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	3	3	2	1	-	-	1	-	-	-	-	1
CO2	3	3	2	1	-	-	1	-	-	-	-	1
CO3	3	3	2	1	-	-	1	-	-	-	-	1
CO4	3	3	2	1	-	-	1	-	-	-	-	1
CO5	3	3	2	1	-	-	1	-	-	-	-	1
CO6	3	3	2	1	-	-	1	-	-	-	-	1

18A2103403- MANUFACTURING PROCESS

Course Outcomes:

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

CO1 Understand the Technology of the casting processes.

CO2 Differentiate various casting methods and their applications.

CO3 Differentiate various joining processes with applications

CO4 Understand various bulk metal forming and sheet metal processes

CO5 Understand Various Plastic operations.

CO6 Evaluate the manufacturing processes being utilized in the present industrial scenario.

Contribution of Course Outcomes towards achievement of Program Outcomes

(1 – Low, 2- Medium, 3 – High)

	PO110	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	2	1	-	-	-	-	-	1	-
CO2	2	1	-	1	1	-	-	-	-	-	1	-
CO3	3	2	2	-		-		-	-	-	-	2
CO4	3	1	2	-		-	1	-	-	-	-	2
CO5	2	2	1	-	1	-	-	-	-	-	-	2
CO6	3	-	2	-	1	-	-	-	-	-	-	2

18A2102301- Essential Electrical and electronics Engineering

Course Outcomes:

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

CO1 Analyze the various electrical networks.

CO2 Able to understand the principle of operation of DC machines

CO3 Understand the principle of operation of AC machines

CO4 Understand the principle of operation of transformer.

CO5 Analyze the operation of half wave, full wave rectifiers and Transistor configurations

CO6 Able to analyze the operation of OP-AMPS

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	3	3	1	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO6	3	2	2	1	-	-	-	-	-	-	-	-

18A2103491-MATERIALS TESTING AND METALLURGY LAB

Course Outcomes:

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

CO1 Prepare the specimens as per standards.

CO2 Observe microstructure of different materials.

CO3 Analyse the properties of materials based on microstructure.

CO4 Perform hardness test and heat treatment of steels.

CO5 Perform the UTM test of a material.

CO6 Perform various test to know the mechanical properties of a material.

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	3	-	2	-	-	-	-	-	2	-	-
CO2	1	2	-	2	-	-	-	-	-	-	-	-
CO3	-	3	-	2	-	-	-	-	-	-	-	-
CO4	-	3	-	2	-	-	-	-	-	-	-	-
CO5	-	3	-	-	-	1	-	-	-	-	-	-
CO6	-	2	-	3	-	-	1	-	-	-	-	-

18A2103492-MANUFACTURING PROCESS LAB

Course Outcomes:

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

CO1 Know how to design and making the pattern and mold preparation in sand castings.

CO2 Know to design the different types of weld joints and operating the weld machines

CO3 Know the difference between gas cutting gas welding operations and equipment.

CO4 Find out the performance characteristics of the different metal forming processes.

CO5 Know the different types of plastic processing types.

CO6 Able to determine the ripple factor of half wave & full wave rectifiers.

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	2	2	1	3	-	-	-	-	-	-	-	-
CO2	2	2	1	3	-	-	-	-	-	-	-	-
CO3	2	2	1	3	-	-	-	-	-	-	-	-
CO4	2	2	1	3	-	-	-	-	-	-	-	-
CO5	2	2	1	3	-	-	-	-	-	-	-	-
CO6	2	2	1	3	-	-	-	-	-	-	-	-

18A2102391- ESSENTIAL ELECTRICAL&ELECTRONICS ENGINEERING LAB

Course Outcomes:

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

CO1 Able to find out the efficiency of dc shunt machine without actual loading of the machine.

CO2 Able to estimate the efficiency and regulation for different load conditions and power factors of single phase transformer with OC and SC test.

CO3 Able to analyze the performance characteristics and to determine efficiency of DC shunt motor &3-phase induction motor.

CO4 Able to pre-determine the regulation of an alternator by synchronous impedance method. Able to control the speed of dc shunt motor using speed control methods.

CO5 Able to find out the characteristics of PN junction diode & transistor

CO6 Able to determine the ripple factor of half wave & full wave rectifiers

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	2	2	1	3	-	-	-	-	-	-	-	-
CO2	2	2	1	3	-	-	-	-	-	-	-	-
CO3	2	2	1	3	-	-	-	-	-	-	-	-
CO4	2	2	1	3	-	-	-	-	-	-	-	-
CO5	2	2	1	3	-	-	-	-	-	-	-	-
CO6	2	2	1	3	-	-	-	-	-	-	-	-

2-2 SEMSTER

18A2200201 EM-IV - PROBABILITY AND STATISTICS

Course Outcomes:

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

CO1 Find the measures of central tendency and relation between them. (L1)

CO2 Evaluate the correlation coefficient, rank coefficient and regression. (L5)

CO3 Understand probabilities of events and expectations of random variables for elementary problems. (L2)

CO4 Solve problems related to binomial and passion distribution. (L3)

CO5 Compare situations in which it is appropriate to consider the relevance of the Normal distribution. (L4)

CO6 Construct hypothesis and carryout appropriate tests to checks its acceptability. (L3)

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	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	-	-	-	-	-	-	-	-

18A2203401- DESIGN OF MACHINE MEMBERS – I

Course Outcomes:

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

CO1 Estimate safety factors of machine members subjected to static and dynamic loads.

CO2 Apply multi dimensional static failure criteria in the analysis and design of mechanical components.

CO3 Identify the loads, the machine members subjected and calculate static and dynamic stresses to ensure safe design.

CO4 Design fasteners subjected to variety of loads.

CO5 Select of standard machine elements such as keys, shafts, couplings.

CO6 Analyze and design mechanical springs

Contribution of Course Outcomes towards achievement of Program Outcomes

(1 – Low, 2- Medium, 3 – High)

	PO1	PO2	PO3	PO4	P5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	2			2	2		3
CO2	3	3	3	2	2	2			2	2		3
CO3	3	3	3	2	2	2			2	2		3
CO4	3	3	3	2	2	2			2	2		3
CO5	3	3	3	2	2	2			2	2		3
CO6	3	3	3	2	2	2			2	2		3

18A2203402-FLUID MECHANICS& HYDRAULIC MACHINES

Course Outcomes:

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

CO1 Define fluid properties and explain procedure of dimensional analysis

CO2 Explain procedure of measurement of fluid pressure and manometry

CO3 Apply laws of conservation of mass, momentum and energy to fluid flow

CO4 Analyze flow through different pipes

CO5 Analyze the impact of jet on the vanes

CO6 Evaluate performance of hydraulic machines

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	3	2	2	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	-

18A2203403- KINEMATICS OF MACHINERY

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. Contribution

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	-	-	-	-	-	-	-

18A2203404- IC ENGINES AND GAS TURBINES

Course Outcomes:

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

CO1 Understand the working of various internal combustion engine components and their working Principles. CO2 Analyze the combustion phenomenon of SI engines and CI engines.

CO3 Comprehend the air standard, fuel air and actual cycles.

CO4 Compute the two stroke and four stroke engine performance characteristics.

CO5 Describe the components, functioning and performance of gas turbines.

CO6 Apply the principles of gas turbines and jet propulsion systems.

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	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	-	-	-	-	-

18A2203601- BASICS OF MECHANICAL ENGINEERING

Course Outcomes:

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

CO1 Familiarize with the Engineering materials, their types, properties and applications.

CO2 Analyze coplanar concurrent systems and friction

CO3 Design Power transmission systems using belts, ropes and gear trains.

CO4 Solve Simple problems in stresses and strains

CO5 Familiarize with Basic manufacturing processes used in manufacturing of products.

CO6 Appreciate the Industrial safety, its requirement, goals, training, procedures followed in industries.

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	3	1	1	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	-	-
CO6	3	2	1	-	-	-	-	-	-	-	-	-

18A2203601-INDUSTRIAL MATERIALS (OPEN ELECTIVE)

Course Outcomes:

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

CO1 Familiarize with the concepts of industrial materials, their classification, properties and applications.

CO2 Appreciate the types, structure and characteristics of composite materials.

CO3 Elaborate the applications of composite materials.

CO4 Understand the shape memory concept and its use in industry.

CO5 Elaborate nano materials and importance of nano materials over bulk materials

CO6 Examine the case studies and explore the significance of selection of materials in applications like aerospace, boiler tubes, turbine blades, automobiles, eco sustainable materials.

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	3	2	1	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-
CO5	3	2	1	-	-	-	-	1	1	-	-	-
CO6	3	2	1	-	-	-	-	1	1	-	-	-

18A2203301- COMPUTER AIDED MACHINE DRAWING PRACTICE

Course Outcomes:

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

CO1 Demonstrate the conventional representations of materials and machine components.

CO2 Model riveted, welded and key joints using CAD system.

CO3 Create solid models and sectional views of machine components.

CO4 Generate solid models of machine parts and assemble them.

CO5 Translate 3D assemblies into 2D drawings.

CO6 Create manufacturing drawing with dimensional and geometric tolerances.

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	3	-	-	-	-	-	-	-	-	-	-	2
CO2	3	-	2	-	1	-	-	-	-	-	-	2
CO3	3	-	2	-	1	-	-	-	-	-	-	2
CO4	3	-	2	-	2	-	-	-	-	-	-	2
CO5	3	-	2	-	2	-	-	-	-	-	-	2
CO6	3	-	2	-	2	-	-	-	-	-	-	2

18A2203491- FLUID MECHANICS & HYDRAULIC MACHINES LAB

course outcomes:

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

CO1 Find coefficient of discharge for venture meter

CO2 Demonstrate the concepts of discharge through orifice meter and mouth piece.

CO3 Explain the concepts of loses in the pipe flow

CO4 Explain the concepts of jet on vanes

CO5 Demonstrate the concept of Bernoulli's theorem.

CO6 Analyze the performance of deferent turbines of and pumps.

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	3	2	-	-	-	-	-	-	-	1	-	-
CO2	3	2	-	-	-	-	-	-	-	1	-	-
CO3	3	2	-	-	-	-	-	-	-	1	-	-
CO4	3	2	-	-	-	-	-	-	-	2	-	-
CO5	3	2	-	-	-	-	-	-	-	2	-	-
CO6	3	2	-	-	-	-	-	-	-	2	-	-

18A2203492- THERMAL ENGINEERING LAB

course outcomes:

After the completion of the course, students should be able to

CO1 Find the efficiency and performance of an I.C. engine system for a given set of conditions.

CO2 Calculate the various energy losses and heat balance of Internal Combustion Engines.

CO3 Evaluate the performance parameters of refrigeration system and Solar flat plate.

CO4 Analyze the Volumetric efficiency of air compressor.

CO5 Develop skills in data acquisition systems.

CO6 Study the various parameters of boilers

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	3	2	1	1	-	-	-	-	-	2	-	1
CO2	3	2	1	1	-	-	-	-	-	2	-	1
CO3	3	2	1	1	-	-	-	-	-	2	-	1
CO4	3	2	1	1	-	-	-	-	-	2	-	1
CO5	3	2	1	1	-	-	-	-	-	2	-	1
CO6	3	1	-	-	-	-	-	-	-	2	-	1

18a2200801- PROFESSIONAL ETHICS AND HUMAN VALUES

Course Outcomes:

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

CO1 Grooms themselves as ethical, responsible and societal beings.

CO2 Discuss ethics in society and apply the ethical issues related to engineering.

CO3 Exhibit the understanding of ethical theories in professional environment.

CO4 Recognize their roe as social experimenters (engineers) and comprehend codes of ethics.

CO5 Identify the risks likely to come across in the professional world, analyzing them and find solutions.

CO6 Realize the responsibilities and rights of engineers in the society.

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	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

18A3103601

1. Introduction to Material Handling Equipment

Open Elective – II

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.

CO4

Understand the working principles of Components of material handling systems like Flexible hoisting, hooks, elevators.

CO5

Understand the working principles of Components of material handling systems like conveyors.

CO6

Identify the surface transport to connect loading stations to the different discharge or unloading stations.

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	1		1		1						
CO2	2	1		1		1						
CO3	2	1		1		1						
CO4	2	1		1		1						
CO5	2	1		1		1						
CO6	2	1		1		1						

18A3103602

2. Introduction to Robotics

Course Outcomes:

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

CO1 Identify various robot configurations.

CO2 Understand the basic components of robots.

CO3 Evaluate D-H notations for simple robot manipulator.

CO4 Perform trajectory planning for a manipulator by avoiding obstacles.

CO5 Select appropriate actuators and sensors for a robot.

CO6 Illustrate the industrial applications of robo

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					1					2	
CO2	2		3								1	
CO3		3	2		1							
CO4		2	3									1
CO5	2	-	-	-	3						1	
CO6	2				3						1	

18A3103401
Design of Machine Elements–II

Course Outcomes:

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

CO1 Estimate the bearing life and selection of suitable bearing.

CO2 Analyze and design of chain drive.

CO3 Analyze the forces, calculate the static and dynamic loads on gears.

CO4 Analyze and design of different types of clutches and brakes.

CO5 Analyze and design of flywheel.

CO6 Analyze and design of IC Engine components.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	P0 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
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

18A3103402

Dynamics of Machinery

Course Outcomes:

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

CO1 Analyze dynamic force analysis of slider crank mechanism.

CO2 Analyze and design a flywheel.

CO3 Compute balancing forces in systems with reciprocating and rotary masses.

CO4 Analyze the forces in governors.

CO5 Analyze stabilization of automobiles, airplanes and ships.

CO6 Estimate the effects of natural and forced undesirable vibrations.

Contribution of Course Outcomes towards achievement of Program Outcomes

(1 – Low, 2- Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	1			1						1
CO2	3	2	1									1
CO3	3	2	1									1
CO4	3	2	1									1
CO5	3	2	1									1
CO6	3	2	1									1

18A3103403

Manufacturing Technology

Course Outcomes:

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

CO1 Upon completion of this course, the students will be able to understand and compare the
functions and applications of different metal cutting tools.

CO2 Upon completion of this course, the students can able to apply the different metal removing
,finishing and super finishing and for component production

CO3 Learn the basic concepts of NTM.

CO4 Learn surface finishing techniques

CO5 Apply cutting mechanics to metal machining based on cutting force and power consumption

CO6 Get a basic knowledge on the importance of digital manufacturing.

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	2										
CO2	3		1		2							
CO3	3		2									
CO4	3		2									
CO5	3		2									
C06	3		2		3							

Applied Thermodynamics

Course Outcomes:

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

CO1 Describe the components and functioning of a Rankine cycle

CO2 Analyze the need of various boiler draught systems for a vapor power cycle.

CO3 Apply thermodynamic analysis to study the behavior of steam nozzles.

CO4 Evaluate the performance of impulse, reaction turbines.

CO5 To Understand different types of condensers and its performance analysis.

CO6 Evaluate the performance of reciprocating, rotary and dynamic compressors.

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	2	1									
CO2	3	2	1									
CO3	3	2	2									
CO4	3	3	2									
CO5	3	2	1									
CO6	3	3	2									

Professional Elective - I

1.Rapid Prototyping

Course Outcomes:

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

CO1 Understand the fundamentals of Additive Manufacturing Technologies for engineering and
industrial applications.

CO2 Understand the methodology to manufacture the products using SLA and SGC technologies
and study their applications, advantages and case studies.

CO3 Understand the methodology to manufacture the products using LOM and FDM technologies
and study their applications , advantages and case studies

CO4 Understand the methodology to manufacture the products using SLS and 3D Printing technologies and study their applications, advantages and case studies.

CO5 Evaluate performance of the different types of rapid tools using in RP technologies.

CO6 Evaluate the different types of STL formats, and other Translators.

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	P0 12
CO1	3	2	2									
CO2	3	2	3									
CO3		3	2									
CO4	3	3	2									
CO5	3	3	2				2					
CO6	3	3	2		2							

18A3103512

2. Automation in Manufacturing

Course Outcomes:

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

CO1 Understand automation principles, strategies and types of automation.

CO2 Understand methods and equipment's used for inspection in an automated industry.

CO3 Understand transfer lines, automated flow lines and analyze transfer lines with and without buffer storage.

CO4 Solve the assembly line balancing problems in the various flow line systems.

CO5 Understand the different automated material handling, storage and retrieval systems and automated inspection systems.

CO6 Explain adaptive control principles and implement the same online inspection and control.

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	2	2									
CO2	3	2	3									
CO3		3	2									
CO4	3	3	2									
CO5	3	3	2									
CO6	3	3	2									

18A3103513

3. Hydraulic and Pneumatic Systems

Course Outcomes:

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

CO1 Explain the concepts of fluid power, its types, advantages, applications of fluid power systems and
compare mechanical, electrical, hydraulic and pneumatic systems.

CO2 Explain the basic working principles of the hydraulic pumps and actuators, types of pumpsactuators,
explain the design considerations of pumps, actuators and select the valves for hydraulic circuits.

CO3 develop the hydraulic circuits for practical applications, create circuits for various machines,
select the size of the accumulators and explain the working principles of safety circuits

CO4 explain the fundamental concepts of pneumatic systems, list the properties of air for pneumaticsystem, demonstrate on F-R-L unit

CO5 identify various control elements in pneumatic system, develop electro pneumatic and electrohydraulic circuits for robotic applications, design a pneumatic circuit using classic, cascade andstep counter methods

CO6 select pneumatic components for installation and maintenance of power packs, explain thearchitectures of PLC and Microprocessors, develop logical circuits in PLC for automation anddetermine the faults in fluid power systems

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	1	2	1	2							
CO2	3	2	1	1	2							
CO3	1	3	2	2	1							
CO4	3	3	2	2	1							
CO5	3	3	2	1	2							
CO6	3	3	3	2	1							

4. Electric & Hybrid Vehicles
18A3103514

Course Outcomes:

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

CO1 Acquire basic knowledge of electric and hybrid vehicles.
CO2 Describe the configurations and working principles of electric and hybrid vehicles.
CO3 Identify the various energy resources used for hybrid vehicles.
CO4 Choose the suitable drive systems for electric vehicles.
CO5 Describe the fundamentals of power electronics.
CO6 Apply the concept of power electronics for hybrid vehicles.

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	2										
CO3	1	2										1
CO4	1	2										1
CO5	1	2										
CO6	1	2										1

18A3103491
Machine Tools Lab

Course Outcomes:

Upon Successful Completion of the Course, The Student will be able to:

CO1 Apply The Procedures To Measure Length, Width, Depth, Bore Diameters, Internal And External Tapers, Tool Angles, And Surface Roughness By Using Different Instruments

CO2 Measure Effective Diameter Of Thread Profile Using Different Methods

CO3 Conduct Different Machine Alignment Tests

CO4 Demonstrate Knowledge Of Different Machine Tools Used In Machine Shop

CO5 Perform Step, Taper Turning, Knurling And Threading.

CO6 Produce Stepped Surface Using Shaper And Keyway Using Milling Machine.

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	2	2		2				1	1		
CO2	3		2		2				1	1		
CO3	3		2		2				1	1		
CO4	3		2		2				1	2		
CO5	3		2		2				1	2		
CO6	3		2		2				1	2		

List of Experiments:

1. Introduction of General Purpose Machines
2. Step Turning and
Taper Turning on
Lathe 3.Thread
Cutting and
Knurling on Lathe
Machine
4. Drilling and Tapping
5. Shaping and Planning
6. Slotting
7. Milling
8. Cylindrical Surface Grinding
9. Grinding of Tool Angle
10. Surface Grinding
11. Wood Turning Lathe
12. CNC Xl Turn
13. CNC Xl Mill

18A3103492
Theory of Machines Lab

Course Outcomes:

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

CO1 To analyze the forces and motion of complex systems of linkages, gears and cams.
CO2 To apply the principles of gyroscope and governors.
CO3 To apply the principles of balancing of masses to various links, mechanisms and engines.
CO4 To demonstrate the dynamics of flywheel and their motion.
CO5 To analyze the motion and the dynamical forces acting on mechanical systems composed of
linkages, gears and cams.
CO6 To perform balancing, vibration and critical speeds with respect to Machine dynamics.

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	2		2								
CO2	3	2		2								
CO3	3	2		2								
CO4	3	2		2								
CO5	3	2		2								
CO6	3	2		2								

List of Experiments:

1. To determine whirling speed of shaft theoretically and experimentally
2. To determine the position of sleeve against controlling force and speed of a Hartnell governor
3. To analyze the motion of a motorized gyroscope when the couple is applied along its spin axis
4. To determine the frequency of undamped free vibration of an equivalent spring mass system
5. To determine the frequency of damped force vibration of a spring mass system
6. To analyze the static and dynamic balancing using rigid blocks
7. To find the moment of inertia of a flywheel
8. To plot follower displacement vs cam rotation for various Cam Follower systems
9. To find coefficient of friction between belt and pulley
10. Simulation and study of four bar mechanisms.
11. Simulation and study of slider crank mechanisms.
12. To study various types of gears- Spur, Helical, Worm and Bevel Gears.

(Any TEN of the above experiments are to be covered)

Course code-
HEAT TRANFER

Course Objectives:

1. Student will be aware of various modes of heat transfer.
2. Student will be exposed to different types of fins.
3. Student will be aware of the concepts related to boundary layer theory and dimensional analysis.
4. Student will know about free and force convection.
5. Student will be in a position to classify heat exchangers.
6. Student will be exposed to the law of radiation.

Course Outcomes:

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

CO1	Explain the basic heat transfer principles.
CO2	Analyze study and unsteady state heat transfer concepts.
CO3	Evaluate the rate of heat transfer from a finned surface.
CO4	Explain convective heat transfer in natural and forced convection for both internal and external flow.
CO5	Apply the concepts of heat transfer in Boiling and Condensation.
CO6	Evaluate the radiation heat exchange between the surfaces and know the significance of radiation shields.

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	2			2						2	
CO2	3	3	2	3	1							
CO3	3	2	3		2							
CO4	2	3		2							1	
CO5	3	3	3		2							
CO6	3	2	3		2						1	

Course code-

OPERATIONS RESEARCH

Course Objectives:

1: To impart the basic concepts of modeling models, and statements of the operations research. formulate and solve LPP

2.To solve Transportation and Assignment, sequencing problems to minimize the cost

3. Apply queuing theory to solve the problems of Traffic congestion and counters in banks in etc.. and Game theory to solve different games.

4. To acquire the knowledge on Inventory methods and solution of LPP through Dynamic programming

Course Outcomes:

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

CO1	Formulate and solve the problems using LPP using different methods
CO2	Find the appropriate times to replace items individually and as a group
CO3	Formulate and solve Transportation, Assignment , sequencing problems
CO4	Formulate and solve the problems having saddle and without saddle points
CO5	Solve the queuing problems using different methods
CO6	Solve different problems related to inventory maintenance, apply Dynamic programming Methods

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	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	--	--	--	--	--	--	--	--

Course code-

INSTRUMENTATION AND CONTROL SYSTEMS

Course Objectives:

1. Introduce concepts of theory of elasticity.
2. To enable the students understand the mathematical and physical principles underlying the Finite Element Method (FEM) as applied to solid mechanics and thermal analysis.
3. To understand the basics of finite element formulation.
4. To introduce domain discretization,polynomial interpolation, application of boundary conditions, assembly of global arrays, and solution of the resulting algebraic systems.

Course Outcomes:

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

CO1	Apply the knowledge of Mathematics and Engineering to solve problems in structural engineering by approximate and numerical methods.
CO2	Identify the application and characteristics of FEA elements such as bars, trusses, beams, plane and isoparametric elements.
CO3	To use the techniques, skills, and modern engineering tools necessary for engineering practice.
CO4	Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
CO5	Design a new component or improve the existing components using FEA
CO6	Solve real life problems using finite element analysis.

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	1	2	-	-	-	-	-	-	-	-
CO2	-	3	1	2	-	-	-	-	-	-	-	-
CO3	-	2	-	-	3	-	-	-	-	-	-	-
CO4	-	2	3	-	-	-	-	-	-	-	-	-
CO5	-	2	-	-	-	-	-	-	-	-	-	-
CO6	-	2	-	3	-	-	-	-	-	-	-	-

Course code-
MECHATRONICS

Course Objectives:

1. Student will be able to Introduced to integrative nature of Mechatronics.
2. Student will be exposed to the various types of sensors and transducers.
3. Student will understand the fundamentals of solid state electronic devices.
4. Student will design various Hydraulic and Pneumatic circuits.
5. Student will apply basics of digital electronics for various applications of logic gates.
6. Student will relate different logic gates and their role in Programmable logic controllers.

Course Outcomes:

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

CO1	Describe mechatronics system and their elements and levels
CO2	Differentiate various sensors and transducers
CO3	Understand solid state electronic devices, analog signal conditioning
CO4	Demonstrate hydraulic and pneumatic actuating systems
CO5	Understand Digital electronics and Logic gates
CO6	Explain micro controllers and applications of PLC

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											
CO2	3											
CO3	3											
CO4	2		2		2							
CO5	3											
CO6	2				2							

Course code-
HYDRAULIC AND PNEUMATIC SYSTEMS
(Open Elective – III)

Course Objectives:

1. Familiarize on Fluid Power Engineering and Power Transmission System.
2. Introduce the students, the basic concepts of hydraulic and pneumatic systems.
3. Expose the students with various hydraulic and pneumatic actuators.
4. Familiarize on fluid power systems and its applications to real time.
5. Know the problem, which occur in fluid power systems and take necessary troubleshooting/ maintenance activities.
6. Get practiced in designing hydraulic and pneumatic systems.
7. Understand the design procedure available for Hydraulic and Pneumatic circuits.

Course Outcomes:

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

CO1	Explain the concepts of fluid power, its types, advantages, applications of fluid power systems and compare mechanical, electrical, hydraulic and pneumatic systems.
CO2	Explain the basic working principles of the hydraulic pumps and actuators, types of pumps-actuators, explain the design considerations of pumps, actuators and select the valves for hydraulic circuits.
CO3	develop the hydraulic circuits for practical applications, create circuits for various machines, select the size of the accumulators and explain the working principles of safety circuits
CO4	explain the fundamental concepts of pneumatic systems, list the properties of air for pneumatic system, demonstrate on F-R-L unit
CO5	identify various control elements in pneumatic system, develop electro pneumatic and electro hydraulic circuits for robotic applications, design a pneumatic circuit using classic, cascade and step counter methods
CO6	select pneumatic components for installation and maintenance of power packs, explain the architectures of PLC and Microprocessors, develop logical circuits in PLC for automation and determine the faults in fluid power systems

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	1	2	1	2							
CO2	3	2	1	1	2							
CO3	1	3	2	2	1							
CO4	3	3	2	2	1							
CO5	3	3	2	1	2							
CO6	3	3	3	2	1							

Course code-
ROBOTICS

Course Objectives:

1. Student will know the fundamental concepts of industrial robotic technology.
2. Student will be exposed to the various types of end effectors.
3. Student will apply the basic mathematics to calculate kinematic forces in robot manipulator.
4. Student will understand the robot controlling and programming methods.
5. Student will be in a position to describe various actuators, sensors.
6. Student will be aware of the various industrial applications of robots.

Course Outcomes:

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

CO1	Overview of Robotics and identify various robot configurations.
CO2	Identify various robot components and select different end effectors for specific application
CO3	Carryout Homogeneous transformations, kinematic analysis for various kinematic chains.
CO4	Perform differential transformations and calculate dynamic analysis for simple kinematic chains.
CO5	Perform trajectory planning for a manipulator by avoiding obstacles
CO6	Select appropriate actuators and sensors for a robot and to understand various robot applications in manufacturing.

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					1					2	
CO2	2		3								1	
CO3		3	2		1							
CO4		3	2		1							
CO5		2	3		-							1
CO6	2				3						1	

Course code-

NON DESTRUCTIVE EVALUATION

Course Objectives:

1. Student will know about different techniques in NDT and usage of visual inspections, liquid penetration tests.
2. Student will know about usage of magnetic particle testing and liquid penetrant tests.
3. Student will know the concept of acoustic emission and eddy current testing.
4. Student will know about infrared and thermal testing.
5. Student will know radiography testing
6. Student will know the concepts of application of ndt in various fields

Course Outcomes:

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

CO1	Explain about ndt and explain different tests like visual inspection and liquid penetration.
CO2	Define magnetic particle test ad liquid penetrant test .
CO3	Explain the process of acoustic emission and eddy current testing.
CO4	Analyze the process for infrared and thermal testing.
CO5	Evaluate the process of radiography testing.
CO6	Explain the applications of ndt in various fields.

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	2	1									
CO2	3	2	1									
CO3	3	2	1									1
CO4	3	1	2									
CO5	3	1	2							1		
CO6	3	2	1									1

Course Code:

INTRODUCTION TO MATERIAL HANDLING EQUIPMENT

(Professional Elective – II)

Course Objectives:

1. The student will know the basic Fundamentals of Material Handling Equipment and control and safety measures incorporated on material handling equipments.
2. The student will identify and select the different handling equipments 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.
CO4	Understand the working principles of Components of material handling systems like Flexible hoisting, hooks, elevators.
CO5	Understand the working principles of Components of material handling systems like conveyors.
CO6	Identify the surface transport to connect loading stations to the different discharge or unloading stations.

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	1		1		1						
CO2	2	1		1		1						
CO3	2	1		1		1						
CO4	2	1		1		1						
CO5	2	1		1		1						
CO6	2	1		1		1						

Course code-
HEAT TRANSFER LAB

Course Objectives:

1. To impart practical exposure on conduction through various geometries
2. To impart practical exposure on Heat Transfer through fins
3. To impart practical exposure on Types of Convection
4. To impart practical exposure on Heat Exchangers
5. To impart practical exposure on concepts of Radiation
6. To impart practical exposure on Types of Condensation

Course Outcomes:

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

CO1	Find Heat Transfer rate in different geometries
CO2	Explain performance parameters of a Pin Fin
CO3	Demonstrate the concepts of Natural and Forced Convection
CO4	Determine effectiveness in parallel flow and counter flow heat exchanger
CO5	Determine emissivity of the given surface
CO6	Demonstrate the concepts of Drop-wise and Film-wise Condensation

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
CO1	3	3	3	2	2	-	-	3	-	3	2
CO2	3	3	3	1	2	-	-	3	-	3	2
CO3	3	3	2	1	1	-	-	3	-	3	2
CO4	3	2	3	2	2	-	-	3	-	3	2
CO5	3	2	2	1	-	2	3	3	-	3	2
CO6	3	2	2	1	-	-	-	3	-	3	2

LIST OF EXPERIMENTS:

1. Determination of overall heat transfer co-efficient of a composite slab
2. Determination of heat transfer rate through a lagged pipe.
3. Determination of heat transfer rate through a concentric sphere
4. Determination of thermal conductivity of a metal rod.
5. Determination of efficiency of a pin-fin
6. Determination of heat transfer coefficient in Natural convection
7. Determination of heat transfer coefficient in Forced convection
8. Determination of effectiveness of parallel and counter flow heat exchangers.
9. Determination of emissivity of a given surface.
10. Determination of Stefan Boltzman constant
11. Determination of heat transfer rate in drop and film wise condensation\
12. Determination of Unsteady state of Heat Transfer
13. .Determination of Thermal conductivity of liquids
14. Determination of critical heat flux.

Course code-
Simulation lab

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Design and assemble of the components using geometric modeling software
CO2	Construct sketches in Pro-E & CATIA software.
CO3	The student will be able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.
CO4	Apply the finite element analysis for components design.
CO5	Develop NC code for different part profiles and perform machining on CNC Machines.
CO6	Manipulate the robot by writing programs and executing them.

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						2		3	
CO2	1		1						2		3	
CO3	1		1						2		3	
CO4	1		1						2		3	
CO5	1		1						2		3	
CO6	-		1						2		3	

List of Experiments

1. Construction of 2D sketches.
2. Assembly Modeling (At least three examples)
3. Analysis of trusses
4. Analysis of Beams
5. Plane stress, plane strain analysis
6. Analysis of Axi-symmetric solids
7. Analysis of 3D solids
8. Estimation of natural frequencies and mode shapes for simple problems
9. Steady state heat transfer Analysis
10. Machining of simple components on NC lathe by transferring NC Code /from a CAM package
11. Machining of Simple components on NC-Mill by transferring NC Code/from a CAM Package
12. Robot programming, simulation and execution.

IV-I SEMESTER

18A4103401- INDUSTRIAL ENGINEERING & MANAGEMENT

Course Outcomes:

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

CO1 acquire fundamental knowledge of Industrial management and its importance overview of scientific principles of management, various tools of Industrial Engineering & Productivity measurement

CO2 understand the concept of system approach and different types of production layouts, process layouts and acquire the domain knowledge of maintenance

CO3 understand different types of production, work study, method study, work measurement techniques and design a system, component, or process, and synthesize solutions to achieve desired needs

CO4 identify the role of statistics in engineering problem solving process, use of graphical techniques in data analysis

CO5 use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints

CO6 Use the techniques and tools necessary to reduce cost of a product without compromising quality, reliability & performance, and function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management

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	-	-	-	-	-	-	2	1	-	-	-
CO2	-	-	3	1	2	-	-	-	-	-	1	-
CO3	-	-	1	-	3	2	-	-	-	-	-	-
CO4	-	3	2	-	1	-	-	-	-	-	-	-
CO5	2	-	-	-	3	-	-	-	-	-	1	-
CO6	2	-	-	-	1	-	-	-	-	-	3	-

18A4103402-INTRODUCTION TO CAD/CAM

Course Outcomes:

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

CO1 describe basic structure of CAD workstation, Memory types, input/output device sand display devices and computer graphics

CO2 acquire the knowledge of geometric modeling and execute the steps required in CAD software for developing 2D &3D models and perform transformations

CO3 understand the construction of database models and geometric modeling features

CO4 understand how to write the part programs for different models by using part programming

CO5 explain features of Group Technology (GT), CAPP & FMS

CO6 illustrate CAQC and CIM concepts.

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	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	2	1	3	-	2	1	-	-	-	-	-	1

18A4103403-METROLOGY

Course Outcomes:

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

CO1 Design limit gauges, tolerances, and fits for selected product quality.
CO2 Evaluate various devices for linear and angular measurements.
CO3 Outline the operation of optical and comparator measuring instruments
CO4 Evaluate the surface roughness parameters.
CO5 Demonstrate the flatness and interferometer measuring instruments
CO6 Outline the working of gear and screw thread measuring instruments.

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	2	1	-	-	-	-	-	1	-	-	-
CO2	1	3	2	-	-	-	-	-	-	1	-	-
CO3	2	1	3	-	-	-	-	-	-	-	-	1
CO4	3	2	1	-	-	-	-	-	-	-	1	-
CO5	1	3	2	-	-	-	-	-	-	1	-	-
CO6	2	3	3	-	-	-	-	-	-	-	-	1

ADDITIVE MANUFACTURING
(Open Elective – III)

Course Outcomes:

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

CO1 Paraphrase the fundamentals of AM.
CO2 Interpret the materials used in AM.
CO3 Illustrate the AM processes and analyse parameters controlling the AM process.
CO4 Relate the tools used for RP.
CO5 Analyse the application areas of AM
CO6 Discuss and analyse case studies on AM.

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	-	1	-	-	-	-	-	-	-	-	-
CO2	3	1	1	-	-	-	-	-	-	-	-	1
CO3	-	-	1	-	-	-	-	-	-	-	-	1
CO4	-	-	1	1	3	1	-	-	-	-	-	1
CO5	-	-	1	1	3	1	-	-	-	-	-	1
CO6	-	1	-	1	3	-	-	-	-	-	-	1

18A4103511-UNCONVENTIONAL MACHINING PROCESSES
(Professional Elective – III)

Course Outcomes:

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

CO1 Describe unconventional machining methods and working principles of mechanical energy-based processes

CO2 Demonstrate electro-chemical machining principles in grinding, honing and deburring process.

CO3 Explain principle, working, applications and various characteristics of electric discharge machining process.

CO4 Identify the difference between EBM and LBM based on its characteristics, parameters, and accuracy.

CO5 Explain the applications, characteristics and process of plasma arc machining based on MRR and accuracy.

CO6 Compare different types of mechanical finishing process.

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	-	-	1	2	-	-	-	-	-	-	-
CO2	3	-	-	1	2	-	-	-	-	-	-	-
CO3	3	-	-	1	2	-	-	-	-	-	-	-
CO4	3	-	-	1	2	-	-	-	-	-	-	-
CO5	3	-	-	1	2	-	-	-	-	-	-	-
CO6	3	-	-	1	2	-	-	-	-	-	-	-

POWER PLANT ENGINEERING (Professional Elective – III)

Course Outcomes:

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

CO1 Explain various types of Coals and Illustrate Dust Collector, Cooling Tower and Heat Rejection Systems

CO2 Outline the Diesel and Gas Turbine Power Plant

CO3 Explain Hydrological Cycle, interflow measurements from Hydrographs

CO4 Explain Working Principle of Nuclear Power Plants, Nuclear Fuels and Reactor Operations

CO5 Explain Cost Factors, Load and Power Distribution Factors

CO6 Summarize the impact of Power Plants on the Environment

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	1	1	1	2	3	3	2	-	-	-	3
CO2	3	1	2	1	2	2	2	3	-	-	-	2
CO3	2	3	1	2	1	3	2	2	-	-	-	2
CO4	2	2	1	2	2	2	1	2	-	-	-	3
CO5	2	3	2	1	2	3	2	2	-	-	-	2
CO6	3	1	1	2	1	2	1	1	-	-	-	3

MECHATRONICS (Professional Elective – III)

Course Outcomes:

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

CO1 Describe mechatronics system and their elements and levels
CO2 Differentiate various sensors and transducers
CO3 Understand solid state electronic devices, analog signal conditioning
CO4 Demonstrate hydraulic and pneumatic actuating systems
CO5 Understand Digital electronics and Logic gates
CO6 Explain micro controllers and applications of PLC

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	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	2	-	2	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-
CO6	2	-	-	-	2	-	-	-	-	-	-	-

ADVANCED MECHANICS OF MATERIALS Professional Elective – III)

Course Outcomes:

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

CO1 Calculate deflections in fixed and continuous beams
CO2 Determine the stresses in thick cylinders
CO3 Analyse the curved beams for stresses with different cross sections
CO4 Calculate the stresses in rotating disks
CO5 Determine the Strain Energy under static and gradually applied load
CO6 Determine the Strain Energy under impact and shear stresses

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	1	-	-	-	-	-	-	-	2
CO2	3	3	3	1	-	-	-	-	-	-	-	2
CO3	3	3	3	1	-	-	-	-	-	-	-	2
CO4	3	3	3	1	-	-	-	-	-	-	-	2
CO5	3	3	3	1	-	-	-	-	-	-	-	2
CO6	3	3	3	1	-	-	-	-	-	-	-	2

NANOTECHNOLOGY (Open Elective – IV)

Course Outcomes:

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

CO1 Explain solids and their band structure and applications of nanotechnology.
CO2 Demonstrate about properties of materials and their behaviour at nanoscale.
CO3 Outline different characterization techniques and tools used at the nanoscale.
CO4 Summarize about synthesis and fabrication of materials at nanoscale.
CO5 Explain about applications of silicon carbide, alumina, and zirconia.
CO6 Outline the applications of nanomaterials in various fields.

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	1	2	-	-	-	-	-	1	-	-	-
CO2	3	2	1	-	-	-	-	-	-	1	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	1
CO4	3	1	2	-	-	-	-	-	-	-	1	-
CO5	3	1	2	-	-	-	-	-	-	1	-	-
CO6	3	2	1	-	-	-	-	-	-	-	-	1

MECHANICAL VIBRATIONS (Professional Elective – IV)

Course Outcomes:

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

CO1 Analyze single degree freedom system for its natural frequency and vibration response

CO2 Analyze single degree freedom system for its natural frequency and damped vibration response

CO3 Determine response of Single degree freedom systems under harmonic excitations

CO4 Understanding Vibration measuring instruments

CO5 Determine the response of Two-degree freedom systems under free and forced vibrations

CO6 Understanding Dynamic vibration absorber

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	1	-	-	-	-	-	-	-	2
CO2	3	3	3	1	-	-	-	-	-	-	-	2
CO3	3	3	3	1	-	-	-	-	-	-	-	2
CO4	3	3	3	1	-	-	-	-	-	-	-	2
CO5	3	3	3	1	-	-	-	-	-	-	-	2
CO6	3	3	3	1	-	-	-	-	-	-	-	2

18A4103522-INTRODUCTION TO COMPOSITE MATERIALS
(Professional Elective – IV)

Course Outcomes:

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

CO1 Identify various types of composites.
CO2 Understand the basic concepts of reinforcements.
CO3 Apply the fabrication and manufacturing techniques of composites.
CO4 Understand the joining and theories of failures of composites.
CO5 Select appropriate joining techniques of composites.
CO6 Identify the characteristics of various composites.

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	-	-	-	-	1	-	-	-	-	2	-
CO2	2	-	3	-	-	-	-	-	-	-	1	-
CO3	-	3	2	-	1	-	-	-	-	-	-	-
CO4	-	2	3	-	-	-	-	-	-	-	-	1
CO5	2	-	-	-	3	-	-	-	-	-	1	-
CO6	2	-	-	-	3	-	-	-	-	-	1	-

REFRIGERATION & AIR CONDITIONING (Refrigeration and Psychometric tables and charts allowed) (Professional Elective – IV)

Course Outcomes:

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

CO1 Understand the basic concepts of refrigeration and their applications.

CO2 Identify eco-friendly refrigerants and use P-H charts to evaluate the performance of refrigeration systems.

CO3 Explain the methods to improve performance of vapor compression systems.

CO4 Analyse steam jet, vapor absorption, thermoelectric and vortex tube systems

CO5 Analyse air conditioning processes using principles of psychometry.

CO6 Design of Air Conditioning systems for human comfort conditions.

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	1	-	-	-	1	-	-	-	-	-
CO2	3	2	1	-	-	-	1	-	-	-	-	-
CO3	3	3	2	-	-	-	1	-	-	-	-	-
CO4	3	3	2	-	-	-	1	-	-	-	-	-
CO5	3	3	1	-	-	-	1	-	-	-	-	-
CO6	3	2	2	-	-	-	3	-	-	-	-	-

JET AND ROCKET PROPULSION ENGINEERING
(Professional Elective – IV)

Course Outcomes:

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

CO1 Illustrate the thermodynamic aspects of gas turbines
CO2 Analyse the performance of jet engines
CO3 Compare different aspects of thermal jet engines
CO4 Summarize the working of rocket engines
CO5 Apply thrust mechanics to determine forces in rockets
CO6 Contrast the aspects of electrical, nuclear and plasma arc propulsions

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	2	-	-	-	-	-	-	-	-	-
CO2	-	3	2	-	-	-	2	-	-	-	-	-
CO3	2	2	-	-	-	-	3	-	-	-	-	-
CO4	3	2	1	-	-	-	2	-	-	-	-	-
CO5	-	3	2	-	-	-	-	-	-	-	-	-
CO6	3	1	1	-	-	-	1	-	-	-	-	-

ICS metrology lab

COURSE OUTCOMES:

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

CO1 Explain the calibration of pressure gauge, temperature measuring instruments

CO2 Demonstrate the calibration of displacement, speed measuring instruments

CO3 Explain the calibration of vibration measuring instruments

CO4 Explain the working of various instruments like vernier callipers, bevel protractor , micrometres and dial indicators

CO5 Familiarize the working of tool maker's microscope and surface roughness measuring instruments.

CO6 Demonstrate the Machine tool alignment test on the lathe, drilling and milling machines

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	2	1	-	-	-	-	-	-	1	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	1	3	-	-	-	-	-	-	-	-	-
CO4	2	3	2	-	-	-	-	-	-	1	-	-
CO5	1	3	2	-	-	-	-	-	-	1	-	-
CO6	2	3	2	-	-	-	-	-	-	1	-	-

COMPUTATIONAL FLUID DYNAMICS LABORATORY

COURSE OUTCOMES:

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

CO1 Identify, model, analyse and solve mechanical engineering problems
CO2 Understand basic knowledge of computational methods in Fluid flow applications.
CO3 Analyse Initial Boundary value problems and determine various quantities of interest.
CO4 Use modern modelling and simulation tools and techniques
CO5 Develop practical solutions for mechanical engineering problems under professional and ethical constraints
CO6 Design and conduct laboratory experiments for thermal, fluids and mechanical systems

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	1	2	3	1	2	-	-	-	-	1
CO2	2	-	2	-	2	-	2	-	-	-	-	2
CO3	2	1	-	1	-	2	-	-	-	-	-	2
CO4	2	1	2	2	1	2	2	-	-	-	-	2
CO5	2	3	3	2	3	3	2	-	-	-	-	3
CO6	3	3	3	3	3	3	3	-	-	-	-	3

IV-II SEMESTER
NANOTECHNOLOGY (Professional Elective – V)

Course Outcomes:

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

CO1 Explain solids and their band structure and applications of nanotechnology.
CO2 Demonstrate about properties of materials and their behaviour at nanoscale.
CO3 Outline different characterization techniques and tools used at the nanoscale.
CO4 Summarize about synthesis and fabrication of materials at nanoscale.
CO5 Explain about applications of silicon carbide, alumina, and zirconia.
CO6 Outline the applications of nanomaterials in various fields.

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	1	2	-	-	-	-	-	1	-	-	-
CO2	3	2	1	-	-	-	-	-	-	1	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	1
CO4	3	1	2	-	-	-	-	-	-	-	1	-
CO5	3	1	2	-	-	-	-	-	-	1	-	-
CO6	3	2	1	-	-	-	-	-	-	-	-	1

INTRODUCTION TO ROBOTICS (Professional Elective – V)

Course Outcomes:

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

CO1	Identify various robot configurations.
CO2	Understand the basic components of robots.
CO3	Evaluate D-H notations for simple robot manipulator.
CO4	Perform trajectory planning for a manipulator by avoiding obstacles.
CO5	Select appropriate actuators and sensors for a robot.
CO6	Illustrate the industrial applications of robots.

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	-	-	-	-	1	-	-	-	-	2	-
CO2	2	-	3	-	-	-	-	-	-	-	1	-
CO3	-	3	2	-	1	-	-	-	-	-	-	-
CO4	-	2	3	-	-	-	-	-	-	-	-	1
CO5	2	-	-	-	3	-	-	-	-	-	1	-
CO6	2	-	-	-	3	-	-	-	-	-	1	-

ENERGY CONSERVATION AND MANAGEMENT
(Professional Elective – V)

Course Outcomes:

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

CO1 Student should be able to know basics of Energy conservation and Environmental Aspects Associated With Energy Utilization

CO2 Student should be able to know basics of Energy Management.

CO3 Students should be able to Evaluate the energy saving & conservation in different Energy conservation in Electrical systems.

CO4 Students should be able to Evaluate the energy saving & conservation in different Energy conservation in Thermal systems.

CO5 Students should be able to prepare Energy demand estimation, Organizing and Managing Energy Management Programs.

CO6 Students should be able to Economic Aspects Calculation of simple payback method and Applications of life cycle costing analysis

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	-	-	1	-	1	-	-	-	-	2	-
CO2	2	-	3	-	-	-	-	1	-	-	1	-
CO3	-	3	2	-	1	-	-	-	-	1	-	-
CO4	-	2	3	3	-	-	1	-	-	-	-	1
CO5	3	-	-	2	-	-	-	1	-	-	1	-
CO6	2	-	-	3	-	-	-	-	-	1	-	-

COMPUTER GRAPHICS AND GEOMETRICAL MODELING
(Professional Elective – V)

Course Outcomes:

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

CO1 Student should be able to know basics of Energy conservation and Environmental Aspects Associated with Energy Utilization

CO2 Student should be able to know basics of Energy Management.

CO3 Students should be able to Evaluate the energy saving & conservation in different Energy conservation in Electrical systems.

CO4 Students should be able to Evaluate the energy saving & conservation in different Energy conservation in Thermal systems.

CO5 Students should be able to prepare Energy demand estimation, Organizing and Managing Energy Management Programs.

CO6 Students should be able to Economic Aspects Calculation of simple payback method and Applications of life cycle costing analysis

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	-	-	1	-	1	-	-	-	-	2	-
CO2	2	-	3	-	-	-	-	1	-	-	1	-
CO3	-	3	2	-	1	-	-	-	-	1	-	-
CO4	-	2	3	3	-	-	1	-	-	-	-	1
CO5	3	-	-	2	-	-	-	1	-	-	1	-
CO6	2	-	-	3	-	-	-	-	-	1	-	-

DESIGN FOR MANUFACTURING (Professional Elective-VI)

Course Outcomes:

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

CO1 Understand the basic concept of DFMA for economical production

CO2 Identify and select the proper materials.

CO3 Apply the knowledge in the field of metal casting.

CO4 Select the machining and forming considerations in Design for Manufacturing.

CO5 Apply the design considerations in joining and integrate the knowledge of compliance analysis

CO6 Apply the design considerations in interference analysis for assembly.

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	-	-	-	-	1	-	-	-	-	2	-
CO2	2	-	3	-	-	-	-	-	-	-	1	-
CO3	-	3	2	-	1	-	-	-	-	-	-	-
CO4	-	2	3	-	-	-	-	-	-	-	-	1
CO5	2	-	-	-	3	-	-	-	-	-	1	-
CO6	2	-	-	-	3	-	-	-	-	-	1	-

AUTOMOBILE ENGINEERING (Professional Elective-VI)

Course Outcomes:

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

CO1 Explain the basic layout of an automobile and the fuel systems used.

CO2 Demonstrate the operation of cooling and lubrication systems in automobiles.

CO3 Outline the operation of ignition, electrical, and air conditioning systems in automobiles.

CO4 Summarize the operation of transmission and steering systems.

CO5 Explain the operation of suspension and braking systems.

CO6 Outline the emissions from automobiles and energy alternatives.

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	-	-	-	-	1	-	-	-	-
CO2	3	1	2	-	-	-	-	-	1	-	-	-
CO3	3	2	1	-	-	-	-	-	1	-	-	-
CO4	2	3	1	-	-	-	-	-	-	1	-	-
CO5	2	3	1	-	-	-	-	-	-	-	1	-
CO6	3	2	1	-	-	-	-	-	-	-	-	-

METAL FORMING PROCESS (Professional Elective – VI)

Course Outcomes:

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

CO1 Understand the fundamental concepts of metal forming.
CO2 Know the various process parameters and applied loads in forging.
CO3 Know the various process parameters and applied loads in sheet metal working.
CO4 Analyze Rolling and Extrusion processes and associated parameters
CO5 Analyze Drawing.
CO6 Analyze various High Energy Rate forming processes.

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	-	2	-	3	-	-	-	-	-	-	-
CO2	2	-	2	-	3	-	-	-	-	-	-	-
CO3	2	-	2	-	3	-	-	-	-	-	-	-
CO4	2	-	3	-	3	-	-	-	-	-	-	-
CO5	2	-	2	-	3	-	-	-	-	-	-	-
CO6	2	-	2	-	3	-	-	-	-	-	-	-

PROJECT MANAGEMENT (Professional Elective – VI)

Course Outcomes:

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

CO1 Understand the significance of project management its objectives and various phases involved in project management life cycle.

CO2 Role and responsibilities of a Project Manager

CO3 Gain knowledge regarding project feasibility study and various Organizational issues.

CO4 Able to apply various tools like CPM & PERT in project management.

CO5 Understand how to speed up a project's timeline by adding additional resources.

CO6 Gain knowledge in risk management and role of IT in project management.

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
CO2	2	-	-	-	-	-	-	-	-	-	-	3
CO3	2	-	-	-	-	-	-	-	-	-	-	3
CO4	2	-	-	-	-	-	-	-	-	-	-	3
CO5	2	-	-	-	-	-	-	-	-	-	-	3
CO6	2	-	-	-	-	-	-	-	-	-	-	3

CRITERION 3	COURSE AND PROGRAM SPECIFIC OUTCOMES ATTAINMENT 2018-19 Admitted Batch

Direct Attainment

S.NO	Subject	Course	PSO1	PSO2	PSO3
		SEMSSTER-I			
1	Professional English-I	18A1100101	0.00	0.00	0.00
2	Engineering Mathematics-I	18A1100201	0.00	0.00	0.00
3	Engineering Physics	18A1100202	0.00	0.00	0.00
4	Engineering Drawing	18A1103401	0.00	0.00	0.98
5	Environmental Studies	18A1100801	0.00	0.00	0.00
6	English Communication Skills Lab-I	18A1100191	0.00	0.00	0.00
7	Engineering Physics Lab	18A1100292	0.00	0.00	0.00
8	Basic Engineering & IT Workshop	18A1100391	0.00	0.00	0.00
		SEMSSTER-2			
9	Professional English-II	18A1200101	0.00	0.00	0.00
10	Engineering Mathematics-II	18A1200201	0.00	0.00	0.00
11	Engineering Chemistry	18A1200204	0.00	0.00	0.00
12	Programming and Problem solving with C	18A1205301	0.00	0.00	0.00
13	Engineering Mechanics	18A1201401	0.00	0.00	0.00
14	English Communication Skills Lab-II	18A1200191	0.00	0.00	0.00
15	Engineering Chemistry Lab	18A1200294	0.00	0.00	0.00
16	Programming and Problem solving with C Lab	18A1205392	0.00	0.00	0.00

S.NO	Subject	Course	PSO1	PSO2	PSO3
		SEMESTER-3			
17	Complex Variables and Fourier Series	18A2100201	0.00	0.00	0.00
18	Material Science and Engineering	18A2103301	0.81	0.00	0.81
19	Basic Thermodynamics	18A2103401	0.80	0.00	0.00
20	Mechanics of Materials	18A2103402	0.88	0.00	0.88
21	Manufacturing Process	18A2103403	0.85	0.00	0.85
22	Essential Electrical and Electronics Engineering	18A2102301	0.00	0.00	0.00
23	Material Testing& Metallurgy Lab	18A2103491	0.00	0.00	0.00
24	Manufacturing Process Lab	18A2103492	0.99	0.00	0.00
25	Essential Electrical & Electronics Engineering Lab	18A2102391	0.00	0.00	0.00
		SEMSTER-4			
26	Mathematics-IV(Probability & Statistics)	18A2200201	0.00	0.00	0.00
27	Design of Machine Members –I	18A2203401	1.60	0.00	1.60
28	Fluid Mechanics and Hydraulic Machines	18A2203402	0.84	0.00	0.84
29	Kinematics of Machinery	18A2203403	0.85	0.00	0.00
30	IC Engines and Gas Turbines	18A2203404	0.86	0.00	0.86
31	Computer Aided Machine Drawing Practice	18A2203301	0.00	1.92	0.00
32	Basic Surveying	18A2201602	0.00	0.00	0.00
33	Data Structures	18A2205601	0.00	0.00	0.00
34	Fluid Mechanics & Hydraulic Machines Lab	18A2203491	0.00	0.00	0.00
35	Thermal Engineering Lab	18A2203492	1.00	0.00	0.00
36	Professional Ethics & Human Values	18A2200801	0.00	0.00	0.00

S.NO	Subject	Course	PSO1	PSO2	PSO3
		SEMESTER-5			
37	Design of Machine Elements-II	18A3103401	1.81	0.00	1.81
38	Dynamics of Machinery	18A3103402	0.81	0.00	0.81
39	Manufacturing Technology	18A3103403	0.00	0.00	0.00
40	Applied Thermodynamics	18A3103404	0.87	0.00	0.00
41	Automation in Manufacturing	18A3103512	0.86	0.00	0.00
42	Building Materials	18A3101601	0.00	0.00	0.00
43	OOPS through JAVA	18A3105602	0.00	0.00	0.00
44	Web Design	18A3112601	0.00	0.00	0.00
45	Machine Tools Lab	18A3103491	0.99	0.00	0.99
46	Theory of Machines Lab	18A3103492	0.00	0.00	0.00
47	Minor Project(Design and Fabrication)	18A3103791	0.99	0.99	0.99
		SEMESTER-6			
48	Instrumentation and Control Systems	18A3203301	0.00	0.00	0.84
49	Heat Transfer	18A3203401	0.89	0.00	0.00
50	Operations Research	18A3203402	0.00	0.00	0.00
51	Finite Element Methods	18A3203403	0.00	2.36	0.00
52	Introduction to Material Handling Equipment	18A3203514	0.00	0.00	0.00
53	Building Construction	18A3201602	0.00	0.00	0.00
54	Python Programming	18A3212602	0.00	0.00	0.00
55	IPR & Patents	18A3200802	0.00	0.00	0.00
56	Heat Transfer Lab	18A3203491	0.00	0.00	0.00
57	Simulation Lab	18A3203492	0.00	2.86	0.00

S.NO	Subject	Course	PSO1	PSO2	PSO3
		SEMESTER-7			
58	Industrial Engineering and Management	18A4103401	0.00	0.00	0.00
59	Introduction to CAD/CAM	18A4103402	0.90	1.80	0.00
60	Metrology	18A4103403	0.94	0.00	0.00
61	Unconventional Machining Processes	18A4103511	0.00	0.00	0.00
62	Introduction to Composite Materials	18A4103522	0.94	0.00	0.00
63	Project Management	18A4101607	0.00	0.00	0.00
64	Energy Audit Conservation and Management	18A4102608	0.00	0.00	0.00
65	Instrumentation and Metrology Lab	18A4103491	0.00	0.00	0.00
66	Computational Fluid Dynamics Lab	18A4103492	0.00	0.00	0.00
67	Term Paper	18A4103791	0.00	0.00	0.00
		SEMESTER-8			
68	Introduction to Robotics	18A4203512	0.86	0.00	0.86
69	Automobile Engineering	18A4203522	0.00	0.00	0.00
70	Major Project	18A4203791	2.93	2.93	2.94
No of Courses			22	6	13
Sum			23.26	12.86	15.07
Average PSO Mapping Value			1.06	2.14	1.16

Indirect Attainment

Assessment Tool	PSO1	PSO2	PSO3
Indirect Assessment tool Attainment level	2.90	2.88	2.89

Final Attainment

Assessment Tool	PSO1	PSO2	PSO3
80% of Direct Attainment (I)	0.85	1.71	0.93
20% of Indirect Attainment (II)	0.58	0.58	0.58
Final attainment level(I+II)	1.43	2.29	1.50

HEAD OF THE DEPARTMENT
Head, Mechanical Departmen
NRI Institute of Technolog
POTHAVARAPPADU(Vill)
Agiripalli (Mdl), Krishna Dist

CRITERION 3	COURSE AND PROGRAM OUTCOMES ATTAINMENT 2018-19 Admitted Batch

Direct Attainment

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 1														
1	Professional English-I	18A1100101	0.00	0.00	0.00	0.00	0.00	2.63	2.13	2.26	0.00	2.12	0.00	1.78
2	Engineering Mathematics-I	18A1100201	1.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Engineering Physics	18A1100202	1.53	1.53	0.00	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Engineering Drawing	18A1103401	2.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Environmental Studies	18A1100801	0.00	1.93	1.61	0.00	0.00	0.00	2.89	0.00	0.00	0.00	0.00	1.93
6	English Communication Skills Lab-I	18A1100191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.71	1.30	0.00	1.95
7	Engineering Physics Lab	18A1100292	0.00	2.00	0.00	2.00	3.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00
8	Basic Engineering & IT Workshop	18A1100391	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	0.93	0.00	0.93

NRI INSTITUTE OF TECHNOLOGY

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POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 2														
9	Professional English-II	18A1200101	0.00	0.00	0.00	0.00	0.00	2.91	2.91	1.94	1.90	2.38	0.00	1.94
10	Engineering Mathematics-II	18A1200201	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Engineering Chemistry	18A1200204	1.63	1.49	1.63	1.22	0.00	0.00	2.44	0.00	0.00	0.00	0.00	0.00
12	Programming and Problem solving with C	18A1205301	1.67	1.68	1.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Engineering Mechanics	18A1201401	2.56	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	English Communication Skills Lab-II	18A1200191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.74	1.25	0.00	2.24
15	Engineering Chemistry Lab	18A1200294	1.95	1.63	1.17	1.46	0.00	0.00	1.46	0.00	0.00	0.00	0.00	0.00
16	Programming and Problem solving with C Lab	18A1205392	2.39	2.07	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 3														
17	Complex Variables and Fourier Series	18A2100201	2.19	2.19	1.46	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Material Science and Engineering	18A2103301	1.85	1.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Basic Thermodynamics	18A2103401	2.40	1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	Mechanics of Materials	18A2103402	1.74	2.27	1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Manufacturing Process	18A2103403	2.53	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Essential Electrical and Electronics Engineering	18A2102301	2.37	1.80	1.27	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Material Testing& Metallurgy Lab	18A2103491	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	1.97	0.99	0.00	0.99
24	Manufacturing Process Lab	18A2103492	0.00	1.98	0.00	0.00	0.00	0.00	0.00	0.00	1.98	0.99	0.00	0.99
25	Essential Electrical & Electronics Engineering Lab	18A2102391	1.95	1.95	0.98	2.92	0.00	0.00	0.00	0.00	1.95	0.98	0.00	0.98

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 4														
26	Mathematics-IV(Probability & Statistics)	18A2200201	2.21	2.21	1.48	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Design of Machine Members –I	18A2203401	1.55	1.87	2.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Fluid Mechanics and Hydraulic Machines	18A2203402	1.38	2.23	1.91	0.85	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	Kinematics of Machinery	18A2203403	2.53	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	IC Engines and Gas Turbines	18A2203404	2.42	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	Computer Aided Machine Drawing Practice	18A2203301	1.92	0.00	0.00	0.00	1.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	Basic Surveying	18A2201602	2.81	1.87	0.00	0.00	0.00	1.58	0.00	1.10	0.00	0.00	0.00	0.00
33	Data Structures	18A2205601	2.44	1.75	2.31	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44
34	Fluid Mechanics & Hydraulic Machines Lab	18A2203491	0.00	1.97	0.00	0.00	0.00	0.00	0.00	0.00	1.97	0.99	0.00	0.99
35	Thermal Engineering Lab	18A2203492	2.97	1.99	0.00	0.00	1.98	0.00	0.00	0.00	1.99	1.00	0.00	1.00
36	Professional Ethics & Human Values	18A2200801	0.00	0.00	0.00	0.00	0.00	0.68	0.68	1.35	0.00	0.00	0.00	0.68

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 5														
37	Design of Machine Elements-II	18A3103401	0.91	1.81	2.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	Dynamics of Machinery	18A3103402	0.81	2.42	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	Manufacturing Technology	18A3103403	2.83	0.00	0.00	0.00	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	Applied Thermodynamics	18A3103404	0.00	2.17	1.96	0.00	0.00	0.00	1.78	0.00	0.00	0.00	0.00	0.00
41	Automation in Manufacturing	18A3103512	0.00	2.26	1.76	1.75	0.00	0.00	1.28	0.00	0.00	0.00	0.00	1.75
42	Building Materials	18A3101601	2.45	1.52	0.00	0.00	0.00	1.08	0.00	1.23	0.00	0.00	0.00	0.00
43	OOPS through JAVA	18A3105602	1.52	1.71	1.55	1.52	1.71	1.55	1.52	0.00	1.55	0.00	1.52	1.55
44	Web Design	18A3112601	1.58	2.07	2.22	1.47	2.51	1.62	0.00	0.00	2.28	0.00	2.71	0.00
45	Machine Tools Lab	18A3103491	0.00	1.97	0.00	0.00	1.96	0.00	0.00	0.00	1.97	0.99	0.00	0.99
46	Theory of Machines Lab	18A3103492	0.00	1.96	1.96	0.00	0.00	0.00	0.00	0.00	1.96	0.98	0.00	0.98
47	Minor Project(Design and Fabrication)	18A3103791	2.81	1.65	2.31	1.98	1.59	1.65	1.65	1.59	2.15	1.98	0.99	1.59

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 6														
48	Instrumentation and Control Systems	18A3203301	2.50	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	Heat Transfer	18A3203401	2.40	2.51	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	Operations Research	18A3203402	0.00	1.83	2.74	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	Finite Element Methods	18A3203403	1.56	1.70	1.59	0.00	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
52	Introduction to Material Handling Equipment	18A3203514	1.61	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53	Building Construction	18A3201602	1.96	1.41	0.00	0.00	0.00	1.18	0.00	0.99	0.00	0.00	0.00	0.00
54	Python Programming	18A3212602	1.99	1.98	2.27	1.71	2.27	1.55	0.00	0.00	2.38	0.00	2.62	0.00
55	IPR & Patents	18A3200802	0.00	0.00	0.00	0.00	0.00	2.29	0.00	2.25	2.17	0.00	2.29	2.14
56	Heat Transfer Lab	18A3203491	0.00	1.99	0.00	0.00	0.00	0.00	0.00	0.00	1.99	1.00	0.00	1.00
57	Simulation Lab	18A3203492	0.00	0.96	0.96	0.00	2.86	0.00	0.00	0.00	1.91	0.96	0.00	0.96

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 7														
58	Industrial Engineering and Management	18A4103401	1.70	1.77	2.20	1.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59	Introduction to CAD/CAM	18A4103402	1.79	0.00	0.00	1.81	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	Metrology	18A4103403	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61	Unconventional Machining Processes	18A4103511	2.19	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
62	Introduction to Composite Materials	18A4103522	2.87	1.73	1.24	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
63	Project Management	18A4101607	2.24	1.45	0.00	0.00	0.00	1.17	0.00	1.67	0.00	0.00	0.00	0.00
64	Energy Audit Conservation and Management	18A4102608	1.82	1.82	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65	Instrumentation and Metrology Lab	18A4103491	0.93	1.85	0.00	0.00	0.00	0.00	0.00	0.00	1.85	0.93	0.00	0.93
66	Computational Fluid Dynamics Lab	18A4103492	1.90	2.64	2.83	2.52	2.84	0.00	0.00	2.82	1.89	0.95	0.00	0.95
67	Term Paper	18A4103791	2.97	2.97	2.97	1.98	1.98	0.00	0.00	0.00	0.00	1.97	0.00	0.00

S.NO	Subject	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
SEMESTER 8														
68	Introduction to Robotics	18A4203512	0.00	1.85	2.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.78
69	Automobile Engineering	18A4203522	2.80	0.94	0.00	0.00	0.00	0.00	1.90	0.00	0.00	0.00	0.00	0.00
70	Major Project	18A4203791	2.95	2.28	2.93	1.95	2.93	2.94	2.94	2.94	2.95	2.93	2.95	1.96
No of courses			51	56	33	22	16	13	12	11	22	19	6	26
Sum			106.39	102.75	61.16	36.60	34.49	22.83	23.58	20.14	45.09	25.60	13.08	37.31
Direct assessment attainment level			2.09	1.83	1.85	1.66	2.16	1.76	1.97	1.83	2.05	1.35	2.18	1.44

Indirect Attainment

Assessment tool	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Indirect assessment attainment level	2.95	2.92	2.91	2.92	2.93	2.90	2.91	2.88	2.88	2.90	2.90	2.89

Final Attainment

Assessment tool	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
80% of Direct Attainment (I)	1.67	1.47	1.48	1.33	1.72	1.41	1.57	1.46	1.64	1.08	1.74	1.15
20% of Indirect Attainment (II)	0.59	0.58	0.58	0.58	0.59	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Final attainment level(I+II)	2.26	2.05	2.06	1.92	2.31	1.98	2.15	2.04	2.22	1.66	2.32	1.73

HEAD OF THE DEPARTMENT
Head, Mechanical Dept.
NRI Institute of Techno...
POTHAVARAPPADU (Vill)
Agiripalli (Mdl), Krishna Dist.

NRI INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

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Accredited by NAAC with "A" GRADE, Accredited by NBA (CSE, ECE&EEE)
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Department of Electronics and Communication Engineering

Course Structure for B.Tech

R18 (18 & 19 Batches)

II-I Courses

COMPLEX VARIABLES AND TRANSFORMATION TECHNIQUES:

Course Outcomes:

Upon successful completion of this course, students 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 by applying Milne-Thomson method
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
CO3	Write the infinite series expansion of a complex function by apply Taylor's /Maclaurin's /Laurant's series
CO4	Write a Fourier series expansion of a periodic function by using Euler's formula
CO5	Understand the concept of Fourier transformation and it's properties
CO6	Solve the difference equations using Z-transforms and inverse Z-transforms

DIGITAL ELECTRONICS LOGIC DESIGN:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the numeric information in different forms and interpret different logic gates.
CO2	Minimize the given Switching functions in SoP and PoS forms using K-Map and Tabular Method.
CO3	Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, De-multiplexers, and Arithmetic Circuits.
CO4	Design combinational logic circuits using different types of Programmable Logic Designs.
CO5	Design and implement various sequential circuits like flip flops, registers.
CO6	Design the state diagrams with the knowledge of Mealy and Moore conversions, state machines using various flip flops.

NETWORK ANALYSIS AND TRANSMISSION LINES:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Gain the knowledge on basic RLC circuits behavior
CO2	Analyze the steady state and transient states of RLC circuits
CO3	Analyze the two port network parameters.
CO4	Demonstrate the reflection and Refraction of EM waves at boundaries
CO5	Analyze basic transmission line parameters
CO6	Analysis and Design of a transmission lines

SIGNAL AND SYSTEMS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Learn the basic concepts of signals and systems and represent signal in terms of Exponential and Trigonometric Fourier Series.
CO2	Transform the time domain signal into frequency domain by applying Fourier Transform.
CO3	Perform sampling and reconstruction of signals with the help of Nyquist criterion.
CO4	Analyze Linear systems in time and frequency domain and understand the properties of convolution and correlation.
CO5	Transform continuous time signals into complex frequency domain by applying Laplace Transforms.
CO6	Transform discrete time signals into complex frequency domain by applying Z – Transforms.

DATA STRUCTURE:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Ability to illustrate the concept of algorithm apply the learning concepts to design data structure for the given problem definition
CO2	Ability to design applications using stacks and queues and implements various types of queues
CO3	Analyze and implement operations on linked list and demonstrate their application
CO4	Ability to analyze and implement operations on trees
CO5	Ability to demonstrate various operations on binary search trees and its applications
CO6	Ability to evaluate the properties and operations on graphs and implement the graph applications

MANAGERIAL ECONOMIC AND FINANCIAL ANALYSIS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Use the theory of managerial economics, demand, production analysis & forecasting theories
CO2	Analyze of production markets & pricing strategies & cost price functions to manage markets & break-even-point
CO3	Develop an ability to identify, formulate & solve engineering problems by applying the knowledge of managerial economics
CO4	Theorize the features and types of Industrial organization
CO5	Enhance their capabilities in the interpretation of balance sheet that are followed in industries, organizations & institutes
CO6	Apply financial analysis, capital budgeting techniques in evaluating various investment opportunities

NETWORK ANALYSIS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Familiarity with DC and AC circuit analysis techniques.
CO2	Analyze complicated circuits using different network theorems.
CO3	Acquire skills of using MATLAB software for electrical circuit studies.
CO4	Acquire skills of two port network parameters (Z, Y, ABCD, h & g).
CO5	Determine the self and mutual inductance of coupled coils.
CO6	To draw the locus diagrams of series RL, RC circuits.

BASIC SIMULATION LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand mathematical description and representation of different continuous and discrete time signals and sequences.
CO2	Perform operations on signals, computation of Energy and power of on signals & sequences, and extracting Even, odd, Real and Imaginary parts of on signals and sequences,
CO3	Understand the convolution, auto and cross correlation operators for continuous and discrete time system.
CO4	Develop input output relationship for linear shift invariant system and to compute step, Sinusoidal and impulse responses
CO5	Understand and resolve the signals in frequency domain using Fourier transforms. develop the ability to analyze the systems in s- domain by waveform synthesis using Laplace transforms.
CO6	Verify sampling theorem and identification of poles and zeroes for a given transfer function.

ELECTRONICS AND CIRCUITS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Analyze the characteristics of the diodes in forward and reverse bias
CO2	To interpret the Diode application as rectifier and to analyze Half wave and full wave rectifiers with filter action.
CO3	Analyze and understand the characteristics of BJT and FET in CE and CS configuration respectively.
CO4	Study and analyze the characteristics of UJT and SCR
CO5	Understand how to measure the parameters of the signal by using CRO
CO6	Apply knowledge to calculate the Q-point of the Transistor and to construct amplifiers using BJT and FET

II-II Courses

PROBABILITY THEORY AND STOCHASTIC PROCESSES:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Identifying the basic concepts of probability and Probability functions.
CO2	Understand the concepts of expectation and moment generating functions.
CO3	Implementing the joint density function and joint moments to the multiple random variables.
CO4	Interpreting the random process and stationary random process.
CO5	Determining the correlation function properties.
CO6	Defining the PSD, Cross PSD and its Properties and noise types.

ELECTROMAGNETIC WAVE THEORY:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Interpret and apply the static electrostatic fields with respect to coordinate systems.
CO2	Analyze and demonstrate the static magnetic fields in real time applications.
CO3	Formulate the Maxwell's Equations in different forms.
CO4	Associate the fundamental theory of electromagnetic waves in free space and their practical applications.
CO5	Evaluate and Relate wave propagation characteristics in different conducting media.
CO6	Demonstrate the reflection and Refraction of EM waves in normal and oblique incidences

CONTROL SYSTEM:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	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
CO2	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
CO3	Acquire the skill to analyze absolute and relative stability of LTI systems using Routh-Hurwitz stability criterion and the Root Locus Plot
CO4	Analyze the stability of LTI systems using frequency response methods using Bode plots & Polar Plots.
CO5	Analyze the stability of LTI systems using frequency response methods using Nyquist Plots
CO6	Represent physical systems by State Transition Matrices based state space modeling and

	determine the output response by understanding the concepts of controllability and observability

ANALOG AND PULSE CIRCUITS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	To explain BJT amplifier using h parameter model
CO2	To analyze and design electronic subsystems such as feedback amplifiers and oscillators
CO3	To analyze power amplifiers such as Class A and Class B and compare their performance
CO4	To design linear and non-linear wave shaping circuits with different inputs
CO5	To design and analyze various multi vibrators using transistors
CO6	To remember and analyze unidirectional and bidirectional sampling gates

ANALOG COMMUNICATIONS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate knowledge of various blocks of communication system and to analyze various modulation and demodulation schemes.
CO2	Understand the concepts of DSB-SC, SSB-SC, and VSB and to distinguish different amplitude modulation schemes with their merits, demerits and applications.
CO3	Analyze the concept of generation and detection of FM signal and to compare amplitude and angle modulation schemes.
CO4	Know the effect of noise on the performance of communication systems by computing noise figure of various analog and Frequency modulation techniques.
CO5	Explore the characteristics of AM and FM transmitters and receivers and to analyze the effect of feedback on the performance of AM and FM transmitters.
CO6	Demonstrate the generation and detection of various pulse modulation techniques.

OOPS THROUGH JAVA:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Basic programming understanding on Loops and conditional statements
CO2	Basic programming on Functions, Recursive functions and Arrays
CO3	Understand the concepts of Object-oriented programming Class, object and constructor
CO4	Understand the concepts of Object-oriented programming inheritance and abstraction
CO5	Concepts of exception handling and assertions
CO6	Concepts of multi-threading and applets

PROFESSIONAL ETHICS & HUMAN VALUES:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand moral values, work ethics, respect others and develop civic virtue.
CO2	Understand the ethical responsibilities of the engineer's different professional roles.
CO3	Demonstrate knowledge to become a social experimenter on framing of the problem and determining the facts.
CO4	Create awareness about safety, risk & risk benefit analysis and knowledge on intellectual property rights.
CO5	Develop knowledge about global issues creating awareness on computer and environmental ethics
CO6	Analyze ethical problems in research and give a picture on weapons development.

ANALOG COMMUNICATIONS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand and analyze the modulation and demodulation outputs of AM, DSB-SC.
CO2	Analyze the outputs of FM modulation and demodulation circuits.
CO3	Verify the characteristics of diode detector, PLL and AGC circuits.
CO4	Verify the outputs of Pulse modulation and demodulation circuits such as PAM, PWM and PPM.
CO5	Demonstrate the verification of sampling theorem.
CO6	Explain the characteristics of radio receiver and pre-emphasis and de-emphasis circuits.

ANALOG AND PULSE CIRCUITS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	To analyze the frequency response of a CE amplifier
CO2	To create feedback amplifier and oscillator circuits
CO3	To find the efficiency of Class A power amplifier
CO4	To examine the response of low pass and high pass RC circuit for a square input
CO5	To discover the response of clippers and clampers for different voltage levels
CO6	To demonstrate the design of various types of multivibrator circuits

DIGITAL ELECTRONICS LOGIC DESIGN LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Verify truth tables of basic and Universal gates.
CO2	Design combinational circuits, obtain minimal expression and to verify the truth tables using digital trainer kit.

CO3	Perform logic function verification of various standard combinational circuits.
CO4	Verify the functional tables of various flip-flops.
CO5	Design various sequential circuits using flip-flops and to verify their functionality.
CO6	Perform functional verification of various standard sequential circuits.

III-I Courses

LINEAR AND DIGITAL INTEGRATED CIRCUITS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Interpret the DC and AC analysis of differential amplifiers as a building block of operational amplifier
CO2	Explain the specifications of ideal and practical operational amplifier and their DC, AC characteristics.
CO3	Build various linear and non-linear applications using op-amp operating with negative and positive feedback in closed loop configuration.
CO4	Explain the fundamental frequency of monostable and astable Multivibrators using IC555 timer. Determine the function of Phase Locked Loop and their applications using operational amplifier as IC565.
CO5	Choose appropriate Analog to Digital and Digital to Analog converters for data processing in Microprocessor, Digital signal processing and Communication
CO6	Make use of commercially available sequential and combinational digital ICs to function as Latch, Flip flop, Registers and Counters.

DIGITAL COMMUNICATIONS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Apply the knowledge of statistical theory of communication and understand the basics of digital communication systems.
CO2	Analyze the performance of digital modulation techniques for generation, detection and digital representation of the signal.
CO3	Explore the probability of error for various digital modulation techniques with the help of random variables and filters.
CO4	Integrate and apply the basics of information theory to the communication and compute entropy, information rate of the source.
CO5	Understand and analyze the source coding techniques and channel capacity.
CO6	Compute and analyze different error control coding schemes for reliable transmission of digital information over the channel.

ANTENNA AND WAVE PROPAGATION:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the basic antenna radiation parameters and radiation mechanism of single wire & two wire antennas with current distribution analysis
CO2	Quantify the radiation fields and power radiated by dipole antennas also analyze their radiation characteristics using mathematical approach
CO3	Illustrate the different types of arrays and their radiation patterns with both mathematical and geometrical analysis
CO4	Understand the geometry and working principle of operation of non-resonant radiators and microstrip antennas with qualitative analysis

CO5	Design Microwave antennas also Analyze antenna measurements to assess antenna's performance
CO6	Identify and distinguish the characteristics of different modes of radio wave propagation in the atmosphere with both qualitative and quantitative treatment

COMPUTER ORAGANISATION AND ARCHITECTURE:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Able to understand the basics, evolution and architecture of the computer.
CO2	Able to analyze the machine instructions and how to write programs and can calculate the effective address of an operand by addressing modes.
CO3	Demonstrate the memory organization and understand the concept of cache mapping techniques and able to understand concepts of control unit
CO4	Analyze the concept of I/O organization and design how to interface i/o devices.
CO5	Able to understand the principles of operation of multiprocessor systems.
CO6	Demonstrate the relationship between the software and the hardware and focuses on the foundational concepts that are the basis for current computer design.

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION:

Course Outcomes:

Upon successful completion of this course, students 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	Understand the different types of Special Oscilloscopes and their working principles
CO6	Explore the different types of A.C. and DC Bridges and their operations.

PYTHON PROGRAMMING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand basic python script execution and operators
CO2	Apply python conditional and loop statements
CO3	Understand python data types, memory allocation and methods
CO4	Understand functions and parameter passing and recursive calling of functions
CO5	Understand the object-oriented concepts
CO6	Write the test scripts in python

IPR & PATENTS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	To understand the importance of Intellectual property rights
CO2	To understand the importance which plays a vital role in advanced technical
CO3	Understand and apply the vital role in advanced scientific disciplines
CO4	Understand and apply Intellectual property rights protections
CO5	Apply IPR regulations for further advancement
CO6	Apply latest developments in intellectual properties rights

LINEAR AND DIGITAL INTEGRATED CIRCUITS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Illustrate the block diagram, classifications, package types, temperature range specifications and characteristics of Op-Amp.
CO2	Analyze and design linear and nonlinear applications using Op-Amp.
CO3	Discuss various active filter configurations based on frequency response and construct using 741 OpAmp.
CO4	Design bistable, monostable and astable multivibrators operation by using IC 555 timer and study their applications.
CO5	Analyze the digital to analog converter technique such as weighted resistor DAC, R2R ladder DAC, inverted R-2R ladder DAC and IC 1408 DAC.
CO6	Illustrate the block diagram, classifications, package types, temperature range specifications and characteristics of Op-Amp.

DIGITAL COMMUNICATION LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the Time-Division Multiplexing systems, and verify the output of pulse code modulation and demodulation.
CO2	Analyze the output of differential pulse code modulation and demodulation and verify the delta modulation.
CO3	Analyze the outputs of different digital modulation techniques-FSK, PSK.
CO4	Interpret the outputs of DPSK modulation and demodulation.
CO5	Analyze the outputs of source encoder and decoder, linear block codes, convolution codes and binary cyclic codes.
CO6	Perform and analyze the output of companding circuit.

VHDL PROGRAMMING LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Distinguish logic gates for design of digital circuits
CO2	Design different types of Combinational logic circuits
CO3	Design different types of sequential logic circuits
CO4	Analyze the operation of flip-flops
CO5	Apply knowledge of flip-flops in designing of Registers and Counters
CO6	Analyze the operation of RAM and ALU

III-II Courses

VLSI DESIGN:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the CMOS fabrication flow and also electrical properties of MOS and Bi-CMOS circuit.
CO2	Know the relationship between Ids vs Vds and threshold voltage of MOS transistors.
CO3	Know three sets of design rules with which NMOS and CMOS transistors are fabricated.
CO4	Estimate the scaling factors determining the characteristics and performance of MOS circuits.
CO5	Analyze the concepts of sheet resistance and wiring capacitances of MOS circuits.
CO6	Understand the concepts of FPGA design, synthesis and analyze the design for testability, package selection.

DIGITAL SIGNAL PROCESSING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the representation of different Discrete time signals and apply the difference equations concept in the analysis of discrete time systems
CO2	Interpret and explore the concepts of Discrete Fourier Transforms and Fast Fourier Transforms for various Discrete Time Signals and Sequences.
CO3	Construct the basic structures of Digital FIR and IIR systems.
CO4	Design the Digital IIR Filters from the analog filters using frequency transformations and FIR filters using windowing techniques.
CO5	Illustrate the sampling rate conversion by Decimation and Interpolation processes and extend the concepts to Digital Filter Banks and sub band coding of speech signals
CO6	Interpret the architectural and functional concepts of commercial programmable Digital Signal Processors.

MICROPROCESSOR AND MICROCONTROLLERS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Relate the basic concepts of microprocessor and structural design view
CO2	Illustrate the modes of 8086 by timing diagram.
CO3	Examine the functionality of addressing modes and instruction sets.
CO4	Apply the direct the basic peripherals to the microprocessor
CO5	Build the connection with different devices
CO6	Define the working function of microcontroller with interfacing devices.

CELLULAR AND MOBILE COMMUNICATIONS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate an understanding on cellular communication system, architecture, functioning, various standards and different evolution of cellular communication systems up to 5G
CO2	Interpret the cellular system operation and design concepts, cell splitting.
CO3	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
CO4	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.
CO5	Demonstrates the fundamental techniques to assign a handoff without termination of call, different handoffs, how a dropped call can be overcome.
CO6	To analyze multiple accessing methods, CDMA technology, GSM Architecture and GSM Channels and familiar with 5G challenges

DIGITAL SYSTEM DESIGN:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Model complex digital systems at several levels of abstractions, behavioral, structural, simulation, synthesis and rapid system prototyping.
CO2	To write a test bench in Verilog
CO3	Analyze and design basic digital circuits with combinatorial and sequential logic circuits using Verilog HDL
CO4	Design Analysis of State Machines
CO5	Design of Feedback Sequential Circuits
CO6	Understand the concepts of Memory, CPLDs, FPGAs and ASICs

MACHINE LEARNING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the machine learning concepts and how data is preprocessed
CO2	Predict the linear models
CO3	Analyze distance-based models complexity
CO4	Understand and apply Probabilistic models
CO5	Apply Nonlinear models to different applications to improve efficiency
CO6	Understand how the neural network provide nonlinearity

MICROPROCESSOR & MICROCONTROLLERS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Detect the ALP for Arithmetic and logical operations using 8086 microprocessors
CO2	Judge the given elements in sorting order
CO3	Implement the ADC & DAC interfacing with 8086
CO4	Find number of ones and zeros in a given numbers using keil software
CO5	Do applications using USART, LCD and TLC Interfacing with microcontroller
CO6	Understand the functionality of ARM processor

DIGITAL SIGNAL PROCESSING LABORATORY:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Make use of a software tool to generate various discrete time signals and perform different operations on them.
CO2	Examine Linear and Circular Convolution of discrete time signals.
CO3	Evaluate the Discrete Fourier Transform of a signal and its inverse.
CO4	Analyze the Frequency response of IIR Filters using Butterworth and Chebyshev Approximations.
CO5	Analyze the Frequency Response of FIR filters using windowing techniques.
CO6	Illustrate the Decimation and Interpolation processes on a given Sequence.

VLSI LABORATORY:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Design, implement, and simulate Basic logic gates using S. Edit of Tanner EDA toll and Micro wind using at back end
CO2	Simulate and synthesize Universal gates using Tanner EDA tool and Micro wind Simulate circuits within a Tanner EDA tool and compare to design specifications.
CO3	Design, implement, and simulate circuits using Tanner EDA and Micro wind tool.
CO4	Design Digital logic Counters using Tanner EDA Tools and Implement Using Micro wind Tool.
CO5	Design RAM Cell using Tanner EDA Tools and Implement Using Micro wind Tool.
CO6	Understand Various Design Rules to Obtain the CMOS logic Circuits.

IV-I Courses

MICROWAVE ENGINEERING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Define the basics of microwaves and microwave engineering.
CO2	Study the performance and applications of Reflex klystron.
CO3	Described the operation of microwave solid state device.
CO4	Analyze the modes of operation of Magnetron and Traveling wave tubes.
CO5	Understand the fundamental characteristics of Microstrip lines through electromagnetic field analysis.
CO6	Evaluate the various microwave parameters using a microwave bench setup.

OPTICAL COMMUNICATION:

Course Outcomes:

Upon successful completion of this course, students will be able 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.
CO3	Illustrate various dispersion models Apply splicing techniques on fibers and choose low loss connectors to minimize joint losses.
CO4	Analyze different types of optical sources and photo detectors, External quantum efficiency, and analyze signal transmission, receiver operation and error sources of optical fiber.
CO5	Evaluate the power coupled in to optical fibers and Measurement of Attenuation and Dispersion, Eye pattern.
CO6	Design optical system with budget analysis and to classify principles and types of WDM.

DIGITAL IMAGE PROCESSING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the fundamentals of Digital Image Processing and its applications
CO2	Demonstrate the need for transforms, explain DFT properties and discuss some basic intensity transformation functions
CO3	Explain the fundamentals of spatial and frequency domain filters, restoration techniques and apply various filters to remove noise and enhance quality of image
CO4	Understand color image fundamentals and apply techniques to enhance color images and convert from gray scale to color and vice versa
CO5	Choose various Image compression techniques to reduce the size of image and to transmit within given bandwidth
CO6	Understand and apply various Morphological operations and segmentation techniques to improve the quality of image

SATELLITE COMMUNICATIONS AND RADAR ENGINEERING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the concepts of satellite communications and to analyze the orbital mechanics and launching vehicles.
CO2	Acquire knowledge about various satellite subsystems and basic transmission theory.
CO3	Understand the basic concepts of satellite uplink and downlink design and to analyze the principles of satellite navigation and Global positioning system.
CO4	Acquire the knowledge of Radar system to apply and to design required parameters for a RADAR system and to derive the RADAR Equation.
CO5	Analyze the working principle of CW and Frequency Modulated Radar and their applications.
CO6	Analyze different types of tracking RADARs and to study different types of Radar receivers and displays.

EMBEDDED SYSTEM DESIGN:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Describe the differences between general computing system and the embedded systems.
CO2	Recognize the classification of embedded systems, core of the embedded systems and need for communication interfaces.
CO3	Understand design approaches of embedded hardware and firmware.
CO4	Understand RTOS, RTOS principles, kernel, tasks, threads, multitasking and multiprocessing.
CO5	Apply threads, tasks, process, semaphores and RPC for IPC.
CO6	Understand different embedded software development tools and ARM processor architecture.

DATA COMMUNICATIONS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the concepts of Data Communication networks, different protocols, Standards and layering.
CO2	Analyze open systems interconnection model and various Data Communication circuits.
CO3	Explore the error investigation techniques in data transmission process. Demonstrate the character synchronization and explain the differences between asynchronous and synchronous data formats.
CO4	Analyze different Data-Link Protocols and Data Communications Networks.
CO5	Demonstrate Synchronous Data-Link Control, Frame format, loop operation, message abort
CO6	Elaborate the Congestion control and Quality of Service in Data traffic control.

OPERATING SYSTEMS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Describe the important computer system resources and the structure and functioning of operating system, their process management policies and scheduling of processes by CPU.
CO2	Design various Scheduling algorithms.
CO3	Compare and contrast various memory management schemes.
CO4	Evaluate the requirement for process synchronization and coordination handled by operating system. Describe and analyze the memory management and its allocation policies.
CO5	Understand demand paging, thrashing and principles of deadlocks.
CO6	Understand File system Interface, File System implementation, Mass-storage structure and disk scheduling algorithms.

INDIAN CONSTITUTION:

Course Outcomes:

Upon successful completion of this course, students will be able 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 States and Indian President.
CO4	Know about amendments of the constitution and Emergency Provisions.
CO5	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
CO6	Analyze the decentralization of power between central, state and local self-government.

MICROWAVE ENGINEERING & OPTICAL COMMUNICATION LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Verify the characteristics of Reflex Klystron.
CO2	Verify the characteristics of the Gunn diode.
CO3	Measure the attenuation, frequency, and wavelength using Microwave Bench Setup.
CO4	Measure the characteristics of the multihole Directional Coupler.
CO5	Demonstrate the characteristics of various optical sources and measure different losses that occur in optical fiber link.
CO6	Measure digital data rate and numerical aperture in optical fiber link

IV-II Courses

WIRELESS COMMUNICATIONS NETWORKS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the functioning of wireless communication system and evolution of different wireless communication systems and standards.
CO2	Compare different technologies used for wireless communication systems.
CO3	Explore the architecture, functioning, algorithms, protocols, capabilities and application of various wireless communication networks.
CO4	Analyze various equalization and diversity techniques.
CO5	Analyze various multiple access techniques for Wireless Communication. and security issues associated with wireless networks.
CO6	Acquire knowledge about various wireless data services and their performance.

COMPUTER NETWORKS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Acquire knowledge about various reference models like OSI and TCP/IP and various network topologies like WAN, LAN and MAN.
CO2	Demonstrate the Functions of various protocols of Data link layer and understand the basics of error detection including parity, checksums, and CRC.
CO3	Analyze different services provided to the network layer using Flow control, error detection and correction, different sliding window protocols. MAC layer protocols and LAN technologies are analyzed.
CO4	Design different routing protocols in a network layer using store and forward packet switching with the help of connection oriented and connection less services.
CO5	Acquire knowledge on significance of various Flow control and Congestion control Mechanisms.
CO6	Relationship between Transport and network layer. Acquire Knowledge on Connection less Transport services and functioning of various Application layer Protocols.

INTERNET OF THINGS & APPLICATIONS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the design concepts, protocols, privacy and security of Internet of Things
CO2	Demonstrate IoT communication models, IoT Architecture, IoTWF and alternate models.
CO3	Comprehend and analyze Software defined networks, YANG-NETCONF, IoT nodes, edges TCP/UDP, Static and Dynamic IP Address.
CO4	Develop IT Access Technologies and security for IEEE 802.15.4, 802.15.4g, 802.15.4e, 802.11ah and Lora WAN.
CO5	Develop and build different applications of Arduino and Raspberry Pi projects. Implement interfacing of various sensors with Arduino/Raspberry Pi.
CO6	Analyze the methods of data acquiring, organizing and analytics using Cloud platform for IoT applications. Apply the steps of the design methodology in developing IoT applications.

Signature of HOD
Head, ECE Department
NRI Institute of Technology
POTHAVARAPPADU (V),
Agiripalli (Md), Krishna Dist

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Department of Electronics and Communication Engineering

PO & PSO ATTAINMENTS – BATCH WISE **2018-22 BATCH**

S.No	COURSE NAME	COURSE CODE	INDEX	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
1	PROFESSIONAL ENGLISH-I	18A1100101	C111	-	-	-	-	-	2.71	2.11	2.26	-	2.17	-	1.81	-	-
2	ENGINEERING MATHEMATICS-I	18A1100201	C113	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-
3	APPLIED CHEMISTRY	18A1100205	C118	1.41	1.72	1.88	1.57	-	-	2.66	-	-	-	-	-	-	-
4	FUNDAMENTALS OF ELECTRICAL ENGINEERING	18A1103401	C1114	1.95	1.64	1.34	-	-	-	-	-	-	-	-	-	1.64	1.78
5	ENGINEERING GRAPHICS	18A1103301	C1113	-	-	-	0.93	0.93	-	0.92	-	-	0.93	-	-	-	-
6	ENGLISH COMMUNICATION SKILLS LAB-I	18A1100191	C112	-	-	-	-	-	-	-	-	1.74	1.33	-	1.74	-	-
7	APPLIED CHEMISTRY LAB	18A1100294	C119	1.97	1.64	1.58	1.48	-	-	2.14	-	-	-	-	-	-	-
8	AUTOMATION TOOLS & PROFESSIONAL WORKSHOP	18A1100391	C1118	0.975	0.975	0.975	1.95	1.95	-	-	-	2.42	2.185	2.67	2.428	-	-
9	PROFESSIONAL ENGLISH-II	18A1200101	C121	-	-	-	-	-	2.79	2.79	1.86	1.86	2.42	-	1.86	-	-
10	ENGINEERING MATHEMATICS-II	18A1200201	C123	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-
11	APPLIED PHYSICS	18A1200203	C125	1.85	1.85	-	-	1.85	-	-	-	-	-	-	-	-	-
12	PROGRAMMING AND PROBLEM SOLVING WITH C	18A1205301	C1216	2.8	2.71	2.08	-	1.97	-		-	-	-	-	1.97	-	-
13	ELECTRONIC DEVICES AND CIRCUITS	18A1204401	C1215	2.34	1.84	2.33	2.34	-	-	-	1.55	-	-	-	2.27	2.34	1.95
14	ENVIRONMENTAL STUDIES	18A1200801	C1210	-	1.92	1.6	-	-	-	2.87	-	-	-	-	1.92	-	-
15	ENGLISH COMMUNICATION SKILLS LAB-II	18A1200191	C122	-	-	-	-	-	-	-	-	1.74	1.24	-	2.23	-	-
16	APPLIED PHYSICS LAB	18A1200292	C126	-	1.97	-	1.97	2.96	-	-	-	2.96	-	-	-	-	-
17	PROGRAMMING AND PROBLEM SOLVING WITH C LAB	18A1205302	C1217	2.88	2.72	2.08	-	1.92	-	-	-	-	-	-	1.92	-	-
18	COMPLEX VARIABLES AND TRANSFORM TECHNIQUES	18A2100202	C211	1.47	-	-	-	-	-	-	-	-	-	-	-	-	-
19	DIGITAL ELECTRONICS AND LOGIC DESIGN	18A2104201	C212	1.9	1.72	1.88	-	-	-	-	-	-	1.89	-	1.89	2.37	2.89
20	NETWORK ANALYSIS AND TRANSMISSION LINES	18A2102302	C213	1.57	1.57	-	-	-	-	-	-	-	-	-	1.58	1.56	1.56

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21	SIGNALS AND SYSTEMS	18A2104401	C214	2.2	1.96	1.48	1.48	1.23	-	-	-	-	-	1.45	-	1.11	1.47
22	DATA STRUCTURES	18A2105601	C215	2.55	1.68	1.69	-	-	-	-	-	-	-	-	2.53	2.51	2.57
23	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	18A2100101	C216	1.21	1.24	1.63	-	-	-	2.45	1.63	-	-	2.36	-	-	0.82
24	NETWORK ANALYSIS LAB	18A2102392	C217	2.520	2.520	2.140	-	-	-	-	-	0.940	-	-	2.820	1.580	-
25	BASIC SIMULATION LAB	18A2104392	C218	2.710	1.990	1.810	2.720	1.213	-	-	-	-	-	1.810	-	2.250	1.810
26	ELECTRONIC DEVICES AND CIRCUITS LAB	18A2104491	C219	2.290	2.140	2.570	2.150	-	-	-	-	-	2.580	-	2.000	1.570	2.150
27	PROBABILITY THEORY AND STOCHASTIC PROCESS	18A2200202	C220	1.73	1.85	0.7	0.7	-	-	-	-	-	0.7	-	-	-	1.39
28	ELECTRO MAGNETIC THEORY	18A2204301	C221	2.47	1.6	1.59	-	-	-	-	-	-	-	-	-	-	2.14
29	CONTROL SYSTEMS	18A2204302	C222	2.09	1.44	1.65	1.67	1.19	-	-	-	-	1.54	-	-	2.37	-
30	ANALOG AND PULSE CIRCUITS	18A2204401	C223	2.09	2.28	2.26		1.51								2.27	2.26
31	ANALOG COMMUNICATIONS	18A2204402	C224	2.19	1.81	1.56	-	-	-	1.54	-	-	-	-	1.55	2.34	1.53
32	OOPS THROUGH JAVA	18A2205602	C225	1.75	1.35	1.36	1.97									1.65	1.34
33	PROFESSIONAL ETHICS AND HUMAN VALUES	18A2200801	C226	-	-	-	-	-	1.82	0.76	1.8	0.78	-	-	1.87	-	-
34	ANALOG COMMUNICATIONS LAB	18A2204491	C227	2.54	2.85	2.86	1.905	-	-	-	-	-	-	1.91	-	-	2.54
35	ANALOG AND PULSE CIRCUITS LAB	18A2204492	C228	2.74	2.91	2.9	2.89	1.29	-	-	-	-	-	1.94	-	2.9	2.91
36	DIGITAL ELECTRONICS AND LOGIC DESIGN LAB	18A2204493	C229	2.83	2.82	1.89	1.9		-	0.95	1.89	1.9	-	1.9	0.94	2.36	2.35
37	LINEAR AND DIGITAL INTEGRATED CIRCUITS	18A3104401	C310	2.55	2.54	2.54	1.69	-	-	-	-	-	-	1.7	-	1.69	2.12
38	DIGITAL COMMUNICATIONS	18A3104402	C311	1.77	2.21	1.78	2.22	-	-	-	-	-	-	-	-	-	2.21
39	ANTENNAS AND WAVE PROPAGATION	18A3104403	C312	2.56	2.13	2.55	1.7	-	-	-	-	-	-	1.7	-	1.98	1.29
40	COMPUTER ORGANISATION AND ARCHITECTURE	18A3104512	C313	2.38	1.05	1.79	2.38	-	-	-	-	-	-	-	-	1.77	
41	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	18A3104513	C314	2.61	1.74	1.74	2.61	-	-	-	-	-	-	-	-	1.44	
42	PYTHON PROGRAMMING	18A3112602	C315	2.57	1.7	2.56	2.14									1.71	1.28

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43	IPR AND PATENTS	18A3104802	C316	1.83	1.83	-	-	-	-	-	2.73	1.83	-	-	-	1.85	0.93
44	LINEAR AND DIGITAL INTEGRATED CIRCUIT LABORATORY	18A3104491	C317	2.56	2.75	-	1.83	-	-	-	-	-	-	-	-	2.13	2.75
45	DIGITAL COMMUNICATION LABORATORY	18A3104492	C318	1.96	2.45	1.96	1.97	-	-	-	-	-	-	-	-	-	2.46
46	VHDL PROGRAMMING LAB	18A3104493	C319	2.49	2.8	1.87	1.89	-	-	-	-	-	-	-	1.25	1.87	1.4
47	VLSI DESIGN	18A3204401	C321	1.76	1.76	1.09	1.49	0.83	-	-	1.62	-	-	-	-	2.43	-
48	DIGITAL SIGNAL PROCESSING	18A3204402	C322	1.98	1.75	1.17	1.23	1.94	-	-	-	-	-	1.56	1.55	-	1.58
49	MICROPROCESSORS AND MICROCONTROLLERS	18A3204403	C323	1.72	1.75	1.72	-	-	-	-	-	-	-	-	-	1.71	1.3
50	CELLULAR & MOBILE COMMUNICATIONS	18A3204511	C324	2.4	1.05	1.8	2.26	-	-	-	-	-	-	-	-	1.83	
51	DIGITAL SYSTEM DESIGN	18A3204512	C325	2.4	1.05	1.8	2.4	-	-	-	-	-	-	-	-	2.69	2.24
52	MACHINE LEARNING	18A3212606	C326	1.7	1.68	1.67	1.69		-	-	-	-	-	-	-	-	1.41
53	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	18A3204491	C327	2.68	2.43	2.93	-	-	-	-	-	-	-	-	-	1.47	1.48
54	DIGITAL SIGNAL PROCESSING LABORATORY	18A3204492	C328	-	1.88	1.41	-	1.88	-	-	-	-	-	-	1.88	-	2.04
55	VLSI LABORATORY	18A3204493	C329	2.11	1.3	1.62	1.95	1.96	-	-	-	1.93	-	-	-	2.43	-
56	MICROWAVE ENGINEERING	18A4104401	C410	1.49	1.18	1.19	1.18	-	-	-	-	-	-	-		1.09	-
57	OPTICAL COMMUNICATION	18A4105401	C411	1.98	2.29	2.32	2.32					-	2.32	0.78		1.92	1.89
58	DIGITAL IMAGE PROCESSING	18A4104403	C412	2.27	2.45	2.28	2.19	-	-	-	2.59	-	-	-	2.42	2.2	2.55
59	SATELLITE COMMUNICATIONS & RADAR ENGINEERING	18A4104511	C413	2.56	1.71	1.72	1.72		1.72	1.67	-	1.72	-	1.72	1.71	1.85	1.71
60	EMBEDDED SYSTEM DESIGN	18A4104513	C414	2.29	2.27	2.75	2.71	-	-	-	2.76	1.80	2.70	-	1.80	1.84	1.82
61	DATA COMMUNICATIONS	18A4104521	C415	2.32	2.08	2.32	2.33	-	-	-	2.79	-	2.78	-	1.86	-	1.85
62	OPERATING SYSTEMS	18A4104522	C416	1.7	1.9	-	2.11	-	-	-	-	-	2.53	-	1.68	1.69	-
63	INDIAN CONSTITUTION	18A4100803	C417	1.81	2.72	-	-	-	-		2.32	1.93	2.62	-	0.91	1.42	1.81
64	MICROWAVE ENGINEERING & OC LAB	18A4104491	C418	2.77	1.96	1.96	1.96	-	-	-	-	-	-	-	-	1.96	-
65	MINI PROJECT	18A4104791	C419	2.33	2.48	2.79	2.79	1.86	0.93	-	1.86	-	2.79	1.86	2.79	2.79	2.79
66	WIRELESS	18A4204511	C421	2.55	1.23	-	-	-	-	-	0.93	-	0.93	-	-	1.83	1.85

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	COMMUNICATIONS AND NETWORKS																
67	COMPUTER NETWORKS	18A4204521	C422	2.49	2.47	2.45	2.48	-	-	-	-	-	1.66	-	1.62	2.5	1.23
68	INTERNET OF THINGS AND APPLICATIONS	18A4204522	C423	2.27	1.52	2.25	2.25	1.5	-	1.5	2.25	1.5	2.25	1.5	1.5	1.51	1.51
69	MAIN PROJECT AND SEMINAR	18A4204791	C424	2.28	2.43	2.73	2.73	1.82	1.82	-	1.82	-	2.73	1.82	2.73	2.73	2.73
Total				129.7	117.2	100.5	83.8	29.7	11.7	22.3	32.6	25.0	40.2	26.6	57.0	83.1	79.6
Mapped Subjects				60	60	52	42	18	6	12	16	14	20	15	30	42	42
Total Subjects				69	69	69	69	69	69	69	69	69	69	69	69	69	69
% Contribution				87.1	87.1	75.3	61.0	26.0	87.1	17.1	23.1	20.2	29.1	22.1	43.0	61.2	61.2
AVG				2.16	1.95	1.93	2	1.66	1.97	1.86	2.04	1.79	2.01	1.78	1.9	1.98	1.9

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COURSE OUTCOMES – ATTAINMENT LEVELS 2018-22 BATCH

2018-22 BATCH SEMESTER 1										
A.Y.	Subject	Subject Code	Index	Cos					
				1	2	3	4	5	6
2018-19	PROFESSIONAL ENGLISH-I	18A1100101	C111	2.7	2.79	2.88	2.7	2.62	2.55
	ENGINEERING MATHEMATICS-I	18A1100201	C113	2.7	2.66	2.66	2.28	2.68	2.61
	APPLIED CHEMISTRY	18A1100205	C118	2.81	2.76	2.74	2.82	2.81	2.81
	FUNDAMENTALS OF ELECTRICAL ENGINEERING	18A1103401	C1114	2.75	2.61	2.62	2.77	2.66	2.66
	ENGINEERING GRAPHICS	18A1103301	C1113	2.77	2.76	2.77	2.76	-	-
	ENGLISH COMMUNICATION SKILLS LAB-I	18A1100191	C112	2.99	2.98	2.96	2.98	2.96	2.96
	APPLIED CHEMISTRY LAB	18A1100294	C119	2.98	2.96	2.95	2.96	2.94	2.94
	AUTOMATION TOOLS & PROFESSIONAL WORKSHOP	18A1100391	C1118	2.92	2.91	2.89	2.9	-	-
2018-22 BATCH SEMESTER 2									
2018-19	PROFESSIONAL ENGLISH-II	18A1200101	C121	2.78	2.8	2.67	2.82	2.59	2.6
	ENGINEERING MATHEMATICS-II	18A1200201	C123	2.69	2.66	2.68	2.68	2.66	2.66
	APPLIED PHYSICS	18A1200203	C125	2.76	2.77	2.76	2.83	2.82	2.81
	PROGRAMMING AND PROBLEM SOLVING WITH C	18A1205301	C1216	2.22	2.18	2.17	2.29	2.25	2.25
	ELECTRONIC DEVICES AND CIRCUITS	18A1204401	C1215	2.4	2.32	2.26	2.35	2.33	2.3
	ENVIRONMENTAL STUDIES	18A1200801	C1210	2.87	2.81	2.86	2.91	2.92	2.91
	ENGLISH COMMUNICATION SKILLS LAB-II	18A1200191	C122	2.99	2.98	2.96	2.98	2.96	2.96
	APPLIED PHYSICS LAB	18A1200292	C126	2.98	2.96	2.95	2.96	2.95	2.95
	PROGRAMMING AND PROBLEM SOLVING WITH C LAB	18A1205302	C1217	2.9	2.88	2.87	2.88	2.87	2.87
2018-22 BATCH SEMESTER 3									
19 - 20	COMPLEX VARIABLES AND	18A2100202	C211	2.23	2.16	2.19	2.23	2.15	2.19

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	TRANSFORM TECHNIQUES								
	DIGITAL ELECTRONICS AND LOGIC DESIGN	18A2104201	C212	2.87	2.89	2.9	2.81	2.75	2.87
	NETWORK ANALYSIS AND TRANSMISSION LINES	18A2102302	C213	2.33	2.38	2.33	2.36	2.37	2.32
	SIGNALS AND SYSTEMS	18A2104401	C214	2.24	2.24	2.11	2.23	2.16	2.19
	DATA STRUCTURES	18A2105601	C215	2.55	2.51	2.52	2.53	2.49	2.56
	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	18A2100101	C216	2.38	2.43	2.48	2.44	2.44	2.35
	NETWORK ANALYSIS LAB	18A2102392	C217	2.82	2.83	2.85	2.84	2.83	2.88
	BASIC SIMULATION LAB	18A2104392	C218	2.72	2.7	2.72	2.7	2.71	2.71
	ELECTRONIC DEVICES AND CIRCUITS LAB	18A2104491	C219	2.57	2.56	2.57	2.58	2.57	2.58
	2018-22 BATCH SEMESTER 4								
2019-20	PROBABILITY THEORY AND STOCHASTIC PROCESS	18A2200202	C220	2.07	2.09	2.02	2.1	2.09	2.04
	ELECTRO MAGNETIC THEORY	18A2204301	C221	2.47	2.43	2.43	2.36	2.37	2.34
	CONTROL SYSTEMS	18A2204302	C222	2.5	2.34	2.46	2.27	2.31	2.13
	ANALOG AND PULSE CIRCUITS	18A2204401	C223	2.27	2.28	2.24	2.27	2.27	2.22
	ANALOG COMMUNICATIONS	18A2204402	C224	2.32	2.34	2.35	2.3	2.3	2.26
	OOPS THROUGH JAVA	18A2205602	C225	2.16	2.14	2.11	1.99	1.98	1.95
	PROFESSIONAL ETHICS AND HUMAN VALUES	18A2200801	C226	2.33	2.32	2.27	2.26	2.26	2.21
	ANALOG COMMUNICATIONS LAB	18A2204491	C227	2.86	2.85	2.85	2.85	2.85	2.85
	ANALOG AND PULSE CIRCUITS LAB	18A2204492	C228	2.91	2.9	2.88	2.92	2.9	2.91
	DIGITAL ELECTRONICS AND LOGIC DESIGN LAB	18A2204493	C229	2.82	2.82	2.84	2.84	2.82	2.82
	2018-22 BATCH SEMESTER 5								
2020-21	LINEAR AND DIGITAL INTEGRATED CIRCUITS	18A3104401	C310	2.57	2.58	2.54	2.52	2.53	2.54
	DIGITAL COMMUNICATIONS	18A3104402	C311	2.65	2.64	2.64	2.66	2.7	2.64
	ANTENNAS AND WAVE PROPAGATION	18A3104403	C312	2.6	2.56	2.53	2.57	2.54	2.52
	COMPUTER ORGANIZATION AND ARCHITECTURE	18A3104512	C313	2.67	2.68	2.61	2.72	2.71	2.65

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	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	18A3104513	C314	2.58	2.6	2.58	2.65	2.6	2.57
	PYTHON PROGRAMMING	18A3112602	C315	2.58	2.55	2.54	2.56	2.56	2.55
	IPR AND PATENTS	18A3104802	C316	2.71	2.7	2.7	2.76	2.76	2.74
	LINEAR AND DIGITAL INTEGRATED CIRCUIT LABORATORY	18A3104491	C317	2.75	2.74	2.74	2.74	2.75	2.75
	DIGITAL COMMUNICATION LABORATORY	18A3104492	C318	2.93	2.94	2.95	2.95	2.94	2.93
	VHDL PROGRAMMING LAB	18A3104493	C319	2.81	2.8	2.79	2.82	2.81	2.81
	2018-22 BATCH SEMESTER 6								
2020-21	VLSI DESIGN	18A3204401	C321	2.47	2.46	2.41	2.43	2.4	2.4
	DIGITAL SIGNAL PROCESSING	18A3204402	C322	2.43	2.45	2.34	2.31	2.33	2.32
	MICROPROCESSORS AND MICROCONTROLLERS	18A3204403	C323	2.62	2.58	2.6	2.55	2.49	2.46
	CELLULAR & MOBILE COMMUNICATIONS	18A3204511	C324	2.74	2.72	2.66	2.72	2.68	2.66
	DIGITAL SYSTEM DESIGN	18A3204512	C325	2.75	2.72	2.71	2.65	2.64	2.66
	MACHINE LEARNING	18A3212606	C326	2.57	2.53	2.5	2.54	2.52	2.5
	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	18A3204491	C327	2.93	2.93	2.91	2.95	2.91	2.94
	DIGITAL SIGNAL PROCESSING LABORATORY	18A3204492	C328	2.84	2.82	2.82	2.82	2.81	2.83
	VLSI LABORATORY	18A3204493	C329	2.94	2.9	2.92	2.92	2.91	2.89
	2018-22 BATCH SEMESTER 7								
2021-22	MICROWAVE ENGINEERING	18A4104401	C410	1.79	1.77	1.7	1.81	1.84	1.75
	OPTICAL COMMUNICATION	18A4105401	C411	2.32	2.28	2.26	2.25	2.26	2.26
	DIGITAL IMAGE PROCESSING	18A4104403	C412	2.5	2.48	2.42	2.64	2.62	2.59
	SATELLITE COMMUNICATIONS & RADAR ENGINEERING	18A4104511	C413	2.57	2.57	2.57	2.58	2.53	2.5
	EMBEDDED SYSTEM DESIGN	18A4104513	C414	2.75	2.77	2.75	2.7	2.73	2.7
	DATA COMMUNICATIONS	18A4104521	C415	2.77	2.78	2.78	2.75	2.75	2.74
	OPERATING SYSTEMS	18A4104522	C416	2.55	2.5	2.52	2.52	2.52	2.53
	INDIAN CONSTITUTION	18A4100803	C417	2.71	2.71	2.7	2.89	2.89	2.88
	MICROWAVE ENGINEERING & OC	18A4104491	C418	2.95	2.95	2.93	2.93	2.94	2.91

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	LAB								
	MINI PROJECT	18A4104791	C419	2.79	2.79	2.79	2.79	2.79	2.79
2018-22 BATCH SEMESTER 8									
2021-22	WIRELESS COMMUNICATIONS AND NETWORKS	18A4204511	C421	2.78	2.76	2.74	2.78	2.8	2.77
	COMPUTER NETWORKS	18A4204521	C422	2.5	2.48	2.45	2.47	2.49	2.42
	INTERNET OF THINGS AND APPLICATIONS	18A4204522	C423	2.28	2.26	2.22	2.27	2.24	2.23
	MAIN PROJECT AND SEMINAR	18A4204791	C424	2.72	2.72	2.72	2.72	2.72	2.72

POs attainment levels for Batch 2018 – 2022 (LYG)

Batch 2018 – 2022 (LYG)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	2.15	1.94	1.93	2	1.64	1.97	1.89	2.04	1.79	2.01	1.78	1.9
PE Survey	2.4	2.6	2.6	2.5	2.6	2.6	2.7	2.6	2.7	2.6	2.7	2.6
Alumni survey	2.6	2.5	2.5	2.6	2.5	2.6	2.4	2.7	2.6	2.6	2.7	2.7
Final Po Attainment	2.22	2.06	2.06	2.11	1.82	2.1	2.02	2.16	1.96	2.14	1.96	2.05

PSOs attainment levels for Batch 2018 – 2022 (LYG)

Batch 2018 – 2022 (LYG)	PSO 1	PSO 2
DIRECT ATTAINMENT	1.98	1.9
PE Survey	2.6	2.5
Alumni survey	2.6	2.6
Final Attainment	2.11	2.04

Signature of HOD
Head, ECE Department
NRI Institute of Technology
POTHAVARAPPADU (Vill)
Agiripalli (Mdl), Krishna Dist.

2018-22 BATCH																
S.No	COURSE NAME	COURSE CODE	INDEX	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 I	PSO II
1.	PROFESSIONAL ENGLISH-I	18A1100101	C111	-	-	-	0.81	-	2.5	2.5	2.5	1.64	1.505	-	1.0967	0.823	1.653
2.	ENGLISH COMMUNICATION SKILLS LAB-I	18A1100191	C112	1.85	1.04	1.55	-	-	-	-	-	-	-	-	-	0.63	0.63
3.	ENGINEERING MATHEMATICS-I	18A1100201	C113	2.06	1.14	0.96	0.70	0.71	1.92	1.94	-	-	-	2.02	1.94	1.79	1.52
4.	APPLIED CHEMISTRY	18A1100205	C114	0.91	0.84	0.83	0.82	0.54	-	-	-	-	-	-	-	0.61	0.61
5.	APPLIED CHEMISTRY LAB	18A1100294	C115	2.06	1.42	0.78	-	-	2.3117	2.3117	2.3117	-	-	2.188	2.3117	-	1.543
6.	ENVIRONMENTAL STUDIES	18A1100801	C116	1.86	0.62	-	0.62	-	-	-	1.825	-	-	1.84	-	1.133	1.143
7.	FUNDAMENTALS OF ELECTRICAL ENGINEERING	18A1102301	C117	-	-	-	-	-	2.3733	-	-	1.58	1.8417	-	2.235	-	0.793
8.	ENGINEERING GRAPHICS	18A1103301	C118	1.41	1.8	1.28	1.8	1.15	-	-	-	-	-	-	-	1.67	1.41
9.	PROFESSIONAL ENGLISH-II	18A1200101	C119	2.34	0.79	2.35	0.79	0.79	2.35	2.3433	2.34	1.876	-	-	2.34	2.186	2.08

10.	ENGLISH COMMUNICATION SKILLS LAB-II	18A1200191	C121	-	-	-	-	-	0.76	0.76	-	0.745	0.75	-	1.13	0.76	0.75
11.	ENGINEERING MATHEMATICS-II	18A1200201	C122	2.33	2.08	2.35	-	-	-	-	-	-	-	-	-	0.8	-
12.	APPLIED PHYSICS	18A1200203	C123	2.18	1.93	1.82	-	-	-	-	-	-	-	-	-	0.72	-
13.	APPLIED PHYSICS LAB	18A1200292	C124	-	-	-	-	-	1	-	-	1	1.67	-	1.17	-	1
14.	BASIC ENGINEERING AND IT WORKSHOP	18A1200391	C125	1.73	1.51	1.77	-	1.18	-	-	-	-	-	-	-	1.73	-
15.	ELECTRICAL CIRCUIT ANALYSIS-I	18A1202401	C126	1.685	1.12	0.75	0.56	0.56	1.695	-	1.69	0.58	-	-	-	1.502	1.238
16.	PROGRAMMING AND PROBLEM SOLVING WITH C	18A1205301	C127	-	-	-	-	-	1	-	-	0.7967	0.7917	-	2	-	1
17.	PROGRAMMING AND PROBLEM SOLVING WITH C LAB	18A1205392	C128	1.97	1.45	1.18	0.78	0.78	1.58	-	-	-	0.78	0.79	1.55	1.44	1.57

18.	COMPLX VARIABLE AND TRANSFORM TECH	18A2100202		3	3	1.5	3	-	-	-	-	0.79	-	-	-	2.5	2
19.	ELECTRICAL CIRCUITS ANALYSIS-II	18A2102401		1.49	1.27	1.44	1.05	1.06	-	-	-	-	-	-	-	1.35	1.32
20.	ELECTRICAL MACHINES-I	18A2102402		1.43	1.45	1.45	1.45	1.49	-	-	-	-	-	-	-	1.46	1.49
21.	ELECTRICAL CIRCUITS LAB	18A2102491		1.18	1.47	1.32	-	-	-	-	-	-	-	-	-	1.05	1.05
22.	THERMAL AND HYDRO PRIME MOVERS	18A2103302		1.85	1.94	1.46	2.15	-	-	-	-	-	-	-	-	1.64	1.43
23.	THERMAL AND HYDRO PRIME MOVERS LAB	18A2103391		1.39	1.39	1.4	1.4	1.38	-	-	-	-	-	-	-	1.39	1.39
24.	BASIC ELECTRONIC DEVICES AND CIRCUITS	18A2104301		-	2.19	-	-	1.97	-	1.92	1.96	-	-	-	1.21	-	1.2
25.	BASIC ELECTRONIC DEVICES AND CIRCUITS LAB	18A2104391		2.23	2.23	2.23	2.23	2.23	2.22	-	-	-	-	-	-	2.23	2.23

26.	MANAGERIAL ECONOMICS AND FINANCIAL	18A2200101		2.23	2.23	2.23	2.25	2.23	2.24	-	-	-	-	-	-	2.23	2.22
27.	PROFESSIONAL ETHICS AND HUMAN VALUE	18A2200801		1.65	1.38	1.38	-	-	-	-	-	-	-	-	-	1.6	1.38
28.	ELECTRO MAGNETIC FIELDS	18A2202401		3	2.67	2.75	2	2	-	-	-	-	-	-	-	2.67	-
29.	CONTROL SYSTEMS	18A2202402		2.4	2.2	2.33	-	2.33	-	-	-	-	-	-	-	2.5	2.5
30.	ELECTRIELCALMACHINES-II	18A2202403		2	2	2	2	2	-	-	-	-	-	-	-	2	2
31.	POWER SYSTEMS I	18A2202404		2.33	2	2.33	3	-	-	-	-	-	-	-	-	2.6	2.67
32.	ELECTRICAL MACHINES-I LAB	18A2202491		-	-	-	-	-	1.03	1.1	1.03	1.03	-	1.03	1.03	-	1.15
33.	CONTROL SYSTEMS LAB	18A2202492		3	3	-	-	-	-	-	-	3	-	-	-	3	-
34.	DATA STRUCTURES	18A2205601		2.06	2.08	-	2.06	1.24	-	-	-	-	-	-	1.49	1.98	-
35.	INDIAN CONSTITUTION	18A3100801		1.91	1.73	1.34	2.08	1.39	-	-	-	-	-	-	-	1.68	1.33
36.	ELECTRICAL MEASUREMENTS	18A3102401		-	2	2	2	-	2	2	-	-	-	-	-	2	2
37.	POWER SYSTEMS-II	18A3102402		2.83	2.25	2	2.67	2.33	1	-	-	-	2	-	2	-	3

38.	POWER ELECTRONICS	18A3102403		2.67	2.33	2	2.17	-	-	-	-	-	-	-	-	2	2
39.	ELECTRICAL MACHINES-II LAB	18A3102491		1.33	1.36	1.31	1.41	1.35	-	-	-	-	-	-	-	1.34	1.39
40.	POWER ELECTRONICS LAB	18A3102492		1.74	1.49	1.24	1.49	0.99	-	-	-	1.25	-	-	-	1.61	1.49
41.	ELECTRICAL MEASUREMENTS LAB	18A3102493		2.24	2.12	2.25	2.25	2.3	-	-	-	-	-	-	-	2.23	2.23
42.	SWITCHING THEORY AND LOGIC DESIGN	18A3104301		3	3	-	-	-	-	-	-	3	-	-	-	3	3
43.	OOPS THROUGH JAVA	18A3105602		2.5	2.5	3	-	-	-	-	-	-	-	-	-	2	2
44.	MANAGEMENT SCIENCE	18A3200601		1.55	1.51	1.53	1.49	-	-	1.55	-	1.52	-	-	-	1.53	1.52
45.	MICROPROCESSORS AND MICRO CONTROLLERS	18A3202301		1.52	1.17	1.34	-	-	-	-	-	-	-	-	-	1.55	1.44
46.	MPMC LAB	18A3202391		2.28	1.52	0.77	0.77	1.52	-	-	-	-	-	-	-	0.77	-
47.	POWER ELECTRONIC CONTROLLERS AND DR	18A3202401		1.75	2	1.5	1.5	-	-	-	-	-	-	-	-	2	2
48.	INSTRUMENTATION	18A3202402		3	3	-	-	-	-	-	-	3	-	-	-	3	-

49.	POWER SYSTEM ANALYSIS	18A3202403		2.33	2.5	2.5	-	-	-	-	-	2.67	-	-	2.5	2.5	-
50.	UTILIZATION OF ELECTRICAL ENERGY	18A3202404		2.24	1.37	0.75	0.75	1.49	-	-	-	-	-	-	-	0.75	-
51.	ELECTRICAL SIMULATION LAB	18A3202491		1.69	2.56	1.89	2.13	-	-	-	-	-	-	-	-	1.41	1.69
52.	MINI PROJECT	18A3202791		1.47	1.32	1.93	1.37	1.3	-	-	-	-	-	-	-	1.3	1.33
53.	IPR& PATENTS	18A4100802		1.43	1.5	1.53	1.49	1.63	-	-	-	-	-	-	-	1.54	-
54.	SWITCH GEAR AND PROTECTION	18A4102401		1.73	2.05	2.16	-	2.34	-	-	-	-	-	-	-	1.67	-
55.	POWER SYSTEM OPERATION AND CONTROL	18A4102402		1.83	1.83	1.83	1.79	1.84	-	-	-	-	-	-	-	1.82	-
56.	DIGITAL CONTROL SYSTEMS	18A4102403		2.7	2.2	2.12	-	-	-	-	-	-	-	-	-	2.25	1.8
57.	POWER SYSTEMS LAB	18A4102491		3	3	3	-	-	-	-	-	3	-	-	-	3	3
58.	ELECTRICAL ENGINEERING WORKSHOP	18A4102492		1.76	1.81	-	-	-	-	-	-	1.25	-	-	-	1.88	2.21

59.	ELECTRICAL DISTRIBUTION SYSTEMS	18A4102511		1.81	1.8	-	1.84	-	1.82	-	-	-	-	1.82	-	1.81	1.81
60.	HVDC TRANSMISSION	18A4102521		1.84	-	1.76	-	-	-	-	-	-	1.68	1.68	-	2.02	1.75
61.	TERM PAPER	18A4102791		1.08	1.05	1	-	1.05	1.12	1.09	-	-	-	-	-	1.07	1.07
62.	TECHNICAL SEMINAR	18A4102792		2	2	2	2	2	-	-	-	-	-	-	-	2	2
63.	LINEAR INTEGRATED CIRCUITS AND APPL	18A4104609		1.65	1.65	1.51	1.24	-	-	-	-	-	-	-	-	1.65	1.65
64.	FLEXIBLE AC TRANSMISSION SYSTEMS	18A4202511		2.77	2.77	2.77	2.77	2.77	2.77	-	2.77	-	2.77	2.77	2.77	2.77	2.77
65.	SPECIAL ELECTRICAL MACHINES	18A4202522		2.32	1.755	2.11	-	-	-	-	-	-	-	-	-	1.783	1.776
66.	PROJECT	18A4202791		2	2	2	2	2	-	-	-	-	-	-	-	2	2
Total				115.742	108.3417	89.034	63.867	49.935	29.185	15.015	13.9267	27.088	12.2833	14.138	25.677	102.47	86.94
Mapped Subjects				55	56	47	34	27	15	8	6	15	7	8	14	52	46
Total Subjects				66	66	66	66	66	66	66	66	66	66	66	66	66	66
% Contribution				83.33	84.84	71.21	51.51	40.91	22.72	12.12	9.09	22.72	10.61	12.12	21.21	78.78	69.69
AVERAGE				**2.11**	**1.95**	**1.89**	**1.89**	**1.84**	**1.97**	**1.89**	**2.24**	**1.84**	**1.82**	**1.87**	**1.81**	**1.97**	**1.91**

NRI Institute of Technology, Agiripalli

Course Structure for B.Tech [CSE]

CRYPTOGRAPHY AND NETWORK SECURITY:

Course Outcomes:

	Upon successful completion of the course, the student will be able to:
CO1	Understand the principles of cryptography and security, with enciphering Techniques and analyze a variety of threats and attacks.
CO2	Distinguish the black ciphers and stream ciphers and apply them on a various symmetric cryptographi techniques.
CO3	Understand the principle and mathematical models used in public-key cryptosystems by applying then on different (various) types of algorithms.
CO4	Analyze the message authentication functions with its types and digital certifications for secure communication.
CO5	Understand the user authentications principles and security approach at both the web and email.
CO6	Understand the concept of Email, IP, web Security with its services and dealing with the firewalls and Viruses

NATURAL LANGUAGE PROCESSING:

Course Outcomes:

	Upon successful completion of the course, the student will be able to:
CO1	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
CO2	Understand and carry out proper experimental methodology for training and evaluating

	empirical NLP systems
CO3	Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
CO4	Able to design, implement, and analyze NLP algorithms
CO5	Able to design different language modeling Techniques.

AUGMENTED REALITY & VIRTUAL REALITY:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Understand Basics of Augmented Reality and Interactions. Fundamentals of Augmented , Mixed Reality a its features
CO2	Understand Basics of Virtual Reality and Interactions. Fundamental Concepts and Components of Virt Reality
CO3	Describe various input and output devices required for VR experience
CO4	Classify human factors that affect VR experience
CO5	Analyze the performance of various virtual reality applications.
CO6	Express the object position and orientation in virtual space.

BLOCKCHAIN TECHNOLOGY:

Course Outcome:

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

CO1	Learn about research advances related to one of the most popular technological areas today.
CO2	Demonstrate the block-chain services to develop a New Paradigm of Organizational activities
CO3	Learn the limitations of the block-chain mechanism to develop an efficient organizational structure
CO4	Applying Bit-Coin protocols and how to develop the digital currency in the websites

INTELLIGENT SYSTEMS:

Course Outcomes:

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

CO1	Explore various Artificial Intelligence problem solving techniques.
CO2	Identify and describe the different AI approaches such as Knowledge representation, Search strategi learning techniques to solve uncertain imprecise, stochastic and nondeterministic nature in AI problems
CO3	Apply the AI techniques to solve various AI problems.
CO4	Analyze and compare the relative challenges pertaining to design of Intelligent Systems.

REAL TIME SYSTEMS:

Course Outcomes:

CO1	Understand concepts of Real time Systems and commands
CO2	Be able to explain real-time concepts such as preemptive multitasking, task priorities, priority inversions, mutual exclusion, context switching, and synchronization, interrupt,latency and response time, and semaphores.
CO3	Discuss how tasks can communicate using semaphores, mailboxes, and queues.
CO4	Be able to explain how the real-time operating system implements time management.

DATA SCIENCE:

Course Outcomes:

Upon successful completion of the course, the student will be able to:	
CO1	Able to learn fundamentals of Data Science.
CO2	Understanding different Data collection and Pre-Processing methods.
CO3	Understanding the use of various Descriptive Statistics.
CO4	Analyzing various Data analytics techniques.
CO5	Use of Regression Techniques.
CO6	Evaluation of Various Models.

HIGH PERFORMANCE COMPUTING:

Course Outcomes:

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

CO1	Analyze the functionality of Modern Processor.
CO2	Comprehend and implement various optimization techniques for serial code.
CO3	Design the concept of parallel computing and Programming.
CO4	To study about memory parallel programming using open MP and MPI

MACHINE LEARNING:

Course Outcome:

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

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

AI APPLICATION DEVELOPMENT LAB:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Describe various machine learning algorithms for AI applications
CO2	Describe the development lifecycle of AI applications
CO3	Describe the principles of AI for IoT applications
CO4	Collect data from Internet and perform data preprocessing
CO5	Identify suitable machine learning models for AI applications
CO6	Develop software programs to effectively train machine learning models for AI applications

PREDICTIVE ANALYTICS :

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Able to Implement Linear and Multiple Regressions.
CO2	Able to Estimating Probabilities using a logistic function and the prediction of Categorical placement.
CO3	Able to build Various Time-series models.
CO4	Able to implement the applications single and multiple decision trees.
CO5	Able to build multiple Linear regression models across the range of predictor values.
CO6	Able to know outcome variable's values.

THE FULL STACK WEB DEVELOPMENT – LAB:

Course Outcome:

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

CO1	Analyze existing problems with the team, development process and wider organization
CO2	Apply a thorough understanding of Mongo Db principles and specific practices
CO3	Select the most appropriate way to improve results for a specific circumstance or need
CO4	Judge and craft appropriate adaptations to existing practices or processes depending upon analysis of typi problems
CO5	Evaluate likely successes and formulate plans to manage likely risks or problems
CO6	Create high quality applications

DEEP LEARNING:

Course Outcome:

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

CO1	Understand the basic concepts of neural network, its applications and various learning models
CO2	Acquire the knowledge on Recurrent, Recursive Nets and Auto-encoder models
CO3	Analyze different Network Architectures, learning tasks, Convolutional networks
CO4	Use an efficient algorithm for Deep Models
CO5	Apply optimization strategies for large scale applications

SYSTEM MODELLING AND SIMULATION:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Explain the basic system concept and definitions of system
CO2	Discuss techniques to model and to simulate various systems
CO3	Analyze a system and to make use of the information to improve the performance
CO4	Illustrate the operation of a dynamic system and make improvement according to the simulation results.
CO5	Describe the behavior of a dynamic system and create an analogous model for a dynamic system
CO6	Explain the system concept and apply functional modeling method to model the activities of a static systen

CYBER FORENSICS:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Students will understand the usage of computers in forensic
CO2	How to use various forensic tools for a wide variety of investigations
CO3	Understanding of the cyber security needs of an organization.
CO4	It gives an opportunity to students to continue their zeal in research in computer forensics

III - I Courses

ADVANCED DATA STRUCTURES:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Able to understand the importance, operations and application of Hashing
CO2	Able to understand implementation of skip lists
CO3	Able to get a good understanding about different balanced trees.
CO4	Able to understand the implementation of heaps and binomial queues.
CO5	Have an idea on applications of algorithms in a variety of areas, like string matching, indexing etc.
CO6	Able to understand the importance and applications of tries

COMPUTER NETWORKS:

Course Outcomes:

Upon successful completion of the course, the student will be able to:	
CO1	Able to understand OSI and TCP/IP models.
CO2	Able to design applications using internet protocols.
CO3	Understand routing and congestion control algorithms.
CO4	Understand how the internet works.

FORMAL LANGUAGES AND AUTOMATA THEORY:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Able to use basic concepts of formal languages of finite automata techniques
CO2	Student able to design Finite Automata's for different Regular Expressions and Languages
CO3	Construct context free grammar for various languages
CO4	Solve various problems of applying normal form techniques, push down automata and Turing Machines
CO5	Participate in GATE, PGECET and other competitive examinations

SCRIPTING LANGUAGES:

Type Of Course : Professional Elective – 1.1

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Ability to master the theory behind scripting and its relationship to classic programming.
CO2	Ability to apply your knowledge of the weaknesses of scripting languages to select implementation.
CO3	Able to gain some fluency programming in Perl and related languages.
CO4	Identify PHP encryption functions and Mcrypt Package.
CO5	Understand PHP Authentication and Methodologies
CO6	To design and implement one's own scripting language.

COMPUTER GRAPHICS AND MULTIMEDIA ANIMATION

Type of Course :Professional Elective – 1.2

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Design and apply two-dimensional primitives and filling methods
CO2	Design and apply two-dimensional and three-dimensional transformations.
CO3	Apply visible surface detection methods for identifying back-faces.
CO4	Understood Different types of Multimedia fundamentals.

DATA WAREHOUSING AND DATA MINING

Type of Course :Professional Elective – 1.3

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Understand the basic concepts of warehousing and data preprocessing techniques
CO2	Derive various interesting patterns and associations in datasets.
CO3	Design and develop classifier models to predict future trends.
CO4	Apply unsupervised learning techniques for a given application.

PRINCIPLES OF PROGRAMMING LANGUAGES

Type of Course : Professional Elective – 1.4

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Analyze the basic concepts of programming language, the general problems and methods related to syntax & semantics.
CO2	Interpret the structured data objects, subprograms and programmer defined data types.
CO3	Outline the sequence control and data control.
CO4	Apply the concepts of storage management using programming languages.
CO5	Implementing the Subprogram call and return.
CO6	Classify various programming languages like procedural, non-procedural, structured and object oriented programming language.

COMPUTER NETWORKS LAB:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Should be able to Calculate Data link layer farming methods like bit stuffing and byte stuffing.
CO2	Should be able to Analyze Cyclic redundancy check on different polynomials.
CO3	Should be able to understand Socket Programming Implementation by using TCP and UDP Protocols.

ADVANCED DATA STRUCTURES LAB:

Course Outcomes:

Upon successful completion of the course, the student will be able to:	
CO1	Implement Hashing
CO2	Students able to implement programs on skip lists
CO3	Implement different balanced trees.
CO4	Implement heaps and binomial queues.
CO5	Implement various string matching algorithms
CO6	Implement different search trees

BASICS OF CIVIL AND MECHANICAL ENGINEERING

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Understand the concepts of force and friction, direction and its application & able to demonstrate the basic surveying skills
CO2	Identify different building materials and their importance in building construction.
CO3	Differentiate brick masonry, stone masonry and types of flooring & roofing.
CO4	Familiarize with the Engineering materials, their types, properties and applications.
CO5	Familiarize with the basic manufacturing processes used in manufacturing of products.
CO6	Analyze coplanar concurrent systems and Familiarize with fundamental principles of thermodynamics.

COMPETITIVE CODING:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Understand and design solutions for problems based on various printing patterns/shapes
CO2	Understand the basic principles of various number based problems and design solutions
CO3	Apply appropriate algorithm design technique to solving array based application problems
CO4	Identify suitable method to solve problems based on functions and recursion
CO5	Understand and solve problems based on pointers
CO6	Analyze and design solutions based on linked lists, stacks and queues.

SEMINAR:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	To enable the students experience and reflect upon their own thinking as it is expressed in communication with others.
CO2	To Examine various newspapers, magazines, articles and books, journals, the web, and other instances of contemporary expression so as to discern genuine thinking from the spurious.
CO3	To learn to work on oral skills like conversational practices, extempore and role play
CO4	To learn the oral presentation techniques(planning preparation practice and presenting)
CO5	To improve presentation skills and develop confidence level in students
CO6	To inculcate the scientific analysis and research on various research topics and get good critical thinking and understanding.

INDIAN CONSTITUTION

Course Outcome:

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

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III – II Courses

OPERATING SYSTEMS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Describe the important computer system resources and the structure and functioning of operating system, their process management policies and scheduling of processes by CPU.
CO2	Evaluate the requirement for process synchronization and coordination handled by operating system. Describe and analyze the memory management and its allocation policies.
CO3	Understand demand paging, thrashing and principles of deadlocks.
CO4	Understand File system Interface, File System implementation, Mass-storage structure and disk scheduling algorithms.

DESIGN AND ANALYSIS OF ALGORITHMS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Analyze worst-case running times of algorithms using asymptotic analysis and components
CO2	Describe the divide and conquer method explains when an algorithmic design situation demands it.
CO3	Describe the greedy method explains when an algorithmic design situation demands it.
CO4	Describe the dynamic-programming paradigm explains when an algorithmic design demands it.
CO5	Describe the back tracking method explains when an algorithmic design demands it.
CO6	Describe the branch and bound paradigm and deterministic methods e-plain when an algorithmic design demands it.

COMPILER DESIGN:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Describe the major concept and areas of language translation in compilers, the functionality and complexity levels of various translators, linkers, loaders.
CO2	Describe practical experience in phases of compiler.
CO3	Compare and differentiate various parsing and grammar transformation techniques
CO4	Construct intermediate code and performs type checking.
CO5	Schedule symbol table and its organization.
CO6	Illustrate Code generation, obtains machine independent code optimization and instruction scheduling.

ARTIFICIAL INTELLIGENCE:

Course Outcome:

Upon Completion of the course, the students will be able to	
CO1	Possess the ability to formulate an efficient problem space for a problem expressed in English
CO2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
CO3	Possess the skill for representing knowledge using the appropriate technique.
CO4	Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing
CO5	Apply the knowledge to develop the solutions for real life problems
CO6	Develop new algorithms to contribute to the research arena

OPERATING SYSTEMS &UNIX PROGRAMMING LAB

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Students able to implement CPU scheduling algorithms ,File Organization techniques and paging techniques
CO2	Students able to write shell scripts in Linux platform.

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R-PROGRAMMING LAB

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	List motivation for learning a programming language.
CO2	Access online resources for R and import new function packages into the R workspace.
CO3	Import, review, manipulate and summarize data-sets in R
CO4	Explore data-sets to create testable hypotheses and identify appropriate statistical tests
CO5	Perform appropriate statistical tests using R Create and edit visualizations
CO6	Ability to analyze different Data Analytics Applications.

APTITUDE AND REASONING 2

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Solve the Arithmetic and Reasoning Problems as fast as possible and as simple as possible.
CO2	Exhibits good analytical skills and aptitude skills.
CO3	Perform well in all competitive exams like RRB, SSC, GROUPS, and BANKING
CO4	Clear the aptitude section of exams for higher education like CAT, GMAT, and GRE etc.

HACKATHON:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Familiar with various problems and their solutions.
CO2	Design innovative solutions for daunting problems
CO3	Crowd source solutions for real time problems
CO4	Improve their analytic and problem solving skills

BIOLOGY FOR ENGINEERS:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Describe the fundamental Principles and methods of engineering
CO2	Identify the functions of different types in bio-molecules
CO3	Describe mechanisms underlying the working of molecular biological processes including enzyme catalysis, metabolic pathways, gene expression.
CO4	Use Excel, MATLAB and other computational tools to quantitatively analyze biological processes.

ENTERPRISING AND STARTUP SKILLS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	To evaluate the role and importance of entrepreneurship for economic development
CO2	To acquire necessary knowledge and skills required for organising and carrying out entrepreneur activities through training.
CO3	To analyse and apply contemporary project management tools and methodologies
CO4	To learn policies and their support to small and micro enterprises.
CO5	To consider the legal and financial conditions for starting a business venture, evaluate the effectiveness of different entrepreneurial strategies and challenges
CO6	To understand about supportive role of government, financial institutions and educational institutions offering ED Programmes

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ADVANCED DATA BASE MANAGEMENT SYSTEMS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	**Describe** basic database concepts, Data Models, Schemas, Instances, and Components in the DBMS architecture.
CO2	**Implement** practical solutions to GIS database problems using OO/OR database, spatial database, data warehousing and data mining approaches
CO3	**Evaluate** simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer
CO4	**Demonstrate** the issues involved in data integration for distributed query processing
CO5	**Develop** practical skills in the use of these models and approaches to be able to select and apply the appropriate methods for a particular case
CO6	**Analysed**internal structures, query evaluation and optimization.

UML & DESIGN PATTERNS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Represent the data dependencies of a simple program using UML
CO2	Represent user and programmatic interactions using UML
CO3	Identify the purpose and methods of use of common object-oriented design patterns
CO4	Select and apply these patterns in their own designs for simple programs

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DISTRIBUTED SYSTEMS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Describe important characteristics of distributed systems and the salient architectural features of such systems
CO2	Gaining practical experience of inter-process communication and remote invocation in a distributed environment
CO3	Describe the features and techniques used in distributed systems for implementing parallel processing and distributed file systems.
CO4	Describe techniques for implementing mutual exclusion, transaction processing and recovery concepts in distributed environment.

ADHOC AND SENSOR NETWORKS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Understand basic concepts of WIRELESS networks and challenges of adhoc and sensor networks
CO2	Classify the design issues and different categories of MAC protocols
CO3	Explain the various adhoc routing protocols and transport layer mechanisms
CO4	Discuss the sensor characteristics and wsn layer protocols and security issues

COMPUTER VISION:

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Describes the fundamental of image formation and depth estimation of the techniques.
CO2	Describes the feature extraction of the filters.
CO3	Describe the classification of the segmentation techniques and analyze the clusters methods
CO4	Analyze the clusters methods of image patterns
CO5	Illustrate motion analysis of spatio temp techniques.
CO6	Illustrate shape from texture color motion and edges.

DATA ANALYTICS

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Conduct data analytics using appropriate descriptive and quantitative analysis on real-world problems.
CO2	Use data analytics skills like variance, ANOVA, regression techniques.
CO3	Understand the application of nearest neighbor classifiers and the effect of validation techniques on different datasets.
CO4	Apply unsupervised learning techniques for a given applications.

SOFTWARE TESTING METHODOLOGIES

Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Able To Understand Basic Testing Concepts, Testing Techniques And Strategies
CO2	Have Basic Understanding And Knowledge Of Contemporary Issues Like Component And Interface Testing.
CO3	Able To Support In Generating Test Cases And Test Suites
CO4	Have Basic Understanding And Knowledge About Graphs And Matrix Relations, Apply Testing Methods And Tools

CLOUD COMPUTING AND APPLICATION DEVELOPMENT

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Course Outcome:

Upon successful completion of the course, the student will be able to:	
CO1	Able to understand distributed systems models and cloud platforms, virtualization levels and types.
CO2	To know the design principles, architectures, and enabling technologies of cloud platform, and Assessment of MapReduce, BigTable, Twister, Dryad, DryadLINQ, Hadoop, Sawzall, and Pig Latin
CO3	Use public cloud like IBM Bluemix, Amazon AWS, Google cloud platform or Microsoft Azure for developing an application
CO4	Work with real cloud services

II YEAR I SEMESTER

DISCRETE MATHEMATICAL STRUCTURES

Course Outcome:

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

CO1: Apply the concept of Mathematical Logic in software development process.

CO2: Apply the recurrence relation for analyzing recursive algorithms.

CO3: Student will able to understand the concepts of group theory.

CO4: Apply the concept of group theory in robotics, computer vision & computer graphics.

CO5: Student will able to understand the concepts of graph theory and Trees.

CO6: Use the concepts of graph theory to provide solutions for routing applications in computer networks.

DATA STRUCTURES:

Course Outcomes:

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

CO1: Ability to illustrate the concepts of algorithm apply the learning concepts to design data structure for the given problem definition.

CO2: Ability to design applications using stacks and queues and implements various types of queues

CO3: Analyze and implement operations on linked list and demonstrate their applications

CO4: Ability to analyze and implement operations on trees

CO5: Ability to demonstrate various operations on binary search trees and its applications

CO6:Ability to evaluate the properties and operations on graphs and implement the graph applications

DATA BASE MANAGEMENT SYSTEM:

Course Outcomes:

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

CO1:Ability to define, understand the database management system structure

CO2: Ability to apply SQL as well as relational algebra to find solutions to a broad range of queries.

CO3:Ability to design ER diagrams or database for given scenario

CO4:Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies.

CO5:Ability to design application using locking methods and recovery management.

CO6:Ability to conduct experiments of database using modern tools.

DIGITAL LOGIC DESIGN:

Course Outcomes:

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

CO1:Understand the numeric information in different forms and interpret different logic gates.

CO2:Minimize the given Switching functions in SoP and PoS forms using K-Map and Tabular Method.

CO3 :Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, Demultiplexers, and Arithmetic Circuits.

CO4: Design combinational logic circuits using different types of Programmable Logic Designs.

CO5: Design and Implement various sequential circuits like flip flops, registers.

CO6:Design the state diagrams with the knowledge of Mealy and Moore conversions, state machines using various flip flops.

INTERNET OF THINGS LAB:

Course Outcome:

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

CO1:Interpret the impact and challenges posed by IoT networks leading to new architectural models.

CO2:Explain the basics of microcontrollers, architecture of Arduino and develop simple applications using Arduino.

CO3:Outline the architecture of Raspberry Pi and develop simple applications using Raspberry, select a platform for a particular embedded computing application

CO4:Interpret different protocols and compare them and select which protocol can be used for a specific application

CO5: Select IoT APIs for an application

CO6: Design and develop a solution for a given application using APIs and test for errors in the application

DATA STRUCTURES LAB:

Course Outcomes:

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

CO1: Implement different searching and sorting techniques. Compare different searching and sorting techniques.

CO2: Design linear data structures stacks, queues and linked lists.

CO3: Design nonlinear data structures trees and Graphs, and implement their operations

CO4: Be capable to identity the appropriate data structure for given problem

CO5: Have practical knowledge on the applications of data structure

DATA BASE MANAGEMENT SYSTEM LAB:

Course Outcome:

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

CO1: Queries for Creating, Dropping, and Altering Tables, Views, and Constraints

CO2: Queries to Retrieve and Change Data: Select, Insert, Delete, and Update

CO3: Queries using Built-In Functions: String Functions, Numeric Functions, Date Functions and Conversion Functions.

CO4: Queries using Group By, Order By, and Having Clauses

CO5: Queries on Joins and Correlated Sub-Queries

CO6: Queries on Controlling Data: Commit, Rollback, and Save point

PYTHON PROGRAMMING LAB:

Course Outcome:

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

CO1: Students able to experience with an interpreted Language and to build software for real needs.
CO2:Students able to use basic Decision structures, Boolean logic, variable types, assignments and operators.

CO3:Students able to describe and use of Python lists, dictionaries, tuples and sets.

CO4: To implement methods and functions to improve readability of programs.

CO5: Students able to describe and apply object-oriented programming methodology,top-down concepts in algorithm design.

CO6:Students should be able to design, code ,test and debug python language programs.

PROFESSIONAL COMMUNICATION SKILLS:

Course Outcomes:

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

CO1: Develop effective familiarity with soft skills along with right attitude to eliminate conflict and strife in their presentation skills.

CO2:Develop awareness on setting suitable goals and planning accordingly by using the techniques of time management to climb the ladder of success.

CO3: Enhance the learners' analytical and logical skills besides lateral thinking and kindle the true professional spirit.

CO4: Interpret any situation positively by managing stress at all scenarios.

CO5: Become a responsible citizen by imbibing social etiquette and ethics.

CO6: Draft appropriate written documents using the acquired knowledge on writing.

VISUAL COMMUNICATION:

Course Outcome:

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

CO1: The students will acquire the fundamental and foundation knowledge on image and creating meaning through visuals. They will acquire skills to present ideas and design messages.

CO2: They will be familiarised with communication and presentation of ideas visually.

CO3: The students will study various theories and concepts in understanding the visuals. They will learn new ways of understanding and presentation for different purposes.

CO4: The students will learn the key aspects of visual aspects in art, camera, and filming as well as trade secrets in communication media business to gain an upto-date understanding of the field.
CO5: After studying the course, the students will acquire production planning skills and application of technology for projects based on communication.

SANSKRIT:

Course Outcomes:

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

CO1: Reading, Writing, understanding and conversational skills are developed.

CO2: Unity in diversity of our country is well understood.

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CO3: The origin and development of Indian Languages is well understood

CO4: Proper usage of Language is achieved.

CO5: Sanskrit words that are familiar to us which we are using in our languages are identified.

CO6: The great Indian culture roots are well observed.

PSYCHOLOGY:

Course Outcomes:

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

CO1: The student will be able to understand the inter relationship of knowledge and our fund of knowledge

CO2: The students develops the discrimination between true and false knowledge

CO3: The students develops moral sense of Indian society.

CO4: The students extends his mental horizons in understanding different stands of moral order

CO5: The students intuitively grasps the ways of understanding the world and our environment

CO6: The students gains an insight into the very nature of Science and Technology

ENGINEERING PHILOSOPHY:

Course Outcomes:

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

CO1: The course in **Philosophy** is expected to bridge the gap between theory and practice by making the courses interactive.

CO2: The course of philosophy, which includes ethics and values, different ways of knowing, self and society, theory and practice, self and transcendence. These would enable the student in gaining knowledge about one's meaning and purpose of life, identifying one's goals and purpose and working out one's program of action in life

CO3: The course can provide a new understanding, based on which one can move to overcome the current problems, both at the individual level as well as at the societal level.

PROFESSIONAL ETHICS AND HUMAN VALUES:

Course Outcomes:

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

CO1: Grooms themselves as ethical, responsible and societal beings.

CO2: Discuss ethics in society and apply the ethical issues related to engineering.

CO3: Exhibit the understanding of ethical theories in professional environment.

CO4: Recognize their role as social experimenters (engineers) and comprehend codes of ethics.

CO5: Identify the risks likely to come across in the professional world, analyzing them and find solutions.

CO6: Realize the responsibilities and rights of engineers in the society.

II YEAR-II SEMESTER

PROBABILITY AND STATISTICS:

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 expectations of 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 the Normal distribution.(L4) Compare situations in which it is appropriate to consider the relevance of Normal Distribution (L4).

CO6 Student will be able to Construct hypothesis and carryout appropriate tests to checks its acceptability.(L3)

WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING:

Course Outcomes:

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

CO1: Student able to Implement and design web based applications using features of HTML

CO2: Implement web based applications using features of XML.

CO3: Student will Apply the concepts of server side technologies for dynamic web applications.

CO4: Ability to design the web based applications using effective data base access with rich client interaction.

CO5: Ability to Develop reusable component for Graphical User Interface applications

SOFTWARE ENGINEERING:

Course Outcomes:

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

CO1: Understand the basic concepts of Software engineering, applications, agile development and compare different software process models.

CO2: Analyze the principles of requirement engineering

CO3: Create architectural design for a given project.

CO4:Apply different testing techniques

COMPUTER ORGANIZATION:

Course Outcomes:

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

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CO1: Able to understand the basic components and the design of CPU, ALU and Control unit

CO2: Students can calculate the effective address of an operand by addressing modes

CO3: Ability to understand memory hierarchy and its impact on computer cost/performance..

CO4: Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.

MICROPROCESSOR AND ITS APPLICATIONS:

Course Outcomes:

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

CO1: To Describe the basics of 8086 microprocessors architectures and its Functionalities

CO2: To Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP

CO3: To Analyze 8051 microcontrollers architectures and its functionalities

CO4: To Describe the importance of Timers/Counters and Serial ports of 8051 microcontroller

CO5: To Describe the basics of ARM and ARM7 architecture and its functionalities

CO6: To Interface external peripherals and I/O devices and program the 8051 microcontroller.

WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING LAB:

Course Outcomes:

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

CO1: Create a website statically or dynamically.

CO2: Get knowledge on displaying and decorating the contents in a webpage.

CO3: Learn the concepts of store and transport the data among webpages.

CO4: Generate static or dynamic content according to the client's request.

CO5: Create objects with which the client can communicate with server.

CO6: Provide User Authentication by using cookies and back end operations using JDBC

DATA STRUCTURES:

Course Outcomes:

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

CO1: Ability to illustrate the concepts of algorithm apply the learning concepts to design data structure for the given problem definition.

CO2: Ability to design applications using stacks and queues and implements various types of queues

CO3: Analyze and implement operations on linked list and demonstrate their applications.

CO4: Ability to analyze and implement operations on trees

CO5: Ability to demonstrate various operations on binary search trees and its applications

CO6: Ability to evaluate the properties and operations on graphs and implement the graph Applications

OBJECT ORIENTED PROGRAMMING USING C++

Course Outcomes:

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

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CO1: Ability to understand and analyze the basic concepts of Object Oriented Programming and C++.

CO2: Ability to understand, analyze and design applications using the concepts of arrays, dynamic memory allocation and overloading.

CO3: Ability to understand, analyze and develop programs using the concepts of Inheritance, Polymorphism and Templates.

CO4: Ability to understand, analyze and apply exception handling in programming and understand the concepts of Standard Template Library

JAVA PROGRAMMING:

Course Outcomes:

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

CO1: Able to **solve** real world problems using OOP techniques.

CO2: Able to **understand** the use of abstract classes and Packages in java.

CO3: Able to **develop** and **understand** exception handling and Interfaces in java

CO4: Able to understand multithreaded applications with synchronization and **design** GUI based applications and **develop** applets for web applications

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II CSE - I SEMESTER

18A2100202- DISCRETE MATHEMATICAL STRUCTURES

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	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	
CO6	3	3	3	-	-	-	-	-	-	-	-	

18A2105401- DATA STRUCTURES

	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	2	2	-	-	-	-	-	-	-	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3
CO3	3	2	3	2	-	-	-	-	-	-	-	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3
CO5	3	2	3	2	-	-	-	-	-	-	-	3
CO6	3	2	3	2	-	-	-	-	-	-	-	3

18A2105402- DATA BASE MANAGEMNET SYSTEMS

	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	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	3	-	-

CO5	-	-	-	3		-	-	-	-	-	-	-
CO6	-	-		-	3	-	-	-	-	3	-	-

18A2105403- DIGITAL LOGIC DESIGN

	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	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	2	-	3
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	2	-	3
CO6	2	2	3	-	-	-	-	-	-	-	-	-

18A2105493- INTERNET OF THINGS LAB

	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	-	2	-	-	2	-	-	-	-	2	-
CO2	3	2	-	-	-	2	-	-	2	-	-	-
CO3	3	-	2	2	-	2	-	-	-	-	-	2
CO4	2	-	3	-	-	2	-	-	-	-	-	-
CO5	3	2	2	-	2	2	-	-	-	-	-	2
CO6	-	2	3	-	2	2	-	-	-	-	-	2

18A2105491- DATA STRUCTURES LAB

	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	2	2	-	-	-	-	-	-	-	2
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	-	-	-	-	-	-	-	2
CO4	3	2	3	2	-	-	-	-	-	-	-	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2

18A2105492- DATABASE MANAGEMENT SYSTEMSLAB

	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	1	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	1	-	-	-	-	-	-	-
CO3	1	2	2	-	2	-	-	-	-	-	-	-
CO4	1	2	3	-	3	-	-	-	-	-	-	1
CO5	1	2	1	-	2	-	-	-	-	-	-	-
CO6	1	1	3	-	2	-	-	-	-	-	-	-

18A2105494- PYTHON PROGRAMMING LAB

	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	-	3	-
CO2	-	3	2	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	3	-	-	-	3	-	-	-
CO4	-	-	-	3	3	-	-	-	3	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	3	-

CO6	-	-	-	-	2	-	-	-	3	-	3	-

18A2100602- Visual Communications

	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	-	2	-	3	3	2	2	1	1	1	1
CO2	3	-	2	-	3	3	2	2	1	1	1	1
CO3		-	2	-	-	-	-	-	-	1	1	1
CO4	3	-	1	3	3	-	-	1	1	1	1	1
CO5	2	-	1	-	3	3	2	2	1	1	1	1

18A2100604- Psychology

	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	2	-	-	-	2	-	3	-	-	-	2
CO2	1	2	-	2	-	2	-	2	-	-	-	2
CO3	1	-	-	-	-	3	-	3	-	-	-	-
CO4	1	-	-	-	-	3	-	3	-	-	-	-
CO5	1	-	=	-	-	2	-	-	-	-	-	2
CO6	3	3	3	3	3	3	3	-	-	3	3	3

18A2100802- PROFESSIONAL ETHICS AND HUMAN VALUES

	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	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

IIYEAR -IISEM

18A2200201-PROBABILITY AND STATISTICS

	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	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	--	--	--	--	--	--	--	--

18A2205401- WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING

	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	-	-	-	-	-	-	-	-	2
CO2	-	-	3	-	-	-	-	-	-	-	-	2
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	-	3	3	2	-	-	-	-	-	-	-	2
CO5	-	3	-	3	2	-	-	-	-	-	-	3

18A2205402- SOFTWARE ENGINEERING

	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	3	3	--	--	2	2	2	3	2
CO2	3	3	3	3	3	--	--	2	2	2	3	2
CO3	3	3	3	3	3	--	--	2	2	2	3	2
CO4	3	3	3	3	3	--	--	2	2	2	3	2

18A2205403- COMPUTER ORGANIZATION

	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	--	--	--	--	--	--	--	--	--	--
CO2	3	3	--	3	--	--	--	--	--	--	--	--
CO3	3	3	--	--	--	--	--	--	--	--	--	--
CO4	3	3	--	--	--	--	--	--	---	--	--	--

OE- MICROPROCESSOR AND ITS APPLICATIONS

	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	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	3	-	-	-	-	-	2	-
CO3	3	2	3	2	2	-	-	-	-	-	2	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	3	2	2	2	3	-	-	-	-	-	2	-
CO6	2	2	2	3	2	-	-	-	-	-	-	-

18A2205491- WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING LAB

	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	--	--	--	--	--	--	--	--	--	--
CO2	3	3	--	3	--	--	--	--	--	--	--	3
CO3	3	3	--	--	--	--	--	--	--	--	--	--
CO4	3	3	--	--	--	--	--	--	---	--	--	3
CO5	3	3	--	--	--	--	--	--	--	--	--	3
CO6	3	3	--	--	--	--	--	--	--	--	--	--

18A2205601- DATA STRUCTURES

	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	2	2	-	-	-	-	-	-	-	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3
CO3	3	2	3	2	-	-	-	-	-	-	-	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3
CO5	3	2	3	2	-	-	-	-	-	-	-	3
CO6	3	2	3	2	-	-	-	-	-	-	-	3

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OBJECT ORIENTED PROGRAMMING USING C++

	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
CO2	3	3	3	-	-	-	-	-	-	-	-	3
CO3	3	3	3	-	-	-	-	-	-	-	-	3
CO4	3	2	-	-	-	-	-	-	-	-	-	2

JAVA PROGRAMMING

	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
CO2	3	3	3	-	-	-	-	-	-	-	-	3
CO3	3	3	3	2	-	-	-	-	2	-	-	3
CO4	3	3	3	2	-	-	-	-	2	-	-	3

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III CSE - I SEMESTER

18A3105401:Advanced Data Structures

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	2	-	2	-	-	-	-	-	-	-
CO2	-	-	-	2	-	-	-	-	-	-	-	-
CO3	-	2	3	2	2	-	-	-	-	-	-	-
CO4	2	3	2	2	2	-	-	-	-	-	-	2
CO5	2	2	-	3	3	-	-	-	-	-	-	-
CO6	-	2	3	3	-	-	-	-	-	-	-	2

18A3105402:COMPUTER NETWORKS

Contribution of Course Outcomes towards the achievement of Program Outcomes (1 – Low, 2-Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	2	-	-	-	-	-	-	-
CO2	3	3	3	2	3	2	-	-	-	-	-	-
CO3	3	3	3	2	2	2	2	-	-	-	-	-
CO4	3	2	2	2	2	-	2	2	-	-	-	-

18A3105403:Formal Languages and Automata Theory

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	-	-	-	2	2	2	-	-	-	2
CO2	2	2	3	2	2	2	2	-	-	-	2	2
CO3	2	3	3	2	2	2	-	-	-	-	2	2
CO4	3	2	2	2	3	-	2	2	-	-	2	-
CO5	3	3	3	-	-	-	-	-	-	-	-	2

18A3105511- Scripting Languages

Type of Course : Professional Elective – 1.1

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	2	-	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	-	-	3	-	3	-	-	-	-	-	-	2
CO5	3	-	3	-	2	-	-	-	-	-	-	2

18A3105512:COMPUTER GRAPHICS AND MULTIMEDIA ANIMATION

Type of Course :Professional Elective – 1.2

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	2	-	2	3	2	-	-	-	-	-	-

CO2	2	2	-	2	3	-	-	-	-	-	-	-
CO3	-	2	-	2	-	-	-	-	-	-	-	-
CO4	2	2	-	2	-	-	-	-	-	-	-	-

18A3105513:Data Warehousing and Data Mining

Type of Course :Professional Elective – 1.3

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	-	-	-	-	-	-	-	2
CO2	2	2	-	3	-	-	-	-	-	-	-	-
CO3	2	2	-	3	2	-	-	-	-	-	-	2
CO4	3	2	-	3	-	-	-	-	-	-	-	2

18A3105514:Principles of Programming Languages

Type of Course : Professional Elective – 1.4

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	-	2	-	-	-	-	2	-	-	2	2
CO2	3	2	-	-	-	-	-		-	-	-	-
CO3	3	2	2	2		-	-	-	-	-	-	-

CO4	3	2	-		2	-	-	-	-	-	-	-
CO5	3	-	2	-	-	-	-	-	-	-	-	-
CO6	3	2	2	-	-	-	-	-	-	2	2	2

18A3105492:Computer Networks Lab

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	2	-	2	-	-	-	-	-	-	-	-
CO2	-	2	2	-	-	-	-	-	-	-	2	2
CO3	3	-	-	2	2	-	-	-	-	-	2	2

18A3105491-Advanced Data Structures Lab

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	2	2	-	2	-	-	-	-	-	-	-
CO2	2	2	2	2	2	-	-	-	-	-	-	-
CO3	2	2	3	2	2	-	-	-	-	-	-	-
CO4	2	3	2	2	2	-	-	-	-	-	-	2
CO5	2	2	-	3	3	-	-	-	-	-	-	-
CO6	-	2	3	3	-	-	-	-	-	-	-	2

18A3101301:Basics of Civil and Mechanical Engineering

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	-	-	-	-	-	-	2	-	-	-	-
CO2	2	-	-	-	-	-	-	2	-	-	-	-
CO3	2	-	-	-	-	-	-	2	-	-	-	-
CO4	3	1	1	-	-	-	-	-	-	-	-	3
CO5	3	2	1	-	-	-	-	-	-	-	-	-
CO6	3	2	1	-	-	-	-	-	-	-	-	-

18A3105791:COMPETITIVE CODING

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	-	-	-	-	-	-	3
CO2	3	3	-	-	3	-	-	-	-	-	-	3
CO3	3	3	-	-	-	-	-	-	-	-	-	3
CO4	3	3	-	-	3	-	-	-	-	-	-	3
CO5	3	3	-	-	3	-	-	-	-	-	-	3
CO6	3	3	-	-	-	-	-	-	-	-	-	3

18A3105792:SEMINAR

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

CO2	3	3	-	-	-	-	-	-	-	-	-	3
CO3	3	3	-	-	-	-	-	-	-	-	-	3
CO4	3	3	-	-	-	-	-	-	-	-	-	3
CO5	3	3	-	-	-	-	-	-	-	-	-	3
CO6	3	3	-	-	-	-	-	-	-	-	-	3

18A3100801:INDIAN CONSTITUTION

Type of Course : Audit Course

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	2	-	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	2	-	-	-	-
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	-	-	3	-	-	-	-	2	-	-	-	2

III CSE - II SEMESTER

18A3205401:OPERATING SYSTEMS

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	2	2	2	-	-	-	-	-	-	-	-
CO2	2	3	2	2	-	-	-	-	-	-	-	-
CO3	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	3	3	2	-	-	-	-	-	-	-	-

18A3205402:Design and Analysis of Algorithms

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	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-
CO6	3	3	3	2	-	-	-	-	-	-	-	-

18A3205403:COMPILER DESIGN

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	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	2	-	-	-	-	-	-	-
CO3	-	-	3	3	-	-	-	-	-	-	-	-

CO4	-	-	3	2	-	-	-	-	-	-	-	-
CO5	-	-	3	3	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	3

18A3205404:ARTIFICIAL INTELLIGENCE

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

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	-	2	-	2	-	-	-	-	2	-	-
CO2	3	2	-	2	-	-	-	-	2	-	2	-
CO3	3	-	2	-	-	-	-	2	-	-	-	-
CO4	3	2	-	2	-	-	-		-	-	-	-
CO5	3	-	2	-	2	-	-	2	2	2	-	-
CO6	3	-	-	2	2	-	-	-	-	2	2	2

18A3205491:Operating Systems &Unix programming Lab

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	3	3	-	-	-	-	-	-
CO2	3	3	3	2	3	3	-	-	-	-	-	-

18A3205492:R-PROGRAMMING LAB

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	3	2	-	-	-	2	-	-	2
CO2	3	3	3	3	3	-	-	2	2	-	-	2
CO3	3	3	3	3	3	-	-	2	2	-	-	2
CO4	3	3	3	3	2	-	-	-	2	-	-	2
CO5	3	3	3	3	3	-	-	-	2	-	-	2

18A3205991:Aptitude and Reasoning 2

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	-	2	-	-	-	-	2	-	3
CO2	2	-		-	-	-	-	2	-	-	2	2
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	3	-	2	2	-	-	-	-	-	-	-	3

18A3205791-HACKATHON

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
CO2	3	3	-	-	-	-	-	-	-	-	-	3
CO3	3	3	-	-	-	-	-	-	-	-	-	3
CO4	3	3	-	-	-	-	-	-	-	-	-	3

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Course Code- Cryptography and Network Security

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	PSO 1	PSO 2	PSO3
CO1	3	2	-	-	-	2	-	-	-	-	-	-	3	-	2
CO2	3	3		2	-	2	-	-	-	-	-	-	3	-	2
CO3	3	3	-	2	-	-	-	-	-	-	-	-	3	2	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO5	3	2	-	2	-	-	-	-	-	-	-	-	3	2	2
CO6	3	2	-	2	-	-	-	-	-	-	-	-	3	2	2
Average	3	2.5		2		2							3	2	2

Course Code-NATURAL LANGUAGE PROCESSING

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	PSO 2	PSO 3
CO1	2	2	3	-	2	-	-	-	-	-	-	-	3	3	2
CO2	2	3	3	-	2	-	-	-	-	-	-	-	2	-	3
CO3	-	2	2	2	3	-	-	-	-	-	-	-	2	-	2

CO4	2	3	3	3	3	-	-	-	-	-	-	-	2	2	2
CO5	-	2	2	3	3	-	-	-	-	-	-	-	2	2	2
Average	2	2.4	2.6	2.6	2.6								2.2	2.3	2.2

Course Code:Nano Technology

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	1	2						1			
CO2	3	2	1							1		
CO3	3	2	1									1
CO4	3	1	2								1	
CO5	3	1	2							1		
CO6	3	2	1									1
Average	3	1.5	1.5						1	1	1	1

Course Code- Augmented Reality & Virtual Reality

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	3	3	3	-	3	-	-	-	-	-	-	-	2	-	-
CO2	3	3	3	-	3	-	-	-	-	-	-	-	-	2	-

CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	2	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-	-	-	3
CO5	3	3	3	-	3	-	-	-	-	-	-	3	-	-	3
CO6	3	3	3	-	-	-	-	-	-	-	-	-	3	-	-
Average	3	3	3		3							3	2.5	2	3

Course Code- BLOCKCHAIN TECHNOLOGY

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	3	3	2	2	-	-	-	-	-	-	-	3	3	3	2
CO2	3	2	3	2	-	-	-	-	-	-	-	3	3	2	3
CO3	3	2	3	2	-	-	-	-	-	-	-	3	3	2	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3	3	2	3
Average	3	2.25	2.75	2								3	3	2.25	2.75

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Course Code- INTELLIGENT SYSTEMS

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	-	2	-	-	2	2	-	-	3	-	-	2	2	-	2
CO2	2	-	-	-	-	-	-	3	-	3	-	-	2	-	-
CO3	-	3	3	-	-	3	-	-	-	-	-	-	3	-	3
CO4	-	-	-	3	-	-	3	-	-	-	3	-	-	3	-
Average	2	2.5	3	3	2	2.5	3	3	3	3	3	2	2.3	3	2.5

Course Code-Real Time Systems

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	PSO 1	PSO 2	PSO3
CO1	2	2	2	--	2	--	--	--	--	--	--	--	2	2	2
CO2	3	2	2	--	2	--	--	--	--	--	--	--	--	2	--
CO3	3	2	3	--	--	--	--	--	--	--	--	--	2	2	2
CO4	2	2	2	--	2	--	--	--	--	--	--	--	2	2	2
Avergе	2.5	2	2.25		2								2	2	2

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COURSE CODE- DATA SCIENCE

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	PSO 1	PSO2	PSO 3
CO1	3	2	2	2	2	2	--	--	--	--	--	--	2	2	3
CO2	2	2	3	2	2	--	--	--	--	--	--	--	2	2	2
CO3	2	2	3	2	2	--	--	--	--	--	--	--	3	3	2
CO4	3	3	2	3	3	3	--	--	--	--	--	--	2	3	2
CO5	3	3	2	3	3	3	--	--	--	--	--	--	2	3	2
CO6	2	2	2	3	3	3	--	--	--	--	--	--	2	3	3
Average	2.5	2.3	2.3	2.5	2.5	2.75							2.16	2.6	2.3

COURSE CODE- HIGH PERFORMANCE COMPUTING

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	PSO 1	PSO 2	PSO 3
CO1	2	--	--	2	--	--	--	2	--	--	--	--	2	--	--
CO2	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--
CO3	2	--	--	--	--	2	--	--	--	2	--	-	2	--	--
CO4	--	2	--	--	3	--	--	2	--	--	--	--	--	--	2
Average	2	2		2	3	2		2		2			2	2	2

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Course Code- MACHINE LEARNING

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	2	--	2	3	3	--	--	--	--	--	--	--	2	2	--
CO2	--	--	2	2	2	--	--	--	--	--	--	--	--	2	3
CO3	--	--	2	3	2	--	--	--	--	--	--	--	--	2	2
CO4	2	--	3	2	2	--	--	--	--	--	--	--	--	3	--
CO5	2	--	2	2	2	--	--	--	--	--	--	--	2	--	--
CO6	2	--	2	--	2	--	--	--	--	--	--	--	--	2	2
Average	2		2.16	2.4	2.16								2	2.2	2.3

AI APPLICATION DEVELOPMENT LAB

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	3	2	-	-	-	2	-	-	2
CO2	3	3	3	3	3	-	-	2	2	-	-	2
CO3	3	3	3	3	3	-	-	2	2	-	-	2
CO4	3	3	3	3	2	-	-	-	2	-	-	2
CO5	3	3	3	3	3	-	-	-	2	-	-	2
CO6	3	3	3	3	2	-	-	-	2	-	-	2
Average	3	3	3	3	2.5			2	2			2

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Course Code- Predictive Analytics

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	PSO 1	PSO2	PSO 3
CO1	3	2	2	2	2	2	--	--	--	--	2	--	2	2	3
CO2	2	2	3	2	2	--	--	--	--	--	2	--	2	2	2
CO3	2	2	3	2	2	--	--	--	--	--	2	--	3	3	2
CO4	3	3	2	3	3	3	--	--	--	--	2	--	2	3	2
CO5	3	3	2	3	3	3	--	--	--	--	2	--	2	3	2
CO6	2	2	2	3	3	3	--	--	--	--	2	--	2	3	3
Average	2.5	2.3	2.3	2.5	2.5	2.75					2		2.16	2.6	2.3

Course Code- The Full Stack Web Development - LAB

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	PSO 3
CO1	3	2	2	--	2	--	--	2	--	--	--	--	3	2	2
CO2	3	2	2	--	--	--	2	--	--	--	--	2	3	2	2
CO3	2	2	2	--	--	--	--	--	--	--	--	--	2	2	2
CO4	2	2	3	--	--	--	--	--	2	--	--	--	2	2	3

CO5	2	2	2	--	--	--	--	--	--	2	--	--	2	2	2
CO6	2	2	2	--	--	--	--	--	--	--	--	--	2	2	2
Average	2.3	2	2.16		2		2	2	2	2		2	2.3	2	2.16

IV YEAR II SEMESTER

Course Code-DEEP LEARNING

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	3	2	3	3	2	2	--	--	--	--	--	--	3	2	2
CO2	2	3	3	2	2	2	--	--	--	--	--	--	2	2	2
CO3	3	3	2	2	2	3	--	--	--	--	--	--	2	2	3
CO4	3	3	3	2	3	3	--	--	--	--	--	--	3	2	3
CO5	3	3	2	3	2	3	--	--	--	--	--	--	3	2	2
Average	2.8	2.8	2.6	2.4	2.2	2.6							2.6	2	2.4

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Course Code-SYSTEM MODELLING AND SIMULATION

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	3	-	3	-	2	-	-	-	2	-	-	2	2	-	3
CO2	2	-	-	-	-	-	-	2	2	-	-	2	3	-	-
CO3	3	-	-	-	-	-	-	2		-	-	-	-	2	-
CO4	-	2		3	-	-	-	-		-	-	2	-	-	2
CO5	3	-	3	-	--	-	-	-	2	-	-	-	3	2	-
CO6	2	-	--	-		-	-	-	2	-	-	2	-	2	3
Average	2.6	2	3	3	2			2	2			2	2.6	2	2.6

Course Code- Social Networking and Semantics

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	3	3	2	2	-	-	-	-	-	-	-	3	3	3	2
CO2	3	2	3	2	-	-	-	-	-	-	-	3	3	2	3
CO3	3	2	3	2	-	-	-	-	-	-	-	3	3	2	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3	3	2	3
Avera	3	2.25	2.75	2								3	3	2.	2.

ge														25	7 5

Course Code- CYBER FORENSICS

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	3	-	2	2	-	-	-	-	-	-	-	3	3	3	2
CO2	3	2	3	2	-	-	-	-	-	-	-	-	3	2	3
CO3	3	2	3	2	-	-	-	-	-	-	-	3	3	2	3
CO4	3	-	3	2	-	-	-	-	-	-	-	-	3	2	3
Average	3	2	2.75	2								3	3	2.25	2.75

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Subject Name	PYTHON PROGRAMMING LAB	C218

Course Code	Course Outcome
C218.1	Students able to experience with an interpreted Language and to build software for real needs architectural models
C218.2	Students able to use basic Decision structures, Boolean logic, variable types, assignments and operators. simple applications using Arduino.
C218.3	Students able to describe and use of Python lists, dictionaries, tuples and sets.
C218.4	To implement methods and functions to improve readability of programs methodology,top-down concepts in algorithm design.
C218.5	Students able to describe and apply object-oriented programming methodology,top-down concepts in algorithm design.
C218.6	Students should be able to design, code ,test and debug python language programs

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C218.1	3	3	2	2	2	2	-	-	-	-	2	2	3	3	2
C218.2	-	3	2	2	2	2	-	-	-	-	2	-	3	3	-
C218.3	3	2	-	2	2	-	-	-	-	-	2	2	3	3	2
C218.4	-	3	3	3	2	-	-	-	2	-	2	2	3	3	2
C218.5	3	-	2	2	2	-	-	-	-	-	-	2	3	3	-
C218.6	3	3	2	2	2	-	-	-	-	-	2	2	3	3	-

Subject Name	Database Management systems	C213

Course Code	Course Outcome
C213.1	Ability to define, understand the database management system structure
C213.2	Ability to apply SQL as well as relational algebra to find solutions to a broad range of queries
C213.3	Ability to design ER diagrams or database for given scenario
C213.4	Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies.
C213.5	Ability to design application using locking methods and recovery management.
C213.6	Ability to conduct experiments of database using modern tools.

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO 3
C213.1	3	3	-	-	-	-	-	-	-	-	-	-	3.00	2.00	3.00
C213.2	3	3	3	-	-	-	-	-	-	-	-	-	3.00	2.00	2.00
C213.3	-	-	3	-	-	-	-	-	-	-	-	-	3.00	2.00	2.00
C213.4	2	2	3	-	-	-	-	-	-	-	-	-	3.00	2.00	3.00
C213.5	2	-	2	-	-	-	-	-	-	-	-	-	3.00	2.00	3.00
C213.6	-	-	3	-	-	-	-	-	-	-	-	-	3.00	2.00	2.00

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Subject Name	DIGITAL LOGIC DESIGN	C214

Course Code	Course Outcome
C214.1	Understand the numeric information in different forms and interpret different logic gates.
C214.2	Minimize the given Switching functions in SoP and PoS forms using K-Map and Tabular Method
C214.3	Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, Demultiplexers, and Arithmetic Circuits.
C214.4	Design combinational logic circuits using different types of Programmable Logic Designs. dependencies, validating and identifying anomalies
C214.5	Design and Implement various sequential circuits like flip flops, registers.
C214.6	Design the state dia

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO1 2	PSO 1	PS O2	PSO 3
C214.1	3	3	-	-	-	-	-	-	-	-	-	-	-	2	-
C214.2	3	3	3	-	-	-	-	-	-	3	-	2	2	-	-
C214.3	-	-	3	-	-	-	-	-	-	-	-	2	2	-	-
C214.4	2	2	3	-	-	-	-	-	-	3	-	-	-	2	-
C214.5	2	-	2	-	-	-	-	-	-	3	-	2	2	2	-
C214.6	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-

Subject Name	Discrete Mathematical Structures	C211

Course Code	Course Outcome
C211.1	Apply the concept of Mathematical Logic in software development process.
C211.2	Apply the recurrence relation for analyzing recursive algorithms.
C211.3	Student will able to understand the concepts of group theory.
C211.4	Apply the concept of group theory in robotics, computer vision & computer graphics.
C211.5	Student will able to understand the concepts of graph theory and Trees.
C211.6	Use the concepts of graph theory to provide solutions for routing applications in computer networks

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C211.1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
C211.2	3	3	3	-	-	-	-	-	-	-	-	-	2.00	-	-
C211.3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
C211.4	2	2	3	-	-	-	-	-	-	-	-	-	-	2.00	-
C211.5	2	-	2	-	-	-	-	-	-	-	-	-	-	-	2.00
C211.6	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-

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Subject Name	DATA STRUCTURES	C212

Course Code	Course Outcome
C212.1	Ability to illustrate the concepts of algorithm apply the learning concepts to design data structure for the given problem definition.
C212.2	Ability to design applications using stacks and queues and implements various types of queues □
C212.3	Analyze and implement operations on linked list and demonstrate their applications
C212.4	Ability to analyze and implement operations on trees
C212.5	Ability to demonstrate various operations on binary search trees and its applications
C212.6	Ability to evaluate the properties and operations on graphs and implement the graph applications

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C212.1	3	3	-	2	-	-	-	-	-	-	-	3	3	2	2
C212.2	3	3	3	2	-	-	-	-	-	-	-	3	3	2	2
C212.3	-	-	3	2	-	-	-	-	-	-	-	3	3	2	2
C212.4	2	2	3	2	-	-	-	-	-	-	-	3	3	2	2
C212.5	2	-	2	2	-	-	-	-	-	-	-	3	3	2	2
C212.6	-	-	3	2	-	-	-	-	-	-	-	3	3	2	2

Subject Name	Professional ethics and Human Values	C2110

Course Code	Course Outcome
C2110.1	Grooms themselves as ethical, responsible and societal beings fund of knowledge
C2110.2	Discuss ethics in society and apply the ethical issues related to engineering
C2110.3	Exhibit the understanding of ethical theories in professional environment
C2110.4	Recognize their role as social experimenters (engineers) and comprehend codes of ethics
C2110.5	Identify the risks likely to come across in the professional world, analyzing them and find solutions environment
C2110.6	Realize the responsibilities and rights of engineers in the society. computer networks

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO 3
C2110.1	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-
C2110.2	-	-	-	-	-	3	3	3	-	-	-	-	2.00	-	-
C2110.3	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
C2110.4	-	-	-	-	-	2	2	3	-	-	-	-	-	2.00	-
C2110.5	-	-	-	-	-	2	-	2	-	-	-	-	-	-	2.00
C2110.6	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-

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Subject Name	DATA BASE MANAGEMNET SYSTMS LAB	C217

Course Code	Course Outcome
C217.1	Queries for Creating, Dropping, and Altering Tables, Views, and Constraints architectural models
C217.2	Queries to Retrieve and Change Data: Select, Insert, Delete, and Update simple applications using Arduino.
C217.3	Queries using Built-In Functions: String Functions, Numeric Functions, Date Functions and Conversion Functions
C217.4	Queries using Group By, Order By, and Having Clauses
C217.5	Queries on Joins and Correlated Sub-Queries
C217.6	Queries on Controlling Data: Commit, Rollback, and Save point

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO 2	PO 3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO 2	PSO 3
C217.1	3	3	2	2	2	2	-	-	-	-	2	2	-	-	2
C217.2	-	3	2	2	2	2	-	-	-	-	2	-	-	2	-
C217.3	3	2	-	2	2	-	-	-	-	-	2	2	3	-	2
C217.4	-	3	3	3	2	-	-	-	-	-	2	2	-	-	-
C217.5	3	-	2	2	2	-	-	-	-	-	-	2	3	-	-
C217.6	3	3	2	2	2	-	-	-	-	-	2	2	-	3	-

Subject Name	DATA STRUCTURES LAB	C216

Course Code	Course Outcome
C216.1	Implement different searching and sorting techniques. Compare different searching and sorting techniques.
C216.2	Design linear data structures stacks, queues and linked lists
C216.3	Design nonlinear data structures trees and Graphs, and implement their operations
C216.4	Be capable to identity the appropriate data structure for given problem
C216.5	Have practical knowledge on the applications of data structures

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C211.1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
C211.2	3	3	3	-	-	-	-	-	-	-	-	-		-	-
C211.3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
C211.4	2	2	3	-	-	-	-	-	-	-	-	-	-		
C211.5	2	-	2	-	-	-	-	-	-	-	-	-	-	-	
C211.6	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-

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Subject Name	INTERNET OF THINGS LAB	C215

Course Code	Course Outcome
C215.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models
C215.2	Explain the basics of microcontrollers, architecture of Arduino and develop simple applications using Arduino.
C215.3	Outline the architecture of Raspberry Pi and develop simple applications using Raspberry, select a platform for a particular embedded computing application
C215.4	Interpret different protocols and compare them and select which protocol can be used for a specific application
C215.5	Select IoT APIs for an application

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C215.1	3	3	2	2	2	2	-	-	-	-	2	2	2	2	2
C215.2	-	3	2	2	2	2	-	-	-	-	2	-	2	2	2.00
C215.3	3	2	-	2	2	-	-	-	-	-	2	2	2	2	2
C215.4	-	3	3	3	2	-	-	-	-	-	2	2	2	2	
C215.5	3	-	2	2	2	-	-	-	-	-	-	2	2	2	
C215.6	3	3	2	2	2	-	-	-	-	-	2	2	2	2	

Subject Name	Psychology	C211

Course Code	Course Outcome
C211.1	The student will be able to understand the inter relationship of knowledge and our fund of knowledge
C211.2	The students develops the discrimination between true and false knowledge □
C211.3	The students develops moral sense of Indian society
C211.4	The students extends his mental horizons in understanding different stands of moral order
C211.5	The students intuitively grasps the ways of understanding the world and our environment
C211.6	The students gains an insight into the very nature of Science and Technology computer networks

	CO-PO & PSO Relevance Matrix														
Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C211.1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
C211.2	3	3	3	-	-	-	-	-	-	-	-	-		-	-
C211.3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
C211.4	2	2	3	-	-	-	-	-	-	-	-	-	-		-
C211.5	2	-	2	-	-	-	-	-	-	-	-	-	-	-	
C211.6	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-

Subject Name	COMPUTER ORGANIZATION	224

Course Code	Course Outcome
C224.1	Students can understand the architecture of modern computer.They can analyze the Performance of a computer using performance equation
C224.2	Students can calculate the effective address of an operand by addressing modes
C224.3	Understanding of different instruction types.
C224.4	Evaluate I/O system also demonstrate the connection and interfacing of I/O devices with the system
C224.5	Summarize basic concepts on memory and differences between those memories
C224.6	Understanding of how a computer performs arithmetic operation of positive and negative numbers.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C223.1	3	-	2	-	-	-	-	-	-	-	-	-	3	-	3
C224.2	2	3	3	3	-	-	-	-	-	-	-	-	3	3	-
C224.3	3	-	3	3	-	-	-	-	-	-	-	-	3	3	3
C224.4	2	-	2	-	-	-	-	-	-	-	-	-	2	-	3
C224.5	3	-	3	-	-	-	-	-	-	-	-	-	3	-	3
C224.6	2	-	3	-	-	-	-	-	-	-	-	-	3	-	-

Subject Name	PROBABILITY AND STATISTICS	221

Course Code	Course Outcome
C221.1	Student will be able to Find the measures of central tendency and relation between them.(L1)
C221.2	Student will be able to Evaluate the correlation coefficient, rank coefficient and regression.(L5)
C221.3	Students will be able to Understand probabilities of events and expectationsof random variables for elementary problems.(L2)
C221.4	Students will be able to Solve problems related to binomial and passion distribution.(L3)
C221.5	Student will be able to Compare situations in which it is appropriate to consider the relevance of the Normal distribution.(L4)
C221.6	Student will be able to Construct hypothesis and carryout appropriate tests to checks its acceptability

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C221.1	3	3	-	2	-	-	-	-	-	-	-	-	-	-	-
C221.2	3	3	3	2	-	-	-	-	-	-	-	-	2.00	-	-
C221.3	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-
C221.4	2	2	3	2	-	-	-	-	-	-	-	-	-	2.00	-
C221.5	2	-	2	2	-	-	-	-	-	-	-	-	-	-	2.00
C221.6	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-

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Subject Name	Software Engineering	C223

Course Code	Course Outcome
C223.1	Ability to outline the basic software engineering methods and practices and their appropriate applications and Summarize software process models such as the waterfall and evolutionary model
C223.2	Ability to identify the software requirements of a given project and then design and develop an SRS document
C223.3	Ability to Make use of the developed SRS document and then build appropriate software design methodologies elementary problems.(L2)
C223.4	Ability to classify the different levels of software testing like black box and white box testing methodologies and apply testing methods to various real time projects
C223.5	Ability to apply the estimation, size and effort of a given real time projects using different estimation models, and conduct various experiments.
C223.6	Ability to test and validate quality of the software for various application

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO12	PSO 1	PSO 2	PSO 3
C223.1	3	3	-	2	-	-	-	2	-	2	2	2	2	2	-
C223.2	3	3	3	2	-	-	-	-	2	2	-	-	-	-	2
C223.3	-	-	3	3	-	-	-	2	-	-	2	2	2	2	2
C223.4	2	2	3	2	-	-	-	2	2	2	-	-	-	-	-
C223.5	2	-	2	2	-	-	-	-	-	2	2	-	-	-	2
C223.6	-	-	3	2	-	-	-	2	2	-	-	2	2	2	-

Subject Name	Web Technologies and Advanced Java Programming	C222

Course Code	Course Outcome
C222.1	Create a website statically or dynamically.
C222.2	Get knowledge on displaying and decorating the contents in a web page
C222.3	Learn the concepts of store and transport the data among web pages elementary problems.(L2)
C222.4	Generate static or dynamic content according to the client's request.
C222.5	Create objects with which the client can communicate with server.
C222.6	Provide User Authentication by using cookies and back end operations using JDBC

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C222.1	3	3	-	2	-	-	-	-	-	-	-	2	3.00	2.00	-
C222.2	3	3	3	2	-	-	-	-	-	-	-	-	3	2.00	2.00
C222.3	-	-	3	3	-	-	-	-	-	-	-	2	3.00	2.00	2.00
C222.4	2	2	3	2	-	-	-	-	-	-	-	-	3.00	2	-
C222.5	2	-	2	2	-	-	-	-	-	-	-	-	3.00	2.00	2
C222.6	-	-	3	2	-	-	-	-	-	-	-	2	3.00	2.00	2.00

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Subject Name	MICROPROCESSOR AND ITS APAPLCIATIONS	C225

Course Code	Course Outcome
C225.1	To Describe the basics of 8086 microprocessors architectures and its Functionalities
C225.2	To Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP
C225.3	Student have Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.
C225.4	Student have Distinguish and analyze the properties of Microprocessors & Micro controllers
C225.5	Student have Analyze the data transfer information through serial & parallel ports.
C225.6	Student have Train their practical knowledge through laboratory experiments

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C223.1	2	2	2	-	-	-	-	-	-	-	-	-	2	-	3
C225.2	2	2	2	-	-	-	-	-	-	-	-	-	2	3	-
C225.3	-	2	2	-	-	-	-	-	-	-	-	-	2	3	3
C225.4	-	-	2	-	-	-	-	-	-	2	-	-	2	-	3
C225.5	-	-	-	-	-	-	-	-	-	2	2	-	2	-	3
C225.6	2	2	2	-	-	-	-	-	-	-	-	-	2	-	-

Subject Name	WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING LAB	C226

Course Code	Course Outcome
C226.1	Create a website statically or dynamically
C226.2	Get knowledge on displaying and decorating the contents in a webpage
C226.3	Learn the concepts of store and transport the data among webpages.
C226.4	Generate static or dynamic content according to the client's request.
C226.5	Create objects with which the client can communicate with server.
C226.6	Provide User Authentication by using cookies and back end operations using JDBC

Course Code	CO-PO & PSO Relevance Matrix														
	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
C226.1	3	3	2	2	2	2	-	-	-	-	2	2	-	-	2
C226.2	-	3	2	2	2	2	-	-	-	-	2	-	-	2	-
C226.3	3	2	-	2	2	-	-	-	-	-	2	2	3	-	2
C226.4	-	3	3	3	2	-	-	-	-	-	2	2	-	-	-
C226.5	3	-	2	2	2	-	-	-	-	-	-	2	3	-	-
C226.6	3	3	2	2	2	-	-	-	-	-	2	2	-	3	-

Subject Name	MINI PROJECT	C228

Course Code	Course Outcome
C228.1	Independently carry out literature survey in identified domain, and consolidate it to formulate a problem statement
C228.2	Apply identified knowledge to solve a complex engineering problem and design a solution, implement and test the proposed solution
C228.3	Use synthesis/modeling to simulate and solve a problem or apply appropriate method of analysis to draw valid conclusions and present, demonstrate, execute final version of project
C228.4	Incorporate the social, environmental and ethical issues effectively into solution of an engineering problem
C228.5	Contribute effectively as a team member or leader to manage the project timeline
C228.6	Write pertinent project reports and make effective project Presentations

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C228.1	3	2	0	0	0	0	0	0	0	0	0	0	3	3	3
C228.2	0	3	3	0	0	0	0	0	0	0	0	0	3	0	0
C228.3	0	2	3	2	3	0	0	0	0	0	0	0	0	3	0
C228.4	0	0	0	0	0	3	3	3	0	0	3	0	3	0	3
C228.5	0	0	0	0	0	0	0	0	3	0	3	0	3	3	3
C228.6	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0

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Subject Name	ADVANCED DATA STRUCTURES	C311

Course Code	Course Outcome
C311.1	Able to understand the importance, operations and application of Hashing
C311.2	Able to understand implementation of skip lists
C311.3	Able to get a good understanding about different balanced trees.
C311.4	Able to understand the implementation of heaps and binomial queues.
C311.5	Have an idea on applications of algorithms in a variety of areas, like string matching,indexing etc.
C311.6	Able to understand the importance and applications of tries

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C311.1	3	3	-	-	-	-	-	-	-	-	-	-	3	2	2
C311.2	3	3	3	2	-	-	-	-	-	-	-	-	3	2	2
C311.3	-	-	3	3	2	-	-	-	-	-	-	-	3	2	2
C311.4	2	2	3	-	-	-	-	-	-	-	-	2	3	2	2
C311.5	2	-	2	2	2	-	-	-	-	-	-	2	3	2	2
C311.6	-	-	3	-	-	-	-	-	-	-	-	2	3	2	2

Subject Name	COMPUTER NETWORKS	C312

Course Code	Course Outcome
C312.1	Will be able to understand OSI and TCP/IP models, various topologies and LAN, MAN, WAN Technologies and example networks
C312.2	Will be able to identify characteristics of Transmission Media and Classify various Multiplexing and Switching Techniques
C312.3	Will be able to calculate block coding techniques for EDC and ECC along with various data link control protocols.
C312.4	Will be able to locate the different channel allocation problems, and design various CSMA and controlled Access Protocols and Routing protocols.
C312.5	Will be able to identify various MAC sub layer protocols in wired and wireless LANs.
C312.6	Will be able to analyze various application layer protocols for WWW and wireless web.

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
C312.1	3	3	-	-	-	-	-	-	-	-	-	-	-	3	-
C312.2	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
C312.3	3	2	3	-	-	-	-	-	-	-	2	-	-	3	3
C312.4	2	2	2	-	-	-	-	-	-	-	3.00	-	3	3	-
C312.5	3	-	2	-	-	-	-	-	-	-	2	-	3	3	-
C312.6	-	-	3	-	-	-	-	-	-	-	3	3	-	3.00	-

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Subject Name	DATA WAREHOUSING AND DATA MINING	C314

Course Code	Course Outcome
C314.1	Students will understand purpose and use of mining, various mining techniques and issues in mining.
C314.2	Students will understand pre-process and they will apply preprocessing before actual mining begins.
C314.3	Students able to distinguish between database and data warehouse & OLTP and OLAP queries, able to work with multi-dimensional databases.
C314.4	Students learn about classification and various classification techniques like decision tree building, Bayes theorem, Naive Bayesian Classification, Bayesian Belief Networks
C314.5	Students learn about Association analysis and basic concepts and algorithms
C314.6	Students will be able to learn Cluster Analysis: Basic Concepts and Algorithms

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
C314. 1	3	3	2	3	3	-	-	-	-	-	-	-	3	3	-
C314. 2	3	3	3	2	3	-	-	-	-	-	-	-	2	3	-
C314. 3	3	-	3	3	3	-	-	-	-	-	-	-	2	3	-
C314. 4	3	3	-	3	3	-	-	-	-	-	-	-	3	3	-
C314. 5	3	3	-	3	3	-	-	-	-	-	-	-	3	3	3
C314. 6	3	3	-	3	3	-	-	-	-	-	-	-	2	3	-

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Subject Name	FORMAL LANG & AUTOMATA THEORY	C313

Course Code	Course Outcome
C313.1	Students will be able to define the mathematical principles behind theoretical computer science
C313.2	Students will be able to differentiate and give examples for the different types of automata like finite automata, push down automata, linear bounded automata and turing machine.
C313.3	Students will be able to correlate the different types of automata to real world applications.
C313.4	Students will be able to choose and design appropriate automata for the different requirements outlined by theoretical computer science.
C313.5	Students will be able to identify the different computational problems and their associated complexity.
C313.6	Summarize computability, decidability and complexity through problem solving

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
C313. 1	3	3	2.0 0	-	-	-	-	-	-	-	-	3.00	-	3	-
C313. 2	2.00	3	2	3	2.0 0	-	-	-	-	-	-	2.00	2	3	3
C313. 3	-	2	3	-	3.0 0	-	-	-	-	-	-	3.00	3	2	3
C313. 4	2.00	2	2	-	-	-	-	-	-	-	-	-	2	3	-
C313. 5	2	3	3	-	-	-	-	-	-	-	-	-	2	3	-
C313. 6	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-

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Subject Name	Introduction to ROBOTICS

Course Code	Course Outcome
C315.1	Identify various robot configurations.
C315.2	Understand the basic components of robots.
C315.3	Evaluate D-H notations for simple robot manipulator.
C315.4	Perform trajectory planning for a manipulator by avoiding obstacles
C315.5	Select appropriate actuators and sensors for a robot.
C315.6	Illustrate the industrial applications of robots.

Course Code	CO-PO & PSO Relevance Matrix														
	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
C315.1	3	3	2.00	-	-	-	-	-	-	-	-	3.00	-	3	-
C315.2	2.00	3	2	3	2.00	-	-	-	-	-	-	2.00	2	3	3
C315.3	-	2	3	-	3.00	-	-	-	-	-	-	3.00	3	2	3
C315.4	2.00	2	2	-	-	-	-	-	-	2.00	2.00	-	2	3	-
C315.5	2	3	3	-	-	-	-	-	-	-	-	-	2	3	-
C315.6	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-

Subject Name	Computer Networks LAB	C319

Course Code	Course Outcome
C319.1	Should be able to Calculate Data link layer farming methods like bit stuffing and byte stuffing.
C319.2	Should be able to Analyze Cyclic redundancy check on different polynomials
C319.3	Should be able to understand Socket Programming Implementation by using TCP and UDP Protocols.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C319.1	3	3	-	-	2	2	-	-	-	-	2	2	-	-	2
C319.2	-	3	-	-	2	2	-	-	-	-	2	-	-	2	-
C319.3	3	2	-	-	2	-	-	-	-	-	2	2	3	-	2

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Subject Name	COMPETATIVE CODING LAB	C319

Course Code	Course Outcome
C319.1	Understand and design solutions for problems based on various printing patterns/shapes
C319.2	Understand the basic principles of various number based problems and design solutions
C319.3	Apply appropriate algorithm design technique to solving array based application problems
C319.4	Identify suitable method to solve problems based on functions and recursion
C319.5	Understand and solve problems based on pointers
C319.6	Analyze and design solutions based on linked lists, stacks and queues.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C319.1	3	3	-	-	2	2	-	-	-	-	2	2	-	-	2
C319.2	-	3	-	-	2	2	-	-	-	-	2	-	-	2	-
C319.3	3	2	-	-	2	-	-	-	-	-	2	2	3	-	2
C319.4	-	3	-	-	2	-	-	-	-	-	2	2	-	-	-
C319.5	3	-	-	-	2	-	-	-	-	-	-	2	3	-	-
C319.6	3	3	-	-	2	-	-	-	-	-	2	2	-	3	-

Subject Name	Advanced Data Structures Lab	C317

Course Code	Course Outcome
C317.1	Implement Hashing
C317.2	Students able to implement programs on skip lists
C317.3	Implement different balanced trees.
C317.4	Implement heaps and binomial queues.
C317.5	Implement various string matching algorithms
C317.6	Implement different search trees

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C317.1	3	3	-	-	2	2	-	-	-	-	2	2	-	-	2
C317.2	-	3	-	-	2	2	-	-	-	-	2	-	-	2	-
C317.3	3	2	-	-	2	-	-	-	-	-	2	2	3	-	2
C317.4	-	3	-	-	2	-	-	-	-	-	2	2	-	-	-
C317.5	3	-	-	-	2	-	-	-	-	-	-	2	3	-	-
C317.6	3	3	-	-	2	-	-	-	-	-	2	2	-	3	-

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Subject Name	seminar	C3111

Course Code	Course Outcome
C3111.1	Independently carry out literature survey in identified domain, and consolidate it to formulate a problem statement
C3111.2	Apply identified knowledge to solve a complex engineering problem and design a solution, implement and test the proposed solution
C3111.3	Use synthesis/modeling to simulate and solve a problem or apply appropriate method of analysis to draw valid conclusions and present, demonstrate, execute final version of project
C3111.4	Incorporate the social, environmental and ethical issues effectively into solution of an engineering problem
C3111.5	Contribute effectively as a team member or leader to manage the project timeline
C3111.6	Write pertinent project reports and make effective project Presentations

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO 3
C3111.1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0
C3111.2	0	3	3	0	0	0	0	0	0	0	0	0	3	0	0
C3111.3	0	2	3	2	3	0	0	0	0	0	0	0	0	3	0
C3111.4	0	0	0	0	0	3	3	3	0	0	3	0	0	0	3
C3111.5	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0
C3111.6	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0

Subject Name	DESIGN&ANALYSIS OF ALGORITHM	

Course Code	Course Outcome
C322.1	Students evaluate worst-case running times of algorithms using asymptotic analysis and components.
C322.2	Students evaluates the divide and conquer method explains when an algorithmic design situation demands it.
C322.3	Students evaluates the greedy method explains when an algorithmic design situation demands it.
C322.4	Student evaluates the dynamic-programming paradigm explains when an algorithmic design demands it.
C322.5	Student evaluates the back tracking method explains when an algorithmic design demands it. organizational and industries.
C322.6	Student evaluates the branch and bound paradigm and deterministic methods e-plain when an algorithmic design demands it.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C322.1	3	3	3	3	-	-	-	-	-	-	-	-	2	2	-
C322.2	3	3	3	3	-	-	-	-	-	-	-	-	2	2	2
C322.3	3	3	3	3	-	-	-	-	-	-	-	-	-	2	2
C322.4	3	3	3	3	-	-	-	-	-	-	-	-	2	3	3
C322.5	3	3	3	3	-	-	-	-	-	-	-	-	2	2	2
C322.6	3	3	3	3	-	-	-	-	-	-	-	-	3	2	2

Subject Name	COMPILER DESIGN	C323

Course Code	Course Outcome
C323.1	Describes the major concept and areas of language translation in compilers, the functionality and complexity levels of various translators, linkers, loaders..
C323.2	Describes practical experience in phases of compiler
C323.3	Compare and differentiate various parsing and grammar transformation techniques
C323.4	Construct intermediate code and performs type checking
C323.5	Schedule symbol table and its organization.
C323.6	Illustrate Code generation, obtains machine independent code optimization and instruction scheduling.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO1 2	PS O1	PS O2	PSO 3
C323.1	3	3	-	-	-	-	-	-	-	-	-	-	2	2	3
C323.2	3	3	3	2	-	-	-	-	-	-	-	-	2	2	2
C323.3	-	-	3	3	-	-	-	-	-	-	-	-	3	2	2
C323.4	2	2	3	-	-	-	-	-	-	-	-	-	2	2	2
C323.5	-	-	2	2	-	-	-	-	-	-	-	-	2	3	2
C323.6	-	-	3	-	-	-	-	-	-	-	-	-	2	2	2

Subject Name	ARTIFICIAL INTELLIGENCE	C326

Course Code	Course Outcome
C326.1	Possess the ability to formulate an efficient problem space for a problem expressed in English.
C326.2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
C326.3	Possess the skill for representing knowledge using the appropriate technique
C326.4	Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing
C326.5	Apply the knowledge to develop the solutions for real life problems
C326.6	Develop new algorithms to contribute to the research arena

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2	PSO3
C326.1	3	3	-	-	-	-	-	-	-	2.00	-	-	2	2	3
C326.2	3	3	3	2	-	-	-	2.00	2.00	-	2.00	-	2	2	2
C326.3	-	-	3	3	-	-	-	-	-	-	-	-	3	2	2
C326.4	2	2	3	-	-	-	-	2.00	-	-	-	-	2	2	2
C326.5	-	-	2	2	-	-	-	-	2.00	2.00	2.00	-	2	3	2
C326.6	-	-	3	-	-	-	-	-	-	2.00	-	2.00	2	2	2

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Subject Name	Operating Systems & Unix programming Lab	C327

Course Code	Course Outcome
C327.1	To Design various CPU Scheduling algorithms
C327.2	To implement system calls
C327.3	To Compare and contrast various memory management schemes
C327.4	To implement deadlock algorithms
C327.5	To Design and Implement a page replacement algorithms
C327.6	To Design and implement file allocation strategies

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C327.1	3	3	2	2	2	2	-	-	-	-	2	2	-	-	2
C327.2	-	3	2	2	2	2	-	-	-	-	2	-	-	2	-
C327.3	3	2	-	2	2	-	-	-	-	-	2	2	3	-	2
C327.4	-	3	3	3	2	-	-	-	-	-	2	2	-	-	-
C327.5	3	-	2	2	2	-	-	-	-	-	-	2	3	-	
C327.6	3	3	2	2	2	-	-	-	-	-	2	2	-	3	-

Subject Name	OPERATING SYSTEMS	C321

Course Code	Course Outcome
C321.1	To Understand the structure and functions of OS.
C321.2	To Design various Scheduling algorithms. to manage markets & break-even point.
C321.3	To Apply the principles of concurrency and Design deadlock, prevention and avoidance algorithms.
C321.4	To Compare and contrast various memory management schemes.
C321.5	To Design and Implement a prototype file systems. organizational and industries.
C321.6	To Perform administrative tasks on Linux Servers and to understand the basics of Android Operating System Internals.

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Subject Name	R PROGRAMMING LAB	C328

Course Code	Course Outcome
C328.1	List motivation for learning a programming language.
C328.2	Access online resources for R and import new function packages into the R workspace
C328.3	Import, review, manipulate and summarize data-sets in R
C328.4	Explore data-sets to create testable hypotheses and identify appropriate statistical tests
C328.5	Perform appropriate statistical tests using R Create and edit visualizations
C328.6	Ability to analyze different Data Analytics Applications.

Subject Name	SOFTWARE TESTING METHODLOGIES	C325

Course Code	Course Outcome
C325.1	Able To Understand Basic Testing Concepts And Models In Testing
C325.2	Able To Explore Basic Testing Techniques And Strategies
C325.3	Have Basic Understanding And Knowledge Of Contemporary Issues Like Component And Interface Testing
C325.4	Able To Support In Generating Test Cases And Test Suites.
C325.5	Have Basic Understanding And Knowledge About Graphs And Matrix Relations
C325.6	Apply Testing Methods And Tools To Resolve The Problems In Real Time Environment.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C325.1	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3.00
C325.2	-	-	-	-	3	-	-	-	-	-	-	-	-	3	3.00
C325.3	-	-	-	-		-	-	-	3	3	-	-	-	3	3.00
C325.4	-	-	-	-	3	-	-	-	3	3	-	-	-	-	3
C325.5	3	-	-	-	-	-	-	3.00	-	-	-	-	3	-	3.00
C325.6	-	-	-	-	3	-	-	-	3	3	-	-	-	-	3

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Subject Name	Data Science	C414

Course Code	Course Outcome
C414.1	Understanding the machine learning basics and how data is preprocessed
C414.2	How linear models help in prediction
C414.3	Able to understand Distance based models complexity estimate parameters using supervised and unsupervised training methods.
C414.4	Able to designProbabilistic models
C414.5	Able to design Nonlinear models and ensembles improve efficiency organizational and industries.
C414.6	Able to design, implement, and analyze various neural networks algorithms opportunities.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C414.1	3	3	-	-	2	-	-	3	-	-	-	2	3	-	-
C414.2	3	2	3	2	3	-	-	3	-	-	-	3	3	3	-
C414.3	3	3	3	3	3	-	-	3	-	-	-	2	3	3	-
C414.4	2	3	-	-	3	-	-	3	-	-	-	3	3	3	-
C414.5	3	3	-	-	3	-	-	3	-	-	-	3	3	2	-
C414.6	3	2	-	-	3	-	-	3	-	-	-	3	2	2	-

Subject Name	MEFA	C411

Course Code	Course Outcome
C411.1	Use the theory of managerial economics, demand, production analysis and forecasting theories.
C411.2	Analyse of production markets and pricing strategies. Functions and cost-price functions to manage markets & break-even point.
C411.3	Develop ability to identify, formulate and solve engineering problem by applying the knowledge of managerial economics.
C411.4	Theorize about characteristics features and types of industrial organization, concept of changing business environment in post-liberalization scenario.
C411.5	Enhance their capabilities in the interpretation of b/s that are followed in industries, organizational and industries.
C411.6	Apply financial analysis, capital budgeting techniques in evaluating various investment opportunities.

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
C411.1	2	-	-	-	-	-	3	3	-	2	-	3	-	-	2
C411.2	3	-	-	-	-	-	3	-	-	3	-	3	-	3	2
C411.3	-	-	-	-	-	-	-	3	-	-	-	2	-	3	-
C411.4	3	-	-	-	-	-	3	-	-	3	-	3	-	3	-
C411.5	-	3	-	-	-	-	-	3	-	-	-	-	-	3	3
C411.6	2	-	-	-	-	-	-	-	-	-	-	3	-	3	3

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Subject Name	OPERATION RESEARCH	C414

Course Code	Course Outcome
C414.1	Formulate and solve the problems using LPP using different methods
C414.2	Find the appropriate times to replace items individually and as a group
C414.3	Formulate and solve Transportation, Assignment , sequencing problems
C414.4	Formulate and solve the problems having saddle and without saddle points
C414.5	Solve the queuing problems using different methods
C414.6	Solve different problems related to inventory maintenance, apply Dynamic programmingmethods

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C414.1	3	3	-	-	2	-	-	3	-	-	-	2	3	-	-
C414.2	3	2	-	-	3	-	-	3	-	-	-	3	3	3	-
C414.3	3	3	-	-	3	-	-	3	-	-	-	2	3	3	-
C414.4	2	3	-	-	3	-	-	3	-	-	-	3	3	3	-
C414.5	3	3	-	-	3	-	-	3	-	-	-	3	3	2	-
C414.6	3	2	-	-	3	-	-	3	-	-	-	3	2	2	-

Subject Name	PREDECTIVE ANALYTICS LAB	C417

Course Code	Course Outcome
C417.1	Able to Implement Linear and Multiple Regressions.
C417.2	Able to Estimating Probabilities using a logistic function and the prediction of Categorical placement.
C417.3	Able to build Various Time-series models.
C417.4	Able to implement the applications single and multiple decision trees.
C417.5	Able to build multiple Linear regression models across the range of predictor values.
C417.6	Able to know outcome variable's values.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C417.1	3	3	2	2	2	2	-	-	-	-	2	2	-	-	2
C417.2	3	3	2	2	2	2	-	-	-	-	2	2	-	2	-
C417.3	3	2	2	2	2	-	-	-	-	-	2	2	3	-	2
C417.4	3	3	3	3	2	-	-	-	-	-	2	2	-	-	-
C417.5	3	3	2	2	2	-	-	-	-	-	2	2	3	-	-
C417.6	3	3	2	2	2	-	-	-	-	-	2	2	-	3	-

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Subject Name	RESEARCH METHODOLOGY	

Course Code	Course Outcome
C419.1	Have basic awareness of social research, research process and testing of hypothesis
C419.2	Have adequate knowledge on research designs and measurement scaling techniques as well as quantitative data analysis. to manage markets & break-even point.
C419.3	Apply various methodologies including sampling questioning, empirical techniques in their research work reports
C419.4	Construct the data for hypothesis testing and statistical quality control charts changing business environment in post-liberalization scenario.
C419.5	Construct the data using various multi-variate techniques and ANOVA for complex experimental design
C419.6	Construct the data using various bi-variate techniques and ANOVA for complex experimental design

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C419.1	1	-	-	-	-	-	3	3	-	2	-	-	-	-	2
C419.2	1	-	-	-	-	-	3	-	-	3	-	3	-	3	2
C419.3	-	-	-	-	-	-	-	3	-	-	-	1	3	3	-
C419.4	3	-	-	-	-	-	3	-	-	3	-	3	-	3	-
C419.5	-	3	-	-	-	-	-	3	-	-	-	-	-	3	3
C419.6	2	-	-	-	-	-	-	-	-	-	-	3	-	3	3

Subject Name	MINOR PROJECT

Course Code	Course Outcome
C419.1	Independently carry out literature survey in identified domain, and consolidate it to formulate a problem statement
C419.2	Apply identified knowledge to solve a complex engineering problem and design a solution, implement and test the proposed solution
C419.3	Use synthesis/modeling to simulate and solve a problem or apply appropriate method of analysis to draw valid conclusions and present, demonstrate, execute final version of project
C419.4	Incorporate the social, environmental and ethical issues effectively into solution of an engineering problem
C419.5	Contribute effectively as a team member or leader to manage the project timeline
C419.6	Write pertinent project reports and make effective project Presentations

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C419.1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0
C419.2	0	3	3	0	0	0	0	0	0	0	0	0	3	0	0
C419.3	0	2	3	2	3	0	0	0	0	0	0	0	0	3	0
C419.4	0	0	0	0	0	3	3	3	0	0	3	0	0	0	3
C419.5	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0
C419.6	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0

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Subject Name	AI APPLICATION DEVELOPMENT LAB	C416

Course Code	Course Outcome
C416.1	Describe various machine learning algorithms for AI applications
C416.2	Describe the development lifecycle of AI applications
C416.3	Describe the principles of AI for IoT applications
C416.4	Collect data from Internet and perform data preprocessing
C416.5	Identify suitable machine learning models for AI applications
C416.6	Develop software programs to effectively train machine learning models for AI applications features.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C416.1	3	3	2	2	2	-	-	-	2	-	-	2	3.00	3.00	-
C416.2	3	3	2	2	2	-	-	2	2	-	-	2	3.00	3.00	-
C416.3	3	2	2	2	2	-	-	2	2	-	-	2	3.00	3.00	-
C416.4	3	3	3	3	2	-	-	-	2	-	-	2	3.00	3.00	-
C416.5	3	3	2	2	2	-	-	-	2	-	-	2	3.00	3.00	-
C416.6	3	3	2	2	2	-	-	-	2	-	-	2	3.00	3.00	-
Average	3.00	2.83	2.17	2.17	2.00	-	-	2.00	2.00	-	-	2.00	3	3	-

Subject Name	Block Chain Technology	C419

Course Code	Course Outcome
C419.1	Have basic awareness of social research, research process and testing of hypothesis
C419.2	Have adequate knowledge on research designs and measurement scaling techniques as well as quantitative data analysis. to manage markets & break-even point.
C419.3	Apply various methodologies including sampling questioning, empirical techniques in their research work reports
C419.4	Construct the data for hypothesis testing and statistical quality control charts changing business environment in post-liberalization scenario.
C419.5	Construct the data using various multi-variate techniques and ANOVA for complex experimental design
C419.6	Construct the data using various bi-variate techniques and ANOVA for complex experimental design

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
C419.1	1	-	-	-	-	-	3	3	-	2	-	-	-	-	2
C419.2	1	-	-	-	-	-	3	-	-	3	-	3	-	3	2
C419.3	-	-	-	-	-	-	-	3	-	-	-	1	3	3	-
C419.4	3	-	-	-	-	-	3	-	-	3	-	3	-	3	-
C419.5	-	3	-	-	-	-	-	3	-	-	-	-	-	3	3
C419.6	2	-	-	-	-	-	-	-	-	-	-	3	-	3	3

Subject Name	CRYPTOGRAPHY AND NETWORK SECURITY	C412

Course Code	Course Outcome
C412.1	Understand the principles of cryptography and security, with enciphering Techniques and analyze a variety of threats and attacks.
C412.2	Distinguish the block ciphers and stream ciphers and apply them on a various symmetric cryptographic techniques.
C412.3	Analyze the principle and mathematical models used in public-key cryptosystems by applying them on different (various) types of algorithms.
C412.4	Theorize about characteristics features and types of industrial organization, concept ofAnalyze and design the message authentication functions and digital certifications for secure communication.
C412.5	Analyze the user authentications principles and security approach at both the web and email.
C412.6	Understand the concepts of IP Security with its services and dealing with the prevention and detection of intrusions.

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C412.1	3	3	-	-	-	2	-	3	-	-	-	2	3	-	-
C412.2	9	3	3	3	-	3	-	3	-	-	-	3	3	3	3
C412.3	93	3	3	3	-	3	-	3	-	-	-	2	3	3	3
C412.4	3	3	-	-	-	3	-	3	-	-	-	3	3	3	3
C412.5	3	3	-	-	-	3	-	3	-	-	-	3	3	2	2
C412.6	3	2	-	-	-	3	-	3	-	-	-	3	2	2	2

Subject Name	Social Networking and Semantics	C421

Course Code	Course Outcome
C421.1	Ability to understand and knowledge representation for the semantic web.
C421.2	Learn the various semantic web applications.
C421.3	Ability to create ontology.
C421.4	Ability to build a blogs and social networks
C421.5	Ability to build real world blogs used in social netwroks

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C421.1	3	3	3	2	-	-	-	-	-	-	-	2	3	3	2
C421.2	3	2	3	2	-	-	-	-	-	-	-	2	3	2	3
C421.3	3	2	2	-	-	-	-	-	-	-	-	2	3	2	3
C421.4	3	3	3	-	-	-	-	-	-	-	-	2	3	2	3

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Course codes

Course Codes Allotted For All The Courses Of NRIA18 Regulation For 2018 And 2019 Admitted Batch

S. NO	Course Code	IT Program Code
1	C111	Professional English-1
2	C112	Engineering Mathematics-1
3	C113	Applied Physics
4	C114	Programming and Problem Solving with C
5	C115	Engineering Graphics
6	C116	English Communication Skills Lab-1
7	C117	Applied Physics lab
8	C118	Programming and Problem Solving with C Lab
9	C119	Environmental Studies
10	C121	Professional English-II
11	C122	Engineering Mathematics-II
12	C123	Applied Chemistry
13	C124	OOPS through Java
14	C125	Fundamentals of Electrical Engineering
15	C126	English Communication Skills Lab-II
16	C127	Applied Chemistry lab
17	C128	Automation Tools andProfessional Workshop
18	C129	OOPS through Java Lab

19	C211	Discrete Mathematical Structures
20	C212	Data Structures
21	C213	Data Base Management Systems
22	C214	Digital Logic Design
23	C215	Internet of Things Lab
24	C216	Data Structures Lab
25	C217	Data Base Management System Lab
26	C218	Python programming Lab
27	C219	Humanities elective-1
28	C2110	Professional ethics and Human Values
29	C221	Probability and Statistics
30	C222	Web Technologies and Advanced Java Programming
31	C223	Software Engineering
32	C224	Computer Organization
33	C225	Open Elective-1
34	C226	Web Technologies and Advanced Java Programming Lab
35	C227	Aptitude and Reasoning
36	C228	Mini project
37	C311	Advanced Data Structures
38	C312	Computer Networks
39	C313	Formal Languages and Automata Theory
40	C314	Professional Elective-1
41	C315	Open Elective-II
42	C316	Computer Networks lab
43	C317	Advanced Data Structures Lab
44	C318	Basics of Civil and Mechanical Engineering / Swayam/NPTEL **
45	C319	Competitive Coding

46	C3110	Seminar
47	C3111	Indian Constitution
48	C321	Operating Systems
49	C322	Design and Analysis of Algorithms
50	C323	Compiler Design
51	C324	Professional Elective -2(stm)
52	C325	Professional Elective -3(ds)
53	C326	Artificial Intelligence
54	C327	Operating Systems & Unix programming Lab
55	C328	R Programming lab
56	C329	Aptitude and Reasoning – 2
57	C3210	Hackathon
58	C3211	NSS / YOGA / Social service/ sports /gamesBiology for Engineers/Enterprising and Startup/
59	C411	Managerial Economics and Financial Accounting
60	C412	Cryptography and Network Security
61	C413	Professional Elective -4(bct)
62	C414	Professional Elective -5ds)
63	C415	Open Elective -3(or)
64	C416	AI application development Lab
65	C417	Predictive Analytics using R
66	C418	Agile Software Development & Devops
67	C419	Minor project ##
68	C4110	Research Methodology
69	C421	Professional Elective-6 Social Networking and Semantics
70	C422	Open Elective-4 Image procesing
71	C423	Major Project (Internal/Industry Internship) dissertation***

Head, IT Department
NRI Institute of Technology
POTHAVARAPPADU (V)
Agiripalli (M), Krishna Dist.

S. NO	Course Code	IT Program Code	CO	CIE (%)	CIE (Level)	SEE (%)	SEE (Level)	Direct (%)	Direct (Level	CO Overall Attainment %	CO Overall Attainment Level	Target (%)	Target (Level)
1	C111	Professional English-1	CO1	48	1.43	98	2.9483	84	2.5143477	87	2.6115	60	1.8
			CO2	92	2.76	98	2.9483	95	2.8556978	96	2.8846	60	1.8
			CO3	94	2.81	98	2.9483	96	2.8762241	97	2.901	60	1.8
			CO4	86	2.59	98	2.9483	92	2.764757	94	2.8118	60	1.8
			CO5	94	2.83	98	2.9483	96	2.8659129	96	2.8927	60	1.8
			CO6	67	2.00	98	2.9483	83	2.4925399	86	2.594	60	1.8
2	C112	Engineering Mathematics-1	CO1	98	2.95	74	2.2241	83	2.4926832	83	2.4804	60	1.8
			CO2	79	2.38	74	2.2241	75	2.2421568	77	2.3006	60	1.8
			CO3	82	2.45	74	2.2241	74	2.2150544	75	2.2479	60	1.8
			CO4	65	1.96	74	2.2241	66	1.9700544	71	2.1243	60	1.8
			CO5	99	2.96	74	2.2241	83	2.4979463	85	2.5363	60	1.8
			CO6	98	2.94	74	2.2241	82	2.4671809	83	2.5013	60	1.8
3	C113	Applied Physics	CO1	89	2.67	80	2.3908	80	2.4026518	80	2.4027	60	1.8
			CO2	95	2.84	81	2.442	82	2.4635769	82	2.4636	60	1.8
			CO3	96	2.87	82	2.4462	81	2.4369638	81	2.437	60	1.8
			CO4	99	2.98	85	2.5593	87	2.5974192	87	2.5974	60	1.8
			CO5	99	2.98	85	2.5361	86	2.5688624	86	2.5689	60	1.8
			CO6	99	2.97	83	2.4815	84	2.5151991	84	2.5152	60	1.8
4	C114	Programming and Problem Solving with C	CO1	98	2.94	84	2.5345	89	2.6803993	86	2.5788	60	1.8
			CO2	95	2.85	84	2.5345	88	2.6348793	87	2.6148	60	1.8
			CO3	95	2.84	84	2.5345	87	2.615977	86	2.5686	60	1.8
			CO4	99	2.97	84	2.5345	90	2.6961887	85	2.5501	60	1.8
			CO5	99	2.97	84	2.5345	89	2.6793103	86	2.5676	60	1.8
			CO6	99	2.97	84	2.5345	89	2.6793103	89	2.671	60	1.8
5	C115	Engineerin	CO1	100	3.00	88	2.6379	93	2.7827586	93	2.7952	65	1.95
			CO2	100	3.00	88	2.6379	93	2.7827586	94	2.8262	65	1.95

		g Graphics	CO3	100	3.00	88	2.6379	93	2.7827586	94	2.8262	65	1.95
			CO4	100	3.00	88	2.6379	93	2.7827586	92	2.7745	65	1.95
6	C116	English Communication Skills Lab-1	CO1	95	2.84	100	3	98	2.937931	98	2.9503	70	2.1
			CO2	95	2.84	100	3	98	2.937931	98	2.9503	70	2.1
			CO3	95	2.84	100	3	98	2.937931	95	2.8572	70	2.1
			CO4	95	2.84	100	3	98	2.937931	98	2.9503	70	2.1
7	C117	Applied Physics lab	CO1	100	3	100	3	100	3	100	3	70	2.1
			CO2	100	3	100	3	100	3	100	3	70	2.1
			CO3	100	3	100	3	100	3	97	2.9069	70	2.1
			CO4	100	3	100	3	100	3	100	3	70	2.1
			CO5	100	3	100	3	100	3	97	2.8966	70	2.1
			CO6	100	3	100	3	100	3	97	2.8966	70	2.1
8	C118	Programming and Problem Solving with C Lab	CO1	99	2.974	100	3	100	2.9896552	100	2.9917	80	2.4
			CO2	99	2.974	100	3	100	2.9896552	100	2.9917	80	2.4
			CO3	99	2.974	100	3	100	2.9896552	97	2.8986	80	2.4
			CO4	99	2.974	100	3	100	2.9896552	100	2.9917	80	2.4
			CO5	99	2.974	100	3	100	2.9896552	96	2.8883	80	2.4
			CO6	99	2.974	100	3	100	2.9896552	96	2.8883	80	2.4
9	C119	Environmental Studies	CO1	98	2.94	97	2.8966	97	2.9082733	95	2.8645	60	1.8
			CO2	99	2.98	97	2.8966	98	2.9263596	97	2.8997	60	1.8
			CO3	93	2.78	97	2.8966	95	2.8498348	92	2.7557	60	1.8
			CO4	100	2.99	97	2.897	98	2.933536	96	2.8848	60	1.8
			CO5	100	2.99	97	2.897	98	2.925717	96	2.8785	60	1.8
			CO6	100	3	97	2.897	98	2.929844	96	2.8922	60	1.8
10	C121	Professional English-II	CO1	57	1.71	97	2.897	83	2.492931	86	2.5943	60	1.8
			CO2	99	2.97	97	2.897	97	2.916931	98	2.9335	60	1.8
			CO3	97	2.92	97	2.897	97	2.896978	97	2.9176	60	1.8
			CO4	97	2.9	97	2.897	96	2.874931	97	2.8999	60	1.8
			CO5	100	3	97	2.897	98	2.933085	98	2.9465	60	1.8
			CO6	67	2	97	2.897	82	2.46098	86	2.5688	60	1.8

11	C122	Engineering Mathematics-II	CO1	98	2.93	65	1.947	77	2.306371	78	2.3313	60	1.8
			CO2	92	2.76	65	1.947	75	2.246898	77	2.3044	60	1.8
			CO3	99	2.98	65	1.947	79	2.361053	79	2.3647	60	1.8
			CO4	99	2.98	65	1.947	79	2.361053	81	2.4371	60	1.8
			CO5	49	1.46	65	1.947	57	1.718885	64	1.913	60	1.8
			CO6	99	2.98	65	1.947	76	2.290058	79	2.3596	60	1.8
12	C123	Applied Chemistry	CO1	98	2.93	85	2.565	90	2.702852	88	2.6485	60	1.8
			CO2	99	2.96	85	2.565	90	2.691344	89	2.66	60	1.8
			CO3	97	2.91	85	2.565	89	2.664677	87	2.6076	60	1.8
			CO4	96	2.88	85	2.565	90	2.687063	90	2.6979	60	1.8
			CO5	100	3	85	2.565	90	2.709677	90	2.7057	60	1.8
			CO6	67	2	85	2.565	74	2.209677	77	2.2953	60	1.8
13	C124	OOPS through Java	CO1	92	2.75	53	1.603	68	2.029247	69	2.0579	60	1.8
			CO2	92	2.75	53	1.603	68	2.036285	65	1.9394	60	1.8
			CO3	90	2.71	53	1.603	65	1.950872	66	1.9923	60	1.8
			CO4	92	2.75	53	1.603	69	2.066089	71	2.1287	60	1.8
			CO5	95	2.84	53	1.603	67	2.014205	70	2.1079	60	1.8
14	C125	Fundamentals of Electrical Engineering	CO1	97	2.9	98	2.948	98	2.939964	96	2.882	60	1.8
			CO2	98	2.94	98	2.948	98	2.937739	95	2.8602	60	1.8
			CO3	100	3	98	2.948	99	2.964406	96	2.8715	60	1.8
			CO4	100	3	98	2.948	99	2.966279	97	2.9064	60	1.8
			CO5	100	3	98	2.948	99	2.964406	96	2.8949	60	1.8
			CO6	100	3	98	2.948	99	2.967966	96	2.8844	60	1.8
15	C126	English Communication Skills Lab-II	CO1	97	2.91	100	3	99	2.965517	96	2.8897	80	2.4
			CO2	97	2.91	100	3	99	2.963793	97	2.8986	80	2.4
			CO3	97	2.91	100	3	99	2.962069	94	2.8145	80	2.4
			CO4	97	2.91	100	3	99	2.968966	97	2.9131	80	2.4
			CO5	97	2.91	100	3	99	2.965517	95	2.8483	80	2.4
			CO6	97	2.91	100	3	99	2.965517	96	2.8897	80	2.4
		Applied	CO1	94	2.82	100	3	98	2.927586	98	2.9421	70	2.1

16	C127	Chemistry lab	CO2	94	2.82	100	3	98	2.927586	98	2.9421	70	2.1
			CO3	94	2.82	100	3	98	2.927586	95	2.849	70	2.1
			CO4	94	2.82	100	3	98	2.927586	98	2.9421	70	2.1
			CO5	94	2.82	100	3	98	2.927586	95	2.8386	70	2.1
			CO6	94	2.82	100	3	98	2.927586	95	2.8386	70	2.1
17	C128	Automation Tools and Professional Workshop	CO1	100	3	100	3	100	3	100	3	70	2.1
			CO2	100	3	100	3	100	3	100	3	70	2.1
			CO3	100	3	100	3	100	3	97	2.9069	70	2.1
			CO4	100	3	100	3	100	3	100	3	70	2.1
18	C129	OOPS through Java Lab	CO1	97	2.91	100	3	99	2.965517	96	2.8897	80	2.4
			CO2	97	2.91	100	3	99	2.963793	97	2.8986	80	2.4
			CO3	97	2.91	100	3	99	2.962069	94	2.8145	80	2.4
			CO4	97	2.91	100	3	99	2.968966	97	2.9131	80	2.4
			CO5	97	2.91	100	3	99	2.965517	95	2.8483	80	2.4
			CO6	97	2.91	100	3	99	2.965517	96	2.8897	80	2.4
19	C211	Discrete Mathematical Structures	CO1	74	2.21	60.9	1.83	74	2.209	75	2.26	**60**	1.8
			CO2	60	1.81	60.9	1.83	74	2.213	76	2.29	**60**	1.8
			CO3	75	2.26	60.9	1.83	75	2.256	76	2.29	**60**	1.8
			CO4	75	2.25	60.9	1.83	75	2.255	79	2.36	**60**	1.8
			CO5	71	2.13	60.9	1.83	71	2.132	75	2.25	**60**	1.8
			CO6	71	2.13	60.9	1.83	71	2.132	75	2.24	**60**	1.8
20	C212	Data Structures	CO1	58	1.73	35.9	1.078	58	1.734	64	1.931	**60**	1.8
			CO2	52	1.57	35.9	1.078	52	1.568	60	1.789	**60**	1.8
			CO3	60	1.79	35.9	1.078	60	1.790	65	1.948	**60**	1.8
			CO4	61	1.82	35.9	1.078	61	1.825	67	2.022	**60**	1.8
			CO5	53	1.58	35.9	1.078	53	1.579	60	1.807	**60**	1.8
			CO6	48	1.43	35.9	1.078	48	1.426	56	1.675	**60**	1.8
21	C213	Data Base Management Systems	CO1	96	2.88	53.1	1.594	69	2.061	72	2.146	**60**	1.8
			CO2	99	2.98	53.1	1.594	72	2.148	74	2.234	**60**	1.8
			CO3	99	2.98	53.1	1.594	72	2.148	74	2.206	**60**	1.8
			CO4	97	2.91	53.1	1.594	70	2.111	75	2.242	**60**	1.8

			CO5	98	2.94	53.1	1.594	66	1.989	71	2.135	**60**	1.8
			CO6	96	2.88	53.1	1.594	66	1.968	70	2.109	**60**	1.8
22	C214	Digital Logic Design	CO1	95	2.84	50.0	1.5	66	1.993394	71	2.1385	**60**	1.8
			CO2	94	2.83	50.0	1.5	67	2.015881	72	2.1471	**60**	1.8
			CO3	92	2.76	50.0	1.5	66	1.983537	70	2.1025	**60**	1.8
			CO4	94	2.82	50.0	1.5	66	1.982341	72	2.1484	**60**	1.8
			CO5	94	2.81	50.0	1.5	63	1.894382	69	2.0593	**60**	1.8
			CO6	92	2.77	50.0	1.5	63	1.878499	68	2.0372	**60**	1.8
23	C215	Internet of Things Lab	CO1	95	2.86	100.0	3	98	2.94375	96	2.88	**60**	1.8
			CO2	95	2.86	100.0	3	98	2.94375	97	2.9175	**60**	1.8
			CO3	95	2.86	100.0	3	98	2.94375	95	2.8425	**60**	1.8
			CO4	95	2.86	100.0	3	98	2.94375	96	2.8894	**60**	1.8
			CO5	95	2.86	100.0	3	98	2.94375	95	2.8519	**60**	1.8
			CO6	95	2.86	100.0	3	98	2.94375	95	2.8613	**60**	1.8
24	C216	Data Structures Lab	CO1	91	2.74	100.0	3	97	2.896693	95	2.8424	80	2.4
			CO2	91	2.74	100.0	3	97	2.896875	96	2.88	80	2.4
			CO3	91	2.74	100.0	3	97	2.896329	93	2.8046	80	2.4
			CO4	91	2.74	100.0	3	97	2.896875	95	2.8519	80	2.4
			CO5	91	2.74	100.0	3	97	2.896875	94	2.8144	80	2.4
25	C217	Data Base Management System Lab	CO1	96	2.88	100.0	3	98	2.953125	96	2.8875	80	2.4
			CO2	96	2.88	100.0	3	98	2.953125	98	2.925	80	2.4
			CO3	96	2.88	100.0	3	98	2.953125	95	2.85	80	2.4
			CO4	96	2.88	100.0	3	98	2.953125	97	2.8969	80	2.4
			CO5	96	2.88	100.0	3	98	2.953125	95	2.8594	80	2.4
			CO6	96	2.88	100.0	3	98	2.953125	96	2.8688	80	2.4
26	C218	Python programming Lab	CO1	73	2.2	100.0	3	89	2.68125	89	2.67	80	2.4
			CO2	73	2.2	100.0	3	89	2.68125	90	2.7075	80	2.4
			CO3	73	2.2	100.0	3	89	2.68125	88	2.6325	80	2.4
			CO4	73	2.2	100.0	3	89	2.68125	89	2.6794	80	2.4
			CO5	73	2.2	100.0	3	89	2.68125	88	2.6419	80	2.4

			CO6	73	2.2	100.0	3	89	2.68125	88	2.6513	80	2.4
27	C219	Humanities elective-1(PSYC)	CO1	95	2.86	69.7	2.091	79	2.371935	80	2.3944	60	1.8
			CO2	63	1.89	69.7	2.091	64	1.929291	69	2.0591	60	1.8
			CO3	84	2.53	69.7	2.091	77	2.311522	78	2.3367	60	1.8
			CO4	86	2.58	69.7	2.091	79	2.357682	81	2.4393	60	1.8
			CO5	97	2.91	69.7	2.091	80	2.387725	82	2.4539	60	1.8
			CO6	94	2.82	69.7	2.091	77	2.298045	79	2.3728	60	1.8
28	C2110	Professional ethics and Human Values	CO1	99	2.98	71.9	2.156	82	2.459683	82	2.4646	60	1.8
			CO2	100	2.99	71.9	2.156	83	2.490699	84	2.5082	60	1.8
			CO3	100	2.99	71.9	2.156	81	2.42911	81	2.4308	60	1.8
			CO4	96	2.89	71.9	2.156	81	2.440699	84	2.5057	60	1.8
			CO5	97	2.91	71.9	2.156	81	2.42442	83	2.4833	60	1.8
			CO6	100	3	71.9	2.156	76	2.267444	78	2.3483	60	1.8
29	C221	Probability and Statistics	CO1	92	2.77	42.2	1.266	62	1.860938	66	1.9856	60	1.8
			CO2	96	2.89	42.2	1.266	60	1.802708	65	1.9578	60	1.8
			CO3	95	2.85	42.2	1.266	63	1.882438	66	1.9935	60	1.8
			CO4	95	2.86	42.2	1.266	59	1.784375	66	1.9806	60	1.8
			CO5	73	2.2	42.2	1.266	50	1.508162	58	1.7503	60	1.8
			CO6	83	2.48	42.2	1.266	54	1.606985	61	1.82	60	1.8
30	C222	Web Technologies and Advanced Java Programming	CO1	79	2.37	46.9	1.406	59	1.779276	64	1.9203	60	1.8
			CO2	93	2.78	46.9	1.406	61	1.839792	66	1.9875	60	1.8
			CO3	98	2.94	46.9	1.406	67	2.020313	70	2.1038	60	1.8
			CO4	96	2.88	46.9	1.406	62	1.847426	68	2.0311	60	1.8
			CO5	98	2.94	46.9	1.406	67	2.020313	72	2.16	60	1.8
			CO6	97	2.92	46.9	1.406	64	1.911458	69	2.0635	60	1.8
31	C223	Software Engineering	CO1	99	2.97	62.5	1.875	77	2.31125	78	2.3365	60	1.8
			CO2	100	2.99	62.5	1.875	77	2.32125	78	2.3539	60	1.8
			CO3	96	2.89	62.5	1.875	75	2.241316	75	2.2524	60	1.8
			CO4	99	2.98	62.5	1.875	73	2.201471	76	2.2768	60	1.8
			CO5	99	2.98	62.5	1.875	73	2.201471	75	2.2581	60	1.8
			CO6	99	2.98	62.5	1.875	73	2.201471	75	2.2581	60	1.8

32	C224	Computer Organizatio n	CO1	95	2.84	54.7	1.641	70	2.089342	71	2.1308	60	1.8
			CO2	96	2.87	54.7	1.641	71	2.131375	73	2.1832	60	1.8
			CO3	91	2.72	54.7	1.641	68	2.038375	68	2.0526	60	1.8
			CO4	95	2.85	54.7	1.641	68	2.043194	71	2.1408	60	1.8
			CO5	78	2.35	54.7	1.641	61	1.836912	64	1.9289	60	1.8
			CO6	82	2.46	54.7	1.641	63	1.8775	66	1.9708	60	1.8
33	C225	Open Elective-1(MPA)	CO1	75	2.25	35.9	1.078	53	1.602003	58	1.741	60	1.8
			CO2	72	2.17	35.9	1.078	50	1.492781	56	1.6723	60	1.8
			CO3	87	2.60	35.9	1.078	54	1.630332	58	1.7261	60	1.8
			CO4	90	2.69	35.9	1.078	52	1.569783	59	1.7621	60	1.8
			CO5	84	2.52	35.9	1.078	50	1.511548	56	1.6686	60	1.8
			CO6	81	2.43	35.9	1.078	49	1.478018	55	1.6512	60	1.8
34	C226	Web Technologi es and Advanced Java Programmi ng Lab	CO1	100	3	100.0	3	100	3	98	2.925	80	2.4
			CO2	100	3	100.0	3	100	3	99	2.9625	80	2.4
			CO3	100	3	100.0	3	100	3	96	2.8875	80	2.4
			CO4	100	3	100.0	3	100	3	98	2.9344	80	2.4
			CO5	100	3	100.0	3	100	3	97	2.8969	80	2.4
			CO6	100	3	100.0	3	100	3	97	2.9063	80	2.4
35	C227	Aptitude and Reasoning	CO1	98	2.93	96.9	2.906	97	2.915625	95	2.8575	80	2.4
			CO2	98	2.93	96.9	2.906	97	2.915625	97	2.895	80	2.4
			CO3	98	2.93	96.9	2.906	97	2.915625	94	2.82	80	2.4
			CO4	98	2.93	96.9	2.906	97	2.915625	96	2.8669	80	2.4
			CO5	98	2.93	96.9	2.906	97	2.915625	94	2.8294	80	2.4
			CO6	98	2.93	96.9	2.906	97	2.915625	95	2.8388	80	2.4
36	C228	Mini project	CO1	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO2	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO3	100	3	100.0	3	100	3	97	2.9063	70	2.1
			CO4	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO5	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO6	100	3	100.0	3	100	3	97	2.9156	70	2.1

37	C311	Advanced Data Structures	CO1	90	2.69	61.9	1.857	73	2.180613	75	2.2414	60	1.8
			CO2	91	2.72	61.9	1.857	73	2.191582	76	2.2689	60	1.8
			CO3	87	2.62	61.9	1.857	70	2.101758	72	2.1689	60	1.8
			CO4	90	2.69	61.9	1.857	71	2.135091	75	2.2612	60	1.8
			CO5	85	2.54	61.9	1.857	69	2.084214	74	2.2111	60	1.8
			CO6	85	2.54	61.9	1.857	69	2.084214	73	2.2017	60	1.8
38	C312	Computer Networks	CO1	92	2.76	81.3	2.438	86	2.569796	84	2.534	60	1.8
			CO2	94	2.81	81.3	2.438	86	2.584164	85	2.5455	60	1.8
			CO3	92	2.75	81.3	2.438	85	2.537421	83	2.4987	60	1.8
			CO4	92	2.76	81.3	2.438	85	2.545896	86	2.5711	60	1.8
			CO5	88	2.64	81.3	2.438	84	2.519184	84	2.531	60	1.8
			CO6	88	2.64	81.3	2.438	84	2.519184	84	2.531	60	1.8
39	C313	Formal Languages and Automata Theory	CO1	95	2.85	50.0	1.5	67	2.003278	70	2.1089	60	1.8
			CO2	92	2.76	50.0	1.5	66	1.975114	70	2.1051	60	1.8
			CO3	87	2.61	50.0	1.5	61	1.827905	65	1.9404	60	1.8
			CO4	95	2.86	50.0	1.5	65	1.949571	71	2.1315	60	1.8
			CO5	85	2.54	50.0	1.5	60	1.799546	66	1.9928	60	1.8
			CO6	84	2.53	50.0	1.5	60	1.797781	66	1.982	60	1.8
40	C314	Professional Elective-1(dmdw)	CO1	92	2.75	61.3	1.839	61	1.83871	76	2.2831	60	1.8
			CO2	93	2.78	61.3	1.839	61	1.83871	77	2.3001	60	1.8
			CO3	86	2.57	61.3	1.839	61	1.83871	72	2.1636	60	1.8
			CO4	91	2.73	61.3	1.839	61	1.83871	76	2.2844	60	1.8
			CO5	88	2.65	61.3	1.839	61	1.83871	74	2.2126	60	1.8
			CO6	82	2.45	61.3	1.839	61	1.83871	72	2.1744	60	1.8
41	C315	Open Elective-II(IR)	CO1	67	2	54.0	1.619	60	1.81203	65	1.9559	60	1.8
			CO2	73	2.2	54.0	1.619	61	1.841429	67	1.9981	60	1.8
			CO3	99	2.98	54.0	1.619	58	1.737698	62	1.8683	60	1.8
			CO4	67	2	54.0	1.619	58	1.746032	66	1.9687	60	1.8
			CO5	49	1.48	54.0	1.619	55	1.663445	63	1.8839	60	1.8
			CO6	48	1.45	54.0	1.619	55	1.654622	62	1.8674	60	1.8

42	C316	Computer Networks lab	CO1	100	3	100.0	3	100	3	98	2.925	80	2.4
			CO2	100	3	100.0	3	100	3	99	2.9625	80	2.4
			CO3	100	3	100.0	3	100	3	96	2.8875	80	2.4
43	C317	Advanced Data Structures Lab	CO1	100	3	100.0	3	100	3	98	2.925	80	2.4
			CO2	100	3	100.0	3	100	3	99	2.9625	80	2.4
			CO3	100	3	100.0	3	100	3	96	2.8875	80	2.4
			CO4	100	3	100.0	3	100	3	98	2.9344	80	2.4
			CO5	100	3	100.0	3	100	3	97	2.8969	80	2.4
			CO6	100	3	100.0	3	100	3	97	2.9063	80	2.4
44	C318	Basics of Civil and Mechanical Engineering / Swayam/NPTEL **	CO1	92	2.77	73.0	2.19	80	2.414543	80	2.4098	60	1.8
			CO2	88	2.65	73.0	2.19	79	2.37341	79	2.3769	60	1.8
			CO3	82	2.45	73.0	2.19	75	2.25806	76	2.2752	60	1.8
			CO4	82	2.47	73.0	2.19	78	2.332539	80	2.4004	60	1.8
			CO5	86	2.57	73.0	2.19	77	2.319195	79	2.371	60	1.8
			CO6	84	2.52	73.0	2.19	77	2.299784	79	2.3555	60	1.8
45	C319	Competitive Coding	CO1	100	3	100.0	3	100	3	98	2.925	80	2.4
			CO2	100	3	100.0	3	100	3	99	2.9625	80	2.4
			CO3	100	3	100.0	3	100	3	96	2.8875	80	2.4
			CO4	100	3	100.0	3	100	3	98	2.9344	80	2.4
			CO5	100	3	100.0	3	100	3	97	2.8969	80	2.4
			CO6	100	3	100.0	3	100	3	97	2.9063	80	2.4
46	C3110	Seminar	CO1	0		0.0		0		0			0
			CO2	0		0.0		0		0			0
			CO3	0		0.0		0		0			0
			CO4	0		0.0		0		0			0
			CO5	0		0.0		0		0			0
			CO6	0		0.0		0		0			0

47	C3111	Indian Constitution	CO1	92	2.77	90.6	2.719	92	2.74819	89	2.6767	60	1.8
			CO2	88	2.65	90.6	2.719	90	2.690374	88	2.6304	60	1.8
			CO3	82	2.45	90.6	2.719	87	2.610242	85	2.5569	60	1.8
			CO4	82	2.47	90.6	2.719	89	2.684721	89	2.6822	60	1.8
			CO5	86	2.57	90.6	2.719	90	2.692095	89	2.6693	60	1.8
			CO6	84	2.52	90.6	2.719	89	2.672683	88	2.6538	60	1.8
48	C321	Operating Systems	CO1	96	2.88	85.9	2.578	90	2.700208	89	2.657	60	1.8
			CO2	94	2.81	85.9	2.578	88	2.651898	88	2.6371	60	1.8
			CO3	95	2.84	85.9	2.578	89	2.68443	88	2.635	60	1.8
			CO4	92	2.77	85.9	2.578	88	2.647304	89	2.671	60	1.8
			CO5	85	2.56	85.9	2.578	86	2.573186	87	2.6023	60	1.8
			CO6	92	2.77	85.9	2.578	88	2.647304	88	2.6522	60	1.8
49	C322	Design and Analysis of Algorithms	CO1	2	2.73	78.1	2.344	83	2.497024	83	2.4945	60	1.8
			CO2	82	2.46	78.1	2.344	80	2.408264	81	2.4422	60	1.8
			CO3	80	2.39	78.1	2.344	79	2.383558	80	2.3943	60	1.8
			CO4	81	2.44	78.1	2.344	80	2.39944	82	2.4727	60	1.8
			CO5	78	2.35	78.1	2.344	79	2.367676	81	2.4379	60	1.8
			CO6	79	2.37	78.1	2.344	79	2.374734	81	2.4342	60	1.8
50	C323	Compiler Design	CO1	92	2.75	73.4	2.203	81	2.41651	81	2.4301	60	1.8
			CO2	92	2.75	73.4	2.203	79	2.384094	81	2.4229	60	1.8
			CO3	91	2.72	73.4	2.203	80	2.391685	80	2.4008	60	1.8

			CO4	92	2.75	73.4	2.203	79	2.384094	82	2.4604	60	1.8
			CO5	87	2.62	73.4	2.203	78	2.347864	81	2.422	60	1.8
			CO6	86	2.57	73.4	2.203	78	2.331982	80	2.4	60	1.8
51	C324	Professional Elective - 2(stm)	CO1	85	2.56	56.3	1.689	87	2.595595	86	2.5734	60	1.8
			CO2	85	2.56	56.3	1.689	86	2.573128	86	2.5741	60	1.8
			CO3	85	2.54	56.3	1.689	86	2.586823	85	2.557	60	1.8
			CO4	78	2.34	56.3	1.689	85	2.548018	86	2.5915	60	1.8
			CO5	78	2.34	56.3	1.689	85	2.548018	86	2.5822	60	1.8
			CO6	77	2.32	56.3	1.689	85	2.539194	86	2.5657	60	1.8
52	C325	Professional Elective - 3(ds)	CO1	93	2.78	90.6	2.719	92	2.753098	90	2.6994	60	1.8
			CO2	93	2.78	90.6	2.719	91	2.739382	90	2.7071	60	1.8
			CO3	94	2.83	90.6	2.719	92	2.759444	90	2.6951	60	1.8
			CO4	93	2.78	90.6	2.719	91	2.739382	91	2.7446	60	1.8
			CO5	89	2.67	90.6	2.719	91	2.724051	91	2.723	60	1.8
			CO6	88	2.65	90.6	2.719	91	2.715228	90	2.7066	60	1.8
53	C326	Artificial Intelligence	CO1	93	2.78	67.2	2.016	77	2.308114	78	2.3434	60	1.8
			CO2	93	2.78	67.2	2.016	76	2.269676	78	2.3314	60	1.8
			CO3	94	2.82	67.2	2.016	78	2.335208	79	2.3557	60	1.8
			CO4	93	2.78	67.2	2.016	76	2.269676	79	2.3689	60	1.8
			CO5	89	2.67	67.2	2.016	74	2.226716	78	2.3251	60	1.8
			CO6	89	2.67	67.2	2.016	74	2.226716	77	2.3157	60	1.8
54	C327	Operating Systems & Unix programming Lab	CO1	98	2.95	100.0	3	99	2.98125	97	2.91	80	2.4
			CO2	98	2.95	100.0	3	99	2.98125	98	2.9475	80	2.4
			CO3	98	2.95	100.0	3	99	2.98125	96	2.8725	80	2.4
			CO4	98	2.95	100.0	3	99	2.98125	97	2.9194	80	2.4
			CO5	98	2.95	100.0	3	99	2.98125	96	2.8819	80	2.4
			CO6	98	2.95	100.0	3	99	2.98125	96	2.8913	80	2.4
55	C328	R Programmi	CO1	91	2.74	100.0	3	97	2.896875	95	2.8425	80	2.4
			CO2	91	2.74	100.0	3	97	2.896875	96	2.88	80	2.4
			CO3	91	2.74	100.0	3	97	2.896875	94	2.805	80	2.4

		ng lab	CO4	91	2.74	100.0	3	97	2.896875	95	2.8519	80	2.4
			CO5	91	2.74	100.0	3	97	2.896875	94	2.8144	80	2.4
			CO6	91	2.74	100.0	3	97	2.896875	94	2.8238	80	2.4
57	C329	Hackathon	CO1	95	2.84	100.0	3	98	2.934375	95	2.8538	80	2.4
			CO2	95	2.84	100.0	3	98	2.934375	96	2.8725	80	2.4
			CO3	95	2.84	100.0	3	98	2.934375	93	2.7881	80	2.4
			CO4	95	2.84	100.0	3	98	2.934375	95	2.8538	80	2.4
58	C3211	Biology for Engineers/ Enterprising and Startup/ NSS / YOGA / Social	CO1	100	2.99	98.3	2.95	99	2.967339	96	2.8707	60	1.8
			CO2	100	2.99	98.3	2.95	99	2.965524	96	2.888	60	1.8
			CO3	100	2.99	98.3	2.95	99	2.968972	95	2.8627	60	1.8
			CO4	100	2.99	98.3	2.95	99	2.965524	98	2.9255	60	1.8
			CO5	100	2.99	98.3	2.95	99	2.963496	97	2.9145	60	1.8
			CO6	100	2.99	98.3	2.95	99	2.963496	97	2.9052	60	1.8
59	C411	Managerial Economics and Financial Accounting	CO1	98	2.93	60.3	1.81	75	2.258709	77	2.3038	60	1.8
			CO2	98	2.93	60.3	1.81	75	2.258709	77	2.3226	60	1.8
			CO3	98	2.93	60.3	1.81	75	2.258709	76	2.2945	60	1.8
			CO4	97	2.91	60.3	1.81	73	2.176343	76	2.2942	60	1.8
			CO5	97	2.91	60.3	1.81	74	2.219693	77	2.3195	60	1.8
			CO6	95	2.86	60.3	1.81	71	2.127893	75	2.2367	60	1.8
60	C412	Cryptography and Network Security	CO1	92	2.75	74.6	2.238	81	2.441329	82	2.4499	60	1.8
			CO2	85	2.55	74.6	2.238	81	2.416937	82	2.4492	60	1.8
			CO3	86	2.59	74.6	2.238	79	2.38316	80	2.394	60	1.8
			CO4	85	2.54	74.6	2.238	80	2.414321	83	2.4846	60	1.8
			CO5	87	2.61	74.6	2.238	79	2.36678	81	2.4372	60	1.8
			CO6	88	2.63	74.6	2.238	79	2.375603	81	2.4349	60	1.8
61	C413	Professional Elective - 4(bct)	CO1	100	2.99	87.3	2.619	92	2.756391	90	2.702	60	1.8
			CO2	99	2.97	87.3	2.619	92	2.755071	91	2.7197	60	1.8
			CO3	100	3	87.3	2.619	92	2.768571	90	2.7024	60	1.8
			CO4	100	2.99	87.3	2.619	91	2.727731	91	2.7353	60	1.8
			CO5	100	2.99	87.3	2.619	92	2.768571	92	2.7586	60	1.8

			CO6	100	2.99	87.3	2.619	91	2.742857	91	2.7287	60	1.8
62	C414	Professional Elective - 5ds)	CO1	99	2.98	74.6	2.238	84	2.511779	84	2.5215	60	1.8
			CO2	99	2.98	74.6	2.238	85	2.53619	85	2.5441	60	1.8
			CO3	99	2.98	74.6	2.238	83	2.49269	84	2.5062	60	1.8
			CO4	98	2.95	74.6	2.238	82	2.447283	83	2.4887	60	1.8
			CO5	82	2.45	74.6	2.238	74	2.21819	77	2.296	60	1.8
			CO6	92	2.77	74.6	2.238	79	2.379656	81	2.4158	60	1.8
63	C415	Open Elective - 3(or)	CO1	94	2.82	59.7	1.79	73	2.204808	73	2.1951	60	1.8
			CO2	93	2.8	59.7	1.79	73	2.182808	74	2.215	60	1.8
			CO3	95	2.86	59.7	1.79	74	2.215152	74	2.2221	60	1.8
			CO4	92	2.77	59.7	1.79	72	2.164152	73	2.2001	60	1.8
			CO5	90	2.71	59.7	1.79	69	2.076649	70	2.1019	60	1.8
			CO6	91	2.73	59.7	1.7903	69	2.0837083	71	2.117	60	1.8
64	C416	AI application development Lab	CO1	98	2.93	100.0	3	99	2.9714286	97	2.9021	80	2.4
			CO2	98	2.93	100.0	3	99	2.9714286	98	2.9396	80	2.4
			CO3	98	2.93	100.0	3	99	2.9714286	95	2.8646	80	2.4
			CO4	98	2.93	100.0	3	99	2.9714286	97	2.9115	80	2.4
			CO5	98	2.93	100.0	3	99	2.9714286	96	2.874	80	2.4
			CO6	98	2.93	100.0	3	99	2.9714286	96	2.8834	80	2.4
65	C417	Predictive Analytics using R	CO1	100	3	100.0	3	100	3	98	2.925	80	2.4
			CO2	100	3	100.0	3	100	3	99	2.9625	80	2.4
			CO3	100	3	100.0	3	100	3	96	2.8875	80	2.4
			CO4	100	3	100.0	3	100	3	98	2.9344	80	2.4
			CO5	100	3	100.0	3	100	3	97	2.8969	80	2.4
			CO6	100	3	100.0	3	100	3	97	2.9063	80	2.4
66	C418	fs lab	CO1	100	3	100.0	3	100	3	98	2.925	80	2.4
			CO2	100	3	100.0	3	100	3	99	2.9625	80	2.4
			CO3	100	3	100.0	3	100	3	96	2.8875	80	2.4
			CO4	100	3	100.0	3	100	3	98	2.9344	80	2.4
			CO5	100	3	100.0	3	100	3	97	2.8969	80	2.4

			CO6	100	3	100.0	3	100	3	97	2.9063	80	2.4
67	C419	Minor project ##	CO1	97	2.92	100.0	3	99	2.9694915	96	2.8912	80	2.4
			CO2	97	2.92	100.0	3	99	2.9694915	96	2.8912	80	2.4
			CO3	97	2.92	100.0	3	99	2.9694915	96	2.8818	80	2.4
			CO4	97	2.92	100.0	3	99	2.9694915	96	2.8912	80	2.4
			CO5	97	2.92	100.0	3	99	2.9694915	96	2.8912	80	2.4
			CO6	97	2.92	100.0	3	99	2.9694915	96	2.8912	80	2.4
68	C4110	Research Methodology	CO1	98	2.95	100.0	3	99	3.0	96	2.882	60	1.8
			CO2	98	2.95	100.0	3	99	3.0	97	2.9008	60	1.8
			CO3	98	2.95	100.0	3	99	3.0	96	2.8726	60	1.8
			CO4	98	2.95	100.0	3	99	3.0	98	2.9383	60	1.8
			CO5	97	2.91	100.0	3	99	3.0	98	2.9263	60	1.8
			CO6	96	2.88	100.0	3	99	3.0	97	2.9098	60	1.8
69	C421	Professional Elective-6 Social Networking and	CO1	100	3	100.0	3	100	2.9990132	97	2.8961	60	1.8
			CO2	99	2.97	100.0	3	100	2.9896875	97	2.9074	60	1.8
			CO3	100	2.99	100.0	3	100	2.9967188	96	2.8849	60	1.8
			CO4	100	3	100.0	3	100	2.9988971	98	2.9522	60	1.8
70	C422	Open Elective-4(ip)	CO1	100	2.99	88.9	2.6667	93	2.7864177	91	2.726	60	1.8
			CO2	100	2.99	88.9	2.6667	93	2.7970968	92	2.7533	60	1.8
			CO3	96	2.89	88.9	2.6667	93	2.7850968	91	2.7156	60	1.8
			CO4	100	2.99	88.9	2.6667	93	2.7864177	93	2.7823	60	1.8
			CO5	100	2.99	88.9	2.6667	76	2.274552	79	2.3634	60	1.8
			CO6	100	2.99	88.9	2.6667	76	2.274552	78	2.354	60	1.8
71	C423	Major Project (Internal/Industry Internship) dissertation***	CO1	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO2	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO3	100	3	100.0	3	100	3	97	2.9063	70	2.1
			CO4	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO5	100	3	100.0	3	100	3	97	2.9156	70	2.1
			CO6	100	3	100.0	3	100	3	97	2.9156	70	2.1

Head, IT Department
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Reflection in Programme Outcomes (eg. B.Tech Programme)

Following are the Programme Outcome (PO) statements for all B.Tech Programmes. Highlighted POs has direct relates to the local, national, regional and global developmental needs

PO_01: Having an ability to apply mathematics and science in engineering applications.

PO_02: Having a clear understanding of the subject related concepts and of contemporary issues and apply them to identify, formulate and analyse complex engineering problems.

PO_03: Having an ability to design a component or a product applying all the relevant standards and with realistic constraints, including public health, safety, culture, society and environment

PO_04: Having an ability to design and conduct experiments, as well as to analyse and interpret data, and synthesis of information

PO_05: Having an ability to use techniques, skills, resources and modern engineering and IT tools necessary for engineering practice

PO_06: Having problem solving ability- to assess social issues (societal, health, safety, legal and cultural) and engineering problems

PO_07: Having adaptive thinking and adaptability in relation to environmental context and sustainable development

PO_08: Having a clear understanding of professional and ethical responsibility

PO_09: Having cross cultural competency exhibited by working as a member or in teams

PO_10: Having a good working knowledge of communicating in English – communication with engineering community and society

PO_11: Having a good cognitive load management skills related to project management and finance

PO_12: Having interest and recognise the need for independent and lifelong learning

20A2100201-VECTOR CALCULUS, FOURIER TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

Course Outcomes:

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

CO1	Interpret the physical meaning of different operators such as gradient, cur land divergence
CO2	Estimate the work done against a field, circulation and flux using vector calculus
CO3	Apply the Laplace transform for solving differential equations
CO4	Find or compute the Fourier series of periodic signals
CO5	Know and be able to apply integral expressions for the forwards and inverse Fouriertransform to arrange of non-periodic wave forms
CO6	Identify solution methods for partial differential equations that model physical processes

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	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	-	-	-	-	-	-	-	-

20A2101401-STRENGTH OF MATERIALS – I

Course Outcomes:

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

CO1	Understand the basic materials behaviour under the influence of different external loading conditions and the support conditions
CO2	Draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
CO3	Knowledge of bending concepts and calculation of section modulus
CO4	Determine the stresses developed in the beams and deflections due to various loading conditions
CO5	Assess stresses across section of the thin cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.
CO6	Assess stresses across section of the thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-
CO4	1	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	1	-	-	-	-	-	-	-	-
CO6	3	3	-	1	-	-	-	-	-	-	-	-

20A2101402-FLUID MECHANICS

Course Outcomes:

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

CO1	Explain the various properties of fluids and their influence on fluid motion
CO2	Analyze a variety of problems in fluid statics and dynamics.
CO3	Calculate the forces that act on submerged planes and curves.
CO4	Analyze various types of fluid flows.
CO5	Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.
CO6	Measure the quantities of fluid flowing in pipes, tanks and channels.

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	-	-	-	-	2	-	1	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	3	-	-	-	2	-	-	-	-
CO5	2	2	-	3	-	-	-	2	-	-	-	-
CO6	2	2	-	2	-	-	-		-	-	-	-

20A2101403-SURVEYING AND GEOMETRICS

Course Outcomes:

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

CO1	Apply the knowledge to calculate angles, distances and levels
CO2	Identify data collection methods and prepare field notes
CO3	Explain the working principles of survey instruments, measurement errors and corrective measures
CO4	Interpret survey data and compute areas and volumes,
CO5	levels by different type of equipment
CO6	Relate the knowledge to the modern equipment and methodologies

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	-	-	1	-	-	-	-	-	-	-
CO2	2	3	-	-	1	-	-	-	-	-	-	-
CO3	2	3	-	1	-	-	-	-	-	-	-	-
CO4	2	3	-	-	1	-	-	-	-	-	-	-
CO5	2	3	-	-	1	-	3	1	-	-	-	-
CO6	2	-	-	-	-	-	2	1	-	-	-	-

20A2101404-HIGHWAY ENGINEERING

Course Outcomes:

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

CO1	Plan highway network for a given area.
CO2	Determine Highway alignment
CO3	Design highway geometrics.
CO4	Design Intersections and prepare traffic management plans
CO5	Judge suitability of pavement materials
CO6	Design flexible and rigid pavements

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-		-		-	-	-	-
CO3	2	3	3	-	-	2	-	1	-	-	-	-
CO4	2	3	3	-	-	2	-	1	-	-	-	-
CO5	2	3	3	-	-	2	-	1	-	-	-	-
CO6	2	3	3	-	-	2	-	1	-	-	-	-

20A2101491-CONCRETE TECHNOLOGY LAB

Course Outcomes:

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

CO1	Determine the properties of the constituent materials of concrete.
CO2	Test and evaluate properties of fresh concrete and the properties of hardened concrete including strength and durability.

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	-	-	-	-

20A2101492-HIGHWAY ENGINEERING LAB

Course Outcomes:

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

CO1	Test aggregates and judge the suitability of materials for the road construction
CO2	Test the given bitumen samples and judge their suitability for the road construction
CO3	Obtain the optimum bitumen content for Bituminous Concrete
CO4	Determine the traffic volume, speed and parking characteristics.
CO5	Draw highway cross sections and intersections.

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	-	-	-	-
CO4	3	3	-	3	-	2	-	2	-	-	-	-
CO5	3	3	-	3	-	2	-	2	-	-	-	-

20A2101493- SURVEYING FIELD WORK-I (LAB)

Course Outcomes:

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

CO1	Conduct survey and collect field data.
CO2	Prepare field notes from survey data
CO3	Interpret survey data and compute areas and volumes.

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	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	2	3	-	2	1	-	-	-	-	-	-	2

20A2100801-CONSTITUTION OF INDIA

Course Outcomes:

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

CO1	Apply the knowledge on directive principle of state policy & analyze the History, features of Indian constitution
CO2	Explain the structure of Indian government & Differentiate between the state and central
CO3	Analyze the role Governor and Chief Minister & explain the role of state Secretariat
CO4	Compare and contrast district administration role and importance
CO5	Analyze the role of Myer and elected representatives of Municipalities
CO6	Know the role of Election Commission apply knowledge & Analyze role of state election commission

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	2	-	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	2	-	-	-	-
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	-	-	3	-	-	-	-	2	-	-	-	2
CO5	3	3	2	-	-	-	-	2	-	-	-	-
CO6	3	-	2	-	-	-	-	-	-	-	-	2

20A2200201-PROBABILITY AND STATISTICS

Course Outcomes:

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

CO1	Classify the concepts of data science and its importance
CO2	Interpret the association of characteristics and through the correlation and Regression tools
CO3	Make us of the concepts of probability and their applications
CO4	Apply discrete and Continuous probability distributions
CO5	Design the components of a classical hypothesis test
CO6	Infer the statistical inferential methods based on small and large sampling tests

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	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	--	--	--	--	--	--	--	--

20A2201401-STRENGTH OF MATERIALS - II

Course Outcomes:

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

CO1	Understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.
CO2	Explain concepts of failures in the material considering different theories
CO3	Assess stresses in different engineering applications like shafts, springs
CO4	Assess stresses in different engineering applications like columns and struts
CO5	Assess stresses due to combined effect of direct and bending stresses on different engineering
CO6	Explain the concept of unsymmetrical bending in beams Location of neutral axis Deflection of beams under unsymmetrical bending.

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	3	1	-	-	-	-	-	-	-	-
CO2	2	2	-	1	-	-	-	-	-	-	-	-
CO3	2	3	-	1	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-
CO5	2	3	-	1	-	-	-	-	-	-	-	-
CO6	2	3	-	1	-	-	-	-	-	-	-	-

20A2201301-HYDRAULICS AND HYDRAULIC MACHINERY

Course Outcomes:

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

CO1	Solve uniform and non-uniform open channel flow problems.
CO2	Apply the principals of dimensional analysis and similitude in hydraulic model testing
CO3	Understand the working principles of various hydraulic machineries
CO4	Design different types of turbines
CO5	Design of centrifugal and multi stage pumps
CO6	Design of reciprocating pump

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	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	1	-	-	2	2	-	-	-	-
CO3	3	-	-	1	-	-	2	2	-	-	-	-
CO4	2	-	-	3	-	-	1	2	-	-	-	-
CO5	2	-	-	3	-	-	1	2	-	-	-	-
CO6	2	-	-	3	-	-	1	2	-	-	-	-

20A2201402-ENVIRONMENTAL ENGINEERING

Course Outcomes:

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

CO1	Select a source based on quality and quantity
CO2	Estimate design population and water demand
CO3	Design a water treatment plant for a village/city
CO4	Design the water distribution network
CO5	Design a sewer by estimating DWF and Strom water flow and plumbing system for buildings
CO6	Design a Sewage Treatment Plant for a town/city.

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	-	-	-	-	-	-	1	-	-	-	-
CO2	2	-	-	-	-	-	-	1	-	-	-	-
CO3	2	-	-	-	-	-	-	1	-	-	-	-
CO4	2	-	-	-	-	-	-	1	-	-	-	-
CO5	2	2	3	-	-	-	-	1	-	-	-	-
CO6	2	-	-	-	-	-	-	1	-	-	-	-

20A2201403-ENGINEERING GELOGOY Integrated (Theory & Lab)

Course Outcomes:

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

CO1	Identify and classify the geological minerals
CO2	Measure the rock strengths of various rocks
CO3	Classify and measure the earthquake prone areas to practice the hazard zonation
CO4	Classify, monitor and measure the Landslides and subsidence
CO5	Prepares, analyses and interpret the Engineering Geologic maps
CO6	Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-
CO4	1	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	1	-	-	-	-	-	-	-	-
CO6	3	3	-	1	-	-	-	-	-	-	-	-

Course Outcomes:

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

CO1	Identify Megascopic minerals & their properties.
CO2	Identify Megascopic rocks & their properties.
CO3	Identify the site parameters such as contour, slope & aspect for topography.
CO4	Know the occurrence of materials using the strike & dip problems

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	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	2	3	-	2	1	-	-	-	-	-	-	2

20A2201491-ENVIRONMENTAL ENGINEERING LAB

Course Outcomes:

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

CO1	Determine some important characteristics of water and wastewater in the laboratory
CO2	Outline some conclusion and decide whether the water is potable or not.
CO3	Decide whether the water body is polluted or not with reference to the state parameters in the list of experiments
CO4	Determine strength of the sewage in terms of BOD and COD

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	3	-	-	3
CO2	3	3	-	-	-	3	-	2	3	-	-	3
CO3	3	3	-	-	-	3	-	2	3	-	-	3
CO4	3	3	-	-	-	3	-	2	3	-	-	3

20A2201492-STRENGTH OF MATERIALS LAB

Course Outcomes:

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

CO1	Conduct tension test on steel
CO2	Conduct compression tests on spring, wood, brick and concrete
CO3	Conduct flexural and torsion test to determine elastic constants
CO4	Determine hardness of metals

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	1	2	-	-	-	-	2	-	-	-	2
CO2	3	1	2	-	-	-	-	2	-	-	-	2
CO3	3	1	2	-	-	-	-	2	-	-	-	-
CO4	3	1	2	-	-	-	-	2	-	-	-	2

20A2201493-FLUID MECHANICS & HYDRAULIC MACHINES LAB

Course Outcomes:

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

1. Utilize the knowledge in the design of water supply pipe networks and measure the rate of flow in pipes and channels.
2. Design to turbines and able to identify suitable pumps and turbines for different working conditions

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	3	-	-	3
CO2	3	3	-	-	-	3	-	2	3	-	-	3

Head of The Department
CIVIL ENGINEERING
NRI Institute of Technology
POTHAVARAPPADU

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: VECTOR CALCULUS, FOURIER TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
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
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
3.	Write the infinite series expansion of complex function by apply taylor's/maclaurin's/laurent's series
4.	Write a fourier series expansion of a periodic function by using euler's formulae
5.	Understand the concept of fourier transform and its properties
6.	Solve the difference equations using z-transforms and inverse z-transforms

HEAD OF THE DEPARTMENT
Dr. N. SAMBASIVA RAO
B.Tech, M.Tech, Ph.D, MISTE
Controller of Examinations & Professor of EEE
NRI INSTITUTE OF TECHNOLOGY (KN)

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRONIC DEVICES AND CIRCUITS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the basic concepts of semiconductor physics
2.	Understand the formation of p-n junction and how it can be used as diode in different modes of operation
3.	Know the construction ,working principles of rectifiers
4.	Understands the working principles of rectifiers with and without filters
5.	Understand the construction, principle of operation of BJT and their V-I characteristics.
6.	Understand the construction, principle of operation of FET and their V-I characteristics.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL CIRCUIT ANALYSIS-II			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the basic concepts of three phase electrical circuits
2.	Measure the power in balanced three phase circuits.
3.	Understand the basic concepts of three phase electrical circuits
4.	Measure the power in Unbalanced three phase circuits.
5.	Determine the transient response of R-L, R-C, R-L-C Series circuits with ac and dc excitation
6.	Calculate the parameters for a given two port network

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: DC MACHINES AND TRANSFORMERS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Analyze the basic operation of DC generators, their armature reaction.
2.	Analyze the conditions required for analyzing the performance of dc generators
3.	Analyze the operation of dc motors & the necessity of starters.
4.	Determine the performance of testing of dc motors.
5.	Determine the voltage regulation and efficiency of single phase transformer from test results
6.	Determine the operation of a poly phase transformers and their parallel operation.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRO MAGNETIC FIELDS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Able to Compute electric fields and potentials using Gauss law or solve Laplace's or Poisson's equations for various electric charge distributions.
2.	Able to Calculate the capacitance and energy stored in dielectrics
3.	Able to Calculate the magnetic field intensity due to current carrying conductor and understanding the application of Ampere's law, Maxwell's second and third law.
4.	Able to Estimate self and mutual inductances and the energy stored in the magnetic field.
5.	Able to Understand the concepts of displacement current
6.	Able to Poynting theorem and Poynting vector

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: DC MACHINES AND TRANSFORMERS LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Evaluate the magnetization characteristics of a self excited DC generator
2.	Determine the characteristics of DC generators at load condition.
3.	Summarize the efficiency of DC shunt machine both as generator and motor
4.	Experiment with the performance of DC motors at load condition by brake test
5.	Determine the voltage regulation and efficiency of single phase transformer from test results
6.	Determine the operation of a poly phase transformers and their parallel operation.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRONIC DEVICES AND CIRCUITS LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Determine the characteristics of PN junction diode, zever diode
2.	Experiment with rectifiers with and without C filters
3.	Determine the characteristics of BJT, FET, UJT and SCR
4.	Explain transistor biasing and CRO operation
5.	Examine the characteristics of various amplifiers such as BJT -CE, Emitter Follower CC, FET-CS
6.	Utilize several equipment such as Ammeters, Voltmeters, Active & Passive Electronic Components, Regulated Power supplies, CRO's, Function Generators, Digital Multimeters, Résistance Boxes/Rheostats, Decade Capacitance

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Course Name: ELECTRICAL CIRCUITS LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**I-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve different electrical networks by using Thevenin's, Norton's and superposition theorems
2.	Solve different electrical networks by using maximum power transfer, compensation, reciprocity and millman's theorems
3.	Solve different electrical networks by using series and parallel resonance
4.	Determine the self, mutual inductances and coefficient of coupling
5.	Analyze the networks by using Z, Y,ABCD,H parameters
6.	Measure the 3 phase power by two wattmeter method for unbalanced loads

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name:			
DESIGN OF ELECTRICAL CIRCUITS USING ENGINEERING SOFTWARE TOOLS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Learn the fundamentals of MATLAB Tools
2.	Generate Various Waveform Signals And Sequences
3.	Verify And Simulate Various Electrical Circuits Using Mesh And Nodal Analysis
4.	Verify And Simulate Various Theorems
5.	Verify And Simulate RLC Series And Parallel Resonance
6.	Determine Self And Mutual Inductance Of A Magnetic Circuit, Parameters Of A Given Coil.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: PROFESSIONAL ETHICS AND HUMAN VALUES			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
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 role 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.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: PYTHON PROGRAMMING			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Learn About Python Programming Language Syntax, Semantics, And The Runtime Environment
2.	Familiarized With Universal Computer Programming Concepts Like Data Types, Containers
3.	Familiarized With General Computer Programming Concepts Like Conditional Execution
4.	Familiarized With General Computer Programming Concepts Like Loops & Functions
5.	Familiarized With General Coding Techniques
6.	Familiarized With Object-Oriented Programming

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: Digital Electronics			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve A Typical Number Base Conversion
2.	Analyze New Error Coding Techniques
3.	Theorems And Functions Of Boolean Algebra And Behavior Of Logic Gates
4.	Optimize Logic Gates For Digital Circuits Using Various Techniques
5.	Understand Concepts Of Combinational Circuits
6.	Develop Advanced Sequential Circuits

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER SYSTEMS-I			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Identify the different components of thermal power plants and principle of operation.
2.	Identify the different components of nuclear Power plants and their principle of operation.
3.	Identify the different components of hydel power plants and their classification and principle of operation
4.	Identify the components of gas power station and their principle of operation.
5.	Identify different components of substation and their classification.
6.	Calculate the different tariffs applicable to consumers.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: INDUCTION AND SYNCHRONOUS MACHINES			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the constructional details and principle of operation of induction machines
2.	Understand the starting methods of induction machines
3.	Understand the operation of constructional features and principle of operation of single phase induction motors.
4.	Understand the constructional details and principle of operation of synchronous generators.
5.	Analyze the construction and principle of operation of synchronous motor.
6.	Analyze the performance of the synchronous motor and its operation

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Use the theory of managerial economics, demand, production analysis and forecasting theories.
2.	Analyse of production markets and pricing strategies. Functions and cost-price functions to manage markets & break-even point.
3.	Develop ability to identify, formulate and solve engineering problem by applying the knowledge of managerial economics.
4.	Theorize about characteristics features and types of industrial organization, concept of changing business environment in post-liberalization scenario.
5.	Enhance their capabilities in the interpretation of b/s that are followed in industries, organizational and industries.
6.	Apply financial analysis, capital budgeting techniques in evaluating various investment opportunities.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: PYTHON PROGRAMMING LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Acquire Programming Skills In Core Python
2.	Acquire Object Oriented Skills In Python
3.	Develop The Skill Of Designing Graphical User Interfaces In Python
4.	Develop The Ability To Write Database Applications In Python
5.	Familiarized With General Coding Techniques
6.	Familiarized With Object-Oriented Programming

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: INDUCTION AND SYNCHRONOUS MACHINES LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve the performance parameters of a three phase induction motor
2.	Categorize the different performance characteristics of a three-phase induction motor
3.	Measure the performance parameters of three-phase alternator
4.	Analyze V and Inverted V curves of a three-phase synchronous motor
5.	Contrast the performance parameters of single-phase induction motor
6.	Power factor improvement of single phase induction motor

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: DIGITAL ELECTRONICS LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Know The Concept Of Boolean Laws For Simplifying The Digital Circuits.
2.	Understand The Concepts Of Flipflops.
3.	Understand The Concepts Of Counters
4.	Analyze And Design Various Circuits
5.	Understand Concepts Of Combinational Circuits
6.	Develop Advanced Sequential Circuits

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Course Name: IOT APPLICATIONS OF ELECTRICAL ENGINEERING			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**II-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand Fundamentals Of Various Technologies Of Internet Of Things
2.	Know Various Communication Technologies Used In The Internet Of Things.
3.	Know The Connectivity Of Devices Using Web And Internet In The Iot Environment
4.	Understand The Implementation Of Iot By Studying Case Studies Like Smart Home, Smart City, Etc
5.	Experiment With Raspberry Pi/Arduino
6.	LED And 7 Segment Display

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER SYSTEMS-II			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Derive transmission line parameters for analyzing the behavior under different operating conditions.
2.	Understand the surge propagation, reflection and refraction in transmission lines and design the level of insulation coordination at various high voltages.
3.	Analyze the performance of short & medium transmission lines.
4.	Analyze the performance of long transmission lines.
5.	Utilize the knowledge on surge behavior of transmission line for protection of power equipment
6.	Formulate physical and geometrical parameters of transmission line useful for its safe and efficient performance.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER ELECTRONICS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Demonstrate basic theory of operation of SCR, characteristics of power MOSFET & power IGBT and to design protection & Firing circuits.
2.	Explore and interpret 1-Φ Half Wave, Full wave converters, with the effect of source inductance and input harmonics.
3.	Analyze various 3-Φ uncontrolled & controlled rectifier circuits and Understand their Applications
4.	Analyze & design various BUCK,BOOST & BUCK – BOOST converters in different modes with ripple calculation & operation of different modes with ripple calculation & operation of fly back converter
5.	Analyze steady –state performance of 1-Φ & 3-Φ inverters & applications of PWM techniques ,operation of VSI & CSI
6.	Analyze the operation of 1-Φ & 3-Φ AC – AC Regulators, Static V-I characteristics of TRAIC & operation of Tap changing Transformer with Anti-parallel connection of Thyristors

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Course Name: LINEAR CONTROL SYSTEMS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
2.	Determine time response specifications of second order systems and absolute and relative stability of LTI systems using Routh's stability criterion and root locus method.
3.	Analyze the stability of LTI systems using frequency response methods.
4.	Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode diagrams.
5.	Represent physical systems as state models and determine the response.
6.	Understand the concepts of controllability and observability.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: APTITUDE AND REASONING			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Solve the Arithmetic and Reasoning Problems as fast as possible and as simple as possible
2.	Exhibits good analytical skills
3.	Exhibits good aptitude skills
4.	Perform well in all competitive exams like RRB, SSC, GROUPS, and BANKING etc...
5.	Clear the aptitude section of exams for higher education like CAT, GMAT, and GRE etc...
6.	Perform well in academics

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: UTILIZATION OF ELECTRICAL ENERGY			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Identify various illumination methods produced by different illuminating sources.
2.	Identify a suitable motor for electric drives and industrial applications
3.	Identify most appropriate heating and welding techniques for suitable applications.
4.	Distinguish various traction system
5.	Determine the tractive effort and specific energy consumption.
6.	Validate the necessity and usage of different energy storage schemes for different applications and comparisons.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: CONTROL SYSTEMS LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	To understand the performance of basic control system components such as magnetic amplifiers
2.	To understand time and frequency responses of control system with controllers and compensators.
3.	To understand time and frequency responses of control system without controllers and compensators.
4.	To obtain Transfer Function
5.	To Obtain magnetic characteristics
6.	To verify truth tables

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER ELECTRONICS LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Study the characteristics of various power electronic devices and analyze gate drive circuits of IGBT.
2.	Analyze the performance of single-phase and three-phase full-wave bridge converters with both resistive and inductive loads.
3.	Understand the operation of single phase AC voltage regulator.
4.	Understand the working of Buck converter, Boost converter, single-phase square wave inverter and PWM inverter.
5.	Understand the operation of various rectifiers and inverters.
6.	Understand the operation of resistive and inductive loads.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: IOT APPLICATIONS OF ELECTRICAL ENGINEERING			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-I**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	To understand fundamentals of various technologies of Internet of Things.
2.	To know various communication technologies used in the Internet of Things.
3.	To know the connectivity of devices using web.
4.	To know the connectivity of devices internet in the IoT environment.
5.	To understand the implementation of IoT by studying case studies like Smart Home, Smart city, etc.
6.	To interface LEDs

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MICROPROCESSORS AND MICROCONTROLLERS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Know the concepts of the Microprocessor capability in general and explore the evaluation of microprocessors.
2.	Analyse the instruction sets - addressing modes - minimum and maximum modes operations of 8086 Microprocessors
3.	Analyse the Microcontroller and interfacing capability
4.	Describe the architecture and interfacing of 8051 controller
5.	Know the concepts of PIC micro controller
6.	Know the concepts of PIC micro controller programming.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name:	POWER SYSTEM ANALYSIS	Course Index:	C221
REGULATION:	NRIA20	YEAR-SEM:	III-II

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Explain the working principle and constructional features of different types of electromagnetic protective relays
2.	Compare different types of static relays with a view to application in the system.
3.	Relate the acquired in depth knowledge of faults that is observed in high power generator and transformers and protective schemes used for all protections
4.	Improve the ability to understand various types of protective schemes used for feeders and bus bar protection
5.	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6gas type
6.	Explain different types of over voltages appearing in the system, including existing protective schemes

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Know the construction and working of various types of analog instruments.
2.	Describe the construction and working of wattmeter and power factor meters
3.	Know the construction and working various bridges for the measurement resistance - inductance and capacitance
4.	Know the operational concepts of various transducers
5.	Know the construction of digital meters
6.	Know the operation of digital meters

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: POWER SYSTEM ANALYSIS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Draw impedance diagram for a power system network and calculate per unit quantities.
2.	Apply the load flow solution to a power system using different methods.
3.	Form Zbus for a power system networks and analyse the effect of symmetrical faults.
4.	Find the sequence components for power system Components
5.	Analyse the effects of unsymmetrical faults.
6.	Analyse the stability concepts of a power system.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: SWITCH GEAR AND PROTECTION			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air - oil - vacuum - SF6 gas type.
2.	Analyse the working principle and operation of different types of electromagnetic protective relays.
3.	Acquire knowledge of protective schemes for generator and transformers for different fault conditions.
4.	Classify various types of protective schemes used for feeders
5.	Classify various types of protective schemes used for bus bar protection and Types of static relays.
6.	Analyse the operation of different types of over voltages protective schemes required for insulation co–ordination and types of neutral grounding.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: INDUSTRIAL ELECTRONICS			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand the concept of DC amplifiers.
2.	Analyze and design different voltage regulators for real time applications
3.	Describe the basis of SCR and Thyristor
4.	Determine the performance of DIAC
5.	Determine the performance of TRIAC
6.	Develop real time application using electronics

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB			
REGULATION:	NRIA20	YEAR-SEM:	III-II

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand Students How Different Types Of Meters Work And Their Construction.
2.	Understand How To Measure Resistance, Inductance And Capacitance By AC & DC Bridges.
3.	Understand The Testing Of CT And PT.
4.	Understand And The Characteristics Of Thermo Couples, LVDT, Capacitive Transducer, Piezoelectric Transducer.
5.	Understand The Measurement Of Strain And Choke Coil Parameters.
6.	Study The Procedure For Standardization And Calibration Of Various Methods.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MICROPROCESSORS AND MICRO CONTROLLERS LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Study Programming Based On 8086 Microprocessor
2.	Study Programming Based On 8051 Microcontroller.
3.	Study 8086 Microprocessor Based ALP Using Arithmetic, Logical And Shift Operations.
4.	Study To Interface 8086 With I/O Devices.
5.	Study To Interface 8086 With Other Devices.
6.	Study Parallel And Serial Communication Using 8051& PIC 18 Micro Controllers.

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Course Name: POWER SYSTEMS AND SIMULATION LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Study and Calculate the sequence impedance of three phase alternator
2.	Study and Calculate the sequence impedance of three phase transformer
3.	Calculation of ABCD Parameters
4.	Determine Y Bus and Z Bus
5.	Determine Economic Load Dispatch with and without losses
6.	Calculate the Load Frequency Control

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name: MACHINE LEARNING WITH PYTHON LAB			
REGULATION:	**NRIA20**	**YEAR-SEM:**	**III-II**

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Implement procedures for the machine learning algorithms
2.	Develop Python programs for various Learning algorithms
3.	Design Python programs for various Learning algorithms
4.	Apply appropriate data sets to the Machine Learning algorithms
5.	Develop Machine Learning algorithms to solve real world problems
6.	To study Bayesian Networks

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name:	RESEARCH METHODOLOGY		
REGULATION:	NRIA20	YEAR-SEM:	III-II

The student will be able to:

S.NO.	COURSE OUTCOME
1.	Understand objectives of a research problem
2.	Understand characteristics of a research problem
3.	Analyze research related information and to follow research ethics.
4.	Understand the types of intellectual property rights.
5.	Learn about the scope of IPR.
6.	Understand the new developments in IPR.

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CRITERION 3	COURSE OUTCOMES 2020-21 Admitted Batch

Course Name: Professional Communication (20A1100101) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C111.1	Build the grammatical structures accurately in their real-time situations in either spoken or written form
C111.2	Extend their ability to use vocabulary from various texts along with GRE and technical vocabulary in written and spoken communication
C111.3	Comprehend, analyze and evaluate texts critically. Demonstrate effective writing skills in specific forms of written communication (paragraphs, summaries, email and letters.)
C111.4	Apply the strategies of reading various texts and graphs, and describe in prose.
C111.5	Relate human values and professional ethics in their academic, professional and social lives.
C111.6	Summarize the main events of the literary texts, from different socio-cultural contexts, and interpret them critically

Course Name: Engineering Mathematics-I (20A1100201) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C112.1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) solve system of linear algebraic equations using Gauss elimination, Gauss Seidel and write Eigen values and eigenvectors of a matrix (L3) Gain knowledge and skills on Matrix algebra techniques. solve system of linear algebraic equations
C112.2	Write diagonal form and different factorizations of a matrix (L3), to find inverse of a matrix and integral powers of a matrix by Cayley - Hamilton Theorem Identify the nature of a Quadratic form such as positive definite, positive semi definite etc., and use this information to facilitate the calculation of matrix characteristics (L2)
C112.3	Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
C112.4	Apply Newton's forward & backward interpolation and Lagrange's formulae for unequal intervals (L3)
C112.5	Apply numerical integral techniques to different Engineering problems (L3)
C112.6	Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

Course Name: Engineering Physics (20A1100202) **Year of Study: 2020-21**

At the end of the course completion student will be able to:	
C113.1	Apply the interaction of light with matter through interference, diffraction, polarization..
C113.2	Get the knowledge on laser and fibre optic communication systems in various engineering applications
C113.3	Interpret the knowledge of dielectric and magnetic materials with characteristic utility in appliances
C113.4	Apply the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment.
C113.5	Apply the knowledge of non-destructive testing using ultrasonics in various engineering applications.
C113.6	Study the Structure-property relationship exhibited by solid crystal materials for their utility.

Course Name: Engineering Drawing (20A1101401) **Year of Study: 2020-21**

At the end of the course completion student will be able to:	
C114.1	Understand the simple geometric constructions like polygons, engineering curves and scales.
C114.2	Understand the orthographic projections of points and lines
C114.3	Understand the orthographic projections of straight lines- inclined to one plane and inclined to both the planes.
C114.4	Understand the orthographic projections of planes and Planes inclined to both the planes.
C114.5	Understand and draw the projections of the various types of solids in different positions inclined to one of the planes
C114.6	Understand the transformation of Orthographic views into isometric views and vice versa.

Course Name: Programming and Problem Solving with C (20A1105301)
Year of Study: 2020-21

At the end of the course completion student will be able to:	
C115.1	Understand the programming terminology and implement various c-tokens & input-output statements to solve simple problems
C115.2	Able to compare and differentiate various looping & branching constructs and apply the best looping structure for a given problem
C115.3	Identify the necessity of modularity in programming and design various function types
C115.4	Understand pointers and implement the programs to directly access memory locations
C115.5	Interpret and implement the need of arrays and structure/union to store homogeneous and heterogeneous groups of data
C115.6	Contrast the need of using files in programming and implement file operations

Course Name: Engineering Physics Lab (20A1100291) **Year of Study: 2020-21**

At the end of the course completion student will be able to:	
C116.1	Understand principle, concept, working of an instrument and can compare results with theoretical calculations.
C116.2	Analyze the physical principle involved in the various instruments; also relate the principle to new application
C116.3	Understand design of an instrument with targeted accuracy for physical measurements.
C116.4	Develop skills to impart practical knowledge in real time solution
C116.5	Conduct various experiments in the areas of optics, mechanics and thermal physics..
C116.6	Think innovatively and also improve the creative skills that are essential for engineering.

Course Name: Programming and Problem Solving with C Lab (20A1105391)
Year of Study: 2020-21

At the end of the course completion student will be able to:	
C117.1	Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables.
C117.2	Exercise conditional and iterative statements to inscribe C programs
C117.3	Exercise user defined functions to solve real time problems.
C117.4	Inscribe C programs using Pointers to access arrays, strings and functions
C117.5	Inscribe C programs using pointers and allocate memory using dynamic memory management functions.

C117.6	Exercise user defined data types including structures, unions and files to solve problems

Course Name: Engineering Mathematics-II (20A1200201) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C121.1	Find the General/Particular solutions of first order and first degree ordinary differential equations by apply different methods (L3), know the applications of Newton's law of cooling, natural growth and decay problems and find orthogonal trajectories of the given family of curves. (L3)
C121.2	Identify the essential characteristics of linear differential equations with constant coefficients. (L2) solve the linear differential equations with constant coefficients by appropriate method (L3)
C121.3	Find convergence (or) divergence of a series (L3)
C121.4	Utilize mean value theorems to real life problems(L3)
C121.5	Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L4)acquire the Knowledge maxima and minima of functions of several variable (L1) Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)
C121.6	Find length of the arc, volume of solid of revolution and surface area of solid of revolution(L3)

Course Name: Engineering Chemistry (20A1200204) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C122.1	Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.
C122.2	Predict potential complications from combining various chemicals and metals in engineering.
C122.3	Discuss fundamental aspects of electrochemistry and materials science relevant to corrosion phenomena
C122.4	Acquire the knowledge on Nano chemistry, Refractories, Lubricants and cement.
C122.5	Gain the knowledge on various petroleum products and alternate fuels
C122.6	Examine the water quality and select appropriate purification technique for intended use.

Course Name: Engineering Mechanics (20A1203301) **Year of Study: 2020-21**

At the end of the course completion student will be able to:	
C123.1	Compute the resultant of forces and moments using free body diagrams and able to apply the concepts of friction.
C123.2	Analyze plane truss by method of joints and method of sections.
C123.3	Identify the Centroid and Centre of Gravity and estimate the area and mass moment of inertia of the composite figures and bodies.
C123.4	Understand the fundamental concepts of Rectilinear and curvilinear motion of a particle.
C123.5	Understand the fundamental concepts of kinematics and kinetics of rigid body.
C123.6	Able to apply the work energy and Impulse momentum principle to analyze the simple practical problems.

Course Name: Basic Electrical and Electronics Engineering (20A1202301)
Year of Study: 2020-21

At the end of the course completion student will be able to:	
C124.1	Analyze various electrical networks.
C124.2	Understand operation of DC generators,3-point starter
C124.3	Understand operation of DC machine testing by Swinburne's Test and Brake test.
C124.4	Analyze performance of single-phase transformer and acquire proper knowledge and working of 3-phase alternator and 3-phase induction motors.
C124.5	Analyze operation of half wave, full wave, bridge rectifiers and OP-AMPs.
C124.6	Understanding operations of CE amplifier and basic concept of feedback amplifier.

Course Name: Computer Aided Engineering Drawing (20A1203401)
Year of Study: 2020-21

At the end of the course completion student will be able to:	
C125.1	Understand the projections of solids which are essential in 3D modeling and animation.
C125.2	Understand the sections of solids and development of surfaces for designing and manufacturing of the objects.
C125.3	Understand the hidden details of machine components with the help of sections and interpenetrations of solids.
C125.4	Understand the various commands in AutoCAD and to draw the geometric entities and to create 2D and 3D wire frame models.
C125.5	Understand the modeling commands for generating 2D and 3D objects using computer aided drafting tools.

C125.6	Understand the concept of computer aided solid modeling

Course Name: Environmental Sciences (20A1200801) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C126.1	Illustrate the importance of sustainability in the progress of a nation.
C126.2	Infer the existence of ecosystems in maintaining ecological balance.
C126.3	Recall the importance of biodiversity and its conservation.
C126.4	Summarize the role of natural resources for the sustenance of life on earth and recognize the need to conserve them.
C126.5	Identify the environmental pollutants and the abatement devices to be used
C126.6	Interpret environmental related acts and social issues

Course Name: Communicative English Lab (20A1200191) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C127.1	Demonstrate better understanding of the nuances of spoken English to put into use in various situation and events.
C127.2	Apply the rules of phonetics–pronunciation, accent and intonation– in their everyday communication
C127.3	Relate their understanding of the importance of spoken skills and the need for life-long learning in day-to-day communication.
C127.4	Construct strategies like critical and analytical skills to participate effectively in group discussions and debates.
C127.5	Demonstrate their ideas accurately and effectively in presentations
C127.6	Build responses to the questions by listening to short audio texts and identify the context and specific pieces of information.

Course Name: Engineering Chemistry Lab (20A1200293) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C128.1	Apply polymers and plastic technologies to solve the problems of the society
C128.2	Utilize knowledge of cells and sensors in many instruments like batteries and fuel cells.
C128.3	Understand electrochemical cells corrosion along with the methods of controlling to budding engineers.
C128.4	Understand water and its hardness, boiler troubles and problems associated with the

	environment and its sustainability.
C128.5	Understand fuels and energy, their advantages & disadvantages.
C128.6	Design and analysis of complex problems of the society.

Course Name: Workshop Practice Lab (20A1203391) Year of Study: 2020-21

At the end of the course completion student will be able to:	
C129.1	Acquire skills in basic engineering trades like Carpentry, Fitting, Tin smithy, House wiring, Black smithy etc.,
C129.2	Apply the knowledge of basic engineering trades in their day – to – day activities.
C129.3	Fabricate small components using the knowledge of basic engineering trades.
C129.4	Select appropriate tools and consumables for getting an object of required shape and size.
C129.5	Configure the components and peripherals of PC.
C129.6	Assemble and disassemble the PC components.

Course Name: Basic Electrical and Electronics Engineering Lab (20A1202391)
Year of Study: 2020-21

At the end of the course completion student will be able to:	
C1210.1	Compute the efficiency of DC shunt machine without actual loading of the machine.
C1210.2	Estimate the efficiency and regulation at different load conditions and power factors for single phase transformer with OC and SC tests.
C1210.3	Analyze the performance characteristics and to determine efficiency of DC shunt motor &3- Phase induction motor.
C1210.4	Pre-determine the regulation of an alternator by synchronous impedance method.
C1210.5	Control the speed of dc shunt motor using Armature voltage and Field flux control methods.
C1210.6	Draw the characteristics of PN junction diode & transistor, Determine the ripple factor of half wave & full wave rectifiers.

Course Name: Vector Calculus, Transform Techniques& Partial Differential Equations (20A2100201) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C211.1	Interpret the physical meaning of different operators such as gradient, cur land divergence (L5)
C211.2	Estimate the work done against a field, circulation and flux using vector calculus (L5)
C211.3	Apply the Laplace transform for solving differential equations (L3)
C211.4	Find or compute the Fourier series of periodic signals (L3)
C211.5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to arrange of non-periodic wave forms (L3)
C211.6	Identify solution methods for partial differential equations that model physical processes (L3)

Course Name: Mechanics of Solids (20A2103401) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C212.1	Understand the fundamental concepts of stress, strain and principal stresses.
C212.2	Analyze beams and draw shear force and bending moment diagrams for beams.
C212.3	Estimate bending stresses in structural members subjected to flexural loadings.
C212.4	Estimate shear stresses in various beam sections.
C212.5	Determine the deflections and slopes produced in beams under loading conditions and Estimate the stresses and strains in circular torsion members
C212.6	Estimate hoop and longitudinal stresses in thin and thick cylinders and Design slender, long columns subjected to axial loads

Course Name: Fluid Mechanics & Hydraulic Machines (20A2103402)
Year of Study: 2021 -22

At the end of the course completion student will be able to:	
C213.1	Explain procedures of measurement of fluid pressure and manometry
C213.2	Apply The mechanics of fluids in static and dynamic conditions.
C213.3	Apply Boundary layer theory and flow separation
C213.4	Perform Dimensional Analysis.
C213.5	Analyse the impact of jet on the vanes
C213.6	Evaluate performance of hydraulic machines

Course Name: Production Technology (20A2103403) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C214.1	Understand the casting methods and procedures.
C214.2	Differentiate various casting methods and their applications.
C214.3	Understand the welding types and procedures.
C214.4	Differentiate various joining processes with applications
C214.5	Understand Various Plastic operations.
C214.6	Understand various bulk metal forming and sheet metal processes.

Course Name: Kinematics of Machines (20A2103404) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C215.1	Understand Kinematic joint and mechanism and study the relative motion of parts in a machine.
C215.2	Understand various mechanisms for straight line motion and their applications.
C215.3	Determine the velocity and acceleration diagrams for simple mechanisms.
C215.4	Determine the instantaneous centre of rotation diagrams for simple mechanisms.
C215.5	Apply working principles of cams and also design the profile of cams. Understand various power transmission mechanisms, methodologies and working principles
C215.6	Understand the nomenclature of gear and determine the number of teeth without interference. Understand the mechanism of gear trains.

Course Name: Thermodynamics (20A2103301) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C216.1	Understand the basic concepts of thermodynamics.
C216.2	Understand the first law of thermodynamics and apply to simple systems.
C216.3	Understand the second law of thermodynamics and apply to various thermodynamic systems.
C216.4	Understand Maxwells relations, thermodynamic functions and concept of entropy and apply to various thermodynamic systems.
C216.5	Understand the concept of vapour power cycles – estimation of performance of vapour power cycles.

C216.6	Understand the properties of gas mixtures and gas power cycles - estimation of efficiency and work done.

Course Name: Fluid Mechanics & Hydraulic Machines Lab (20A2103491) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C217.1	Find coefficient of discharge for venture meter
C217.2	Demonstrate the concepts of discharge through orifice meter and mouthpiece.
C217.3	Explain the concepts of loses in the pipe flow
C217.4	Explain the concepts of jet on vanes.
C217.5	Demonstrate the concept of Bernoulli's theorem.
C217.6	Analyze the performance of deferent turbines of and pumps.

Course Name: Production Technology Lab (20A2103492) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C218.1	Design the pattern and mold in sand castings.
C218.2	Perform different welding and other joining techniques.
C218.3	Perform blanking, piercing and extrusion operations..
C218.4	Perform bending and related operations
C218.5	Understand the basic powder compaction and sintering process.
C218.6	Understand and operate Injection moulding and blow moulding operations.

Course Name: Drafting & Modeling Lab (20A2103991) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C219.1	Understand the projections of solids which are essential in 3D modeling and animation.
C219.2	Understanding the study of DXE and IGES files.
C219.3	Understand the hidden details of machine components with the help of sections and interpenetrations of solids.
C219.4	Understand the various commands in AutoCAD and to draw the geometric entities and to create 2D and 3D wire frame models.
C219.5	Understand the modeling commands for generating 2D and 3D objects using computer aided drafting tools.
C219.6	Understand the concept of computer aided solid modeling

Course Name: Material Science & Metallurgy (20A2203301) Year of Study: 2021 -22

At the end of the course completion student will be able to:	
C221.1	Classify, construct and analyze equilibrium diagrams.
C221.2	Analyze and distinguish various ferrous, non-ferrous metals and alloys.
C221.3	Identify the influence of mechanical working on materials.
C221.4	Identify the influence of heat treatment principles on materials.
C221.5	Define applications of powder metallurgy.
C221.6	Suggest the composites and ceramics for various engineering applications based on their suitability.

Course Name: Complex Variables & Statistical Methods (20A2200202) Year of Study: 2021 -22

At the end of the course completion student will be able to:	
C222.1	Classify the concepts of data science and its importance
C222.2	Interpret the association of characteristics and through the correlation and Regression tools
C222.3	Make us of the concepts of probability and their applications
C222.4	Apply discrete and Continuous probability distributions
C222.5	Design the components of a classical hypothesis test
C222.6	Infer the statistical inferential methods based on small and large sampling tests

Course Name: Dynamics of Machinery (20A2203401) Year of Study: 2021 -22

At the end of the course completion student will be able to:	
C223.1	Compute the frictional losses and transmission in clutches, brakes and dynamometers.
C223.2	Analyze dynamic force analysis of slider crank mechanism. Design a Flywheel.
C223.3	Analyze stabilization of automobiles, airplanes and ships.
C223.4	Analyze the forces in governors.
C223.5	Compute balancing forces in systems with reciprocating and rotary masses.
C223.6	Estimate the effects of natural and forced vibrations.

Course Name: Thermal Engineering-I (20A2203402) **Year of Study: 2021 -22**

C224.1	Comprehend the air standard, fuel air and actual cycles.
C224.2	Understand the working of various internal combustion engine components and their working Principles.
C224.3	Analyze the combustion phenomenon of SI engines
C224.4	Analyze the combustion phenomenon of CI engines
C224.5	Compute the two stroke and four stroke engine performance characteristics.
C224.6	Describe the components, functioning and performance of gas turbines. Apply the principles of gas turbines and jet propulsion systems.

Course Name: Industrial Engineering & Management (20A2200102)
Year of Study: 2021 -22

At the end of the course completion student will be able to:	
C225.1	Acquire fundamental knowledge of Industrial management.
C225.2	Understand the concept of system approach and different types of production layouts, process layouts and acquire the domain knowledge of maintenance
C225.3	Understand different types of production, work study, method study, work measurement techniques.
C225.4	Identify the role of statistics in engineering problem solving process, use of graphical techniques in data analysis
C225.5	Solve Engineering Problems using Statistical quality Control Methods.
C225.6	Understand and use of effective project management to solve Engineering problems.

Course Name: Mechanics of Solids & Metallurgy Lab (20A2203391)
Year of Study: 2021 -22

C226.1	Perform the UTM test of a material.
C226.2	Perform various test to know the mechanical properties of a material
C226.3	Perform hardness test and heat treatment of steels.
C226.4	Prepare the specimens as per standards.
C226.5	Observe micro structure of different materials.

C226.6	Analyse the properties of materials based on micro structure.

Course Name: Machine Drawing Practice (20A2203491) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C227.1	Demonstrate the conventional representations of materials and machine components
C227.2	Understand and draw riveted, welded and key joints
C227.3	Understand the hidden details of machine components with the help of sections and interpenetrations of solids.
C227.4	Understand and draw machine parts.
C227.5	Understand and draw assembly drawing.
C227.6	Understand and draw manufacturing drawing with dimensional and geometric tolerances

Course Name: Theory of Machines Lab (20A2203492) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C228.1	Analyze the forces and motion of complex systems of linkages, gears and cams.
C228.2	Apply the principles of gyroscope and governors.
C228.3	Apply the principles of balancing of masses to various links, mechanisms and engines.
C228.4	Demonstrate the dynamics of flywheel and their motion.
C228.5	Analyze the motion and the dynamical forces acting on mechanical systems composed of linkages, gears and cams.
C228.6	Perform balancing, vibration and critical speeds with respect to Machine dynamics

Course Name: Python Programming Lab (20A2203991) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C229.1	Solve the different methods for linear, non-linear and differential equations
C229.2	Learn the PYTHON Programming language
C229.3	Familiar with the strings and matrices in PYTHON
C229.4	Write the Program scripts and functions in PYTHON to solve the

	methods

Course Name: Essence of Indian Traditional Knowledge (20A2200801) **Year of Study: 2021 -22**

At the end of the course completion student will be able to:	
C2210.1	Understand the concept of Traditional knowledge and its importance
C2210.2	Know the need and importance of protecting traditional knowledge
C2210.3	Know the various enactments related to the protection of traditional knowledge
C2210.4	Understand the concepts of Intellectual property to protect the traditional knowledge
C2210.5	Understand the Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture
C2210.6	Know the importance of TK and biotechnology, TK in agriculture

Course Name: Thermal Engineering-II (20A3103401) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C311.1	Describe the components and functioning of a Rankine cycle. Analyze the need of various boiler draught systems for a vapor power cycle
C311.2	Apply thermodynamic analysis to study the behavior of steam nozzles Evaluate the performance of impulse turbines
C311.3	Evaluate the performance of reaction turbines
C311.4	Understand different types of condensers and analyze its performance analysis.
C311.5	Evaluate the performance of reciprocating and rotary compressors.
C311.6	Evaluate the performance of centrifugal and axial flow compressors.

Course Name: Design of Machine Members-I (20A3103402) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C312.1	Estimate safety factors of machine members subjected to static and dynamic loads.
C312.2	Identify the loads that the machine members subjected to and calculate static and dynamic stresses to ensure safe design
C312.3	Design of Riveted and Welded joints under eccentric loading.
C312.4	Design standard machine elements such as keys, cotters and knuckle joints.
C312.5	Design standard machine elements such as shafts and couplings.

C312.6	Design and Analyze mechanical springs

Course Name: Machining, Machine Tools & Metallurgy (20A3103403) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C313.1	Understand the fundamentals of Machining.
C313.2	Understand the functions and applications of Lathe, Shaper, Slotter and Planner.
C313.3	Understand and Compare the functions and applications of Drilling and Boring.
C313.4	Understand the functions and applications of Milling
C313.5	Analyze the concepts of finishing processes and the system of limits and fits.
C313.6	Understand the concepts of surface roughness and optical measuring instruments.

Course Name: Surveying & Geomatics (20A3101601) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C314.1	Understand the basics of surveying and identifying the needs of surveying
C314.2	Apply the knowledge, techniques and survey tools in engineering practices
C314.3	Calculate angles, distances and levels
C314.4	Translate the knowledge gained for implementation infrastructure facilities.
C314.5	Correlate knowledge to frontiers like hydrography, electronic distances measurement, global positioning system, photogrammetry and remote sensing
C314.6	Identify data collection methods and prepare field notes.

Course Name: Finite Element Methods (20A3103511) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C315.1	Understand the concept of theory of elasticity and solution to the problems using this method.
C315.2	Use of FEM to solve trusses.
C315.3	Use of FEM to solve beam problems.
C315.4	Apply FEM to solve two-dimensional problems
C315.5	Apply FEM to solve axis symmetric problems
C315.6	Use of FEM for solving problems on dynamic analysis.

Course Name: Machine Tools Lab (20A3103491) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C316.1	Demonstrate about general purpose machine tools in the machine shop.
C316.2	Explain various operations on lathe machine.
C316.3	Distinguish between different operations on drilling machine.
C316.4	Experiment with basic operations on shaping machine.
C316.5	Utilize slotting machine to make keyways.
C316.6	Experiment with the basic operations on milling machine.

Course Name: Thermal Engineering Lab (18A3103492) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C317.1	Find the efficiency and performance of an I.C. engine system for a given set of conditions.
C317.2	Calculate the various energy losses and heat balance of Internal Combustion Engines.
C317.3	Evaluate the performance parameters of refrigeration system and Solar flat plate.
C317.4	Analyze the Volumetric efficiency of air compressor
C317.5	Develop skills in data acquisition systems
C317.6	Study the various parameters of boilers

Course Name: Advanced Communication Skills Lab (20A3103991)
Year of Study: 2022-23

At the end of the course completion student will be able to:	
C318.1	Recall vocabulary and use it contextually
C318.2	Interpret listen and speak effectively
C318.3	Develop proficiency in academic reading and writing
C318.4	Develop the possibilities of job prospects

Course Name: Heat Transfer (20A3203401) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C321.1	Explain the basic heat transfer principles.
C321.2	Analyze steady and unsteady state heat transfer concepts.
C321.3	Understand the concepts of natural and forced convective heat transfer

	for both internal and external flow
C321.4	Estimate the heat transfer coefficient and rate of heat transfer
C321.5	Apply the concepts of heat transfer in Boiling, Condensation and heat exchangers.
C321.6	Evaluate the radiation heat exchange between the surfaces.

Course Name: Design of Machine Members-II (20A3203402) Year of Study: 2022-23

At the end of the course completion student will be able to:	
C322.1	Estimate the bearing life and selection of suitable bearing.
C322.2	Analyze and design of various engine parts.
C322.3	Design of curved beams.
C322.4	Analyze and design of power screws.
C322.5	Design of Pulleys and Gear drives.
C322.6	Apply the concepts in designing various machine tool elements

Course Name: CAD/CAM (20A3203403) Year of Study: 2022-23

At the end of the course completion student will be able to:	
C323.1	Describe basic structure of CAD workstation, Memory types, input/output device sand display devices and computer graphics
C323.2	Understand how to write the part programs for different models by using part programming
C323.3	Explain features of Group Technology (GT), Computer Aided Process Planning (CAPP).
C323.4	Explain features of Flexible Manufacturing System (FMS)
C323.5	Illustrate Computer Aided Quality Control (CAQC) concepts.
C323.6	Illustrate Computer Integrated Manufacturing (CIM) concepts.

Course Name: Environmental Engineering (20A3201605) Year of Study: 2022-23

At the end of the course completion student will be able to:	
C324.1	Understand about quality of water and purification process
C324.2	Select appropriate technique for treatment of waste water.
C324.3	Assess the impact of air pollution
C324.4	Understand consequences of solid waste and its management.
C324.5	Design domestic plumbing systems.

C324.6	Selection of suitable treatment flow for raw water treatments.

Course Name: Fundamentals of Utilization of Electrical Energy (18A3202605) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C325.1	Identify various illumination methods produced by different illuminating sources.
C325.2	Identify most appropriate heating techniques for suitable applications.
C325.3	Identify most appropriate welding techniques for suitable applications.
C325.4	Distinguish various traction system and determine the tractive effort and specific energy consumption.
C325.5	Validate the necessity and usage of different energy storage schemes for different applications and comparisons.
C325.6	Explain the Thermal ,magnetic, Chemical Energy storage systems.

Course Name: Automobile Engineering (20A3203511) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C326.1	Understand the basic systems and components of an automobile
C326.2	Summarize the operation of transmission systems.
C326.3	Summarize the operation of steering systems
C326.4	Explain the operation of suspension systems.
C326.5	Explain the operation of braking systems.
C326.6	Outline the engine specification and safety systems. Understand the concepts of automobile electronic systems.

Course Name: Heat Transfer Lab (20A3203491) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C327.1	Find Heat Transfer rate in different geometries
C327.2	Estimate performance parameters of a Pin Fin
C327.3	Demonstrate the concepts of Natural and Forced Convection
C327.4	Determine effectiveness in parallel flow and counter flow heat exchanger
C327.5	Determine emissivity of the given surface
C327.6	Demonstrate the concepts of Drop-wise and Film-wise Condensation

Course Name: CAE & CAM Lab (20A3203492) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C328.1	Experiment with trusses and beams to determine stress, deflection, natural frequencies, harmonic analysis, HT analysis and buckling analysis.
C328.2	Create part programmes using FANUC controller.
C328.3	Apply the finite element analysis for components design.
C328.4	Apply G-codes for automated tool path using CAM software.
C328.5	Analyze about rapid prototyping machine and to print simple parts.
C328.6	Experiment with virtual 3D printing simulation using V labs.

Course Name: Measurements & Metrology Lab (20A3203493) Year of Study: 2022-23

At the end of the course completion student will be able to:	
C329.1	Explain the calibration of pressure gauge and temperature measuring instruments
C329.2	Demonstrate the calibration of displacement and speed measuring instruments
C329.3	Explain the calibration of vibration measuring instruments
C329.4	Explain the working of various instruments like vernier callipers, bevel protractor, micrometres and dial indicators
C329.5	Familiarize the working of tool maker's microscope and surface roughness measuring instruments.
C329.6	Demonstrate the Machine tool alignment test on the lathe, drilling and milling machines

Course Name: Mini Project (20A3203791) **Year of Study: 2022-23**

At the end of the course completion student will be able to:	
C3210.1	Realize product design and fabrication.
C3210.2	Learn entire manufacturing chain by step wise.
C3210.3	Understand the design and manufacturing integration.
C3210.4	Prepare report of design and manufacturing of products.
C3210.5	Improve digital presentation.
C3210.6	Improve practical and presentation skills.

Course Name: Unconventional Machining Processes (20A4103513) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C411.1	Describe unconventional machining methods and working principles of Abrasive Jet Machining.
C411.2	Describe the working Principle of Ultrasonic Machining.
C411.3	Demonstrate electro-chemical machining principles.
C411.4	Demonstrate electro-chemical grinding, honing and deburring process.
C411.5	Explain principle, working, applications and various characteristics of electric discharge machining process.
C411.6	Explain the applications, characteristics and process of EBM, LBM and PAM.

Course Name: Power Plant Engineering (20A4103522) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C412.1	Identify the different components of the steam power plant for power production.
C412.2	Illustrate the component used in the diesel and gas power plant for power production
C412.3	Understand how the power is produced by hydro-electric and nuclear power plants
C412.4	Understand different types of reactors.
C412.5	Interpret the power production by combined power plants and operating principles of different instruments used in power plants.
C412.6	Analyze power plant economics and implementation of pollution standards and control of pollution caused by the power plants.

Course Name: Additive Manufacturing (20A4103534) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C413.1	Understand the principles of prototyping, classification of RP processes and liquid-based RP systems.
C413.2	Understand and apply different types of solid-based RP systems.
C413.3	Apply powder-based RP systems
C413.4	Understand the working principle of 3-D Printing.
C413.5	Analyze and apply various rapid tooling techniques.
C413.6	Understand different RP data types and applications of Rapid Prototyping.

Course Name: Non Destructive Evaluation (20A4103535) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C414.1	Understand the concepts of various NDE techniques and the requirements of radiography techniques and safety aspects.
C414.2	Interpret the principles and procedure of ultrasonic testing
C414.3	Understand the principles and procedure of Liquid penetration testing
C414.4	Understand the principles and procedure of eddy current testing
C414.5	Illustrate the principles and procedure of Magnetic particle testing.
C414.6	Interpret the principles and procedure of infrared testing and thermal testing

Course Name: Air Pollution & Control (20A4101610) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C415.1	Classify the air pollutants.
C415.2	Understand the impacts of air pollutants individually and globally.
C415.3	Identify what type of atmospheric conditions useful to disperse the air pollutants.
C415.4	Select the suitable particulate control equipment depend on particle size and efficiency.
C415.5	Apply suitable process to remove gaseous pollutants.
C415.6	Know cause for industrial and automobile pollution and minimizing methods.

Course Name: Green Energy Resources (20A4102610) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C416.1	Understand the principles and working of solar, wind, biomass, geo thermal, ocean energies
C416.2	Understand the principles and working and green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.
C416.3	Understand the principle of OTEC motion of waves
C416.4	Estimate the power associated with OTEC.
C416.5	Study the various chemical energy sources like fuel cells along with hydrogen energy

C416.6	Understand the concept of Wind energy and its applications

Course Name: Term Paper (20A4103792) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C417.1	Identify real world problem
C417.2	Research on topic by Literature survey
C417.3	Produce a well structured document.
C417.4	Develop presentation skills.
C417.5	Communicate with peers
C417.6	Contribute effectively as a team member or leader

Course Name: Universal Human Values (20A4100101) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C418.1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
C418.2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
C418.3	They would have better critical ability.
C418.4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
C418.5	It is hoped that they would be able to apply what they have learnt to their own self indifferent day-to-day settings in real life, at least a beginning would be made in this direction.

Course Name: Major Project (20A4203791) **Year of Study: 2023-24**

At the end of the course completion student will be able to:	
C421.1	Carry out literature survey in identified domain, and consolidate it to formulate a problem statement
C421.2	Apply identified knowledge to solve a complex engineering problem.
C421.3	Use synthesis/modeling to simulate and solve a problem or apply appropriate method of analysis to draw valid conclusions and present, demonstrate, execute final version of project
C421.4	Incorporate the social, environmental and ethical issues effectively into solution of an engineering problem
C421.5	Contribute effectively as a team member or leader to manage the project timeline
C421.6	Write pertinent project reports and make effective project Presentations

HEAD OF THE DEPARTMENT

Head, Mechanical Department
NRI Institute of Technology
POTHAVARAPPADU (Vill)
Agiripalli (Mdl), Krishna Dist

NRI INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

Approved by AICTE, New Delhi: Permanently Affiliated to JNTUK, Kakinada
Accredited by NAAC with "A" GRADE, Accredited by NBA (CSE, ECE&EEE)
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Department of Electronics and Communication Engineering

Course Structure for B.Tech

R20 (20, 21& 22 Batches)

II-I Courses

MATHEMATICS-III:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Interpret the physical meaning of different operators such as gradient, curland, divergence
CO2	Estimate the work done against a field, circulation and fluxusing vector calculus
CO3	Apply Cauchy-Riemann equations to complex functions inorder to determine whether a given continuous function is analytic
CO4	Find the differentiation and integration of complex functions used in engineering problems and make use of the Cauchy residue theorem to evaluate certain integrals
CO5	Write the infinite series expansion of complex function by apply Taylor's, Maclaurin's/Laurant's series
CO6	Identify solution methods for partial differential equations that model physical process

ELECTRONIC DEVICE AND CIRCUITS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate the operation, V-I characteristics, parameters of P-N diode in differentmodes
CO2	Understand the operations, V-I characteristics and applications of Zener diode and special diodes in different modes and evaluate the performance of various rectifiers and filters with relevant expressions
CO3	Describe the construction, principle of operation of Transistors with their V-I characteristics in different configurations.
CO4	Describe the construction, principle of operation of Field Effect Transistors with their V-I characteristics in different configurations.
CO5	Chose the biasing and stabilization techniques for BJT and JFET with necessaryexpressions
CO6	Describe the construction, principle of operation of MOS Field Effect Transistors with their V-I characteristics in different configurations.

SWITCHING THEORY & LOGIC DESIGN:

Course Outcomes:

Upon successful completion of this course, students will be able to:

CO1	Classify different number systems and apply to generate various codes.
CO2	Use the concept of Boolean algebra in minimization of switching functions
CO3	Design different types of combinational logic circuits.
CO4	Design combinational logic circuits using different types of Programmable Logic.
CO5	Apply knowledge of flip-flops in the design of Registers and counters.
CO6	Construct the state diagrams with the knowledge of Mealy and Moore conversions, state machines using various flip flops.

SIGNAL AND SYSTEM:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the basic concepts of signals and systems and differentiate various classifications of signals and systems.
CO2	Analyze the frequency domain representation of signals using Fourier concepts.
CO3	Classify the systems based on their properties and determine the response of LTIsystems
CO4	Analyze Linear systems in time and frequency domain and understand the properties of convolution.
CO5	Perform sampling and reconstruction of signals with the help of Nyquist criterion andunderstand the properties of co relation
CO6	Transform continuous time signals into complex frequency domain by applying Laplace Transforms and discrete time signals by applying Z – Transforms.

RANDOM VARIABLES AND STOCHASTIC PROCESS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Identifying the basic concepts of probability and Probability functions.
CO2	Understand the concepts of expectation and moment generating functions.
CO3	Implementing the joint density function and distribution functions to the multiple random variables.
CO4	understanding the operations joint moments and joint characteristic functions on multiple random variables.
CO5	Understand the concept of random processes, and characterize the random processes in the time domain.
CO6	Apply the theory of stochastic processes to analyze linear systems with random inputs

ELECTRONIC DEVICE AND CIRCUITS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Analyze the characteristics of the diodes in forward and reverse bias
CO2	To interpret the Diode application as rectifier and to analyze Half wave and full waverectifiers with filter action.
CO3	Analyze and understand the characteristics of BJT and FET in CE and CS configuration respectively.
CO4	Study and analyze the characteristics of UJT and SCR
CO5	Understand how to measure the parameters of the signal by using CRO

CO6	Apply knowledge to calculate the Q-point of the Transistor and to construct amplifiersusing BJT and FET

SWITCHING THEORY & LOGIC DESIGN LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Analyze the truth tables of different Logic Gates
CO2	Design Various combinational Circuits with minimal SOP functions
CO3	Apply knowledge to Verify the truth tables of Decoders and Demultiplexers
CO4	Design a 4-bit ring counter and Johnson's counter using D Flip–Flops/JK Flip Flop
CO5	Understand the operation of 4-bit Universal Shift Register for different Modes ofoperation
CO6	Apply knowledge Construct 7 Segment Display Circuit Using Decoder and 7Segment LED

BASIC SIMULATION LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand mathematical description and representation of different continuous anddiscrete time signals and sequences.
CO2	Perform operations on signals, computation of Energy and power of on signals &sequences, and extracting Even, odd, Real and Imaginary parts of signals and sequences,
CO3	Understand the convolution, auto and cross correlation operators for continuous anddiscrete time system.
CO4	Develop input output relationship for linear shift invariant system and to compute step, Sinusoidal and impulse responses
CO5	Understand and resolve the signals in frequency domain using Fourier transforms. develop the ability to analyze the systems in s- domain by waveform synthesisusing Laplace transforms.
CO6	Verify sampling theorem and identification of poles and zeroes for a given transferfunction.

ELECTRONIC CIRCUIT DESIGN:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Analyze the electronic circuit rules and its parameter calculations.
CO2	Develop the simulation process in the design of Electronic Circuits.
CO3	Interpret the PCB design and various processes involved
CO4	Explore in-depth core knowledge in the and fabrication of Printed Circuit Boards
CO5	Apply assembling and testing of the PCB based electronic circuits
CO6	Design single side PCB for power supplies of various devices.

II-II Courses

ANALOG COMMUNICATIONS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand and analyze the modulation and demodulation outputs of AM and DSB-SC circuits.
CO2	Analyze the outputs of FM modulation and demodulation circuits.
CO3	Verify the characteristics of diode detector and AGC circuits.
CO4	Verify the outputs of Pulse modulation and demodulation circuits such as PAM, PWM and PPM.
CO5	Demonstrate the verification of sampling theorem and radio receiver characteristics.
CO6	Explain the characteristics of radio receiver and pre-emphasis and de- emphasis circuits.

ANALOG COMMUNICATION LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand and analyze the modulation and demodulation outputs of AM, DSB-SC.
CO2	Analyze the outputs of FM modulation and demodulation circuits.
CO3	Verify the characteristics of diode detector, PLL and AGC circuits.
CO4	Verify the outputs of Pulse modulation and demodulation circuits such as PAM, PWM and PPM.
CO5	Demonstrate the verification of sampling theorem.
CO6	Explain the characteristics of radio receiver and pre-emphasis and de- emphasis circuits.

ANALOG AND PULSE CIRCUITS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Design and analysis of small signal high frequency transistor amplifier using BJT and FET
CO2	Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT
CO3	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept
CO4	Know the classification of the power amplifiers and their analysis with performance comparison
CO5	Derive the expressions for RC circuits for various inputs
CO6	Design and analysis of different types of multivibrators

ANALOG AND PULSE CIRCUIT LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Construct the RC phase shift oscillator using transistors for different frequencies.
CO2	Design Colpitt's oscillator using transistors for different frequencies.
CO3	Estimate frequency response of two stage RC coupled amplifier.
CO4	Understand the characteristics of power amplifiers and multivibrators.
CO5	Draw the characteristics of series and shunt feedback amplifiers.
CO6	Understand the characteristics of linear and non linear wave shaping circuits.

EMWTL:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Interpret and apply the static electrostatic fields with respect to coordinate systems.
CO2	Analyze and demonstrate the static magnetic fields in real time applications.
CO3	Formulate the Maxwell's Equations in different forms with time considerations.
CO4	Formulate the theory of electromagnetic waves in free space with practicalapplications.
CO5	Evaluate and Relate wave propagation characteristics in different conducting and non-conducting media.
CO6	Demonstrate the reflection and Refraction of EM waves at normal and obliqueincidences.

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Use the theory of managerial economics, demand, production analysis & forecastingtheories
CO2	Analyze of production markets & pricing strategies & cost price functions to managemarkets & break-even-point
CO3	Develop an ability to identify, formulate & solve engineering problems by applying the knowledge of managerial economics
CO4	Theorize the features and types of Industrial organization
CO5	Enhance their capabilities in the interpretation of balance sheet that are followed in industries, organizations & institutes
CO6	Apply financial analysis, capital budgeting techniques in evaluating various investment opportunities

PYTHON PROGRAMMING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Upon successful completion of this course, students will be able to
CO2	Understand Python syntax and semantics and be fluent in the use of Python flow control and Functions
CO3	Develop, run and manipulate Python programs using Core data structures like Lists,Dictionaries, and use of Strings Handling methods
CO4	Develop, run and manipulate Python programs using File Operations and searchingpattern using regular expressions
CO5	Interpret the concepts of object-oriented programming using Python
CO6	Understand the numbers, math's function, strings, list, tuples, and dictionaries in pythons

VHDL PROGRAMMING LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Distinguish logic gates for design of digital circuits
CO2	Design different types of Combinational logic circuits
CO3	Design different types of sequential logic circuits
CO4	Analyze the operation of flip-flops
CO5	Apply knowledge of flip-flops in designing of Registers and Counters
CO6	Analyze the operation of RAM and ALU

III-I Courses

LINEAR AND DIGITAL INTEGRATED CIRCUITS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Analyze different types of differential amplifiers and to discuss AC, DC characteristics of op-amp.
CO2	Build various linear and non-linear applications using op-amp operating with negative and positive feedback in closed loop configuration.
CO3	Experiment with various active filters.
CO4	Explain the fundamental frequency of monostable and astable multivibrators using IC555 timer.
CO5	Conclude the applications of PLL and A/D and D/A converters.
CO6	Identify the importance and applications of different types of digital ICs.

ANTENNAS AND WAVE PROPAGATION:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the basic antenna radiation parameters and radiation mechanism of single wire & two wire antennas with current distribution analysis.
CO2	Quantify the radiation fields and power radiated by dipole antennas also analyze their radiation characteristics using mathematical approach.
CO3	Illustrate the different types of arrays and their radiation patterns with both mathematical and geometrical analysis.
CO4	Understand the geometry and working principle of operation of non-resonant radiators and microstrip antennas with qualitative analysis.
CO5	Illustrate techniques for antenna parameter measurements and analyze various types of Microwave Antennas.
CO6	Identify and distinguish the characteristics of different modes of radio wave propagation in the atmosphere with both qualitative and quantitative treatment.

DIGITAL COMMUNICATION:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Apply the knowledge of statistical theory of communication and understand the basics of digital communication systems
CO2	Analyze the performance of digital modulation techniques for generation, detection and digital representation of the signal
CO3	Explore the probability of error for various digital modulation techniques with the help of random variables and filters
CO4	Integrate and apply the basics of information theory to the communication and compute entropy, information rate of the source
CO5	Understand and analyze the source coding techniques and channel capacity.
CO6	Compute and analyze different error control coding schemes for reliable transmission of digital

	information over the channel

COMPUTER ORAGANISATION AND ARCHITECTURE:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the basics, evolution and architecture of the computer.
CO2	Analyze the machine instructions and how to write programs and calculate the effective address of an operand by addressing modes.
CO3	Demonstrate the relationship between the software and the hardware and to understand concepts of control unit and all arithmetic operations.
CO4	Analyze the concept of I/O organization and design how to interface i/o devices.
CO5	Demonstrate the memory organization and understand the concept of cache mapping techniques.
CO6	Understand the principles of operation of multiprocessor systems.

BIO-MEDICAL ENGINEERING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate Man – Instrumentation system and different problems encountered in measuring the living system and able to analyze different types of bioelectric potentials with resting and action potential.
CO2	Explain the working of various Electrodes and Transducers using Transduction principles for obtaining Bio electric potentials.
CO3	Demonstrate the anatomy of physiological systems and the measurements of various tests for Cardiovascular system, ECG, heart sound, Blood Pressure, blood flow and cardiac output and experiment with Plethysmography.
CO4	Illustrate the anatomy of physiological systems and the measurements of various tests using instrumentation for mechanism of breathing with Respiratory Therapy Equipment.
CO5	Recognize the importance of patient monitoring system and explain the design, Principle & working of various Therapeutic and Prosthetic devices.
CO6	Describe the basic principle and applications of various medical imaging systems and importance of Bio Telemetry for patient care and patient safety in medical equipment's and also able to identify the methods to prevent shock hazards from electrical equipment and express the working of different types of recorders and monitors.

DATA STRUCTURES:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Ability to illustrate the concepts of algorithm apply the learning concepts to design data
CO2	Analyze and implement operations on linked list and demonstrate their applications
CO3	Ability to design applications using stacks and queues and implements various types of queues
CO4	Ability to analyze and implement operations on trees
CO5	Ability to demonstrate various operations on binary search trees and its applications

CO6	Ability to evaluate the properties and operations on graphs and implement the graph

INTELLECTUAL PROPERTY:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Classify intellectual property rights, cyber-crimes and understand the importance of ipr
CO2	Categorize subject matters of copyrights, understand the registration process of copyrights and effect of infringement
CO3	Analyze patent requirements and its registration formalities and effect of infringement
CO4	Analyze functions of Trademark and its registration formalities and effect of infringement under Trademark Act
CO5	Understand the importance of trade secrets and how to maintain trade secrets
CO6	Pave the way for the students to catch up Intellectual Property as an career option

LINEAR AND DIGITAL INTEGRATED CIRCUITS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the basics of Op-Amp (IC 741), timer (IC 555) and PLL (IC 565).
CO2	Design, analyze various applications of Op-amp 741 IC.
CO3	Designs multivibrator circuits using IC555 and determine the frequency of oscillation and time delay.
CO4	Understand the characteristics of PLL.
CO5	Design various combinational circuits using various digital Integrated Circuits.
CO6	Design various sequential circuits using various digital Integrated Circuits.

DIGITAL COMMUNICATIONS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the Time-Division Multiplexing systems, and verify the output of pulse code modulation and demodulation.
CO2	Analyze the output of differential pulse code modulation and demodulation and verify the delta modulation.
CO3	Analyze the outputs of different digital modulation techniques-FSK, PSK.
CO4	Interpret the outputs of DPSK modulation and demodulation.
CO5	Analyze the outputs of source encoder and decoder, linear block codes, convolution codes and binary cyclic codes.
CO6	Perform and analyze the output of companding circuit.

INTERNET OF THINGS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the concept of Internet of Things
CO2	Implement interfacing of various sensors with Arduino/Raspberry Pi.
CO3	Demonstrate the ability to transmit data wirelessly between different devices.
CO4	Design the mobile applications for controlling the devices.
CO5	Show an ability to upload/download sensor data on cloud and server.
CO6	Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks

INTERNSHIP:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Acquire on job the skills, knowledge, and attitude, which are requisite to constitute a professional identity.
CO2	Engage in applied professional-level work under supervision of a professional in the field.
CO3	Exhibit evidence of increased content knowledge gained through practical experience.
CO4	To deal with industry-professionals and ethical issues in the work environment.
CO5	Explain how the internship placement site fits into their broader career field.
CO6	Evaluate the internship experience in terms of their personal, educational and career needs.

III-II Courses

MICROPROCESSOR AND MICROCONTROLLERS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the architecture of 8086 microprocessor and their operation.
CO2	Demonstrate programming skills in assembly language for 8086 microprocessors.
CO3	Analyze various interfacing techniques and apply them for the design of processor based systems.
CO4	Interface external peripherals and I/O devices and program the 8086 microprocessor.
CO5	Understand the architecture of 8051 microcontroller and their operation and programming skills for 8051.
CO6	Understand the concepts of ARM Processor.

DIGITAL SIGNAL PROCESSING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the representation of different Discrete time signals and apply the difference equations concept in the analysis of discrete time systems
CO2	Interpret and explore the concepts of Discrete Fourier Transforms and Fast Fourier Transforms for various Discrete Time Signals and Sequences.
CO3	Use FFT algorithm for solving DFT of sequence
CO4	Design the Digital IIR Filters from the analog filters using frequency transformations and FIR filters using windowing techniques.
CO5	Construct the basic structures of Digital FIR and IIR systems.
CO6	Apply the signal processing concepts on programmable Digital Signal Processors.

VLSI DESIGN:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
CO2	Apply the design Rules and draw layout of a given logic circuit.
CO3	Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.
CO4	Understand the switch logic and gate logic.
CO5	Apply the concepts in testing which can help them design a better yield in IC design.
CO6	Analyze the FPGA architecture , design flow and CPLD architecture.

OPTICAL COMMUNICATIONS:

Course Outcomes:

Upon successful completion of this course, students will be able 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.
CO3	Illustrate various dispersion models Apply splicing techniques on fibers and choose low loss connectors to minimize joint losses.
CO4	Analyze different types of optical sources and photo detectors, External quantum efficiency, and analyze signal transmission, receiver operation and error sources of optical fiber.
CO5	Evaluate the power coupled in to optical fibres and Measurement of Attenuation and Dispersion, Eye pattern.
CO6	Design optical system with budget analysis and to classify principles and types of WDM.

EMBEDDED SYSTEMS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the basic concepts of embedded system.
CO2	Analyze the different hardware components used to design the embedded system.
CO3	Design various approaches for embedded firmware.
CO4	Design RTOS for an embedded system design.
CO5	Understand the fundamental issues in hardware software co design.
CO6	Understand the IDE and various tools used in implementing the embedded system.

RADAR SYSTEMS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Acquire the knowledge of Radar system to apply and to design required parameters for a RADAR system and to derive the RADAR Equation.
CO2	Analyze the working principle of CW and Frequency Modulated Radar and their applications.
CO3	Understand the principle of MTI and pulse Doppler Radar and analyze MTI Radar parameters and their limitations.
CO4	Acquire the knowledge of phase array antennas used for transmission and reception in RADAR.
CO5	Analyze different types of tracking RADARs and to study different types of Radar receivers and displays.
CO6	Explore the detection of Radar signals in the presence of noise and analyze the performance of matched filter receiver and its characteristics.

INDUSTRIAL ROBOTICS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Explain the basic concepts and components of industrial robotics and automation
CO2	Judge the knowledge about robot actuators and feedback components.
CO3	Analyze the motion of robot and manipulator kinematics.
CO4	Analyze the general considerations of path description and generation.
CO5	Analyze the motion of robot joints,straight line and skew.
CO6	Utilize knowledge about the image processing. machine vision and robotic applications.

PROFESSIONAL ETHICS AND HUMAN VALUES:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand moral values, work ethics, respect others and develop civic virtue.
CO2	Understand ethical responsibilities of the engineer's different professional roles.
CO3	Demonstrate knowledge to become a social experimenter on framing of the problem and determining the facts.
CO4	Create awareness about safety, risk & risk benefit analysis and knowledge on intellectual property rights.
CO5	Develop knowledge about global issues creating awareness on computer and environmental ethics.
CO6	Analyze ethical problems in research and give a picture on weapons development.

VLSI LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Design, implement, and simulate Basic logic gates using S. Edit of Tanner EDA toll and Micro wind using at back end
CO2	Simulate and synthesize Universal gates using Tanner EDA tool and Micro wind.Simulate circuits within a Tanner EDA tool and compare to design specifications.
CO3	Design, implement, and simulate circuits using Tanner EDA and Micro wind tool.
CO4	Design Digital logic Counters using Tanner EDA Tools and Implement Using Micro wind Tool.
CO5	Design RAM Cell using Tanner EDA Tools and Implement Using Micro wind Tool.
CO6	Understand various design rules to obtain the CMOS logic circuits.

DIGITAL SIGNAL PROCESSING LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Make use of a software tool to generate various discrete time signals and perform different operations on them.
CO2	Examine Linear and Circular Convolution of discrete time signals.
CO3	Evaluate the Discrete Fourier Transform of a signal and its inverse.
CO4	Analyze the Frequency response of IIR Filters using Butterworth and Chebyshev Approximations.
CO5	Analyze the Frequency Response of FIR filters using windowing techniques.
CO6	Illustrate the Decimation and Interpolation processes on a given Sequence.

MICROPROCESSOR AND MICROCONTROLLER LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Develop the assembly language Programmes for 8086 Microprocessor
CO2	Use the cross compiler such as MASM to verify and simulate the 8086 codes
CO3	Develop the assembly language Programmes for 8051 Microcontroller.
CO4	Use Keil to verify and simulate the 8051 Programming
CO5	Use various interfacing circuits for Real world and practical Applications.
CO6	Analyze the performance of various interface techniques for the computing circuits.

SENSOR & INSTRUMENTATIONS LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understanding the concept of measurement system
CO2	Identifying concepts in common methods for converting a physical parameter into an electrical quantity.
CO3	Applying concepts in advances in transducers for various engineering applications.
CO4	Choose proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc.
CO5	Applying knowledge on advanced sensor which related to detect the enhanced parameters using sensors.
CO6	Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system

IV-I Courses

DATA COMMUNICATION AND COMPUTER NETWORKS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate different network models for networking links OSI, TCP/IP and get knowledge about various communication techniques, methods and protocol standards.
CO2	Analyze data link layer services, compare and classify medium access control protocols
CO3	Demonstrate network service models, virtual circuits and routing mechanism
CO4	Analyze the internet protocol addressing in internet using IPV4 & IPV6 format
CO5	Determine the relationship between transport and network layer, understand connection and and connection less services in transport layer.
CO6	Determine application layer services and client server protocols

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the fundamental concepts of instrumentation and characteristics of measuring systems. Describe different types of meters and understanding the operation of meters.
CO2	Analyze Different types of signal generators and signal analyzers and their working principles.
CO3	Interpret the basic principle of Oscilloscope, measurement of parameters using CRO and understand different types of CRO probes.
CO4	Understand the working of different types of special purpose oscilloscopes.
CO5	Explore the different types of A.C. and DC Bridges, Q meters, Counters and their operations
CO6	Demonstrate the different types of transducers and their principles and operations.

DIGITAL IMAGE PROCESSING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the fundamentals of image processing
CO2	Study transforms and introduce different intensity transformation functions and filtering techniques in spatial domain to enhance quality of image
CO3	Introduce different filtering techniques in frequency domain filters
CO4	Study different noise models and apply filters to estimate degradation and restore images
CO5	Explain the concept of color image processing To discuss various compression techniques.
CO6	Apply morphological and segmentation techniques for processing images

SATELLITE COMMUNICATION:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the historical background of satellite communication and analyze different frequency allocation of satellites communication
CO2	Ability to calculate the orbital mechanics, determination of satellite orbits , orbital effects and launching methods
CO3	Ability to develop AOCS, commands, monitoring power systems and developments of antennas
CO4	Able to design antennas to provide Uplink and Down link Frequency and analyze multiple access techniques like TDMA, CDMA,FDMA
CO5	Ability to design different kinds of transmitter and receiver antennas, design and develop Satellite for real time applications
CO6	Ability to learn the concepts of Radio and Satellite Navigation system and GPS location principles, DGPS

MACHINE LEARNING:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Explain the fundamental usage of the concept Machine Learning system.
CO2	Able to form clusters based on Distance models and demonstrate on various regression Technique.
CO3	Analyze the Ensemble Learning Methods.
CO4	Explain Linear and Non-Linear Support Vector Machine (SVM) Classification.
CO5	Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.
CO6	Discuss the Artificial Neural Networks Neural Network training and Fundamentals concepts of Activation functions.

DATABASE MANAGEMENT SYSTEM:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Understand the database management system structure
CO2	Apply as relational algebra to find solutions to a broad range of queries.
CO3	Create applications using various normal forms, functional dependencies
CO4	Ability to validating and identifying anomalies
CO5	Explain the principle of transaction management design.
CO6	Understands and applies indexing mechanisms in databases

ENGINEERING PROJECT MANAGEMENT:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Attain knowledge on planning and scheduling of various projects
CO2	learn and apply the knowledge of Networks in project planning
CO3	Analysis by PERT
CO4	Analysis by CPM
CO5	Optimization of the cost
CO6	Evaluation of the project by using various methodologies.

UNIVERSAL HUMAN VALUES - II: UNDERSTANDING HARMONY:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Describe more aware of themselves, and their surroundings (family, society, nature)
CO2	Illustrate more responsibility in life, and in handling problems with sustainable solutions
CO3	Handle problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO4	Exhibit critical ability and become sensitive to their commitment towards their understanding of human values, human relationship and human society.
CO5	Exhibit sensitivity to their commitment towards what they have understood (human values, human relationship and human society)
CO6	Apply what they have learnt to their own self in different day-to-day settings in real life.

EMPLOYABILITY SKILLS:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Compare and differentiate between formal and informal communication.
CO2	Take part in and manage interpersonal communication.
CO3	Solve the Arithmetic and Reasoning Problems as fast as possible and as simple as possible.
CO4	Exhibits good analytical skills and aptitude skills.
CO5	Perform well in all competitive exams like RRB, SSC, GROUPS, and BANKING and clear the aptitude section of exams for higher education like CAT, GMAT, and GRE etc…
CO6	Make use of the techniques of effective communication in letter and report preparation.

MICROWAVE & RF COMMUNICATION LAB:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate the characteristics of Reflex Klystron.
CO2	Measure vthe negative Resistance characteristics of the Gunn diode.
CO3	Calculate the attenuation, frequency, and wavelength of given microwave component using Microwave Bench Setup.
CO4	Analyze the characteristics of the multihole Directional Coupler.
CO5	Perform the characteristics of various optical sources and measure different losses occur in optical fiber link.
CO6	Determine the spectral components of given frequency band using Spectrum Analyzer

INTERNSHIP:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Acquire on job the skills, knowledge, and attitude, which are requisite to constitute a professional identity.
CO2	Engage in applied professional-level work under supervision of a professional in the field.
CO3	Exhibit evidence of increased content knowledge gained through practical experience.
CO4	To deal with industry-professionals and ethical issues in the work environment.
CO5	Explain how the internship placement site fits into their broader career field.
CO6	Evaluate the internship experience in terms of their personal, educational and career needs.

IV-II Courses

MAJOR PROJECT:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study
CO2	Design and construct a hardware and software system, component, or process to meet desired needs.
CO3	Identify, analyze, and solve problems creatively through sustained critical investigation.
CO4	Discussion and critical thinking about topics of current intellectual importance
CO5	Ability to understand advanced technology and research in engineering.
CO6	Develop presentation and technical writing skills.

COMMUNITY SERVICE PROJECT:

Course Outcomes:

Upon successful completion of this course, students will be able to:	
CO1	To learn the application of knowledge in real world problems
CO2	Assess and improve upon their own cultural competency skills.
CO3	Demonstrate ethical conduct and professional accountability while working in a team for the benefit of society
CO4	Demonstrate understanding of therapeutic models of helping.
CO5	Understand the stages of helping, including exploration, insight, and action.
CO6	Develop applied helping skills to facilitate change in individuals, families, and groups.

Signature of HOD
Head, ECE Department
NRI Institute of Technology
POTHAVARAPPADU (Vill)
Agiripalli (Mdl), Krishna Dist.

20A2100201: Vector Calculus, Transform Techniques and Partial Differential Equations

Course Outcomes:

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

CO1	Interpret the physical meaning of different operators such as gradient, cur land divergence (L5)
CO2	Estimate the work done against a field, circulation and flux using vector calculus (L5)
CO3	Apply the Laplace transform for solving differential equations (L3)
CO4	Find or compute the Fourier series of periodic signals (L3)
CO5	Knowandbe able to apply integral expressions for the forwards and inverse Fourier transform to arrange of non-periodic wave forms (L3)
CO6	Identify solution methods for partial differential equations that model physical processes (L3)

20A2105401-Python Programming

Course Outcomes:

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

CO1	Experience with an interpreted Language and to build software for real needs
CO2	Use basic Decision structures, Boolean logic, variable types, assignments and operators.
CO3	Describe and use of Python lists, dictionaries, tuples and sets.
CO4	Implement methods and functions to improve readability of programs
CO5	Describe and apply object-oriented programming methodology, top-down concepts in algorithm design.

20A2105402-DATA BASE MANAGEMENT SYSTEMS

Course Outcomes:

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

CO1	Ability to define, understand the database management system structure
CO2	Ability to apply as relational algebra to find solutions to a broad range of queries.
CO3	Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies

CO4	Will be able to explain the principle of transaction management design.
CO5	Understands and applies indexing mechanisms in databases

20A2105403- Computer Organization and Architecture

Course Outcomes:

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

CO1	Understand the numeric information in different forms and interpret different logic gates.
CO2	Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, De-multiplexers, and Arithmetic Circuits.
CO3	Able to understand the basic components and the design of CPU, ALU and Control unit
CO4	Students can calculate the effective address of an operand by addressing modes
CO5	Ability to understand memory hierarchy and its impact on computer cost/performance..
CO6	Ability to understand the advantage of instruction level parallelism.

20A2105404-INTERNET OF THINGS

Course Outcomes:

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

CO1	Understand Device-processor communication models & protocols.
CO2	Understand the application areas of IOT.
CO3	Visualize the effect of internet on Mobile Devices, Cloud & Sensor Networks.
CO4	Acquire programming experience with Raspberry Pi kit to interface various devices.
CO5	Implement Programming models for IoT Cloud Environment.

20A2105491-Python Programming Lab

Course Outcomes:

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

CO1	Experience with an interpreted Language and to build software for real needs

CO2	Use basic Decision structures, Boolean logic, variable types, assignments and operators.
CO3	Describe and use of Python lists, dictionaries, tuples and sets.
CO4	Implement methods and functions to improve readability of programs
CO5	Describe and apply object-oriented programming methodology, top-down concepts in algorithm design.
CO6	Design, code ,test and debug python language programs

20A2105492-DATABASEMANAGEMENTSYSTEMS LAB

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
CO2	Queries to Retrieve and Change Data:Select, Insert,Delete,andUpdate
CO3	QueriesusingBuilt-InFunctions:StringFunctions,NumericFunctions,DateFunctionsandConversion Functions.
CO4	Queries using GroupBy,OrderBy,andHavingClauses
CO5	Queries on Joins and CorrelatedSub-Queries
CO6	Queries on Controlling Data:Commit,Rollback,andSavepoint

20A2105493- INTERNET OF THINGS LAB

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Understand the application areas of IOT.
CO2	Understand building blocks of Internet of Things and characteristics.
CO3	Understand enabling technologies Embedded Devices and communication protocols for Hands on activities.
CO4	Write programs using Python for processing Internet of Things

Course Code-Web Application Development Using Full Stack – Frontend Development – Module - I

Course Outcomes:

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

CO1	Analyze a web page and identify its elements and attributes
CO2	Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet
CO3	Implement MVC and responsive design to scale well across PC, tablet and Mobile Phone
CO4	Create web pages using HTML and Cascading Style Sheets.

20A2105901: APTITUDE AND REASONING

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

1. Solve the Arithmetic and Reasoning Problems as fast as possible and as simple as possible.
2. Exhibits good analytical skills and aptitude skills.
3. Perform well in all competitive exams like RRB, SSC, GROUPS, and BANKING etc...
4. Clear the aptitude section of exams for higher education like CAT, GMAT, and GRE etc...

20A2200201-PROBABILITY ANDSTATISTICS

Course Outcomes:

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

CO1	Classify the concepts of data science and its importance
CO2	Interpret the association of characteristics and through the correlation and Regression tools
CO3	Make us of the concepts of probability and their applications
CO4	Apply discrete and Continuous probability distributions
CO5	Design the components of a classical hypothesis test
CO6	Infer the statistical inferential methods based on small and large sampling tests

20A2205401- Web Technologies

Course Outcomes:

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

CO1	Student able to Implement and design webbased applications using features of HTML
CO2	Implement webbased applications using features of XML
CO3	Student will Apply the concepts of server side technologies for dynamic web applications
CO4	Ability to design the webbased applications using effective database access with rich client interaction
CO5	Abilityto Develop reusable component for Graphical User Interface applications

20A2205402- SOFTWARE ENGINEEEING

Course Outcomes:

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

CO1	Understand the basic concepts of Software engineering and applications
CO2	Compare different software engineering process models
CO3	Analyze the principles of requirement Engineering
CO4	Create design models for software Engineering projects
CO5	Apply different testing techniques

20A2205403 OPERATING SYSTEMS

CourseOutcomes:

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

CO1	Understand the important computer system resources and the structure and functioning of operating system.
CO2	Understand process management policies and scheduling of processes by CPU.
CO3	Evaluate the requirement for process synchronization and coordination handled by operating system. Describe and analyze the memory management and its allocation policies.
CO4	Understand demand paging, thrashing and principles of deadlocks.

CO5	Understand File system Interface, File System implementation, Mass-storage structure and Disk scheduling algorithms.

Formal Languages and Automata Theory

CourseOutcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Able to use basic concepts of formal languages of finite automata techniques
CO2	Student able to design Finite Automata's for different Regular Expressions and Languages
CO3	Construct context free grammar for various languages
CO4	Solve various problems of applying normal form techniques, push down automata and Turing Machines
CO5	Participate in GATE, PGECET and other competitive examinations

20A2205491- WEB TECHNOLOGIES LAB

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Createawebsitestaticallyordynamically
CO2	Getknowledgeon displayingand decoratingthecontentsin awebpage.
CO3	Learntheconceptsofstoreandtransportthedataamongwebpages.
CO4	Createobjectswithwhichtheclientcancommunicatewithserver.
CO5	Generatestaticordynamiccontentaccordingtotheclient'srequest
CO6	ProvideUser Authentication byusingcookiesand back end operations usingJDBC and PHP

20A2205492- SOFTWARE ENGINEEEING LAB

Course Outcomes:
Upon successful completion of the course, the student will be able to:

CO1	Ability to translate end-user requirements into system and software requirements
CO2	Analyze the principles of requirement Engineering
CO3	Ability to generate a high-level design of the system from the software requirements
CO4	Create design models for software Engineering projects
CO5	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

20A2205493: Operating Systems &Unix programming Lab

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Students able to implement CPU scheduling algorithms ,File Organization techniques and paging techniques
CO2	Students able to write shell scripts in Linux platform.

Course Code- APPLICATIONS OF PYTHON- NumPy,Pandas

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Understand the workings of various numerical techniques, different descriptive measures of Statistics, correla and regression to solve the engineering problems
CO2	Understand how to apply some linear algebra operations to n-dimensional arrays
CO3	Use NumPy perform common data wrangling and computational tasks in Python
CO4	Use Pandas to create and manipulate data structures like Series and DataFrames, work with arrays, queries, dataframes
CO5	Query DataFrame structures for cleaning and processing and manipulating files
CO6	Understand best practices for creating basic charts

20A2200802: Professional Ethics & Human Values

Course Outcomes

Students will be able to:
CO1 Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
CO2 Identify the multiple ethical interests at stake in a real-world situation or practice
Articulate what makes a particular course of action ethically defensible

Assess their own ethical values and the social context of problems
CO3 Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
CO4 Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
CO5 Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.

Artificial Intelligence

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

CO1	Possess the ability to formulate an efficient problem space for a problem expressed in English.
CO2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
CO3	Possess the skill for representing knowledge using the appropriate technique
CO4	Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learnir and Natural Language Processing
CO5	CO5 Apply the knowledge to develop the solutions for real life problems CO6 Develop new algorithms to contribu to the research arena

Computer Networks

Course Outcomes:	
CO1	Able to understand OSI and TCP/IP models.
CO2	Understand data link layer protocols and flow control
CO3	Understand routing and network layer protocols and IPV4
CO4	Understand transport layer congestion, flow control and protocols
CO5	Understand application layer protocols

Design and Analysis of Algorithms

Course Outcomes: **Upon Completion of the course, the students will be able to**
CO1:Analyze worst-case running times of algorithms using asymptotic analysis and components

CO2: Describe the divide and conquer method explains when an algorithmic design situation demands it.
CO3: Describe the greedy method explains when an algorithmic design situation demands it.
CO4: Describe the dynamic-programming paradigm explains when an algorithmic design demands it.
CO5: Describe the back tracking method explains when an algorithmic design demands it.
CO6: Describe the branch and bound paradigm and deterministic methods e-plain when an algorithmic design demands it.

Cloud Computing

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Understanding the key dimensions of the challenge of Cloud Computing
CO2	Assessment of the economics , financial, and technological implications for selecting cloud computing for own organization
CO3	Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications
CO4	Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas
CO5	Describe the features of Resource Management systems

Software Testing Methodologies and Tools

Course Outcomes	
Upon successful completion of the course, the student will be able to:	
CO1	Understand the basic testing procedures.
CO2	Able to support in generating test cases and test suites.
CO3	Able to test the applications manually by applying different testing methods and automation tools..
CO4	Apply tools to resolve the problems in Real time environment.

Data Warehousing and Data Mining

Course Outcomes
Upon successful completion of the course, the student will be able to:

CO1	Understand the basic concepts of warehousing and data preprocessing techniques
CO2	Derive various interesting patterns and associations in datasets.
CO3	Design and develop classifier models to predict future trends.
CO4	Apply unsupervised learning techniques for a given application.

Advanced Data Structures

Course Outcomes	
Upon successful completion of the course, the student will be able to:	
CO1	Abletounderstand theimportance, operations and applicationofHashing
CO2	Ableto understand implementationof skip lists
CO3	Abletogeta goodunderstandingaboutdifferentbalancedtrees.
CO4	Abletounderstandthe implementationofheapsand binomialqueues.
CO5	Haveanideaonapplicationsofalgorithmsinavarietyofareas,likestringmatching, indexingetc.
CO6	Abletounderstand theimportanceandapplicationsof tries

Computer Networks Lab

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Should be able to Calculate Data link layer farming methods like bit stuffing and byte stuffing.
CO2	Should be able to Analyze Cyclic redundancy check on different polynomials.
CO3	Should be able to understand Socket Programming Implementation by using TCP and UDP Protocols.

Artificial Intelligence Lab

CourseOutcomes:
UponCompletionofthecourse,thestudentswillbeableto

CO1: Elicit, analyze and specify software requirements.
CO2: Simulate given problem scenario and analyze its performance.
CO3: Develop programming solutions for given problem scenario.

DEVOPS LAB

Course Outcomes

Upon successful completion of the course, the student will be able to: Understand the traditional software development. Learn the rise of agile methodologies.• Define and design purpose of DevOps.•	
CO1	Realize the importance of agile software development practices in determining the requirements for a software system
CO2	Analyze and execute iterative software development processes to manage software development activities.
CO3	Apply a systematic understanding of Agile principles and defined practices for a specific circumstance or need.
CO4	Examine the impact of DevOps in the successful completion of software development by improving team collaboration and software quality.
CO5	Perform software process improvement by applying DevOps capabilities at enterprise level.

Employability Skills-I

Course Outcomes	
Upon successful completion of the course, the student will be able to:	
CO1	Establish effective communication with employers, supervisors, and co-workers
CO2	Identify to explore their values and career choices through individual skill assessments
CO3	Adapts positive attitude and appropriate body language
CO4	Interpret the core competencies to succeed in professional and personal life

Machine Learning

Course Outcomes	
Upon successful completion of the course, the student will be able to:	
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

Compiler Design

Course Outcomes:

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

CO1	To use the knowledge of patterns, tokens & regular expressions for solving a problem.
CO2	To apply the knowledge of lex tool &yacc tool to develop a scanner & parser.
CO3	To write the new code optimization techniques to improve the performance of a program in terms of speed & space.
CO4	To employ the knowledge of modern compiler & its features.
CO5	To participate in GATE, PGECET and other competitive examinations

Cryptography and Network Security

CourseOutcomes:
UponCompletionofthecourse, thestudentswillbeableto

CO1. Understand the principles of cryptography and security, with enciphering Techniques and analyze a variety threats and attacks.
CO2. Distinguish the black ciphers and stream ciphers and apply them on a various symmetric cryptographic technique.
CO3. Understand the principle and mathematical models used in public-key cryptosystems by applying them on different (various) types of algorithms.
CO4. Analyze the message authentication functions with its types and digital certifications for secure communicat
CO5. Understand the user authentications principles and security approach at both the web and email.
CO6. Understand the concept of IP Security with its services and dealing with the prevention and detection of intrusions.

Advanced Database Management Systems

COURSE OUTCOMES: Upon successful completion of the course, the student will be able to:

CO1	**Describe** basic database concepts, Data Models, Schemas, Instances, and Components in the DBMS architecture.
CO2	**Implement** practical solutions to GIS database problems using OO/OR database, spatial database, data warehousing and data mining approaches
CO3	**Evaluate** simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer
CO4	**Demonstrate** the issues involved in data integration for distributed query processing
CO5	**Develop** practical skills in the use of these models and approaches to be able to select and apply the appropriate methods for a particular case
CO6	**Analysed**internal structures, query evaluation and optimization.

Network Programming

Course Outcomes	
Upon successful completion of the course, the student will be able to:	
CO1	Explain the client-server paradigm and socket structures.
CO2	Describe the basic concepts of TCP sockets and TCP echo client-server programs.
CO3	Discuss the UDP sockets and UDP echo client-server programs.
CO4	Explain Socket options and ability to understand IPC.
CO5	Apply the applications of sockets and demonstrate skill to design simple applications like FTP, TEI etc.

Big Data Analytics

Course Outcomes	
Upon successful completion of the course, the student will be able to:	
CO1	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing
CO2	Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics
CO3	Students Interpret business models and scientific computing paradigms, and apply software tools for big data analytics
CO4	Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications

OBJECT ORIENTED ANALYSIS AND DESIGN

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Analyse, design, document the requirements through use case driven approach
CO2	Identify, analyse, and model structural concepts of the system
CO3	Develop,explore the conceptual model into various scenarios and applications.
CO4	Apply the concepts of architectural design for deploying the code for software.
CO5	Identify, analyse, and model Architectural concepts of the system

Machine Learning Lab

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Should be able to do data cleaning and data preprocessing
CO2	Should be able to apply imbalanced data sets accuracy
CO3	Should be able to apply machine learning techniques to large data sets

R Programming Lab

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Perform basic 'R' operations.
CO2	Understand the Sorting and Searching techniques.
CO3	Perform Statistical functions on datasets.
CO4	Apply Classification and Regression techniques.
CO5	Perform Clustering.

Complier Design Lab

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	To use the knowledge of patterns, tokens & regular expressions for solving a problem.
CO2	To apply the knowledge of lex tool &yacc tool to develop a scanner & parser.
CO3	To write the new code optimization techniques to improve the performance of a program in terms of speed & space.
CO4	To employ the knowledge of modern compiler & its features.
CO5	To participate in GATE, PGECET and other competitive examinations

Course Outcomes
Upon successful completion of the course, the student will be able to: 1.Understand the traditional software development. 2.Learn the rise of agile methodologies. 3.Define and design purpose of DevOps.

MEAN STACK TECHNOLOGY -LAB

EMPLOYABILITY SKILLS –II

Course Outcomes	
Upon successful completion of the course, the student will be able to:	
CO1	Recite the corporate etiquette.
CO2	Make presentations effectively with appropriate body language
CO3	Be composed with positive attitude
CO4	Apply their core competencies to succeed in professional and personal life

IV-I

BLOCKCHAIN TECHNOLOGY

Course Code	Course Outcomes
CO1	Contentedly discuss and describe the history, types And applications of Blockchain.
CO2	Gainsfamiliaritywithcryptographyand Consensusalgorithms.
CO3	Demonstratetheblock-chainservicestodevelopaNewParadigmofOrganizationalactivitie.
CO4	Learn the limitations of the block-chain mechanism to develop an efficient organizational structure.
CO5	Applying Bit-Coin protocols and how to develop the digital currency in the websites.

Cognitive Science and Analytics

Course Code	Course Outcomes
CO1	Understand the basic principles and processes of cognitive science.
CO2	Demonstrate qualitative and quantitative skills and critical thinking in cognitive science by applyinga suitable methodology to real-world applications.
CO3	Apply declarative and logical models.

CO4	Envisage the concept of cognitive learning.
CO5	Demonstration with the acquired inter-disciplinary knowledge in language processing and application of different research approaches with cognitive science

Computer visionRegulation

Course Code	Course Outcomes
CO1	Studentsshouldbeabletoappreciatethedetailedmodelsofimageformation.
CO2	Analysethetechniquesforimagefeaturedetectionandmatching.
CO3	Applyvariousalgorithmsforpatternrecognition.
CO4	Examinevariousclusteringalgorithms.
CO5	Analyzestructuralpatternrecognitionandfeatureextractiontechniques.

Data Science

Course Code	
CO1	Understand the applications of Data Science.
CO2	Apply summary and descriptive statistics on various data sets.
CO3	Apply Statistical and Linear Algebra functions.
CO4	Apply Classification and Regression to decision-making Scenarios.
CO5	Develop Unsupervised and Reinforcement applications.

DEEP LEARNING AND ITS APPLICATIONS

Course Code	Course Outcomes
CO1	Recognize the characteristics of deep learning models that are useful to solve real-world problems
CO2	Understand different methodologies to create application using deepnets.
CO3	Identify and apply appropriate deep learning algorithms for analyzing the data for variety of problems.
CO4	Implement different deep learning algorithms
CO5	Design the test procedures to assess the efficacy of the developed model.
CO6	Combine several models into gain better results

DESIGN THINKING IN SOFTWARE DEVELOPMENT

Course Code	Course Outcomes
CO1	Explain the principles of design thinking and its approaches.
CO2	Identify the empathy, define phases in human centered design problems.
CO3	Develop an idea, build a prototype and test in design thinking context.
CO4	Apply design thinking techniques for product innovation.
CO5	Use design thinking in business process models.

DATA VISUALIZATION TECHNIQUES

Course Code	Course Outcomes
CO1	Able to Identify and recognize visual perception and representation of data
CO2	Able to Illustrate about projections of different views of objects.
CO3	Apply various Interaction and visualization techniques
CO4	Analyze various groups for visualization.
CO5	Able to visualizations
CO6	Able to understand the importance and applications of data visualization

DATA VISUALIZATION LAB

Course Code	Course Outcomes
CO1	Able to apply different data visualization techniques on real time data
CO2	Able to understand the importance and applications of data visualization
CO3	Design information dashboard

High Performance Computing

Course Code	Course Outcomes
CO1	Ability to define, understand the database management system structure
CO2	Ability to apply as relational algebra to find solutions to a broad range of queries.
CO3	Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies
CO4	Will be able to explain the principle of transaction management design.

CO5	Understands and applies indexing mechanisms in databases

NATURAL LANGUAGE PROCESSING

Course Code	Course Outcomes
CO1	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
CO2	Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
CO3	Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
CO4	Able to design, implement, and analyze NLP algorithms
CO5	Able to design different language modeling Techniques.
CO6	Describe the branch and bound paradigm and deterministic methods e-plain when an algorithmic design demands it.

Parallel and Distributed Computing

Course Code	Course Outcomes
CO1	Understanding Concept of parallel processing and parallel architectures
CO2	Understanding the concepts of shared memory based and thread based
CO3	To learn the two modes of distributed computing using message passing and remote procedure calls.
CO4	To learn introductory techniques of parallel debugging, and be introduced to other parallel paradigms.
CO5	To introduce basic concepts of distributed data bases and distributed operating systems.
CO6	Understanding implementations of Distributed Databases and Distrbuted Operating Systems.

PREDICTIVE ANALYTICS

Course Code	**Course Outcomes**
CO1	Understand the importance of predictive analytics

CO2	Able to prepare and process data for the models
CO3	Learn about statistical analysis techniques used in predictive models
CO4	Apply regression and classification model on applications for decision making and evaluate the performance
CO5	Build and apply time series forecasting models in a variety of business contexts

Quantum Computing

Course Code	**Course Outcomes**
CO1	Analyze the behavior of basic quantum algorithms.
CO2	Implement simple quantum algorithms.
CO3	Implement information channels in the quantum circuit model.
CO4	Simulate a simple quantum error-correcting code.
CO5	Prove basic facts about quantum information channels.

Social Networking and Semantics

Course Code	Course Outcomes
CO1	Understand the basics of Semantic Web and Social Networks.
CO2	Ability to understand and knowledge representation for the semantic web.
CO3	Learn the various semantic web applications.
CO4	Ability to create ontology.
CO5	Ability to build a blogs and social networks.

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Subject Name	APPLICATIONS OF PYTHON- NumPy,Pandas	C229

Course Code	Course Outcome	TARGET
C229.1	Understand the workings of various numerical techniques, different descriptive measures of Statistics,correlation and regression to solve the engineering problems	70
C229.2	Understand how to apply some linear algebra operations to n-dimensional arrays	70
C229.3	Use NumPy perform common data wrangling and computational tasks in Python	70
C229.4	Use Pandas to create and manipulate data structures like Series and DataFrames, work with arrays,queries, and dataframes	70
C229.5	Query DataFrame structures for cleaning and processing and manipulating files	70
C229.6	Understand best practices for creating basic charts	70

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C229.1	3	2	-		-	-	2	-	-	-	-	2	-	2	
C229.2	2	3	3		2	-	3	-	-	-	-	-	2	-	-
C229.3	2	2	2		2	-	2	-	-	-	-	2	-	2	-
C229.4	2	2	3		3	-	2	-	-	-	-	2	2	-	-
C229.5	2	2	3		3	-	1	-	-	-	-	2	2	-	-
C229.6	2	3	3		2	-	2	-	-	-	-	-	2	-	-

Subject Name	APTITUDE AND REASONING	C2110

Course Code	Course Outcome
C2110.1	Solve the Arithmetic and Reasoning Problems as fast as possible and as simple as possible.
C2110.2	Exhibits good analytical skills and aptitude skills.
C2110.3	Perform well in all competitive exams like RRB, SSC, GROUPS, and BANKING etc…
C2110.4	Clear the aptitude section of exams for higher education like CAT, GMAT, and GRE etc…

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO2	PS O3
C2110.1	2	2	2	2	-	-	2	-	-	-	-	-	-	-	-
C2110.2	2	2	2		-	-	3	-	-	-	-	-	-	-	-
C2110.3	2	2	1.0 0		-	-	2	-	-	-	-	-	-	-	-
C2110.4	2	1		1	-	-	2	-	-	-	-	-	-	-	-

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Subject Name	Computer Organization and Architecture	C214

Course Code	Course Outcome
C214.1	Understand the numeric information in different forms and interpret different logic gates.
C214.2	Analyze and Design various combinational circuits like Encoders, Decoders, multiplexers, and Arithmetic Circuits.
C214.3	Able to understand the basic components and the design of CPU, ALU and Control unit
C214.4	Students can calculate the effective address of an operand by addressing modes
C214.5	Ability to understand memory hierarchy and its impact on computer cost/performance..
C214.6	Ability to understand the advantage of instruction level parallelism

Course Code	CO-PO & PSO Relevance Matrix														
	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
C214.1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
C214.2	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
C214.3	3	2	2	-	-	-	-	-	-	-	-	2	-	-	-
C214.4	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
C214.5	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
C214.6	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-

Subject Name	DATA BASE MANAGEMENT SYSTEMS	C213

Course Code	Course Outcome
C213.1	Ability to define, understand the database management system structure
C213.2	Ability to apply as relational algebra to find solutions to a broad range of queries.
C213.3	Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies
C213.4	Will be able to explain the principle of transaction management design.
C213.5	Understands and applies indexing mechanisms in databases

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C213.1	3	3	2	-	-	-	-	-	-	-	-	2	3.00	2.00	3.00
C213.2	3	3	2	-	-	-	-	-	-	-	-	2	3.00	2.00	3.00
C213.3	3	2	2	-	-	-	-	-	-	-	-	2	3.00	2.00	3.00
C213.4	3	3	3	-	-	-	-	-	-	-	-	2	3.00	2.00	2.00
C213.5	3	3	2	-	-	-	-	-	-	-	-	2	3.00	2.00	2.00

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Subject Name	DATA BASE MANAGEMNET SYSTMES LAB	C217

Course Code	Course Outcome
C217.1	Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
C217.2	Queries to Retrieve and Change Data:Select, Insert,Delete,andUpdate
C217.3	QueriesusingBuilt-InFunctions:StringFunctions,NumericFunctions,DateFunctionsandConversion Functions.
C217.4	Queries using GroupBy,OrderBy,andHavingClauses
C217.5	Queries on Joins and CorrelatedSub-Queries
C217.6	Queries on Controlling Data:Commit,Rollback,andSavepoint

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO2	PSO3
C217.1	3	3	2	-	2	2.00	-	-	-	-	2.00	2	-	-	2
C217.2	3	3	2	-	2	2.00	-	-	-	-	2.00	2	-	2	-
C217.3	3	2	2	-	2	-	-	-	-	-	2.00	2	3	-	2
C217.4	3	3	3	-	2	-	-	-	-	-	2.00	2	-	-	-
C217.5	3	3	2	-	2	-	-	-	-	-	-	2	3	-	-
C217.6	3	3	2	-	2	-	-	-	-	-	2.00	2	-	3	-

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Subject Name	Vector calculus, Transform Techniques and Partial Differential Equations	C211

Course Code	Course Outcome
C211.1	Interpret the physical meaning of different operators such as gradient, cur land divergence
C211.2	Estimate the work done against a field, circulation and flux using vector calculus (L5)
C211.3	Apply the Laplace transform for solving differential equations (L3)
C211.4	Find or compute the Fourier series of periodic signals (L3)
C211.5	Knowandbe able to apply integral expressions for the forwards and inverse Fourier transform to arrange of non-periodic wave forms (L3)
C211.6	Identify solution methods for partial differential equations that model physical processes (L3)

Course Code	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	PSO 3
C211.1	3	3	2	2	-	-		-	-	-	-	-	-	-	-
C211.2	3	3	2	2	-	-		-	-	-	-	-	-	-	-
C211.3	3	3	2	2	-	-		-	-	-	-	-	-	-	-
C211.4	3	3	2	2	-	-		-	-	-	-	-	-	-	-
C211.5	3	3	2	2	-	-		-	-	-	-	-	-	-	-
C211.6	3	3	2	2	-	-		-	-	-	-	-	-	-	-

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Subject Name	INTERNET OF THINGS	C215

Course Code	Course Outcome
C215.1	Understand Device-processor communication models & protocols
C215.2	Understand the application areas of IOT.
C215.3	Visualize the effect of internet on Mobile Devices, Cloud & Sensor Networks.
C215.4	Acquire programming experience with Raspberry Pi kit to interface various devices.
C215.5	Implement Programming models for IoT Cloud Environment

Course Code	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	PSO 3
C215.1	2	0	-	-	2.00	-	-	-	2.00	-	-	-	-	-	-
C215.2	-	-	-	2	-	-	2	-	-	-	-	2.00	-	-	-
C215.3	2	-	-	3	-	-	-	3	2	3	-	3	-	-	-
C215.4	-	-	-	3	-	-	-	3	-	-	-	2	-	-	-
C215.5	2	-	-	-	-	-	-	2	-	2	-	3	-	-	-

Subject Name	IOT LAB	C218

Course Code	Course Outcome
C218.1	Understand the application areas of IOT.
C218.2	Understand building blocks of Internet of Things and characteristics.
C218.3	Understand enabling technologies Embedded Devices and communication protocols for Handson activities.
C218.4	Write programs using Python for processing Internet of Things

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO 3
C218.1	3	3	2	2	-	-	2	-	-	-	-	-	3.00	2.00	2.00
C218.2	3	3	2	2	-	-	3	-	-	-	-	-	3.00	2.00	2.00
C218.3	3	3	2	2	-	-	2	-	-	-	-	-	3.00	2.00	2.00
C218.4	3	3	2	2	-	-	2	-	-	-	-	-	3.00	2.00	2.00

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Subject Name	Python Programming	C212

Course Code	Course Outcome
C212.1	Experience with an interpreted Language and to build software for real needs
C212.2	Use basic Decision structures, Boolean logic, variable types, assignments and operators.
C212.3	Describe and use of Python lists, dictionaries, tuples and sets.
C212.4	Implement methods and functions to improve readability of programs
C212.5	Describe and apply object-oriented programming methodology, top-down concepts in algorithm design.

Course Code	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	PSO 3
C212.1	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C212.2	1	2	2	1	-	-	3	-	-	-	-	-	-	-	-
C212.3	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C212.4	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C212.5	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-

Subject Name	PYTHON PROGRAMMING LAB	C216

Course Code	Course Outcome
C216.1	Experience with an interpreted Language and to build software for real needs
C216.2	Use basic Decision structures, Boolean logic, variable types, assignments and operators.
C216.3	Describe and use of Python lists, dictionaries, tuples and sets.
C216.4	Implement methods and functions to improve readability of programs
C216.5	Describe and apply object-oriented programming methodology, top-down concepts in algorithmdesign.
C216.6	Design, code ,test and debug python language programs

Course Code	CO-PO & PSO Relevance Matrix														
	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
C216.1	3	3	2	-	2	-		-	-	-	-	-	3.00	3.00	2.00
C216.2	3	3	2	-	2	-		-	-	-	-	-	3.00	2.00	-
C216.3	3	2	2	-	2	-		-	-	-	-	-	3.00	3.00	2.00
C216.4	3	3	3	-	2	-		-	-	-	-	-	3.00	3.00	-
C216.5	3	3	2	-	2	-		-	-	-	-	-	3.00	3.00	-
C216.6	3	3	2	-	2	-		-	-	-	-	-	3.00	3.00	-

Subject Name	PROBABILITY AND STATISTICS	C221

Course Code	Course Outcome
C221.1	Classify the concepts of data science and its importance
C221.2	Interpret the association of characteristics and through the correlation and Regression tools
C221.3	Make us of the concepts of probability and their applications
C221.4	Apply discrete and Continuous probability distributions
C221.5	Design the components of a classical hypothesis test
C221.6	Infer the statistical inferential methods based on small and large sampling tests

Course Code	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
C221.1	1	2	1	2	-	-		-	-	-	-	2.00	2.00	-	2.00
C221.2	1	2	2	1	-	-		-	-	-	-	2.00	2.00	-	2.00
C221.3	1	2	1	2	-	-		-	-	-	-	2.00	2.00	-	2.00
C221.4	1	2	1	2	-	-		-	-	-	-	2.00	2.00	2.00	2.00
C221.5	1	2	1	2	-	-		-	-	-	-	2.00	2.00	-	2.00
C221.6	2	3	2	2	-	-		-	-	-	-	2.00	2.00	-	2.00

Subject Name	Formal Languages and Automata Theory	C225

Course Code	Course Outcome
C225.1	Able to use basic concepts of formal languages of finite automata techniques
C225.2	Student able to design Finite Automata's for different Regular Expressions andLanguages
C225.3	Construct context free grammar for various languages
C225.4	Solve various problems of applying normal form techniques, push down automata and Turing Machines
C225.5	Participate in GATE, PGECET and other competitive examinations

Course Code	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	PSO 3
C225.1	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C225.2	1	2	2	1	-	-	3	-	-	-	-	-	-	-	-
C225.3	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C225.4	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C225.5	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-

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Subject Name	OPERATING SYSTEMS	C224

Course Code	Course Outcome
C224.1	Understand the important computer system resources and the structure and functioning of operating system.
C224.2	Understand process management policies and scheduling of processes by CPU.
C224.3	Evaluate the requirement for process synchronization and coordination handled by operatingsystem. Describe and analyze the memory management and its allocation policies.
C224.4	Understand demand paging, thrashing and principles of deadlocks.
C224.5	Understand File system Interface, File System implementation, Mass-storage structure and Disk scheduling algorithms.

Course Code	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	PSO 2	PSO 3
C224.1	3	3	2	-	-	-	-	-	-	-	-	2	2		
C224.2	3	3	2	-	-	-	-	-	-	-	-	2	2		
C224.3	3	2	2	-	-	-	-	-	-	-	-	2	2		
C224.4	3	3	3	-	-	-	-	-	-	-	-	2	2		
C224.5	3	3	2	-	-	-	-	-	-	-	-	2	2.00		

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Subject Name	WEB TECHNOLOGIES LAB	C226

Course Code	Course Outcome
C226.1	Createawebsitestaticallyordynamically
C226.2	Getknowledgeon displayingand decoratingthecontentsin awebpage.
C226.3	Learntheconceptsofstoreandtransportthedataamongwebpages
C226.4	Createobjectswithwhichtheclientcancommunicatewithserver.
C226.5	Generatestaticordynamiccontentaccordingtotheclient'srequest
C226.6	ProvideUser Authentication byusingcookiesand back end operations usingJDBC and PHP

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO 3
C226.1	3	3	2	-	2	-	-	-	-	-	-	2	-	-	-
C226.2	3	3	2	-	2	-	-	-	-	-	-	2	-	-	-
C226.3	3	2	2	-	2	-	-	-	-	-	-	2	-	-	-
C226.4	3	3	3	-	2	-	-	-	-	-	-	2	-	-	-
C226.5	3	3	2	-	2	-	-	-	-	-	-	2	-	-	-
C226.6	3	3	2	-	2	-	-	-	-	-	-	2	-	-	-

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Subject Name	SOFTWARE ENGINEEEING	C223

Course Code	Course Outcome
C223.1	Understand the basic concepts of Software engineering and applications
C223.2	Compare different software engineering process models
C223.3	Analyze the principles of requirement Engineering
C223.4	Create design models for software Engineering projects
C223.5	Apply different testing techniques

Course Code	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
C223.1	3	3	2	-	-	-	-	-	-	-	-	2	-	3.00	-
C223.2	3	3	2	-	-	-	-	-	-	-	-	2	-	3.00	-
C223.3	3	2	2	-	-	-	-	-	-	-	-	2	-	3.00	-
C223.4	3	3	3	-	-	-	-	-	-	-	-	2	-	3.00	-
C223.5	3	3	2	-	-	-	-	-	-	-	-	2	-	3.00	-

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Subject Name	SOFTWARE ENGINEEEING LAB	C227

Course Code	Course Outcome
C227.1	Ability to translate end-user requirements into system and software requirements
C227.2	Analyze the principles of requirement Engineering
C227.3	Ability to generate a high-level design of the system from the software requirements
C227.4	Create design models for software Engineering projects
C227.5	Will have experience and/or awareness of testing problems and will be able to develop a simple testing

Course Code	CO-PO & PSO Relevance Matrix														
	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
C227.1	2	2	2	2	-	-	2	-	-	-	-	-	-	3.00	-
C227.2	2	2	1	-	-	-	3	-	-	-	-	-	-	3.00	-
C227.3	2	2	1	-	-	-	2	-	-	-	-	-	-	3.00	-
C227.4	2	1	-	1	-	-	2	-	-	-	-	-	-	3.00	-
C227.5	2	2	1	2	-	-	1	-	-	-	-	-	-	3.00	-

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Subject Name	Operating Systems &Unix programming Lab	C228

Course Code	Course Outcome
C228.1	Students able to implement CPU scheduling algorithms ,File Organization techniques and pagingtechniques
C228.2	Students able to write shell scripts in Linux platform.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C228.1	2	2	2	2	-	-	2	-	-	-	-	-	-	-	-
C228.2	2	2	2		-	-	3	-	-	-	-	-	-	-	-

Subject Name	Web Application Development Using Full Stack – Frontend Development – Module - I	C219

Course Code	Course Outcome
C219.1	Analyze a web page and identify its elements and attributes
C219.2	Demonstrate the important HTML tags for designing static pages and separate design from contentusing Cascading Style sheet
C219.3	Implement MVC and responsive design to scale well across PC, tablet and Mobile Phone
C219.4	Create web pages using HTML and Cascading Style Sheets

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO 3
C219.1	2	2	2	2	-	-	2	-	-	-	-	-	-	-	-
C219.2	2	2	2		-	-	3	-	-	-	-	-	-	-	-
C219.3	2	2	1.00		-	-	2	-	-	-	-	-	-	-	-
C219.4	2	1		1	-	-	2	-	-	-	-	-	-	-	-

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Subject Name	Web Technologies	C222

Course Code	Course Outcome
C222.1	Student able to Implement and design webbased applications using features of HTML
C222.2	Implement webbased applications using features of XML
C222.3	Student will Apply the concepts of server side technologies for dynamic web applications
C222.4	Ability to design the webbased applications using effective database access with rich client interaction
C222.5	Abilityto Develop reusable component for Graphical User Interface applications

Course Code	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	PSO 3
C222.1	1	2	1	2	-	-	3	-	-	-	-	-	3.00	2.00	3.00
C222.2	1	2	2	1	-	-	3	-	-	-	-	-	3.00	-	3.00
C222.3	1	2	1	2	-	-	3	-	-	-	-	-	3.00	2.00	3.00
C222.4	1	2	1	2	-	-	3	-	-	-	-	-	3.00	-	3.00
C222.5	1	2	1	2	-	-	3	-	-	-	-	-	3.00	-	3.00

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Subject Name	APPLIED CHEMISTRY	C113

Course Code	Course Outcome
C113.1	Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers
C113.2	Predict potential complications from combining various Chemicals, metals in engineering setting and categorize materials science relevant to corrosion phenomena
C113.3	Apply new materials with excellent engineering properties to take care of society needs and environment
C113.4	Analyze the principles of different analytical instrumentation and applications
C113.5	Design models for energy by different natural sources
C113.6	Understand the knowledge of computational chemistry and molecular machines

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C113.1	1	2	1	2			3								
C113.2	1	2	2	1			3								
C113.3	1	2	1	2			3								
C113.4	1	2	1	2			3								
C113.5	1	2	1	2			3								
C113.6	2	3	2	2			2								

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Subject Name	PROFESSIONAL COMMUNICATION	C111

Course Code	Course Outcome
C111.1	Use grammar accurately in various formal and functional contexts.
C111.2	Build good vocabulary and develop the ability to use in various contexts.
C111.3	Comprehend, analyze and evaluate texts critically.
C111.4	Develop effective reading and writing skills to enhance communicative competence.
C111.5	Help the students to inculcate and apply human values and professional ethics in their academic, professional and social liv
C111.6	Read texts for pleasure and analyse them critically

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS
C111.1	-	-	-	-	-	-	-	-	1.00		-	-	-	-	
C111.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
C111.3	-	-	-	-	-	-	-	1.00	-	2.00	-	1.00	-	-	
C111.4	-	-	-	-	-	-	-	1.00	-	2.00	-	1.00	-	-	
C111.5	-	-	-	-	-	3.00	3.00	1.00	3.00	2.00	-	2.00	-	-	
C111.6	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	

Subject Name	APPLIED CHEMISTRY LAB	C128

Course Code	Course Outcome
C128.1	Engineering students should understand the basic laboratory fundamentals and its knowledge and analysis of substances can solve few problemsof the society
C128.2	Neutralization reaction between acids & bases and alkalinity of water is performed by the engineering students to gain the knowledge in neutralization process.
C128.3	Redox reactions are the most observed reactions in chemistry &nature and the students are exposed to such reaction
C128.4	Complexometricreactions are carried out as experiments by the students and learn to solve some of the engineering problems
C128.5	Students should understand different ions in the environment,their identification & estimation which enables them to assess the environmental problems.
C128.6	Conductivity and potentials are used in analysis of materials and budding engineers should be able to develop and analyze the materials

Course Code	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
C128.1	2	2	2	2.00	-	-	1	-	-	-	-	-	-
C128.2	2	2	1		-	-	3	-	-	-	-	-	-
C128.3	2	2	1.00		-	-	1.00	-	-	-	-	-	-
C128.4	2	1		1.00	-	-	1	-	-	-	-	-	-
C128.5	2	2	1	2.00	-	-	2	-	-	-	-	-	-
C128.6	2	1	1	1.00	-	-	1	-	-	-	-	-	-

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Subject Name	ENGINEERING MATHEMATICS-I	C112

Course Code	Course Outcome
C112.1	Student will be able to solve the linear system of homogeneous and non-homogeneous equations by applying using technology to facilitate row reduction determine the rank
C112.2	Student will be able to write Eigen values and eigenvectors, diagonal form and different factorizations of a matrix .identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics
C112.3	Students will be able to find an approximate root of algebraic and transcendental equations by applying Bisection, Regula-Falsi, Iteration and Newton-rap son methods. find the function values without knowing function by applying interpolation(equal/unequal) techniques with the help of data..
C112.4	Students will be able to evaluate the definite integrals without knowing integrand by Trapezoidal, Simpson's 1/3rd & 3/8th rules. solve initial value ordinary differential equations by applying Taylor's series, Pickard's, Euler's, Modified Euler's & Runge-Kutta methods
C112.5	Student will be able to find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. .acquire the Knowledge maxima and minima of functions of several variable . Utilize Jacobean of a coordinate transformation to deal with the problems in change of variables
C112.6	Student will be able to examine the properties of Laplace transformation . apply the Laplace and inverse Laplace transformations for different types of functions . evaluate ordinary differential equations by using Laplace transformation technique

Course Code	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C112.1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C112.2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C112.3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C112.4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C112.5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C112.6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Subject Name	ENVIRONMENTAL SCIENCES	C117

Course Code	Course Outcome
C117.1	Illustrate the importance of sustainability in the progress of a nation. (L2)
C117.2	Infer the existence of ecosystems in maintaining ecological balance. (L2)
C117.3	Recall the importance of biodiversity and its conservation. (L1)
C117.4	Summarize the role of natural resources for the sustenance of life on earth and recognize the need to conserve them. (L2)
C117.5	Identify the environmental pollutants and the abatement devices to be used. (L3)
C117.6	Interpret environmental related acts and social issues. (L2)

Course Code	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
C117.1		2	3				3	-	-	-	-	2.00	-	-	-
C117.2		2	1				3	-	-	-	-	2.00	-	-	-
C117.3		2	1				3	-	-	-	-	2.00	-	-	-
C117.4		2	3				3	-	-	-	-	2.00	-	-	-
C117.5		2	1				3	-	-	-	-	2.00	-	-	-
C117.6		2	1				3	-	-	-	-	2.00	-	-	-

Subject Name	ENGINEERING MATHEMATICS-II	C121

Course Code	Course Outcome
C121.1	Student will be able to find the General/Particular solutions of first order and first degree ordinary differential equations by apply different methods.find orthogonal trajectories of the given family of curves.
C121.2	Student will be able to identify the essential characteristics of linear differential equations with constant coefficients .solve the linear differential equations with constant coefficients by appropriate method
C121.3	Student will be able to evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates. Evaluate areas bounded by region by apply double integration techniques .evaluatevolume of solids by apply triple integration techniques
C121.4	Student will be able to find length of the arc, volume of solid of revolution and surface area of solid of revolution.
C121.5	Student will be able to apply del to Scalar and vector point functions .illustrate the physical interpretation of Gradient, Divergence and Curl
C121.6	Student will be able find the work done in moving a particle along the path over a force field .evaluate the rates of fluid flow along and across curves. Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals

Course Code	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	PSO 3
C121.1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C121.2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C121.3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C121.4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C121.5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C121.6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Subject Name	DIGITAL LOGIC DESIGN	C123

Course Code	Course Outcome
C123.1	To define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
C123.2	To understand the different switching algebra theorems and apply them for logic functions
C123.3	To develop and define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
C123.4	To analyse various combinational logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.
C123.5	To analyse and design various sequential circuits like latches and flip flops
C123.6	To analyse and design sequential circuits like registers and counters.

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C123.1	3	3											-	-	-
C123.2	3	3	3										-	-	-
C123.3													-	-	-
C123.4													-	-	-
C123.5	2	3	3	3								3.00	-	-	-
C123.6		2	2				3						-	-	-

Subject Name	APPLIED PHYSICS	C122

Course Code	Course Outcome
C122.1	Apply the interaction of light with matter through interference, diffraction, polarization and identify these phenomena in different natural optical processes and optical instruments.
C122.2	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications.
C122.3	Interpret the knowledge of dielectric and magnetic materials with characteristic utility in appliances.
C122.4	Apply the knowledge of basic quantum mechanics, to set up one dimensional Schrodinger's wave equation and its application to a infinite potential well.
C122.5	Summarize the importance of free electrons in determining the properties of metals and understand the origin & role of energy bands in classifying the solids
C122.6	Understand the physics of Semiconductors and their working mechanism for their utility in sensors.

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C122.1	2	2						-	-	-	-	-	-	-	-
C122.2	2	2						-	-	-	-	-	-	-	-
C122.3	2	2						-	-	-	-	-	-	-	-
C122.4	2	2						-	-	-	-	-	-	-	-
C122.5	2	2						-	-	-	-	-	-	-	-
C122.6	2	2						-	-	-	-	-	-	-	-

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Subject Name	Programming and Problem solving with C	C115

Course Code	Course Outcome
C115.1	Understand the programming terminology and implement various c-tokens & input-output statements to solve simple problems
C115.2	Able to compare and differentiate various looping & branching constructs and apply the best looping structure for a given problem
C115.3	Identify the necessity of modularity in programming and design various function types
C115.4	Understand pointers and implement the programs to directly access memory locations
C115.5	Interpret and implement the need of arrays and structure/union to store homogeneous and heterogeneous groups of data
C115.6	Contrast the need of using files in programming and implement file operations

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C115.1	3	3	2	-	-	-	-	-	-	-	-	2	3.00	-	3.00
C115.2	3	3	2	-	-	-	-	-	-	-	-	2	3.00	2.00	-
C115.3	3	2	2	-	-	-	-	-	-	-	-	2	3.00	2.00	-
C115.4	3	3	3	-	-	-	-	-	-	-	-	2	3.00	2.00	-
C115.5	3	3	2	-	-	-	-	-	-	-	-	2	3.00	-	-
C115.6	3	3	2	-	-	-	-	-	-	-	-	2	3.00	-	-

Subject Name	APPLIED PHYSICS LAB	C126

Course Code	Course Outcome
C126.1	Understand principle, concept, working of an instrument and can compare results with theoretical calculations.
C126.2	Analyze the physical principle involved in the various instruments; also relate the principle to new application.
C126.3	Understand design of an instrument with targeted accuracy for physical measurements.
C126.4	Develop skills to impart practical knowledge in real time solution.
C126.5	Acquires the Practical knowledge in the areas of optics, mechanics, Electricity and magnetism.
C126.6	Think innovatively and also improve the creative skills that are essential for engineering.

Course Code	CO-PO & PSO Relevance Matrix														
	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	PSO 3
C126.1		2		2.00	3.00				3.00						
C126.2		2		2.00	3.00				3.00						
C126.3		2		2.00	3.00				3.00						
C126.4		2		2.00	3.00				3.00						
C126.5		2		2.00	3.00				3.00						
C126.6		2		2.00	3.00				3.00						

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Subject Name	Communicative English lab-2	C129

Course Code	Course Outcome
C129.1	Attain better understanding of the nuances of english language to put into use in various situation and events.
C129.2	Aware of the need of pronunciation and intonation in improving their speaking skills
C129.3	Understand the importance of communication skills and instill the need for life -long learning
C129.4	Enchance their employability skills and critical thinking skillsnwith participation in group discussion
C129.5	Communication and present their ideas and sources accurately and effectively
C129.6	Acquire speaking skills with clarity and confidence which in turn enchances their employability skills.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO 2	PSO 3
C129.1				-	-	-	1	-	1.0 0	1.00	-	-	-	-	-
C129.2				-	-	-		-		-	-	-	-	-	-
C129.3				-	-	-	3.00	-	2.0 0	2.00	-	-	-	-	-
C129.4				-	-	3.00	1	1.0 0	3.0 0	2.00	-	2.00	-	-	-
C129.5				-	-	-	1	1.0 0	2.0 0		-	1.00	-	-	-
C129.6				-	-	-		-	1.0 0	1.00	-	1.00	-	-	-

Subject Name	Programming and Problem Solving With C Lab	C117

Course Code	Course Outcome
C117.1	Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables
C 117.2	Exercise conditional and iterative statements to inscribe C programs
C117.3	Exercise user defined functions to solve real time problems
C117.4	Inscribe C programs using Pointers to access arrays, strings and functions
C117.5	Inscribe C programs using pointers and allocate memory using dynamic memory management functions
C117.6	Exercise user defined data types including structures and unions to solve problems
C117.7	Exercise files concept to show input and output of files in C

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C117.1	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C 117.2	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C117.3	3	2	2	-	2	-	-	-	-	-	-	2	3	2	-
C117.4	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-

C117.5	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C117.6	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C117.7	3	3	2	-	2							2	3	2	

Subject Name	OOPS THROUGH JAVA	C124

Course Code	Course Outcome
C124.1	Understand the concepts of object oriented programming
C 124.2	Able to **understand** the use of abstract classes and Packages in java.
C124.3	Exercise user defined functions to solve real time problems Implement Exception Handling techniques and multiple inheritance through interfaces
C124.4	Able to understand multithreaded applications with synchronization
C124.5	IDevelop Graphical user interface applications using Swing and Applet Components

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C124.1	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C 124.2	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C124.3	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-
C124.4	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-
C124.5	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-

Subject Name	Data Structures	C125

Course Code	Course Outcome
C125.1	Ability to illustrate the concepts of algorithm apply the learning concepts to design data structure for the given problem definition
C125.2	Analyze and implement operations on linked list and demonstrate their applications
C125.3	Ability to design applications using stacks and queues and implements various types of Queues
C125.4	Ability to analyze and implement operations on trees
C125.5	Ability to demonstrate various operations on binary search trees and its applicAtions

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C125.1	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C125.2	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C125.3	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-
C125.4	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-
C125.5	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-

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Subject Name	Data Structures LAB	C128

Course Code	Course Outcome
C128.1	Implement different searching and sorting techniques. Compare different searching and sorting techniques.
C 128.2	Design linear data structures stacks, queues and linked lists.
C128.3	Design nonlinear data structures trees and Graphs, and implement their operations
C128.4	Be capable to identity the appropriate data structure for given problem
C128.5	Have practical knowledge on the applications of data structures

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C128.1	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C 128.2	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C128.3	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-
C128.4	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-
C128.5	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-

Subject Name	OOPS Through JAVA Lab	C127

Course Code	Course Outcome
C127.1	Understand the concepts of object oriented programming
C 127.2	Implement Exception Handling techniques and multiple inheritance through interfaces.
C127.3	Apply thread capabilities and Collections framework.
C127.4	Develop Graphical user interface applications using Swing and Applet Components.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C127.1	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C 127.2	3	3	2	-	2	-	-	-	-	-	-	2	3	2	-
C127.3	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-
C127.4	3	3	3	-	2	-	-	-	-	-	-	2	3	2	-

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Subject Name	Design and Analysis of Algorithms	C313

C313.1	Analyze worst-case running times of algorithms using asymptotic analysis and components
C313.2	Describe the divide and conquer method explains when an algorithmic design situation demands it.
C313.3	Describe the greedy method explains when an algorithmic design situation demands it.
C313.4	Describe the dynamic-programming paradigm explains when an algorithmic design demands it.
C313.5	Describe the back tracking method explains when an algorithmic design demands it.
C313.6	Describe the branch and bound paradigm and deterministic methods e-plain when an algorithmic design demands it.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12	PSO1	PSO2	PSO3
C313.1	3	-	2	-	2	-	-	-	-	2	-	-	3	-	-
C313.2	3	2	-	2	-	-	-	-	2	-	2	-	3	3	-
C313.3	3	-	2	-	-	-	-	2	-	-	-	-	3	3	-
C313.4	3	2	-	2	-	-	-		-	-	-	-	3	2	-
C313.5	3	-	2	-	2	-	-	2	2	2	-	-	3	-	2
C313.6	3	-	3	3	-	-	-	-	-	-	-	-	3	3	3

Subject Name	Artificial Intelligence	C311

Course Code	Course Outcome
C311.1	Possess the ability to formulate an efficient problem space for a problem expressed in English.
C311.2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
C311.3	Possess the skill for representing knowledge using the appropriate technique
C311.4	Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing
C311.5	Apply the knowledge to develop the solutions for real life problems CO6 Develop new algorithms to contribute to the research arena

Course Code	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C311.1	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C311.2	1	2	2	1	-	-	3	-	-	-	-	-	-	-	-
C311.3	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C311.4	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C311.5	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-

Subject Name	Computer Networks	C312

Course Code	Course Outcome
C312.1	Able to understand OSI and TCP/IP models.
C312.2	Understand data link layer protocols and flow control
C312.3	Understand routing and network layer protocols and IPV4
C312.4	Understand transport layer congestion, flow control and protocols
C312.5	Understand application layer protocols

Course Code	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C312.1	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C312.2	1	2	2	1	-	-	3	-	-	-	-	-	-	-	-
C312.3	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C312.4	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-
C312.5	1	2	1	2	-	-	3	-	-	-	-	-	-	-	-

Subject Name	Software Testing Methodologies	C315

Course Code	Course Outcome
C315.1	Able To Understand Basic Testing Concepts, Testing Techniques And Strategies
C315.2	Have Basic Understanding And Knowledge Of Contemporary Issues Like Component AndInterface Testing.
C315.3	Able To Support In Generating Test Cases And Test Suites
C315.4	Have Basic Understanding And Knowledge About Graphs And Matrix Relations, ApplyTesting Methods And Tools

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C315.1	2	3	2		-	-		-	3.00	2.00	-	-	-	-	3.00
C315.2			3		3.00	-		-	2.00	2.00	-	2.00	-	-	3.00
C315.3	3		3		-	-	2	2.00	-	-	-	-	-	-	3.00
C315.4	2	2	2		3.00	-		-	3.00	2.00	-	2.00	-	-	3.00

Subject Name	Computer Networks Lab	C316

Course Code	Course Outcome
C316.1	Should be able to Calculate Data link layer farming methods like bit stuffing and byte stuffing.
C316.2	Should be able to Analyze Cyclic redundancy check on different polynomials.
C316.3	Should be able to understand Socket Programming Implementation by using TCP and UDP Protocols.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	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
C316.1	3	3	3	3	-	-		-	-	-	-	3.0	3.0	-	-
C316.2	2	2	2		-	-		-	-	-	-	3.0	3.0	-	3.00
C316.3	3	3	3.0		-	-		-	-	-	-	3.0	-	-	-
Average	2.67	2.67	2.67	1.00	-	-	-	-	-	-	-	3.00	3.0	-	3.00

Subject Name	Artificial Intelligence Lab

Course Code	Course Outcome
C317.1	Elicit, analyze and specify software requirements.
C317.2	Simulate given problem scenario and analyze its performance.
C317.3	Develop programming solutions for given problem scenario.

Course Code	CO-PO & PSO Relevance Matrix														
	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
C317.1	3	-	2	-	-	-	2	-	-	2	-	-	-	-	-
C317.2	3	2	-	-	-	-	3	-	2	-	2	-	-	-	-
C317.3	3	-	-	-	-	-	2	2	-	-	-	-	-	-	-
Average	**3.00**	**2.00**	**2.00**	-	-	-	**2.80**	**2.00**	**2.00**	**2.00**	**2.00**	-	-	-	-

Subject Name	DEVOP LAB	C318

Course	Course Outcome

Code	
C318.1	Realize the importance of agile software development practices in determining the requirements for a software system
C318.2	Analyze and execute iterative software development processes to manage software development activities.
C318.3	Apply a systematic understanding of Agile principles and defined practices for a specific circumstance or need.
C318.4	Examine the impact of DevOps in the successful completion of software development by improving team collaboration and software quality.
C318.5	Perform software process improvement by applying DevOps capabilities at enterprise level.

Course Code	CO-PO & PSO Relevance Matrix														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C318.1	2	2	-	-	-	-	2	-	2	-	-	3	3.00	3.00	3.00
C318.2	2	3	2	3	-	-	3	-	-	-	2	3	3.00	2.00	2.00
C318.3	2	2	3	3	2	-	2	-	-	-	2	-	3.00	2.00	2.00
C318.4	2	-	2	2	2	-	2	-	-	-	-	3	3.00	2.00	2.00
C318.5	2	-	2	2	2	-	1	-	-	-	2	3	3.00	3.00	3.00

Subject Name	Employability Skills-I	C319

Course Code	Course Outcome
C319.1	Establish effective communication with employers, supervisors, and co-workers
C319.2	Identify to explore their values and career choices through individual skill assessments
C319.3	Adapts positive attitude and appropriate body language
C319.4	Interpret the core competencies to succeed in professional and personal life

Course Code	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 3
C319.1	-	-	-	-	-	-	-	2	-	2	-	-	-	-
C319.2	-	-	-	-	-	-	-	2	-	2	-	-	-	-
C319.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C319.4	-	-	-	-	-	-	-	2	-	2	2	2.00	-	-

Course Code	Course Outcome
C322.1	To use the knowledge of patterns, tokens & regular expressions for solving a problem.
C322.2	To apply the knowledge of lex tool & yacc tool to develop a scanner & parser.
C322.3	To write the new code optimization techniques to improve the performance of a program in terms of speed & space.
C322.4	To employ the knowledge of modern compiler & its features.
C322.5	To participate in GATE, PGECET and other competitive examinations

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C322.1	3	3	2	3	3	-	-	-	-	-	-	-	3	2	0
C322.2	2	3	3	2	2	2	-	-	-	2	2	-	3	2	0
C322.3	3	3	3	3	3	2	-	-	-	2	-	-	3	2	2
C322.4	3	2	3	2	3	-	-	-	-	-	-	-	3	2	0
C322.5	3	3	3	1	-	-	1	-	-	2	-	-	3	2	0

Subject Name	Machine Learning	C321

Course Code	Course Outcome
C321.1	Understanding the machine learning basics and how data is preprocessed
C321.2	How linear models help in prediction
C321.3	Distance based models complexity
C321.4	Probabilistic models understanding
C321.5	Nonlinear models and ensembles improve efficiency

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C321.1	3	2	2	-	-	-	-	-	-	-	-	-	3.00	3.00	-
C321.2	3	2	2	2	-	-	-	-	-	-	-	-	2.00	3.00	-
C321.3	2	2	3	2	-	-	-	-	-	-	-	-	3.00	3.00	3.00
C321.4	3	3	2	-	-	-	-	-	-	-	-	-	3.00	3.00	-
C321.5	2	2	3	2	2.00	2	-	-	-	-	-	-	3.00	3.00	-

Subject Name	Cryptography and Network Security	C323

Course Code	Course Outcome
C323.1	Understand the principles of cryptography and security, with enciphering Techniques and analyze a variety of threats and attacks.
C323.2	Distinguish the black ciphers and stream ciphers and apply them on a various symmetric cryptographic technique.
C323.3	Understand the principle and mathematical models used in public-key cryptosystems by applying them on different (various) types of algorithms.
C323.4	Analyze the message authentication functions with its types and digital certifications for secure communication.
C323.5	Understand the user authentications principles and security approach at both the web and email.
C323.6	Understand the concept of IP Security with its services and dealing with the prevention and detection of intrusions.

Course Code	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C323.1	3	2	-	-	-	2	-	1	-	-	-	1	3	1	1
C323.2	3	3	1	2	1	2	-	1	-	-	-	1	3	1	1
C323.3	3	3	-	1	1	1	-	1	-	-	-	1	3	2	-
C323.4	3	3	-	2	1	1	-	1	-	-	-	1	3	2	1
C323.5	3	2	1	2	1	1	-	1	-	-	-	1	3	1	1
C323.6	3	2	-	2	1	1	-	1	-	-	-	1	3	2	1

Subject Name	OBJECT ORIENTED ANALYSIS AND DESIGN	C325

Course Code	Course Outcome
C325.1	Analyse, design, document the requirements through use case driven approach
C325.2	Identify, analyse, and model structural concepts of the system
C325.3	Develop,explore the conceptual model into various scenarios and applications.
C325.4	Apply the concepts of architectural design for deploying the code for software.
C325.5	Identify, analyse, and model Architectural concepts of the system

Course Code	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C325.1	2	2	2		2						2	-	-	3.00
C325.2	3	3	3							2	2	-	-	2.00
C325.3	3	3			3	2				2	2	2.00	-	3.00
C325.4	2	2	3		2	2				2	3	-	-	2.00
C325.5	3	3	3		2	3				2	2	-	-	3.00

Subject Name	Machine Learning Lab	C326

Course Code	Course Outcome
C326.1	Should be able to do data cleaning and data preprocessing
C326.2	Should be able to apply imbalanced data sets accuracy
C326.3	Should be able to apply machine learning techniques to large data sets

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C326.1	2	2	-	2	-	-	2	-	-	-	-	-	3.00	3.00	-
C326.2	-	2	2	-	-	-	3	-	-	-	2	2	2.00	3.00	3.00
C326.3	2	-	-	2	2	-	2	-	-	-	2	2	3.00	3.00	-
Average	-	-	-	-	-	-	-	-	-	-	-	-	2.67	3.00	3.00

Subject Name	R Programming lab	C327

Course Code	Course Outcome
C327.1	Perform basic 'R' operations.
C327.2	Understand the Sorting and Searching techniques.
C327.3	Perform Statistical functions on datasets.
C327.4	Apply Classification and Regression techniques.
C327.5	Perform Clustering.

Course Code	CO-PO & PSO Relevance Matrix														
	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
C327.1	3	3	-	-	3.00	-	2	-	-	-	-	-	3.00	3.00	-
C327.2	3	2	3	-	2.00	-	3	-	-	-	-	-	3.00	3.00	-
C327.3	2	2	3	-	-	-	2	-	-	-	-	-	2.00	2.00	-
C327.4	3	3	2	2	3.00	-	2	-	-	-	-	-	3.00	3.00	-
C327.5	2	3	3	3	3.00	-	1	-	-	-	-	-	2.00	3.00	-

Subject Name	Complier Design Lab	riit/c328in

Course Code	Course Outcome
C328.1	To use the knowledge of patterns, tokens & regular expressions for solving a problem.
C328.2	To apply the knowledge of lex tool & yacc tool to develop a scanner & parser.
C328.3	To write the new code optimization techniques to improve the performance of a program in terms of speed & space.
C328.4	To employ the knowledge of modern compiler & its features.
C328.5	To participate in GATE, PGECET and other competitive examinations

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C328.1	3	3	2	--	3	-		-	-	-	-	-	3.00	-	-
C328.2	3	2	3	--	2	-		-	-	-	-	-	2.00	2.0 0	-
C328.3	2	2	3	--	--	-		-	-	-	-	-	3.00	3.0 0	-
C328.4	3	-3	2	2	2	-		-	-	-	-	-	3.00	3.0 0	-
C328.5	2	3	3	3	2	-		-	-	-	-	-	2.00	-	-

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Subject Name	MEAN STACK TECHNOLOGY -LAB	C329

Course Code	Course Outcome
C329.1	To code a MEAN Stack Application
C329.2	Developing Single Page Applications (SPAs) via MEAN Stack
C329.3	Setup routing within Angular & Express
C329.4	Write Express Back-End Web Services with Express & Node
C329.5	Employ Express Web Services
C329.6	Understanding Mongo DB

Course Code	CO-PO & PSO Relevance Matrix														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C329.1	2	2	2	2	-	-	2	-	-	-	-	-	-	-	-
C329.2	2	2	2		-	-	3	-	-	-	-	-	-	-	-
C329.3	2	2	1.0 0		-	-	2	-	-	-	-	-	-	-	-
C329.4	2	1		1	-	-	2	-	-	-	-	-	-	-	-
C329.5	2	2	1	2	-	-	1	-	-	-	-	-	-	-	-
C329.6	2	1	1	1	-	-	2	-	-	-	-	-	-	-	-

Subject Name	EMPLOYABILITY SKILLS –II	C3210

Upon successful completion of the course, the student will be able to:	
C3210.1	Recite the corporate etiquette.
C3210.2	Make presentations effectively with appropriate body language
C3210.3	Be composed with positive attitude
C3210.4	Apply their core competencies to succeed in professional and personal life

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C3210.1	2			3			2			2		2	2		
C3210.2				3					2						2
C3210.3		3				2				3				3	
C3210.4				3					2	3		2	2		

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