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

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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

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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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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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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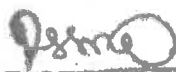URL: www.nriit.edu.in, email: principal@nriit.edu.in, Mobile: +8333882444

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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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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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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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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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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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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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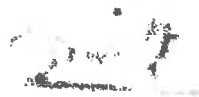URL: www.nriit.edu.in, email: principal@nriit.edu.in, Mobile: +8333882444

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Name:			
POWER ELECTRONICS LAB			
REGULATION:	NRIA20	YEAR-SEM:	III-1

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:

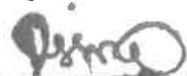### IOT APPLICATIONS OF ELECTRICAL ENGINEERING

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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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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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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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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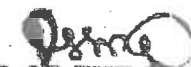**URL: www.nriit.edu.in, email: principal@nriit.edu.in, Mobile: +8333882444**

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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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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)

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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.

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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.

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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.

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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.

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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

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	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.

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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

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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.

DEPARTMENT OF MECHANICAL ENGINEERING

NRI INSTITUTE OF TECHNOLOGY

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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

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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.

DEPARTMENT OF MECHANICAL ENGINEERING

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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.

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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

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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

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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

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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.

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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.

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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

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	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.

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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

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

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.

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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.

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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

DEPARTMENT OF MECHANICAL ENGINEERING

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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.

DEPARTMENT OF MECHANICAL ENGINEERING

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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
RI Institute of Technology
POTHAVARAPPADU (Vill)
Agiripalli (Mdl), Krishna Dist

DEPARTMENT OF MECHANICAL ENGINEERING

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(AUTONOMOUS)
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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 amplifiers using 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 of operation
CO6	Apply knowledge Construct 7 Segment Display Circuit Using Decoder and 7 Segment 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 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 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.

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
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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

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| 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 |

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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

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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:

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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.

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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:

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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

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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

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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:

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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

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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

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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

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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

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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

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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.

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Course Code	Course Outcomes
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.

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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.

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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.

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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

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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	-	-

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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	PO10	PO11	PO12	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	-	-	-

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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	PO1 0	PO1 1	PO1 2	PSO 1	PS O2	PS O3
C217.1	3	3	2	-	2	2.0 0	-	-	-	-	2.00	2	-	-	2
C217.2	3	3	2	-	2	2.0 0	-	-	-	-	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	PO1 0	PO1 1	PO1 2	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	-	-	-

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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	PO1 0	PO1 1	PO1 2	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	-	-	-	-	-	-	-	-

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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	PO1 0	PO1 1	PO1 2	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	-

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Subject Name	PROBÁBILITY 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	PS O1	PS O2	PS O3
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

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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	PO1 0	PO1 1	PO1 2	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	PO1 0	PO1 1	PO1 2	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	PO10	PO11	PO12	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	PO1 0	PO1 1	PO1 2	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	PO1 0	PO1 1	PO1 2	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	-

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	-	-	-	-	-	-	-	-

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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														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	PO1 0	PO1 1	PO1 2	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	-	-	-	-	

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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	PO1	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	-	-	-

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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	PO1 0	PO1 1	PO1 2	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	2.0 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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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						-	-	-

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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	-	-

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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													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C129.1			-	-	-		1	-	1.00	1.00	-	-	-	-	-
C129.2			-	-	-			-		-	-	-	-	-	-
C129.3			-	-	-	3.00		-	2.00	2.00	-	-	-	-	-
C129.4				-	-	3.00	1	1.00	3.00	2.00	-	2.00	-	-	-
C129.5			-	-	-		1	1.00	2.00		-	1.00	-	-	-
C129.6			-	-	-			-	1.00	1.00	-	1.00	-	-	-

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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	-

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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	-

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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														
	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	PSO 2	PSO 3
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.
C128.2	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	-
C128.2	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	-

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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

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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	-	-	-	-	-	-	-	-

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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	-	-	-	-	-	-	-	-

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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

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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	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	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

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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														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	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

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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

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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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO3
C319.1	-	-	-	-	-	-	-	2	-	2	-	-	-	-
C319.2	-	-	-	-	-	-	-	2	-	2	-	-	-	-
C319.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C319.4	-	-	-	-	-	-	-	2	-	2	2	2.00	-	-

Subject Name	Compiler Design	322

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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	-

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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

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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	PO1	PO2	PO3	PO4	PO5	PO6	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

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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

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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.

CO-PO & PSO Relevance Matrix

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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 C328 in

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	2.00	-
C328.3	2	2	3	--	--	-		-	-	-	-	-	3.00	3.00	-
C328.4	3	-3	2	2	2	-		-	-	-	-	-	3.00	3.00	-
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	1.00		-	-	2	-	-	-	-	-	-	-	-
C329.4	2	1		1	-	-	2	-	-	-	-	-	-	-	-
C329.5	2	2	1	2	-	-	1	-	-	-	-	-	-	-	-
C329.6	2	1	1	1	-	-	2	-	-	-	-	-	-	-	-

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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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