

NANDHA COLLEGE OF TECHNOLOGY, ERODE-52
DEPARTMENT OF DEPARTMENTOF ELECTRICAL AND
ELECTRONICS ENGINEERING

R-2021

SEMESTER	COURSECODE	PROGRAM OUTCOMES												PROGRAM SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12	PSO1	PSO2	PSO 3
I	Professional English-I	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	3	-	-	-
	Matrices and Calculus	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
	Engineering Physics	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-	-	-
	Engineering Chemistry	2.8	1.3	1.6	1	-	1.5	1.8	-	-	-	-	1.5	-	-	-
	Problem Solving and Python Programming	2	3	3	3	2	-	-	-	-	-	2	2	3	3	-
	Problem Solving and Python Programming Laboratory	2	3	3	3	2	-	-	-	-	-	2	2	3	3	-
	Physics and Chemistry Laboratory	3	2.4	2.6	1	1	-	-	-	-	-	-	-	-	-	-
		2.6	1.3	1.6	1	1	1.4	1.8	-	-	-	-	1.3	-	-	-
	English Laboratory	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
II	Professional English-II	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-
	Statistics and Numerical Methods	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
	Physics for Electrical Engineering	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
	Basic Civil and Mechanical Engineering	2	-	-	0.2	-	-	1	2	1.2	2	-	-	-	-	-
	Engineering Graphics	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
	Electric Circuit Analysis	3	3	3	2.8	2	-	2	1	-	-	-	3	3	3	3
	Engineering Practices Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
	Electric Circuits Laboratory	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2
	Communication Laboratory	2.4	2.8	3	3	1.8	3	3	3	3	3	3	3	-	-	-
III	Probability and Complex Functions	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-
	Electromagnetic Fields	3	2	1	2	-	-	1.4	1	-	-	-	1	3	2	1
	Digital Logic Circuits	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
	Electron Devices and Circuits	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1

	Electrical Machines -I	3	3	1	1	1	-	-	1	-	-	-	1	3	3	3
	C Programming and Data Structures	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
	Electronic Devices and Circuits Laboratory	-	3	2.7	3	3	-	-	1.5	-	-	3	-	-	3	-
	Electrical Machines Laboratory –I	3	3	1	1	-	-	-	-	1	-	-	-	2.5	2.6	1.6
	C Programming and Data Structures Laboratory	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
IV	Environmental Sciences and Sustainability	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-
	Transmission and Distribution	2.8	1.8	1	1	-	1	-	1.8	-	-	-	-	3	2.4	1
	Linear Integrated Circuits	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
	Measurements and Instrumentation	3	2	3	2	3	2	-	2	-	3	-	3	3	3	3
	Microprocessor and Microcontroller	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
	Electrical Machines-II	3	3	1.6	2.3	2.6	-	-	1	-	-	-	-	3	3	2
	Electrical Machines Laboratory- II	3	3	1	1		-	-	1.5	1	-	-	2.8	3	3	1.6
	Linear and Digital Circuits Laboratory		3	1.6	3	3	-	-	1.5	-	-	3	3	2	1	2
	Microprocessor and Microcontroller laboratory	2	1	2	3		-	-	1.5	-	-	-	3	3	1	3
V	Power System Analysis	3	2.6	2.4	1.8	1.4	-	-	-	1	-	-	1	1	1	1.4
	Power Electronics	3	3	3	3		-	1.5	1	-	-	2.25	3	3	3	3
	Control Systems	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3
	Power Quality	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
	Special Electrical Machines	3	3	3	3	3	-	2.5	1	-	2.2	-	2.3	3	2.8	2.6
	Machine Monitoring System	2.4	2.2	2	2	1	1	1	1	1	1	1	1	1	2	2
	Disaster Risk Reduction And Management	3	3	3	3	-	-	2	2	-	-	2	-	2	-	1
	Power Electronics Laboratory	3	3	3	3	3	-	-	1.5	-	-	-	3	3	3	3
Control and Instrumentation Laboratory	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3	
	Protection and Switchgear	3	1	1	2	1.2	2	1	1	1	1	2	-	3	1.4	1

VI	Power System Operation and Control	2	1.6	1	1	-	1	-	1.6	-	2	-	2	3	2.2	2.86
	Embedded Control for Electric Drives	2.4	1.6	2.4	2.4	1.8	-	-	-	1	-	-	-	2	2	2.6
	Hybrid Energy Technology	3	3	3	2	3	-	-	-	-	3	-	3	3	3	3
	IOT Concepts and Applications	3	2.6	2.4	2	3	-	-	-	2.8	2.2	1.8	2.6	2.8	1.8	2.2
	Industrial Safety	3	3	3	2	1	3	2	2	3	2	1	3	3	3	3
	Power System Laboratory	3	3	2	2	3	-		2	1	2	-	3	3	3	3

1-low, 2-medium, 3-high

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

1. Find employment in Core Electrical and Electronics Engineering and service sectors.
2. Get elevated to technical lead position and lead the organization competitively.
3. Enter into higher studies leading to post-graduate and research degrees. Become consultant and provide solutions to the practical problems of co reorganization.
4. Become an entrepreneur and be part of electrical and electronics product and service industries.

	PEOs	
POs	1. Graduates will pursue higher education and/or have a successful career in industries associated with Electrical and Electronics Engineering, or as entrepreneurs.	2. Graduates will have the ability and attitude to adapt to emerging technological changes.
1. Engineering knowledge: Apply knowledge of mathematics, basic science and engineering science.	3	1
2. Problem analysis: Identify, formulate and solve engineering problems.	3	1
3. Design/development of solutions: Design an electrical system or process to improve its performance, satisfying its constraints.	3	2
4. Conduct investigations of complex problems: Conduct experiments in electrical and electronics systems and interpret the data.	3	2
5. Modern tool usage: Apply various tools and techniques to improve the efficiency of the system.	2	3
6. The engineer and society: Conduct themselves to uphold the professional and social obligations.	2	2

7. Environment and sustainability: Design the system with environment consciousness and sustainable development.	2	1
8. Ethics: Inter acting industry, business and society in a professional and ethical manner.	3	1
9. Individual and team work: Function in a multi disciplinary team.	3	2
10. Communication: Proficiency in oral and written Communication.	3	2
11. Project management and finance: Implement Cost effective and improved system.	2	2
12. Life-long learning: Continue professional development and learning as a life-long activity.	1	3

BATCH: 2021-2025

**COURSE OUTCOMES AND PROGRAM OUTCOMES:
Course Outcomes (COs)**

HS3152– PROFESSIONAL ENGLISH-I	
C101.1	To use appropriate words in a professional context
C101.2	To gain understanding of basic grammatical structures and use the min right context.
C101.3	To read and infer the denotative and connotative meanings of technical texts
C101.4	To write definitions, descriptions, narrations and essays on various topics
C101.5	Express opinions in English
MA3151-MATRICESANDCALCULUS	
C102.1	Use the matrix algebra methods for solving practical problems.
C102.2	Apply differential calculus tools in solving various application problems
C102.3	Able to use differential calculus ideas on several variable functions.
C102.4	Apply different methods of integration in solving practical problems.
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.
PH3151- ENGINEERING PHYSICS	
C103.1	Understand the importance of mechanics
C103.2	Express their knowledge in electromagnetic waves.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.
CY3151- ENGINEERING CHEMISTRY	
C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.

C104.2	To identify and apply basic concepts of nano science and nanotechnology in designing the synthesis of nano materials for engineering and technology applications.
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.
C104.4	To recommend suitable fuels for engineering processes and applications.
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.
GE3151- PROBLEM SOLVING AND PYTHON PROGRAMMING	
C105.1	Develop algorithmic solutions to simple computational problems.
C105.2	Develop and execute simple Python programs.
C105.3	Write simple Python programs using conditionals and loops for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists , tuples , dictionaries etc.
GE3171- PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	
C106.1	Develop algorithmic solutions to simple computational problems.
C106.2	Develop and execute simple Python programs.
C106.3	Implement programs in Python using conditionals and loops for solving problems.
C106.4	Deploy functions to decompose a Python program.
C106.5	Process compound data using Python data structures.
BS3171- PHYSICS AND CHEMISTRY LABORATORY	
C107.1	Understand the function in go various physics laboratory equipment.
C107.2	Use graphical models to analyze laboratory data.
C107.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
C107.4	Access process and analyze scientific information.
C107.5	Solve problems individually and collaboratively.
GE3172- ENGLISH LABORATORY	
C108.1	To listen to and comprehend general as well as complex academic information

C108.2	To listen to and understand different points of view in a discussion.
C108.3	To speak fluently and accurately informal and in formal communicative contexts
C108.4	To describe products and processes and explain the it uses and purposes clearly and accurately.
C108.5	To express their opinions effectively in both formal and in formal discussions.
II-Semester	
HS3252- PROFESSIONL ENGLISH- II	
C109.1	To compare and contrast products and ideas in technical texts.
C109.2	To identify and report cause and effects in events , industrial processes through technical texts.
C109.3	To analyze problems in order to arrive at feasible solutions and communicate the min the written format.
C109.4	To present their ideas and opinions in a planned and logical manner.
C109.5	To draft effective resumes in the context of job search.
MA3251- STATISTICS AND NUMERICAL METHODS	
C110.1	Apply the concept of testing of hypothesis for small and large sample sin real life problems.
C110.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
C110.3	Appreciate the numerical techniques of inter polation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
C110.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C110.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
PH3202- PHYSICS FOR ELECTRICAL ENGINEERING	
C111.1	Know basics of dielectric materials and insulation.
C111.2	Gain knowledge on the electrical and magnetic properties of materials and their applications.
C111.3	Understand clearly of semiconductor physics and functioning of semiconductor devices.

C111.4	Understand clearly of semiconductor physics and functioning of semiconductor devices.
C111.5	Appreciate the importance of nanotechnology and nano devices.
BE3255- BASIC CIVIL AND MECHANICAL ENGINEERING	
C112.1	Understanding profession of Civil and Mechanical engineering.
C112.2	Summarize the planning of building, infrastructure and working of Machineries.
C112.3	Apply the knowledge gained in respective discipline.
C112.4	Illustrate the ideas of Civil and Mechanical Engineering applications.
C112.5	Appraise the material, Structures, machines and energy.
GE3251- ENGINEERING GRAPHICS	
C113.1	Use BIS conventions and specifications for engineering drawing.
C113.2	Construct the conic curves, involutes and cycloid.
C113.3	Solve practical problems involving projection of lines.
C113.4	Draw the orthographic , isometric and perspective projections of simple solids.
C113.5	Draw the development of simple solids.
EE3251- ELECTRIC CIRCUIT ANALYSIS	
C114.1	Explain circuit's behavior using circuit laws.
C114.2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit.
C114.3	Compute the transient response of first order and second order systems to step and sinusoidal input
C114.4	Compute power, line/phase voltage and currents of the given three phase circuit.
C114.5	Explain the frequency response of series and parallel RLC circuits
GE3271- ENGINEERING PRACTICES LABORTORY	
C115.1	Draw pipeline plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household woodwork.
C115.2	Wire various electrical joints in common household electrical wire work.

C115.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
C115.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.
C115.5	Measure the electrical quantities.
EE3271- ELECTRIC CIRCUITS LABORATORY	
C116.1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit(Ex 1)
C116.2	Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin, Norton and maximum power transfer)for the given DC/AC circuit(Ex 2-5)
C116.3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods (Ex 6)
C116.4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods (Ex 7-8)
C116.5	Analyze the performance of the given three-phase circuit using simulation and experimental methods (Ex 9)
GE3272- COMMUNICATION LABORATORY	
C117.1	Speak effectively in group discussion sheld informal/semiformal contexts.
C117.2	Discuss, analyze and present concepts and problems from various perspectives to arrive at suitable solutions
C117.3	Write emails, letters and effective job applications.
C117.4	Write critical reports to convey data and information with clarity and precision
C117.5	Give appropriate instructions and recommendations for safe execution of tasks
III-Semester	
MA3303-PROBABILITY AND COMPLEX FUNCTIONS	
C201.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which and describe real life phenomenon.
C201.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
C201.3	To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.

C201.4	To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
C201.5	To acquaint the students with Differential Equations which are significantly used in engineering problems.
EE3301- ELECTROMAGNETIC FIELDS	
C202.1	Visualize and explain Gradient , Divergence , and Curl operation on electromagnetic vector fields and identify the electromagnetic sources and their effects.
C202.2	Compute and analyse electrostatic fields , electric potential , energy density along with their applications.
C202.3	Compute and analyse magneto static fields, magnetic flux density , vector potential along with their applications.
C202.4	Explain different methods of emf generation and Maxwell's equations.
C202.5	Explain the concept of electromagnetic waves and characterizing parameters.
EE3302- DIGITAL LOGIC CIRCUITS	
C203.1	Explain various number systems and characteristics of digital logic families.
C203.2	Apply K-maps and Quine Mc Cluskey methods to simplify the given Boolean expressions
C203.3	Explain the implementation of combinational circuit such as multiplexers and demultiplexers - code converters, adders, subtractors, Encoders and Decoders
C203.4	Design various synchronous and asynchronous circuits using Flip Flops
C203.5	Explain a synchronous sequential circuits and programmable logic devices
EC3301- ELECTRON DEVICES AND CIRCUITS	
C204.1	Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode),
C204.2	Design clipper, clamper, halfwave and full wave rectifier , regulator circuits using PN junction diodes.
C204.3	Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT.
C204.4	Analyze the performance of various configurations of BJT and MOSFET based amplifier.
C204.5	Explain the characteristics of MOS based cascade and differential amplifier
EE3303- ELECTRICAL MACHINES - I	
C205.1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.

C205.2	Explain the construction and working principle of DC machines.
C205.3	Interpret various characteristics of DC machines.
C205.4	Compute various performance parameters of the machine, by conducting suitable tests.
C205.5	Draw the equivalent circuit of transformer and pre determine the efficiency and regulation.
CS3353- C PROGRAMMING AND DATA STRUCTURES	
C206.1	Develop C programs for any real world/technical application.
C206.2	Apply advanced features of C in solving problems.
C206.3	Write functions to implement linear and non-linear data structure operations.
C206.4	Suggest and use appropriate linear / non-linear data structure operations for solving a given problem.
C206.5	Appropriately use sort and search algorithms for a given application.
EC3311- ELECTRONIC DEVICES AND CIRCUITS LABORATORY	
C207.1	Analyze the characteristics of PN, Zener diode and BJT in CE,CC,CB configurations experimentally.
C207.2	Analyze the characteristics of JFET and UJT experimentally.
C207.3	Analyze frequency response characteristics of a Common Emitter amplifier experimentally.
C207.4	Analyze the characteristics of RC phase shift and LC oscillator experimentally
C207.5	Analyze the characteristics of half-wave and full-wave rectifier with and without Filters experimentally
EE3311- ELECTRICAL MACHINES LABORATORY - I	
C208.1	Construct the circuit with appropriate connections for the ¹ given DC machine/transformer.
C208.2	Experimentally determine the characteristics of different types of DC machines.
C208.3	Demonstrate the speed control techniques for a DC motor for industrial applications.
C208.4	Identify suitable methods for testing of transformer and DC machines.

C208.5	Predetermine the performance parameters of transformers and DC motor.
CS3362- C PROGRAMMING AND DATA STRUCTURES LABORATORY	
C209.1	Use different constructs of C and develop applications
C209.2	Write functions to implement linear and non-linear data structure operations
C209.3	Suggest and use the appropriate linear/non-linear data structure operations for a given problem
C209.4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
C209.5	Implement Sorting and searching algorithms for a given application
IV-Semester	
GE3451- ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	
C210.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
C210.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
C210.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
C210.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
C210.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
EE3401- TRANSMISSION AND DISTRIBUTION	
C211.1	Understand the structure of power system, computation of transmission line parameters for different configurations.
C211.2	Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance.

C211.3	Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system.
C211.4	Design the underground cables and understand the performance analysis of underground cable
C211.5	Understand the modeling, performance analysis and modern trends in distribution system
EE3402- LINEAR INTEGRATED CIRCUITS	
C212.1	Explain monolithic IC fabrication process
C212.2	Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell.
C212.3	Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp
C212.4	Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters
C212.5	Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs.
EE3403- MEASUREMENTS AND INSTRUMENTATION	
C213.1	Ability to understand the fundamental art of measurement in engineering.
C213.2	Ability to understand the structural elements of various instruments.
C213.3	Ability to understand the importance of bridge circuits.
C213.4	Ability to understand about various transducers and their characteristics by experiments
C213.5	Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments.
EE3404- MICROPROCESSOR AND MICROCONTROLLER	
C214.1	Ability to write assembly language program for microprocessor and microcontroller
C214.2	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller.
C214.3	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring.

C214.4	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.
C214.5	Ability to understand and appreciate advanced architecture evolving microprocessor field.
EE3405- ELECTRICAL MACHINES - II	
C215.1	Ability to understand the construction and working principle of Synchronous generator
C215.2	Ability to understand the construction and working principle of Synchronous Motor
C215.3	Ability to understand the construction and working principle of Three Phase Induction Motor
C215.4	Acquire knowledge about the starting and speed control of induction motors.
C215.5	To gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines.
EE3411- ELECTRICAL MACHINES LABORATORY - II	
C216.1	Ability to understand and analyze EMF and MMF methods
C216.2	Ability to analyze the characteristics of V and Inverted V curves
C216.3	Acquire and gain experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines
C216.4	Acquire hands on experience of conducting various tests on induction motor and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors
C216.5	Ability to acquire knowledge on separation of losses
EE3412- LINEAR AND DIGITAL CIRCUITS LABORATORY	
C217.1	Ability to understand and implement Boolean Functions.
C217.2	Ability to understand the importance of code conversion ²
C217.3	Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.
C217.4	Ability to acquire knowledge on Application of Op-Amp

C217.5	Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters.
EE3413- MICROPROCESSORANDMICROCONTROLLERLABORATORY	
C218.1	Ability to write assembly language program for microprocessor.
C218.2	Ability to write assembly language program for microcontroller
C218.3	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
C218.4	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring.
C218.5	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.
V-Semester	
EE3501- POWER SYSTEM ANALYSIS	
C301.1	Ability to model the power system under steady state operating condition.
C301.2	Ability to carry out power flow analysis using.
C301.3	Ability to infer the significance of short circuit studies in designing circuit breakers.
C301.4	Ability to analyze the state of the power system for various unsymmetrical faults.
C301.5	Ability to analyze the stability of power system using different methods.
EE3591- POWER ELECTRONICS	
C302.1	Understand the operation of semiconductor devices and dynamic characteristics and to design & analyze the low power SMPS.
C302.2	Analyze the various uncontrolled rectifiers and design suitable filter circuits
C302.3	Analyze the operation of then-pulse converters and evaluate the performance parameters
C302.4	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits.
C302.5	Understand the operation of AC voltage controllers and its applications.
EE3503- CONTROL SYSTEMS	

C303.1	Represents impulse systems in transfer function and state variable forms.
C303.2	Analyze simple systems in time domain.
C303.3	Analyzes impulse systems in frequency domain.
C303.4	Infer the stability of systems in time and frequency domain.
C303.5	Interpret characteristics of the system and find out solution for simple control problems.
EE3006- POWER QUALITY	
C304.1	Use various definitions of power quality for power quality issues
C304.2	Describe the concepts related with single phase / three phase, linear / nonlinear loads and single phase / three phase sinusoidal, non-sinusoidal source
C304.3	Solve problems related with mitigation of Power System Harmonics
C304.4	Use DSTATCOM for load compensation
C304.5	Demonstrate the role of DVR ,SAFs UPQC in power distribution systems
EE3009- SPECIAL ELECTRICAL MACHINES	
C305.1	Ability to model and analyze power electronic systems and equipment using computational software.
C305.2	Ability to optimally design magnetics required in special machines based drive systems using FEM based software tools.
C305.3	Ability to analyze the dynamic performance of special electrical machines
C305.4	Ability to understand the operation and characteristics of other special electrical machines.
C305.5	Ability to design and conduct experiments towards research.
CIC338- MACHINE MONITORING SYSTEM	
C306.1	Ability to identify the faults in machinery L1.
C306.2	Choose the proper maintenance strategies and condition monitoring techniques for identification of failure in a machine L3.
C306.3	Construct a classifier model for machine learning based fault diagnosis L5.

C306.4	Predict the faulty component in a machine by analyzing the acquired vibration signals L2.
C306.5	Ability to analyze & build a model using modern tools L4.
MX3084- DISASTER RISK REDUCTION AND MANAGEMENT	
C307.1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
C307.2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
C307.3	To develop disaster response skills by adopting relevant tools and technology
C307.4	Enhance awareness of institutional processes for Disaster response in the country
C307.5	Develop rote monetary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity
EE3511- POWER ELECTRONICS LABORATORY	
C308.1	Determine the characteristics of SCR, IGBT, TRIAC, MOSFET and IGBT
C308.2	Find the transfer characteristics of full converter, semi converter, step up and step down choppers by simulation experimentation.
C308.3	Analyze the voltage waveforms for PWM inverter using various modulation techniques.
C308.4	Design and experimentally verify the performance of basic DC/DC converter topologies used for SMPS.
C308.5	Understand the performance of AC voltage controllers by simulation and experimentation
EE3512- CONTROL AND INSTRUMENTATION LABORATORY	
C309.1	To model and analyze simple physical systems and simulate the performance in analog and digital platform.
C309.2	To design and implement simple controllers in standard forms.
C309.3	To design compensators based on time and frequency domain specifications.
C309.4	To design a complete closed control loop and evaluate its performance for simple physical systems.
C309.5	To analyze the stability of a physical system in both continuous and discrete domains.

VI-Semester	
EE3601- PROTECTION AND SWITCHGEAR	
C310.1	Understand and select proper protective scheme and type of earthing.
C310.2	Explain the operating principles of various relays.
C310.3	Suggest suitable protective scheme for the protection of various power system apparatus.
C310.4	Analyze the importance of static relays and numerical relays in power system protection.
C310.5	Summarize the merits and demerits and application areas of various circuit breakers.
EE3602- POWER SYSTEM OPERATION AND CONTROL	
C311.1	Understand the day-to-day operation of power system.
C311.2	Model and analyze the control actions that are implemented to meet the minute-to-minute variation of system real power demand.
C311.3	Model and analyze the compensators for reactive power control and various devices used for voltage control.
C311.4	Prepared real time economic generation scheduling.
C311.5	Understand the necessity of computer control of power systems.
EE3019- EMBEDDED CONTROL FOR ELECTRIC DRIVES	
C312.1	Interpret the significance of embedded control of electrical drives
C312.2	Deliver in sight in to various control strategies for electrical drives.
C312.3	Developing knowledge of Machine learning and optimization techniques for motor control.
C312.4	Develop embedded system solutions for real-time application such as Electric vehicles and UAVs.
C312.5	Improved Employability and entrepreneurship capacity due to knowledge up gradation on recent trends in embedded system skills required for motor control strategy.
EE3033- HYBRID ENERGY TECHNOLOGY	

C313.1	Analyze the impacts of hybrid energy technologies on the environment and demonstrate them to harness electrical power.
C313.2	Select a suitable Electrical machine for Wind Energy Conversion Systems and simulate wind energy conversion system
C313.3	Design the power converters such as AC-DC, DC-DC, and AC-AC converters for SPV systems.
C313.4	Analyze the power converters such as AC-DC, DC-DC, and AC-AC converters for Hybrid energy systems.
C313.5	Interpret the hybrid renewable energy systems.
OCS352- IOT CONCEPTS AND APPLICATIONS	
C314.1	Explain the concept of IoT.
C314.2	Understand the communication models and various protocols for IoT.
C314.3	Design portable IoT using Arduino/Raspberry Pi /open platform
C314.4	Apply data analytics and use cloud offerings related to IoT.
C314.5	Analyze applications of IoT in real time scenario.
MX3089- INDUSTRIAL SAFETY	
C315.1	Understand the Basic concept of safety.
C315.2	Obtain knowledge of Statutory Regulations and standards.
C315.3	Know about the safety Activities of the Working Place.
C315.4	Analyze on the impact of Occupational Exposures and Their Remedies
C315.5	Obtain knowledge of Risk Assessment Techniques.
EE3611- POWER SYSTEM LABORATORY	

C316.1	Model and analyze the performance of the transmission lines.
C316.2	Perform power flow, short circuit, and stability analysis or any power system network.
C316.3	Understand, design, and analyze the load frequency control mechanism.
C316.4	Perform optimal scheduling of generators and compute the state of the power system.
C316.5	Understand, analyze, and apply the relays for power system protection.

3.1.2. CO-PO matrices of courses selected in 3.1.1

I-SEMESTER (8 Papers)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C101.1	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
C101.2	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
C101.3	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
C101.4	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
C101.5	2	3	3	3	-	3	3	3	2	3	-	3	-	-	-
Average	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	3	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C102.1	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
C102.2	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
C102.3	3	3	1	1	0	0	0	0	2	0	2 ²	3	-	-	-
C102.4	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
C102.5	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
Average	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C106.1	3	3	3	3	3	-	-	-	-	-	3	2	3	3	-
C106.2	3	3	3	3	3	-	-	-	-	-	3	2	3	-	-
C106.3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
C106.4	3	2	-	2	2	-	-	-	-	-	1	-	3	-	-
C106.5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
Average	2	3	3	3	2	-	-	-	-	-	2	2	3	3	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C107.A.1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
C107.A.2	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
C107.A.3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
C107.A.4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
C107.A.5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
Average	3	2.4	2.6	1	1	-	-	-	-	-	-	-	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C107.B.1	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
C107.B.2	3	1	2	-	-	1	2	-	-	-	-	1	-	-	-
C107.B.3	3	2	1	1	-	-	1	-	-	-	-	-	-	-	-
C107.B.4	2	1	2	-	-	2	2	-	-	-	-	-	-	-	-
C107.B.5	2	1	2	-	1	2	2	-	-	-	-	1	-	-	-
Average	2.6	1.3	1.6	1	1	1.4	1.8	-	-	-	- ²	1.3	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C108.1	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
C108.2	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
C108.3	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
C108.4	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
C108.5	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
Average	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-

II SEMESTER(9 Papers)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C109.1	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
C109.2	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
C109.3	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
C109.4	3	3	3	3	2	3	3	3	2	3	3	3	-	-	-
C109.5	-	-	-	-	-	-	-	-	3	3	3	3	-	-	-
Average	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C110.1	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
C110.2	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
C110.3	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
C110.4	3	3	1	1	1	0	0	0	2	0	2 ₃	3	-	-	-
C110.5	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
Average	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C111.1	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
C111.2	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
C111.3	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
C111.4	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
C111.5	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
Average	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C112.1	2	-	-	1	-	-	1	2	1	2	-	1	-	-	-
C112.2	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
C112.3	2	-	-	-	-	-	1	2	2	2	-	2	-	-	-
C112.4	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
C112.5	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
Average	2	-	-	0.2	-	-	1	2	1.2	2	-	1.8	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C113.1	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
C113.2	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
C113.3	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
C113.4	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
C113.5	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
Average	3	1	2	-	2	-	-	-	-	3	.3	2	2	2	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C114.1	3	3	3	2	2	-	2	1	-	-	-	3	3	3	3
C114.2	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3
C114.3	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3
C114.4	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3
C114.5	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3
Average	3	3	3	2.8	2	-	2	1	-	-	-	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C115.1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
C115.2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
C115.3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
C115.4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
C115.5	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
Average	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C116.1	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2
C116.2	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2
C116.3	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2
C116.4	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2
C116.5	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2
Average	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C117.1	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
C117.2	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
C117.3	2	2	3	3	1	3	3	3	3	3	3	3	-	-	-
C117.4	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
C117.5	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
Average	2.4	2.8	3	3	1.8	3	3	3	3	3	3	3	-	-	-

III SEMESTER(9 Papers)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C201.1	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-
C201.2	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-
C201.3	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-
C201.4	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-
C201.5	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-
Average	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C202.1	3	2	-	-	-	-	3	1	-	-	-	1	3	2	1
C202.2	3	2	1	2	-	-	1	1	-	-	-	1	3	2	1
C202.3	3	2	1	2	-	-	1	1	-	-	-	1	3	2	1
C202.4	3	2	1	2	-	-	1	1	-	-	-3	1	3	2	1
C202.5	3	2	1	2	-	-	1	1	-	-	-	1	3	2	1
Average	3	2	1	2	-	-	1.4	1	-	-	-	1	3	2	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C203.1	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
C203.2	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
C203.3	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
C203.4	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
C203.5	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
Average	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C204.1	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
C204.2	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
C204.3	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
C204.4	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
C204.5	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
Average	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C205.1	3	3	1	1	1	-	-	1	-	-	-	1	3	2	2
C205.2	3	3	1	1	1	-	-	1	-	-	-	1	3	1	1
C205.3	3	3	1	1	1	-	-	1	-	-	-	1	3	1	1
C205.4	3	3	1	1	1	-	-	1	-	-	-	1	3	3	2
C205.5	3	3	1	1	1	-	-	1	-	-	-	1	3	3	2
Average	3	3	1	1	1	-	-	1	-	-	- ³	1	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C206.1	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
C206.2	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
C206.3	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
C206.4	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
C206.5	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3
Average	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C207.1	-	-	-	3	3	-	-	1.5	-	-	3	-	-	3	3
C207.2	-	-	3	3	3	-	-	1.5	-	-	3	-	-	3	3
C207.3	-	3	2	3	-	-	-	1.5	-	-	3	-	-	3	3
C207.4	-	3	3	3	-	-	-	1.5	-	-	3	-	-	3	3
C207.5	-	-	-	-	3	-	-	1.5	-	-	-	-	-	3	3
Average	-	3	2.7	3	3	-	-	1.5	-	-	3	-	-	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C208.1	3	3	1	1	-	-	-	-	1	-	-	-	3	1	1
C208.2	3	3	1	1	-	-	-	-	1	-	-	-	3	3	2
C208.3	3	3	1	1	-	-	-	-	1	-	-	-	3	3	2
C208.4	3	3	1	1	-	-	-	-	1	-	-	-	2	3	2
C208.5	3	3	1	1	-	-	-	-	1	-	-	-	2	3	2
Average	3	3	1	1	-	-	-	-	1	-	3	-	2.5	2.6	1.6

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C209.1	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
C209.2	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
C209.3	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
C209.4	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
C209.5	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3
Average	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2

IV SEMESTER(9 Papers)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C210.1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
C210.2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
C210.3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
C210.4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
C210.5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
Average	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C211.1	2	1	-	-	-	-	-	1	-	-	-	-	3	1	1
C211.2	3	2	1	1	-	1	-	2	-	-	-	-	3	2	1
C211.3	3	2	1	1	-	1	-	2	-	-	-	-	3	3	1
C211.4	3	2	1	1	-	1	-	2	-	-	-3	-	3	3	1
C211.5	3	2	1	1	-	1	-	2	-	-	-	-	3	3	1
Average	2.8	1.8	1	1	-	1	-	1.8	-	-	-	-	3	2.4	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C212.1	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
C212.2	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
C212.3	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
C212.4	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
C212.5	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
Average	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C213.1	3	2	3	-	3	2	-	2	-	-	-	3	3	3	3
C213.2	3	2	3	2	-	-	-	-	-	3	-	3	3	3	3
C213.3	3	2	3	-	3	2	-	-	-	-	-	3	3	3	3
C213.4	3	2	3	-	-	-	-	2	-	-	-	-	3	3	3
C213.5	3	2	3	2	3	-	-	-	-	3	-	3	3	3	3
Average	3	2	3	2	3	2	-	2	-	3	-	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C214.1	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
C214.2	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
C214.3	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
C214.4	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
C214.5	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
Average	2	1	2	3	-	-	-	1	-	-	- ³	3	3	1	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C215.1	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
C215.2	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
C215.3	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
C215.4	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
C215.5	3	3	1	1	2	-	-	1	-	-	-	-	3	3	2
Average	3	3	1.6	2.3	2.6	-	-	1	-	-	-	-	3	3	2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C216.1	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2
C216.2	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2
C216.3	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2
C216.4	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2
C216.5	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2
Average	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C217.1	-	-	-	3	-	-	-	1.5	-	-	3	3	2	1	2
C217.2	-	-	3	3	-	-	-	1.5	-	-	3	3	2	1	2
C217.3	-	3	2	3	3	-	-	1.5	-	-	3	3	2	1	2
C217.4	-	3	3	3	3	-	-	1.5	-	-	3	3	2	1	2
C217.5	-	-	-	-	-	-	-	1.5	-	-	-	3	-	-	-
Average	-	3	1.6	3	3	-	-	1.5	-	-	3 ³ 3	3	2	1	2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C218.1	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
C218.2	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
C218.3	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
C218.4	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
C218.5	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
Average	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C301.1	3	2	2	1	1	-	-	-	1	-	-	-	1	-	2
C301.2	3	3	3	2	1	-	-	-	1	-	-	-	1	1	1
C301.3	3	3	3	2	1	-	-	-	1	-	-	1	1	1	1
C301.4	3	2	2	2	2	-	-	-	1	-	-	1	1	1	2
C301.5	3	3	2	2	2	-	-	-	1	-	-	1	1	1	1
Average	3	2.6	2.4	1.8	1.4	-	-	-	1	-	-	1	1	1	1.4

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C302.1	3	3	3	3	-	-	2	1	-	-	3	3	3	3	3
C302.2	3	3	3	3	-	-	-	1	-	-	-	-	3	3	3
C302.3	3	3	3	3	-	-	2	1	-	-	2.3	-	3	3	3
C302.4	3	3	3	3	-	-	1	1	-	-	2	3	3	3	3
C302.5	3	3	3	3	-	-	1	1	-	-	2	3	3	3	3
Average	3	3	3	3	-	-	1.5	1	-	-	2.25	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C303.1	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3
C303.2	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3
C303.3	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3
C303.4	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3
C303.5	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3
Average	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C304.1	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
C304.2	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
C304.3	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
C304.4	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
C304.5	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3
Average	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C305.1	3	-	-	-	-	-	-	1	-	1	-	1	3	2	1
C305.2	3	3	3	3	-	-	2	1	-	2	-	3	3	3	3
C305.3	3	-	-	-	-	-	-	1	-	1	-	1	3	3	3
C305.4	3	3	3	3	-	-	-	1	-	3	-	3	3	3	3
C305.5	3	3	3	3	-	-	3	1	-	3	-	3	3	3	3
Average	3	3	3	3	3	-	2.5	1	-	2.2	- ⁴	2.3	3	2.8	2.6

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C306.1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
C306.2	3	2	2	2	1	1	1	1	1	1	1	1	1	2	2
C306.3	3	3	3	3	1	1	1	1	1	1	1	1	1	2	2
C306.4	2	2	1	2	1	1	1	1	1	1	1	1	1	2	2
C306.5	3	3	3	2	1	1	1	1	1	1	1	1	1	2	2
Average	2.4	2.2	2	2	1	1	1	1	1	1	1	1	1	2	2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C307.1	3	3	2	3	-	-	2	2	-	-	2	-	2	-	1
C307.2	3	3	3	3	-	-	2	1	-	-	2	-	2	-	1
C307.3	3	3	3	3	-	-	2	2	-	-	-	-	2	-	1
C307.4	3	3	2	3	-	-	2	1	-	-	2	-	2	-	1
C307.5	3	3	2	3	-	-	2	2	-	-	2	-	3	-	1
Average	3	3	3	3	-	-	2	2	-	-	2	-	2	-	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C308.1	3	3	3	3	3	-	-	1.5	-	-	-	3	3	3	3
C308.2	3	3	3	3	3	-	-	1.5	-	-	-	3	3	3	3
C308.3	3	3	3	3	3	-	-	1.5	-	-	-	3	3	3	3
C308.4	3	3	3	3	3	-	-	1.5	-	-	-	3	3	3	3
C308.5	3	3	3	3	3	-	-	1.5	-	-	-	3	3	3	3
Average	3	3	3	3	3	-	-	1.5	-	-	- ⁴	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C309.1	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3
C309.2	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3
C309.3	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3
C309.4	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3
C309.5	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3
Average	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C310.1	3	1	1	2	1	2	1	1	1	1	2	-	3	1	-
C310.2	3	1	1	2	1	2	1	1	1	1	2	-	3	1	-
C310.3	3	1	1	2	1	2	1	1	1	1	2	-	3	2	-
C310.4	3	1	1	2	1	2	1	1	1	1	2	-	3	2	1
C310.5	3	1	1	2	2	2	1	1	1	1	2	-	3	1	1
Average	3	1	1	2	1.2	2	1	1	1	1	2	-	3	1.4	1

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C311.1	2	1	-	-	-	-	-	1	-	-	-	2	3	3	3
C311.2	3	2	1	1	-	1	-	2	-	2	-	2	3	3	3
C311.3	3	2	1	1	-	1	-	2	-	2	-	2	3	3	3
C311.4	3	2	1	1	-	1	-	2	-	2	-4	2	3	1	2.33
C311.5	2	1	-	-	-	-	-	1	-	2	-	2	3	3	3
Average	2	1.6	1	1	-	1	-	1.6	-	2	-	2	3	2.2	2.86

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C312.1	1	1	2	2	1	-	-	-	-	-	-	-	2	1	2
C312.2	2	1	3	2	1	-	-	-	-	-	-	-	2	1	2
C312.3	3	2	3	3	3	-	-	-	-	-	-	-	1	3	3
C312.4	3	2	3	3	3	-	-	-	-	-	-	-	3	3	3
C312.5	3	2	1	2	1	-	-	-	1	-	-	-	2	2	3
Average	2.4	1.6	2.4	2.4	1.8	-	-	-	1	-	-	-	2	2	2.6

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C313.1	3	3	3	2	-	-	-	-	-	3	-	3	3	3	3
C313.2	3	3	3	2	3	-	-	-	-	3	-	3	3	3	3
C313.3	3	3	3	2	3	-	-	-	-	3	-	3	3	3	3
C313.4	3	3	3	2	3	-	-	-	-	3	-	3	3	3	3
C313.5	3	3	3	2	-	-	-	-	-	3	-	3	3	3	3
Average	3	3	3	2	3	-	-	-	-	3	-	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C314.1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
C314.2	3	2	2	1	3	-	-	-	3	2	2	3	3	1	2
C314.3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
C314.4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2
C314.5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3
Average	3	2.6	2.4	2	3	-	-	-	2.8	2.2	1.8 ⁴	2.6	2.8	1.8	2.2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C315.1	3	3	3	1	1	3	2	2	3	3	1	3	3	3	3
C315.2	2	3	2	2	1	3	2	3	3	2	1	3	3	3	3
C315.3	2	2	2	2	1	2	2	2	3	2	1	2	3	3	3
C315.4	3	3	3	2	2	3	2	2	3	2	1	3	3	3	3
C315.5	3	2	3	2	2	3	2	2	3	2	2	3	3	3	3
Average	3	3	3	2	1	3	2	2	3	2	1	3	3	3	3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C316.1	3	3	2	2	3	-	-	2	1	2	-	3	3	3	3
C316.2	3	3	2	2	3	-	-	2	1	2	-	3	3	3	3
C316.3	3	3	2	2	3	-	-	2	1	2	-	3	3	3	3
C316.4	3	3	2	2	3	-	-	2	1	2	-	3	3	3	3
C316.5	3	3	2	2	3	-	-	2	1	2	-	3	3	3	3
Average	3	3	2	2	3	-	-	2	1	2	-	3	3	3	3

3.1.3. Program level Course-PO matrix of all courses INCLUDING first year courses

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C101	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	3	-	-	-
C102	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
C103	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-	-	-
C104	2.8	1.3	1.6	1	-	1.5	1.8	-	-	-	-	1.5	-	-	-
C105	2	3	3	3	2	-	-	-	-	-	2	2	3	3	-
C106	2	3	3	3	2	-	-	-	-	-	2	2	3	3	-
C107A	3	2.4	2.6	1	1	-	-	-	-	-	-	-	-	-	-
C107B	2.6	1.3	1.6	1	1	1.4	1.8	-	-	-	-	1.3	-	-	-
C108	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
C109	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-
C110	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
C111	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
C112	2	-	-	0.2	-	-	1	2	1.2	2	-	-	-	-	-
C113	3	1	2	-	2	-	-	-	-	3	-	2	2	2	
C114	3	3	3	2.8	2	-	2	1	-	-	-	3	3	3	3
C115	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
C116	3	3	3	3	3	-	2	1.5	3	-	-	3	3	3	2
C117	2.4	2.8	3	3	1.8	3	3	3	3	3	3	3	-	-	-
C201	3	3	0	0	0	0	0	0	2	0	0	2	-	-	-

C202	3	2	1	2	-	-	1.4	1	-	-	-	1	3	2	1
C203	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
C204	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
C205	3	3	1	1	1	-	-	1	-	-	-	1	3	3	3
C206	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
C207	-	3	2.7	3	3	-	-	1.5	-	-	3	-	-	3	-
C208	3	3	1	1	-	-	-	-	1	-	-	-	2.5	2.6	1.6
C209	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
C210	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-
C211	2.8	1.8	1	1	-	1	-	1.8	-	-	-	-	3	2.4	1
C212	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
C213	3	2	3	2	3	2	-	2	-	3	-	3	3	3	3
C214	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
C215	3	3	1.6	2.3	2.6	-	-	1	-	-	-	-	3	3	2
C216	3	3	1	1	-	-	-	1.5	1	-	-	2.8	3	3	1.6
C217	-	3	1.6	3	3	-	-	1.5	-	-	3	3	2	1	2
C218	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
C301	3	2.6	2.4	1.8	1.4	-	-	-	1	- 4	-	1	1	1	1.4
C302	3	3	3	3	-	-	1.5	1	-	-	2.25	3	3	3	3
C303	3	3	3	3	3	-	-	1	-	-	-	3	3	3	3
C304	3	3	3	3	-	-	3	3	-	3	-	3	3	3	3

C305	3	3	3	3	3	-	2.5	1	-	2.2	-	2.3	3	2.8	2.6
C306	2.4	2.2	2	2	1	1	1	1	1	1	1	1	1	2	2
C307	3	3	3	3	-	-	2	2	-	-	2	-	2	-	1
C308	3	3	3	3	3	-	-	1.5	-	-	-	3	3	3	3
C309	3	3	3	3	3	-	-	1.5	-	-	-	2	3	3	3
C310	3	1	1	2	1.2	2	1	1	1	1	2	-	3	1.4	1
C311	2	1.6	1	1	-	1	-	1.6	-	2	-	2	3	2.2	2.86
C312	2.4	1.6	2.4	2.4	1.8	-	-	-	1	-	-	-	2	2	2.6
C313	3	3	3	2	3	-	-	-	-	3	-	3	3	3	3
C314	3	2.6	2.4	2	3	-	-	-	2.8	2.2	1.8	2.6	2.8	1.8	2.2
C315	3	3	3	2	1	3	2	2	3	2	1	3	3	3	3
C316	3	3	2	2	3	-	-	2	1	2	-	3	3	3	3