

PERI INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING

Mapping of Course outcome with program outcome
Regulation -2017

CO	MA8352–Linear algebra and partial differential equations
CO 1	To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.
CO 2	Demonstrate accurate and efficient use of advanced algebraic techniques
CO 3	Demonstrate their mastery by solving non - trivial problems related to the concepts and by simple theorems about the statements proven by the text.
CO 4	Able to solve various types of partial differential equations.
CO 5	Able to solve engineering problems using Fourier series..

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

CO	EC8393–FUNDAMENTALS OF DATA STRUCTURES IN C
CO 1	Implement linear and non-linear data structure operations using C
CO 2	Suggest appropriate linear / non-linear data structure for any given data set.
CO 3	Apply hashing concepts for a given problem
CO 4	Modify or suggest new data structure for an application
CO 5	Appropriately choose the sorting algorithm for an application

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

CO	EC8351–ELECTRONIC CIRCUITS I
CO 1	Acquire knowledge of Working principles, characteristics and applications of BJT and FET
CO 2	Acquire knowledge of Frequency response characteristics of BJT and FET amplifiers
CO 3	Analyze the performance of small signal BJT and FET amplifiers-single stage and multistage amplifiers
CO 4	Analyze the of Frequency response of amplifiers
CO 5	Apply the knowledge gained in the design of Electronic circuits

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

CO	EC8352–SIGNALS AND SYSTEMS
CO 1	Determine if a given system is linear/causal/stable
CO 2	Capable of determining the frequency components present in a deterministic signal
CO 3	Capable of characterizing LTI systems in the time domain and frequency domain
CO 4	Compute the output of an LTI system in the time and frequency domains
CO 5	Analyze the Discrete time signals using Transforms

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	3	2	2	2	1					1	2	3	3	3
CO 2	3	3	2	2	2	1					1	2	3	3	3
CO 3	2	2	1	1	1	0					0	1	2	2	2
CO 4	3	3	2	2	2	1					1	2	3	3	3
CO 5	3	3	2	2	2	1					1	2	3	3	3

CO	EC8392–DIGITAL ELECTRONICS
CO 1	Use digital electronics in the present contemporary world
CO 2	Design various combinational digital circuits using logic gates
CO 3	Do the analysis and design procedures for synchronous and asynchronous sequential circuits
CO 4	Use the semiconductor memories and related technology
CO 5	Use electronic circuits involved in the design of logic gates


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

CO	EC8391-CONTROLSYSTEMSENGINEERING
CO 1	Identify the various control system components and their representations.
CO 2	Analyze the various time domain parameters.
CO 3	Analyze the various frequency response plots and its system.
CO 4	Apply the concepts of various system stability criteria.
CO 5	Design various transfer functions of digital control system using state variable models.

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

CO	EC8381-Fundamentals of data structures in laboratory
CO 1	Write basic and advanced programs in C
CO 2	Implement functions and recursive functions in C
CO 3	Implement data structures using C
CO 4	Choose appropriate sorting algorithms for an application
CO 5	Choose appropriate sorting algorithm to implement in a modularized way

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


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CO	EC8361–Analoganddigitalcircuitslaboratory
CO 1	Design and Test rectifiers, filters and regulated power supplies.
CO 2	Design and Test BJT/JFET amplifiers.
CO 3	Differentiate cascode and cascade amplifiers.
CO 4	Analyze the limitation in bandwidth of single stage and multi stage amplifier & Measure CMRR in differential amplifier
CO 5	Simulate and analyze amplifier circuits using P Spice.& Design and Test the digital logic circuits

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

CO	HS8381InterpersonalSkills/Listening & Speaking
CO 1	Learn the importance of interpersonal skills
CO 2	Recognize the importance of interpersonal skills
CO 3	Understand how good communication with other can influence our working relationships
CO 4	Describe how good communication with other can influence our working relationships
CO 5	outline the roles we play in our work groups and teams

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

CO	MA8451–PROBABILITYANDRANDOMPROCESSES
CO 1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
CO 2	Understandthebasicconceptsofoneandtwodimensionalrandomvariablesandapplyinengineeringapplications.
CO 3	Apply the concept random processes in engineering disciplines.
CO 4	Understand and apply the concept of correlation and spectral densities.
CO 5	The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random in puts to linear time in variant systems.


CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	2	1	1	1						1	1	1	1	0
CO 2	2	2	1	1	1						1	1	1	1	0
CO 3	3	3	2	2	2						2	2	2	2	0
CO 4	2	2	1	1	1						1	1	1	1	0
CO 5	3	3	2	2	2						2	2	2	2	0

CO	EC8452-ELECTRONIC CIRCUITS II
CO 1	Design and analyze feedback amplifiers
CO 2	Design and analyze RC and LC Oscillators
CO 3	Design and analyze tuned amplifiers
CO 4	Design and analyze wave shaping circuits, multivibrators
CO 5	Design power amplifier and DC convertors.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	3	2	2	1	1					1	1	2	2	2
CO 2	3	3	3	3	0	0					0	0	1	1	1
CO 3	3	3	2	2	1	1					1	1	2	2	2
CO 4	3	3	3	3	0	0					0	0	1	1	1
CO 5	3	3	3	3	0	0					0	0	1	1	1

CO	EC8491-COMMUNICATION THEORY
CO 1	Design AM communication systems
CO 2	Design Angle modulated communication systems
CO 3	Apply the concepts of Random Process to the design of Communication systems
CO 4	Analyze the noise performance of AM and FM systems
CO 5	Gain knowledge in sampling and quantization

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	3	2	2	2	2					2	2	2	2	1
CO 2	3	3	2	2	2	2					2	2	2	2	1
CO 3	3	3	2	2	2	2					2	2	2	2	1
CO 4	3	3	3	3	3	3					3	3	3	3	2
CO 5	2	2	2	2	0	0					0	1	2	2	2


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CO	EC8451–ELECTROMAGNETIC FIELDS
CO 1	Display an understanding of fundamental electromagnetic laws and concepts
CO 2	Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning
CO 3	Explain electromagnetic wave propagation in lossy and in lossless media
CO 4	Solve simple problems requiring estimation of electric field quantities based on these concepts and laws
CO 5	Solve simple problems requiring estimation of magnetic field quantities based on these concepts and laws

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

CO	EC8453–LINEAR INTEGRATED CIRCUITS
CO 1	Design linear and non linear application of OP-AMP
CO 2	Design Application using analog multiplier and PLL
CO 3	Design ADC and DAC using OP-AMP
CO 4	Generate waveforms using OP – AMP Circuits
CO 5	Analyze special function Ics

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

CO	GE8291–Environmental science and engineering
CO 1	Environmental Pollution or problems cannot be solved by mere laws.
CO 2	Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
CO 3	Public awareness of environmental is at infant stage.
CO 4	Ignorance and incomplete knowledge has lead to misconceptions
CO 5	Development and improvement in standard. of living has lead to serious environmental disasters

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

CO	EC8461–Circuitsdesignandsimulationlaboratory
CO 1	Analyze various types of feedback amplifiers
CO 2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
CO 3	Design and simulate feedback amplifiers, oscillators using SPICE Tool
CO 4	Design and simulate tuned amplifiers, wave-shaping circuits using SPICE Tool
CO 5	Design and simulate multi vibrators using SPICE Tool

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

CO	EC8462–Linearintegratedcircuitslaboratory
CO 1	Design amplifiers, oscillators, D-A converters using operational amplifiers.
CO 2	Design filters using op-amp and performs an experiment on frequency response.
CO 3	Analyze the working of PLL and describe its application as a frequency multiplier.
CO 4	Design DC power supply using ICs.
CO 5	Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.

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


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CO	EC8501–DIGITALCOMMUNICATION
CO 1	Describe the operating principles of information theory
CO 2	Design and implement base band transmission schemes
CO 3	Design and implement band pass signaling schemes
CO 4	Analyze the spectral characteristics of band pass signaling schemes and their noise performance
CO 5	Design error control coding schemes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	2	1	2	0	0					1	1	2	1	1
CO 2	3	3	2	3	1	1					2	2	3	2	3
CO 3	3	3	2	3	1	1					2	2	3	2	3
CO 4	3	3	3	3	2	2					3	3	3	2	3
CO 5	3	3	2	3	1	1					2	2	3	2	3

CO	EC8553–DISCRETETIMESIGNALPROCESSING
CO 1	Apply DFT for the analysis of digital signals and systems
CO 2	Design IIR and FIR filters
CO 3	Characterize the effects of finite precision representation on digital filters
CO 4	Design multirate filters
CO 5	Apply adaptive filters appropriately in communication systems

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

CO	EC8552–Computerarchitecture and Organization
CO 1	Describe data representation, instruction formats and the operation of a digital computer
CO 2	Illustrate the fixed point and floating-point arithmetic for ALU operation
CO 3	Discuss about implementation schemes of control unit and pipeline performance
CO 4	Explain the concept of various memories, interfacing and organization of multiple processors
CO 5	Discuss parallel processing technique and unconventional architectures


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CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	2	2	1	1	1	0	0	0	0	0	1	2	2	2
CO 2	2	2	2	1	1	1	0	0	0	0	0	1	2	2	2
CO 3	3	3	3	2	2	2	0	0	0	0	0	2	3	3	3
CO 4	2	2	2	1	1	1	0	0	0	0	0	1	2	2	2
CO 5	2	2	2	1	1	1	0	0	0	0	0	1	2	2	2

CO	EC8551-COMMUNICATION NETWORKS
CO 1	Identify the components required to build different types of networks
CO 2	Choose the required functionality at each layer for given application
CO 3	Identify solution for each functionality at each layer
CO 4	Trace the flow of information from one node to another node in the network
CO 5	Summarize the various Application requirements

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1
CO 2	2	2	1	1	1	1	0	0	0	0	0	2	2	2	2
CO 3	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1
CO 4	2	2	1	1	1	1	0	0	0	0	0	2	2	2	2
CO 5	2	2	1	1	1	1	0	0	0	0	0	2	2	2	2

CO	OR0551- RENEWABLE ENERGY SOURCE
CO 1	Exposure on solar radiation and its environment impact of power
CO 2	Learn the various collectores used for storing solar energy
CO 3	Understand the various applications in solar energy
CO 4	Study about the wind energy and biomass and its economic aspects
CO 5	Learn about geothermal energy with other energy sources

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


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CO	GE8077-TOTALQUALITYMANAGEMENT
CO 1	Discuss various dimensions of product and service quality
CO 2	Apply the TQM principles for quality improvement in organization
CO 3	Apply the TQM principles for quality improvement in organization
CO 4	Use QFD tool to design and develop a new product as per customer requirements.
CO 5	Explain various ISO Standards and Quality systems practiced in various sector

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1						2	2	2	2	2	1	2	0	2	1
CO 2						3	3	3	3	3	2	2	1	3	2
CO 3						3	3	3	3	3	2	2	1	3	2
CO 4						3	3	3	3	3	2	2	1	3	2
CO 5						2	2	2	2	2	1	2	0	2	1

CO	EC8562-Digitalsignalprocessinglaboratory
CO 1	Carryout basic signal processing operations
CO 2	Demonstrate their abilities towards MATLAB based implementation of various DSP systems
CO 3	Analyze the architecture of a DSP Processor
CO 4	Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals
CO 5	Design a DSP system for various applications of DSP

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

CO	EC8561-COMMUNICATIONSYSTEMLABORATORY
CO 1	Simulate & validate the various functional modules of a communication system
CO 2	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes
CO 3	Apply various channel coding schemes
CO 4	Demonstrate their capabilities towards the improvement of the noise performance of communication system
CO 5	Simulate end-to-end communication Link


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CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	1	2	1					3	3	3	3	3
CO 2	3	2	2	1	2	1					0	0	2	2	2
CO 3	3	2	2	1	2	1					0	0	2	2	2
CO 4	3	2	2	1	2	1					0	0	2	2	2
CO 5	3	2	2	1	2	1					3	3	3	3	3

CO	EC8563-COMMUNICATION NETWORKS LABORATORY
CO 1	Communicate between two desktop computers
CO 2	Implement the different protocols
CO 3	Program using sockets.
CO 4	Implement and compare the various routing algorithms
CO 5	Use the simulation tool.

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

CO	EC8691-MICROPROCESSOR AND MICROCONTROLLER
CO 1	Understand the Architecture of 8086 microprocessor.
CO 2	Learn the design aspects of I/O and Memory Interfacing circuits.
CO 3	Interface microprocessors with supporting chips.
CO 4	Study the Architecture of 8051 microcontroller.
CO 5	Design a microcontroller based system

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

CO	EC8095–VLSIDESIGN
CO 1	Realize the concepts of digital building blocks using MOS transistor.
CO 2	Design combinational MOS circuits and power strategies.
CO 3	Design of memory elements in sequential circuits.
CO 4	Design arithmetic building blocks and memory subsystems.
CO 5	Apply and implement FPGA design flow and testing.

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

CO	EC8652–WIRELESSCOMMUNICATION
CO 1	Study the characteristic of wireless channel
CO 2	Design a cellular system based on resource availability and traffic demands
CO 3	Study the various digital signaling techniques for fading channel
CO 4	Apply various multipath mitigation techniques
CO 5	Understand the concepts of multiple antenna techniques

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

CO	MG8591–PRINCIPLESOFMANAGEMENT
CO 1	Summarize the evolution of management thoughts and various challenges of managerial activities in a global
CO 2	Explain the types of Planning and Decision making at various levels management in the Organizations
CO 3	Discuss various types of Organization structure.
CO 4	List out the steps in Staffing process and stages in Career development.
CO 5	Generalize various Controlling techniques to maintain standards in Organizations.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1						1	1	1		1	1	1	1	1	-
CO 2						2	2	2		2	2	2	2	2	-
CO 3						2	2	2		2	2	2	2	2	-
CO 4						2	2	2		2	2	2	2	2	-
CO 5						3	3	3		3	3	3	3	3	-

CO	EC8651-TRANSMISSION LINES AND RF SYSTEMS
CO 1	Explain the characteristics of transmission lines and its losses
CO 2	Write about the standing wave ratio and input impedance in high frequency transmission lines
CO 3	Analyze impedance matching by stubs using smith charts
CO 4	Analyze the characteristics of TE and TM waves
CO 5	Design a RF transceiver system for wireless communication

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

CO	EC8004-WIRELESS NETWORKS
CO 1	Conversant with the latest 3G/4G networks and its architecture
CO 2	Design and implement wireless network environment for any application using latest wireless protocols and standards
CO 3	Ability to select the suitable network depending on the availability and requirement
CO 4	Implement different type of applications for smart phones and mobile devices with latest network strategies
CO 5	Learn the applications of beyond 4G wireless networks

CO	PO												PSO		
	1	2		1	2		1	2		1	2		1	2	
CO 1	2	2	1	1	1	1					1	2	2	2	1
CO 2	3	3	2	2	2	2					2	3	3	3	2
CO 3	2	2	1	1	1	1					1	2	2	2	1
CO 4	3	3	2	2	2	2					2	3	3	3	2
CO 5	2	2	1	1	1	1					1	2	2	2	1

CO	EC8681–Microprocessor and Microcontroller laboratory
CO 1	Write ALP Programmes for fixed and Floating Point and Arithmetic operations
CO 2	Interface different I/Os with processor
CO 3	Generate waveforms using Microprocessors
CO 4	Execute Programs in 8051
CO 5	Explain the difference between simulator and Emulator

CO	PO												PSO		
	1	2		1	2		1	2		1	2		1	2	
CO 1	2	2	1	1	1	1					1	1	2		2
CO 2	3	2	1	0	0	0					0	0	0	1	3
CO 3	1	0	0	3	2	1					0	0	0	1	1
CO 4	1	1	3	3	0	0					1	0	0	1	1
CO 5	3	1	0	3	0	0					1	0	1	1	3

CO	EC8661–VLSIDESIGNLABORATORY
CO 1	Write HDL code for basic as well as advanced digital integrated circuit
CO 2	Import the logic modules into FPGA Boards
CO 3	Synthesize Place and Route the digital Ips
CO 4	Design the layouts of Digital & Analog IC Blocks using EDA tools
CO 5	Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	1	0	0	0					0	0	0	1	2
CO 2	3	2	1	0	0	0					0	0	0	1	2
CO 3	1	0	0	3	2	1					0	0	0	1	2
CO 4	1	1	3	3	0	0					1	0	0	1	2
CO 5	3	1	0	3	0	0					1	0	1	1	2

CO	EC8611–TECHNICAL SEMINAR
CO 1	Establish motivation for any topic of interest and develop a thought process for technical presentation
CO 2	Organize a detailed literature survey and build a document with respect to technical publications
CO 3	Analysis and comprehension of proof-of-concept and related data.
CO 4	Effective presentation and improve soft skills.
CO 5	Make use of new and recent technology (e.g. Latex) for creating technical reports

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

CO	HS8581–PROFESSIONAL COMMUNICATION
CO 1	Make effective presentations
CO 2	Participate confidently in Group Discussions.
CO 3	Attend job interviews and be successful in them
CO 4	Develop adequate Soft Skills required for the workplace
CO 5	Develop Team management skills

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

CO	EC8701–ANTENNA AND MICROWAVE ENGINEERING
CO 1	Learn the basic principles of antenna
CO 2	Apply the basic principles of antenna and Evaluate antenna parameters and link power budgets
CO 3	Design and assess the performance of various antennas
CO 4	Learn the basics of microwave system
CO 5	Design a microwave system given the application specifications

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

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CO	EC8751–OPTICAL COMMUNICATION AND NETWORKS
CO 1	Realize basic elements in optical fibers, different modes and configurations
CO 2	Analyze the transmission characteristics associated with dispersion and polarization techniques
CO 3	Design optical sources and detectors with their use in optical communication system
CO 4	Construct fibre optic receiver system, measurements and coupling techniques
CO 5	Design Optical Communication Systems and its networks

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	2	1	1		1	-	-	-	-	1	2	2	2	1
CO 2	3	3	2	2		2	-	-	-	-	2	3	3	3	2
CO 3	3	3	2	2		2	-	-	-	-	2	3	3	3	2
CO 4	3	3	2	2		2	-	-	-	-	2	3	3	3	2
CO 5	3	3	2	2		2	-	-	-	-	2	3	3	3	2

CO	EC8791–EMBEDDED AND REAL TIME SYSTEM
CO 1	Describe the architecture and programming of ARM processor
CO 2	Outline the concepts of embedded systems
CO 3	Explain the basic concepts of real time operating system design
CO 4	Model real-time applications using embedded-system concepts
CO 5	Analyze the concepts of real time operating system design

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

CO	EC8702-Adhoc and Wireless Sensor Networks
CO 1	Know the basics of Ad hoc networks and Wireless Sensor Networks
CO 2	Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement
CO 3	Apply the knowledge to identify appropriate physical and MAC layer protocols
CO 4	Understand the transport layer and security issues possible in Ad hoc and sensor networks.
CO 5	Be familiar with the OS used in Wireless Sensor Networks and build basic modules

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

CO	GE8071-DISASTER MANAGEMENT
CO 1	Differentiate the types of disasters
CO 2	Differentiate the causes of disasters and their impact on environment and society
CO 3	Assess vulnerability and various methods of risk reduction measures as well as mitigation
CO 4	Draw the hazard and vulnerability profile of India
CO 5	Understand about disaster damage assessment and management

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

CO	OCS752- INTRODUCTION TO C PROGRAMMING
CO 1	Describe the advantages of a high level language like C/C++, the programming process, and the compilation process
CO 2	Describe and use software tools in the programming process
CO 3	Apply good programming principles to the design and implementation of C/C++ programs
CO 4	Design, implement, debug and test programs using the fundamental elements of C/C++
CO 5	Design, implement, debug and test programs using the fundamental elements of C/C++

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	2	1	1	1	0					1	1	1	1	1
CO 2	2	2	1	1	1	0					1	1	1	1	1
CO 3	3	3	2	2	2	1					2	2	2	2	2
CO 4	3	3	2	2	2	1					2	2	2	2	2
CO 5	3	3	2	2	2	1					2	2	2	2	2

CO	EC8711-EMBEDDED LABORATORY
CO 1	Write programs in ARM for a specific Application
CO 2	Interface memory, A/D and D/A convertors with ARM system
CO 3	Analyze the performance of interrupt
CO 4	Write program for interfacing keyboard, display, motor and sensor.
CO 5	Formulate a mini project using embedded system

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

CO	EC8761-ADVANCED COMMUNICATION LABORATORY
CO 1	Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber
CO 2	Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER
CO 3	Estimate the Wireless Channel Characteristics
CO 4	Analyze the performance of Wireless Communication System
CO 5	Understand the intricacies in Microwave System design

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

CO	EC8094-SATELLITE COMMUNICATION
CO 1	Analyze the satellite orbits
CO 2	Analyze the earth segment and space segment
CO 3	Analyze the satellite Link design
CO 4	Analyze the satellite access and coding methods
CO 5	Design various satellite applications

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

CO	GE8076–PROFESSIONALETHICSINENGINEERING
CO 1	Outline the core values that enrich the ethical behavior of an engineer.
CO 2	Explain the perception in ethics towards the profession, various moral issues, and theories on moral development
CO 3	Associate the code of ethics in real time application as responsible experimenters and understand the various
CO 4	Aware of responsibilities of an engineer for safety and risk benefit
CO 5	Have a clear idea about the global issues

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

CO	EC8811–PROJECT WORK
CO 1	Analyze areal world problem, review literature and suggest its solution.
CO 2	Perform data analysis, interpret and provide valid conclusions
CO 3	Perform multi-disciplinary task as an individual and/or team member to manage the project/task.
CO 4	ComprehendtheEngineeringactivitieswitheffectivepresentationandreport.
CO 5	Interpretthefindingswithappropriatetechnological/researchcitation.

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

Department of Electrical and Electronics Engineering

CO PO mapping

Regulation 2017

EE8351 DIGITAL LOGIC CIRCUITS	
CO 1	Ability to study various number systems and simplify the logical expressions using Boolean functions.
CO 2	Ability to design combinational and sequential Circuits.
CO 3	Ability to design various synchronous and asynchronous circuits.
CO 4	Ability to introduce asynchronous sequential circuits and PLDs.
CO 5	Ability to simulate using software package.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	1	-	-	-	-	-	2	-	3	3	1	3
2	3	3	3	2	-	-	-	-	-	2	-	3	3	1	3
3	3	3	3	2	-	-	-	-	-	2	-	3	3	1	3
4	3	3	3	1	-	-	-	-	-	2	-	3	3	1	3
5	3	2	1	1	3	-	-	-	-	2	-	3	3	1	3

Low (1); Medium (2); High (3)

EE8391 ELECTROMAGNETIC THEORY	
CO 1	Ability to understand the basic mathematical concepts related to electromagnetic vector fields.
CO 2	Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.
CO 3	Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.
CO 4	Ability to understand the different methods of emf generation and Maxwell's equations.
CO 5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	3	-	-	-	-	-	-	-	2	3	3	2
2	3	3	3	3	-	1	-	-	-	-	-	2	3	3	3
3	3	3	3	3	-	1	-	-	-	-	2	2	3	3	3
4	3	3	3	3	-	1	-	-	-	-	2	2	3	3	3
5	3	3	3	3	-	1	-	-	-	-	-	2	3	3	3

EE8301 ELECTRICAL MACHINES I	
CO 1	Ability to analyze the magnetic-circuits.
CO 2	Ability to acquire the knowledge in constructional details of transformers.
CO 3	Ability to understand the concepts of electromechanical energy conversion.
CO 4	Ability to acquire the knowledge in working principles of DC Generator and DC motor.
CO 5	Ability to acquire the knowledge in various losses taking place in D.C. Machines

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	2	3	2	-	-	-	-	-	-	2	2	3	-	2
2	3	2	3	2	-	-	-	-	-	-	1	-	3	-	1
3	3	2	3	2	-	-	-	-	-	-	-	2	3	1	2
4	3	2	3	2	-	-	-	-	-	-	1	-	3	2	2
5	3	2	3	2	-	-	-	-	-	-	2	-	3	2	2

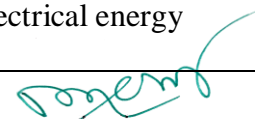
Low (1); Medium (2); High (3)

EC8351 – ELECTRON DEVICES & CIRCUITS	
CO 1	Able to explain the structure and working operation of basic electronic devices
CO 2	Able to identify and differentiate both active and passive elements.
CO 3	Analyze the characteristics of different electronic devices such as diodes and transistors.
CO 4	Able to choose and adapt the required components to construct an amplifier circuit.
CO 5	Able to employ the acquired knowledge in design and analysis of oscillators

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	2	-	3	3	-	-	-	-	3	2	2	1
2	3	2	3	3	-	2	2	-	-	-	-	3	2	2	2
3	3	3	3	3	2	2	2	-	-	-	-	3	2	2	1
4	3	3	3	3	3	2	2	-	-	-	-	3	2	2	1
5	3	3	3	3	3	3	2	-	-	-	-	3	2	2	1

Low (1); Medium (2); High (3)

ME8792 POWER PLANT ENGINEERING	
CO 1	Able to explain the layout, construction and working of the components inside a thermal power plant.
CO 2	Able to explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
CO 3	Able to Explain the layout, construction and working of the components inside nuclear power plants.
CO 4	Able to explain the layout, construction and working of the components inside Renewable energy power plants.
CO 5	Able to explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.


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CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	-	3	-	2	-	-	-	-	-	3	3	3	2
2	3	3	2	3	-	2	-	-	-	-	-	3	3	3	1
3	3	3	2	3	-	-	-	-	-	-	-	3	3	3	2
4	3	3	1	3	-	-	-	-	-	-	-	3	3	3	1
5	3	3	1	3	3	-	-	-	-	-	-	3	3	3	1
Low (1); Medium (2); High (3)															

EE 8311 ELECTRICAL MACHINES LABORATORY – I	
CO 1	Ability to understand and analyze DC generator.
CO 2	Ability to understand and analyze DC motor.
CO 3	Ability to understand and analyse transformers.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3			3	3						3	3	3	3	3
2	3			3	3						3	3	3	3	3
3	3			3	3						3	3	3	3	3
Low (1); Medium (2); High (3)															

EC 8311 ELECTRONICS LABORATORY	
CO 1	Ability to understand and analyse electronic circuits.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3			3	3						3	3	2	2	1
Low (1); Medium (2); High (3)															

EE8401 ELECTRICAL MACHINES - II	
CO 1	Ability to understand the construction and working principle of synchronous generator.
CO 2	Ability to understand MMF curves and armature windings.
CO 3	Ability to acquire knowledge on Synchronous motor.
CO 4	Ability to understand the construction and working principle of three phase induction motor.
CO 5	Ability to predetermine the performance characteristics of synchronous machines.

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

4	2	1	1	1									3	2	
5	2	1	1	1									3	2	
Low (1); Medium (2); High (3)															

EE8402 TRANSMISSION AND DISTRIBUTION	
CO 1	To understand the importance and the functioning of transmission line parameters.
CO 2	To acquire knowledge on the performance of Transmission lines.
CO 3	To understand the importance of distribution of the electric power in power system.
CO 4	To acquire knowledge on underground cables.
CO 5	To become familiar with the function of different components used in Transmission and Distribution levels of power system and modeling of these components.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1											3		
2	3	2	1										3		
3	2	2	1										3		
4	2	1	1										3		
5	2	1	1										3		
Low (1); Medium (2); High (3)															

EE8403 MEASUREMENT & INSTRUMENTATION	
CO 1	To acquire knowledge on Basic functional elements of instrumentation.
CO 2	To understand the concepts of Fundamentals of electrical and electronic instruments.
CO 3	Ability to compare between various measurements techniques.
CO 4	To acquire knowledge on Various storage and display devices.
CO 5	To understand the concepts Various transducers and the data acquisition systems.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1								2			3		
2	2	1								2			3		
3	2	1	1							2			3		
4	2									2			3		
5	2	1								2			3		
Low (1); Medium (2); High (3)															

EE8451 LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	
CO 1	Ability to acquire knowledge in IC fabrication procedure.
CO 2	Ability to analyze the characteristics of Op-Amp.
CO 3	To understand and acquire knowledge on the Applications of Op-amp
CO 4	To understand the functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.
CO 5	To understand the importance of signal analysis using Op-amp based circuits.

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

Low (1); Medium (2); High (3)

IC8451 CONTROL SYSTEMS	
CO 1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
CO 2	Ability to do time domain and frequency domain analysis of various models of linear system.
CO 3	Ability to interpret characteristics of the system to develop mathematical model.
CO 4	Ability to design appropriate compensator for the given specifications.
CO 5	Ability to come out with solution for complex control problem.

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

Low (1); Medium (2); High (3)

EE8411 ELECTRICAL MACHINES LABORATORY - II	
CO 1	Ability to understand and analyze EMF and MMF methods.
CO 2	Ability to analyze the characteristics of V and Inverted V curves.
CO 3	Ability to understand the importance of Synchronous machines.
CO 4	Ability to understand the importance of Induction Machines.
CO 5	Ability to acquire knowledge on separation of losses.


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CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1										2	1	3
2	3	2	1										2	1	3
3	3	2	1										2	1	3
4	3	2	1										2	1	3
5	3	2	1										2	1	3
Low (1); Medium (2); High (3)															

EE8461 LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY	
CO 1	Ability to understand and implement Boolean Functions.
CO 2	Ability to understand the importance of code conversion.
CO 3	Ability to Design and implement 4-bit shift registers.
CO 4	Ability to acquire knowledge on Application of Op-Amp.
CO 5	Ability to Design and implement counters using specific counter IC.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	1		1								1		
2	2	2	2		2								1		
3	1	1	1		2								1		
4	2	2	2		1								1		
5	2	1	2		2								1		
Low (1); Medium (2); High (3)															

EE8412 TECHNICAL SEMINAR															
CO 1	Ability to review, prepare and present technological developments.														
CO 2	Ability to face the placement interviews.														
CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1									3	3	3		1	1	1
2									3	3	3		1	1	1
Low (1); Medium (2); High (3)															

EE8501 Power System Analysis	
CO 1	Ability to model the power system under steady state operating condition.
CO 2	Ability to understand and apply iterative techniques for power flow analysis.
CO 3	Ability to model and carry out short circuit studies on power system.
CO 4	Ability to acquire knowledge on Fault analysis.
CO 5	Ability to model and analyze stability problems in power system.


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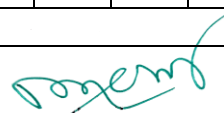
CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	3		3					3	3	2	1
2	3	2	2	2	2		2					3	3	3	2
3	3	2	2	2	2		2					3	3	3	2
4	3	2	2	2	2		2					3	3	3	2
5	3	3	3	2	3		2					3	3	3	3
Low (1); Medium (2); High (3)															

EE8551-MICROPROCESSORS AND MICROCONTROLLERS	
CO 1	Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.
CO 2	Ability to write the assembly language programme.
CO 3	Ability to need & use of Interrupt structure 8085 & 8051.
CO 4	Ability to understand the importance of Interfacing.
CO 5	Ability to develop the Microprocessor and Microcontroller based applications.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1								2			2	1	2
2	2	2								2			2	1	2
3	2	1								2			2	1	2
4	2	1								2			2	1	2
5	3	2	2							2			2	1	3
Low (1); Medium (2); High (3)															

EE8552 POWER ELECTRONICS	
CO 1	Ability to analyse AC-AC converters.
CO 2	Ability to analyse DC-DC converters.
CO 3	Ability to analyse DC-AC converters.
CO 4	Explain the different modulation techniques of pulse with modulated inverters and to understand harmonic reduction methods.
CO 5	Ability to choose the converters for real time applications..

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1	1			2						3		2
2	2	2	2	2			2						3		2
3	2	2	2	2			2						3		2
4	2	2	2	2			2						3		2
5	2	1	1	1			2						3		2
Low (1); Medium (2); High (3)															


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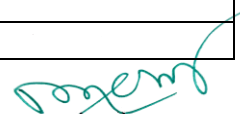
EE8591 Digital Signal Processing	
CO 1	Ability to acquire knowledge on Signals and systems & their mathematical representation.
CO 2	Ability to understand and analyze the discrete time systems.
CO 3	Ability to understand the importance of Fourier transform, digital filters and DS Processors.
CO 4	Ability to understand the types of filters and their design for digital implementation.
CO 5	Ability to acquire knowledge on programmability digital signal processor & quantization effects.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3		1		3								2		2
2	3		1		3								2	1	2
3	3		1		3								2		3
4	3		1		3								2	1	3
5	2		1		3								2		2
Low (1); Medium (2); High (3)															

CS8392 BASICS OF BIO-MEDICAL INSTRUMENTATION	
CO 1	Ability to analyze the fundamentals of biomedical engineering.
CO 2	Ability to interpret the communication mechanics in biomedical systems
CO 3	Ability to measure and analyze non-electrical parameters and its diagnostic procedures.
CO 4	Ability to measure and analyze electrical parameters and also electrical safety.
CO 5	Ability to analyze and apply the life assisting, therapeutic and imaging techniques.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	1	-	-	2	2	-	1	-	-	2	3	1	1
2	3	1	3	-	-	2	2	-	1	-	-	2	3	1	3
3	1	1	-	-	-	1	-	-	1	-	-	2	1	1	-
4	3	2	2	-	2	3	2	-	1	-	-	2	3	2	2
5	3	2	3	1	2	2	2	-	1	-	-	2	3	2	3
Low (1); Medium (2); High (3)															

EE8511 CONTROL AND INSTRUMENTATION LABORATORY	
CO 1	Ability to understand control theory and apply them to electrical engineering problems.
CO 2	Ability to analyze the various types of converters.
CO 3	Ability to design compensators.
CO 4	Ability to understand the basic concepts of bridge networks.
CO 5	Ability to the basics of signal conditioning circuits.


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CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1										3		
2	2	1	1										3		
3	2	1	1										3		
4	2	1	1										3		
5	2	1	1										3		
Low (1); Medium (2); High (3)															

HS8581 PROFESSIONAL COMMUNICATION	
CO 1	Ability to make effective presentations
CO 2	Ability to Participate confidently in Group Discussions.
CO 3	Attend job interviews and be successful in them
CO 4	Develop adequate Soft Skills required for the workplace

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1									2	2	2		2		
2									2	2	2		2		
3									2	2	2		2		
4									2	2	2				
Low (1); Medium (2); High (3)															

CS8383 OBJECT ORIENTED PROGRAMMING LABORATORY	
CO 1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
CO 2	Develop and implement Java programs with array list, exception handling and multithreading.
CO 3	Design applications using file processing, generic programming and event handling

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1											2		
2	2	1											2		
3	2	1											2		
4								3							
5									3			3			
Low (1); Medium (2); High (3)															


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EE8601 SOLID STATE DRIVES	
CO 1	Ability to study about the steady state operation and transient dynamics of a motor load system.
CO 2	Ability to analyze the operation of the converter/chopper fed dc drive.
CO 3	Ability to analyze the operation and performance of AC motor drives.
CO 4	Ability to select suitability drive for the given application.
CO 5	Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.

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

Low (1); Medium (2); High (3)

EE8602-PROTECTION AND SWITCHGEAR	
CO 1	Ability to find the causes of abnormal operating conditions of the apparatus and system.
CO 2	Ability to analyze the characteristics and functions of relays and protection schemes.
CO 3	Ability to study about the apparatus protection, static and numerical relays.
CO 4	Ability to understand and analyze Electromagnetic and static relays.
CO 5	Ability to acquire knowledge on functioning of circuit breaker.

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

Low (1); Medium (2); High (3)

EE8691 EMBEDDED SYSTEMS	
CO 1	Ability to understand and analyze Embedded systems.
CO 2	Ability to study about the bus Communication in processors.
CO 3	Ability to operate various Embedded development strategies.
CO 4	Ability to acquire knowledge on various processor scheduling algorithms.
CO 5	Ability to understand basics of Real time operating system.


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CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2									2			2	1	
2	2	1		1						2			2	1	
3	2	1		1						2			2	1	
4	2	1								2			2	1	
5	2	1	1		1					2			2	1	
Low (1); Medium (2); High (3)															

EE8002 DESIGN OF ELECTRICAL APPARATUS	
CO 1	Ability to understand basics of design considerations for rotating and static electrical machines.
CO 2	Ability to design of field system for its application.
CO 3	Ability to design single and three phase transformer.
CO 4	Ability to design stator and rotor of induction motor.
CO 5	Ability to design and analyze synchronous machines.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	3	1		3			2		2	3		
2	3	3	2	3	1		3			2		2	3	1	
3	3	3	2	3	1		3			2		2	3		
4	3	3	2	3	1		3			2		2	3	1	
5	3	3	2	3	1		3			2		2	3		
Low (1); Medium (2); High (3)															

EE8006 POWER QUALITY	
CO 1	Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.
CO 2	Ability to understand the concepts about Voltage and current distortions, harmonics.
CO 3	Ability to analyze the causes & Mitigation techniques of various PQ events.
CO 4	Ability to acquire knowledge on compensation techniques.
CO 5	Ability to acquire knowledge on DVR.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1	2			2						3		
2	2	1	1	2			2						3		
3	2	1	1	2			2						3		
4	3	2	2	2			2						3		
5	2	1	1	2			2						3		
Low (1); Medium (2); High (3)															


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EE8661 POWER ELECTRONICS AND DRIVES LABORATORY	
CO 1	Ability to practice and understand converter and inverter circuits and apply software for engineering problems.
CO 2	Ability to experiment about switching characteristics various switches.
CO 3	Ability to analyze about AC to DC converter circuits.
CO 4	Ability to analyze about DC to AC circuits.
CO 5	Ability to acquire knowledge on simulation software.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1		3	3						1	1	1	3		
2	1		3	3						1	1	1	3		
3	1		2	3						1	1	1	3		
4	1		3	3						1	1	1	3		
5	1		3	3						1	1	1	3		
Low (1); Medium (2); High (3)															

EE8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	
CO 1	Ability to understand and apply computing platform and software for engineering problems.
CO 2	Ability to programming logics for code conversion.
CO 3	Ability to acquire knowledge on A/D and D/A.
CO 4	Ability to understand basics of serial communication.
CO 5	Ability to understand and impart knowledge in DC and AC motor interfacing.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1		3	3						1	1	1	3		
2	1		3	3						1	1	1	3		
3	1		2	3						1	1	1	3		
4	1		3	3						1	1	1	3		
5	1		3	3						1	1	1	3		
Low (1); Medium (2); High (3)															

EE8611 MINI PROJECT	
CO 1	Evaluate the final year project work and find solution by formulating proper methodology.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1		3	3						1	1	1	3		
Low (1); Medium (2); High (3)															


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EE8701 HIGH VOLTAGE ENGINEERING	
CO 1	Ability to understand various types of over voltages in power system.
CO 2	Ability to understand Generation and measurement of high voltage.
CO 3	Ability to understand Transients in power system.
CO 4	Ability to measure over voltages.
CO 5	Ability to test power apparatus and insulation coordination.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	2	2	2		1					1	2	-	1
2	2	2	2	2	2		1					1	2	2	-
3	2	2	2	2	2		1					1	2	-	-
4	2	2	2	2	2		1					1	2	-	1
5	2	2	2	2	2		1					1	2	-	1

Low (1); Medium (2); High (3)

GE8071 DISASTER MANAGEMENT	
CO 1	Ability to differentiate the types of disasters, causes and their impact on environment and society
CO 2	Ability to assess vulnerability and various methods of risk reduction measures as well as mitigation.
CO 3	Ability to Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

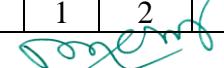
CO	PO												POS		
	1	3	-	1	-	1	1	1	2	1	-	2	1	3	-
1	1	3	1	1	-	1	1	2	2	1	-	2	1	3	1
2	1	2	1	2	-	1	1	2	1	-	-	2	1	2	1
3	1	2	-	1	-	1	1	1	1	2	-	2	1	2	-

Low (1); Medium (2); High (3)

GE8077 TOTAL QUALITY MANAGEMENT	
CO 1	Ability to know the importance of significance of quality and its frame work .
CO 2	Ability to apply various TQM principles and its importance.
CO 3	Ability to apply TQM traditional and new management tools and techniques.
CO 4	Ability to apply TQM Quality circles and quality function deployment.
CO 5	Ability to Identify requirements of quality improvement programs.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	3	1	1	-	1	1	2	2	1	-	2	1	3	1
2	1	2	1	2	-	1	1	2	1	-	-	2	1	2	1
3	1	2	-	1	-	1	1	1	1	2	-	2	1	2	-
4	1	3	1	1	-	1	1	2	2	1	-	2	1	3	1
5	1	2	1	2	-	1	1	2	1	-	-	2	1	2	1

Low (1); Medium (2); High (3)


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EE8703 RENEWABLE ENERGY SYSTEMS	
CO 1	Understand the various types of renewable energy sources and technologies.
CO 2	Understand the adequate inputs on a variety of issues in harnessing renewable Energy.
CO 3	Understand the requirements of solar energy and other thermal systems,
CO 4	Understand the basics of biomass energy.
CO 5	Interpret the current and possible future role of renewable energy sources.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	3	1	1	-	1	1	2	2	1	-	2	1	3	1
2	1	2	1	2	-	1	1	2	1	-	-	2	1	2	1
3	1	2	-	1	-	1	1	1	1	2	-	2	1	2	-
4	1	3	1	1	-	1	1	2	2	1	-	2	1	3	1
5	1	2	1	2	-	1	1	2	1	-	-	2	1	2	1
Low (1); Medium (2); High (3)															

EE8702 POWER SYSTEM OPERATION AND CONTROL	
CO 1	Ability to understand the day-to-day operation of electric power system.
CO 2	Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
CO 3	Ability to understand the significance of power system operation and control.
CO 4	Ability to acquire knowledge on real power-frequency interaction.
CO 5	Ability to understand the reactive power-voltage interaction.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	3	1	1	-	1	1	2	2	1	-	2	1	3	1
2	1	2	1	2	-	1	1	2	1	-	-	2	1	2	1
3	1	2	-	1	-	1	1	1	1	2	-	2	1	2	-
4	1	3	1	1	-	1	1	2	2	1	-	2	1	3	1
5	1	2	1	2	-	1	1	2	1	-	-	2	1	2	1
Low (1); Medium (2); High (3)															

EE8711 POWER SIMULATION LABORATORY	
CO 1	Ability to understand power system planning and operational studies.
CO 2	Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks.
CO 3	Ability to analyze the power flow using GS and NR method
CO 4	Ability to understand the economic dispatch.
CO 5	Analyze the electromagnetic transients.

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

Low (1); Medium (2); High (3)

EE8712 RENEWABLE ENERGY SYSTEMS LABORATORY

CO 1	Ability to understand and analyze renewable energy systems.
CO 2	Ability to provide adequate inputs on a variety of issues in harnessing renewable energy.
CO 3	Ability to train the students in renewable energy sources and technologies.
CO 4	Ability to recognize current and possible future role of Renewable energy sources.
CO 5	Ability to understand basics of intelligent controllers.

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

Low (1); Medium (2); High (3)

EE8015 ELECTRIC ENERGY GENERATION UTILISATION AND CONSERVATION

CO 1	To understand the main aspects of generation, utilization and conservation.
CO 2	To identify an appropriate method of heating for any particular industrial application.
CO 3	To evaluate domestic wiring connection and debug any faults occurred.
CO 4	To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application.
CO 5	To realize the appropriate type of electric supply system as well as to evaluate the 125 performance of a traction unit.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	3	3	1	-	2	-	-	-	-	1	2	1	3
2	2	1	3	3	1	-	2	-	-	-	-	1	2	1	3
3	1	-	3	-	1	-	2	-	-	-	-	1	1	-	3
4	3	-	-	-	2	-	2	-	-	-	-	-	3	-	-
5	3	-	-	-	2	-	2	-	-	-	-	-	3	-	-

Low (1); Medium (2); High (3)

EE 8811 SMART GRID

CO 1	Ability to understand on the concepts of Smart Grid and its present developments
CO 2	Ability to understand different Smart Grid technologies.
CO 3	Ability to interpret the different smart meters and advanced metering infrastructure.
CO 4	Ability to infer power quality management in Smart Grids.
CO 5	Ability to understand on LAN, WAN and Cloud Computing for Smart Grid applications.

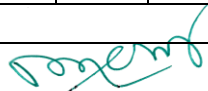

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CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	3	3	1	-	2	-	-	-	-	1	2	1	3
2	2	1	3	3	1	-	2	-	-	-	-	1	2	1	3
3	1	-	3	-	1	-	2	-	-	-	-	1	1	-	3
4	3	-	-	-	2	-	2	-	-	-	-	-	3	-	-
5	3	-	-	-	2	-	2	-	-	-	-	-	3	-	-
Low (1); Medium (2); High (3)															

EE 8811 Project work

CO 1	Infer any challenging practical problems and find solution by formulating proper methodology.
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CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	3	3	1	-	2	-	-	-	-	1	2	1	3
Low (1); Medium (2); High (3)															


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Department of Civil Engineering

Regulation 2017

CE8392 ENGINEERING GEOLOGY	
C1	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
C2	Will get basics knowledge on properties of minerals.
C3	Gain knowledge about types of rocks, their distribution and uses.
C4	Will understand the methods of study on geological structure.
C5	Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor

CE8392 ENGINEERING GEOLOGY														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	2	1	2	1	1	3	1	1	3	1	2	-	2
C2	3	2	2	2	1	1	2	1	1	2	2	2	1	3
C3	3	2	2	2	2	2	2	1	1	3	1	3	3	-
C4	3	2	2	1	2	2	2	1	1	2	2	2	1	2
C5	2	2	2	2	1	3	2	1	2	2	1	1	1	2
Avg	2.8	2	1.8	1.8	1.4	1.8	2.2	1	1.2	2.4	1.4	2	1.5	2.2

CE8301 STRENGTH OF MATERIALS I	
C1	Understand the concepts of stress and strain, principal stresses and principal planes.
C2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
C3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
C4	Apply basic equation of torsion in design of circular shafts and helical springs, .
C5	Analyze the pin jointed plane and space trusses

CE8301 STRENGTH OF MATERIALS I														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	2	2	1	1	1	2	-	1	2	1	2	3	2
C2	3	1	1	2	1	2	2	-	1	1	2	2	2	1
C3	2	1	1	2	1	2	2	-	2	1	2	3	2	1
C4	2	2	1	2	1	1	1	-	2	1	2	2	2	1
C5	1	1	1	-	-	1	2	-	1	2	1	2	2	1
Avg	2.2	1.4	1.2	1.7	1	1.4	1.8	-	1.4	1.4	1.6	2.2	2.2	1.2

CE8302 FLUID MECHANICS	
C1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
C2	Understand and solve the problems related to equation of motion.
C3	Gain knowledge about dimensional and model analysis.
C4	Learn types of flow and losses of flow in pipes.
C5	Understand and solve the boundary layer problems.

CE8302 FLUID MECHANICS														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	2	2	2	2	1	2	1	1	2	1	2	2	2
C2	3	2	2	3	2	3	2	1	1	1	1	2	1	-
C3	3	2	2	2	2	2	2	1	1	2	1	3	2	2
C4	3	3	2	2	2	2	1	1	1	1	1	3	2	1
C5	3	3	2	3	2	2	2	1	1	3	1	2	-	-
Avg	3	2.4	2	2.4	2	1.8	1.8	1	1	1.8	1	2.4	1.7	1.6

CE8351 SURVEYING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	1	2	3	3	1	1	1	1	2	1	2	2
C2	3	2	1	1	3	2	1	1	1	1	2	1	1	-
C3	3	3	2	2	2	3	1	1	2	2	2	1	2	2
C4	3	2	2	2	3	3	1	1	1	2	2	1	2	1
C5	2	3	2	2	3	3	2	1	1	2	2	3	-	-
Avg	2.8	2.6	1.6	1.8	2.8	2.8	1.2	1	1.2	1.6	2	1.4	1.7	1.6

CE8351 SURVEYING	
C1	Able to understand the use of various surveying instruments and mapping
C2	Able to understand measuring Horizontal angle and vertical angle using different instruments
C3	Able to understand Methods of Leveling and setting Levels with different instruments
C4	Able to understand Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth
C5	Able to understand Concept and principle of modern surveying.

CE8391 Construction Materials	
C1	Able to compare the properties of most common and advanced building materials
C2	Able to understand the typical and potential applications of lime, cement and aggregates
C3	Able to know the production of concrete and also the method of placing and making of concrete elements.
C4	Able to understand the applications of timbers and other materials
C5	Able to understand the importance of modern material for construction.

CE8391 Construction Materials														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	1	1	1	1	1	-	1	-	-	1	-	-	-	2
C2	1	1	1	1	1	-	1	-	-	1	-	-	1	3
C3	1	1	1	1	2	-	1	-	-	1	1	-	3	-
C4	1	1	2	1	3	1	1	-	-	1	1	-	1	2
C5	2	1	1	2	3	1	1	-	-	1	1	-	1	2
Avg	1.2	1	1.2	1.2	2	1	1	-	-	1	1	-	1.5	2.2

CE8361 SURVEYING LABORATORY	
C1	Able to apply the principles of surveying in field.
C2	Able to Identify data collection methods and prepare field notes
C3	Able to handling basic survey instruments including leveling
C4	Able to development of contour map of given area
C5	Able to posses knowledge about theodolite

CE8361 SURVEYING LABORATORY														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	2	2	3	2	2	-	-	3	2	1	2	1
C2	3	3	3	2	3	2	1	1	-	1	1	-	2	2
C3	3	3	2	2	2	1	1	-	-	1	1	2	-	-
C4	3	2	3	2	3	1	2	1	-	-	1	-	1	-
C5	3	3	3	2	3	2	1	1	-	-	1	-	1	-
Avg	3	2.8	2.6	2	2.8	1.6	1.4	1	0	1.67	1.2	1.5	1.5	1.5

CE8311 CONSTRUCTION MATERIALS LABORATORY														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	1	1	2	-	2	-	1	1	1	2	1	1	2	-
C2	1	1	2	-	2	-	1	1	1	2	1	1	1	2
C3	1	2	1	-	1	-	1	1	1	2	1	1	-	1
C4	1	1	1	-	2	-	1	2	1	1	1	1	1	-
C5	2	1	1	-	1	-	1	3	1	1	1	1	1	3
Avg	1.2	1.2	1.4	-	1.6	-	1	1.6	1	1.6	1	1	1.2	2

CE8311 Construction Materials Laboratory	
C1	Conduct Quality Control tests on Fine Aggregates
C2	Conduct Quality Control tests on Coarse Aggregates
C3	Conduct Quality Control tests on fresh concrete
C4	Determine the strength properties of hardened concrete
C5	Perform Quality Control tests on Bricks, blocks and tiles

CE8401 Construction Techniques and Practices	
C1	Know the different construction techniques and structural systems
C2	Understand various techniques and practices on masonry construction, flooring, and roofing
C3	Plan the requirements for substructure construction.
C4	Know the methods and techniques involved in the construction of various types of super structures
C5	Select, maintain and operate hand and power tools and equipment used in the building construction sites.

CE8401 CONSTRUCTION TECHNIQUES AND PRACTICES														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	1	3	1	2	1	1	1	1	2	1	1	2
C2	3	3	1	2	1	2	1	1	1	1	1	1	1	-
C3	3	2	2	3	3	3	2	2	2	2	2	2	2	3
C4	3	2	2	3	3	3	2	1	1	2	2	2	2	2
C5	2	2	2	1	2	2	1	1	1	2	2	1	1	1
Avg	2.8	2.4	1.8	2.4	2	2.4	1.4	1.1	1.1	1.6	1.8	1.4	1.4	2

CE8402 Strength Of Materials II	
C1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles
C2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
C3	Find the load carrying capacity of columns and stresses induced in columns and cylinders
C4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
C5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.

CE8402 STRENGTH OF MATERIALS II														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	1	1	2	3	3	-	1	-	3	3	3	2	2
C2	3	2	2	3	2	3	-	1	-	2	2	3	1	1
C3	3	2	3	2	3	1	-	1	-	3	3	3	1	-
C4	3	1	2	2	2	3	-	1	-	2	2	3	2	-
C5	3	2	3	2	2	3	-	1	-	2	3	3	1	2
Avg	2.8	2	2.2	2.2	2.4	2.4	-	1	-	2.4	2.6	3	1.5	1.67


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CE8403 Applied Hydraulic Engineering														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	2	1	2	1	2	1	-	-	-	-	-	-	1
C2	3	2	2	2	1	1	1	-	-	-	-	-	-	1
C3	3	2	2	2	1	1	1	-	-	-	-	-	-	-
C4	3	2	2	2	2	1	1	-	-	-	-	-	3	2
C5	3	2	2	2	2	1	1	-	-	-	-	-	3	-
Avg	3	2	1.8	2	1.4	1.2	1	-	-	-	-	-	1.2	1.3

CE8403 Applied Hydraulic Engineering	
C1	Apply their knowledge of fluid mechanics in addressing problems in open channels
C2	Able to identify a effective section for flow in different cross sections.
C3	To solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
C4	Understand the principles, working and application of turbines
C5	Understand the principles, working and application of pumps.

CE8491 Soil Mechanics	
C1	Able to Characterize and classify soils and also determine Index properties
C2	Able to understands the concepts of stress and permeability in soils
C3	Able to Compute and analyze the consolidation settlements
C4	Able to Identify shear strength parameters for field conditions
C5	Able to understands the concepts of stability analysis of slope

CE8491 Soil Mechanics														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	-	3	-	2	1	-	-	-	2	-	2	2	-
C2	1	-	-	-	2	-	2	-	-	1	-	2	-	2
C3	2	-	1	-	-	-	2	-	-	1	-	1	1	-
C4	3	-	-	3	2	-	2	-	-	1	-	2	1	3
C5	3	1	-	-	2	-	3	-	2	2	-	2	-	1
Avg	2.2	1	2	3	2	1	2.2	-	2	1.6	-	1.8	1.3	2

CE8404 CONCRETE TECHNOLOGY	
C1	The various requirements of cement, aggregates and water for making concrete
C2	The effect of admixtures on properties of concrete
C3	The concept and procedure of mix design as per IS method
C4	The properties of concrete at fresh and hardened state
C5	The importance and application of special concretes


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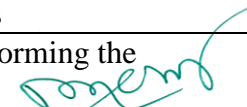
CE8404 CONCRETE TECHNOLOGY														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	2	2	3	2	2	-	-	3	2	1	2	-
C2	3	3	3	2	3	2	1	1	-	1	1	-	1	1
C3	3	3	2	2	2	1	1	-	-	1	1	2	1	-
C4	3	2	3	2	3	1	2	1	-	-	1	-	2	1
C5	3	3	3	2	3	2	1	1	-	-	1	-	1	1
Avg	3	2.8	2.6	2	2.8	1.6	1.4	1	-	1.6	1.2	1.5	1.4	1

CE8481 STRENGTH OF MATERIALS LABORATORY														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	1	1	2	3	3	-	-	3	3	-	2	1	3
C2	3	3	1	3	3	3	-	-	3	3	2	3	-	1
C3	3	3	2	3	2	2	-	-	3	2	2	3	2	-
C4	3	2	1	3	1	2	-	-	2	2	3	2	-	1
C5	2	1	3	2	3	2	-	-	2	3	2	3	2	-
Avg	2.6	2	1.6	2.6	2.4	2.4	-	-	2.6	2.6	2.2	2.6	1.6	1.6

CE8481 STRENGTH OF MATERIALS LABORATORY	
C1	Able to Understand the knowledge about properties of surfaces and solids.
C2	Able to calculate the impact tests on steel bar
C3	Able to perform flexural and torsion test to determine elastic constants
C4	Able to Conduct compression tests on spring, wood and concrete
C5	Able to calculate the deflection of springs

CE 8461 Hydraulic Engineering Laboratory														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	3	2	1	3	2	-	-	1	2	1	1	1	3
C2	3	2	1	2	3	2	-	-	1	2	2	1		1
C3	3	1	2	1	1	3	-	-	1	2	1	1	2	-
C4	3	2	3	2	1	1	-	-	1	1	1	1	1	1
C5	3	3	1	2	2	1	-	-	1	2	2	2	2	-
Avg	2.8	2.2	1.8	1.6	2	1.8	-	-	1	1.8	1.4	1.2	1.5	1.67

CE 8461 Hydraulic Engineering Laboratory	
C1	The students will be able to study the Characteristics of pumps
C2	The students will be able to study the Characteristics of turbine
C3	The students will be able to measure flow in pipes and determine frictional losses.
C4	The students will be able to develop characteristics of pumps and turbines
C5	The students will be able to verify the principles studied in theory by performing the experiments in lab.


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CE8501 Design Of Reinforced Cement Concrete Elements	
C1	Able to understand the basics of concrete design
C2	Able to emphasize the design of structural elements by limit state design method
C3	Able to understand the concrete of shear, bond and torsion
C4	Able to design the vertical compression member
C5	Able to understand the phenomenon about footing design.

CE8501 Design Of Reinforced Cement Concrete Elements														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	1	2	1	3	1	2	1	2	2	1	3	2	1
C2	3	2	2	3	3	2	1	2	1	2	1	2	-	2
C3	3	2	1	2	3	1	2	1	1	2	1	2	2	-
C4	3	2	1	2	2	1	1	1	1	2	1	3	1	2
C5	3	2	1	3	3	1	1	1	1	1	1	3	-	-
Avg	3	1.8	1.4	2.2	2.8	1.2	1.4	1.2	1.2	1.8	1	2.6	1.67	1.67

CE8502 Structural Analysis I														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	3	3	3	2	1	1	2	2	1	2	2	2
C2	3	3	2	3	3	2	1	1	1	2	1	2	1	-
C3	3	3	3	3	3	2	1	1	1	2	1	2	3	2
C4	3	3	3	3	3	2	1	1	1	2	1	2	-	-
C5	3	3	3	3	3	2	1	1	1	2	1	2	-	-
Avg	3	3	2.8	3	3	2	1	1	1.2	2	1	2	2	2

CE8502 Structural Analysis I	
C1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
C2	Analyse the continuous beams and rigid frames by slope deflection method.
C3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.
C4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
C5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.

CE8591 FOUNDATIONENGINEERING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	-	3	2	1	-	1	-	-	2	-	3	1	2
C2	3	1	-	1	2	-	2	-	-	-	-	-	2	-
C3	3	-	1	-	-	2	-	-	-	1	-	-	-	1
C4	2	2	-	3	3	2	-	1	2	-	-	-	-	-
C5	3	-	1	1	-	2	1	1	-	1	-	1	1	1
Avg	2.6	1.5	1.6	1.7	2	2	1	1	2	1.3	-	2	1.3	1.3

CE8591 Foundation Engineering	
C1	Understand the site investigation, methods and sampling
C2	Get knowledge on bearing capacity and testing methods.
C3	Design shallow footings.
C4	Determine the load carrying capacity, settlement of pile foundation.
C5	Determine the earth pressure on retaining walls and analysis for stability.

EN8491 WATER SUPPLY ENGINEERING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	2	2	2	1	1	3	-	1	-	-	-	-	1
C2	2	2	2	1	1	1	2	-	1	-	-	-	-	1
C3	3	2	2	1	2	1	3	-	1	-	-	-	-	1
C4	3	2	2	2	2	1	3	-	1	-	-	-	-	1
C5	2	2	2	2	2	2	2	-	1	-	-	-	-	1
Avg	2.4	2	2	1.6	1.6	1.2	2.6	-	1	-	-	-	-	1

EN8491 WATER SUPPLY ENGINEERING	
C1	An insight into the structure of drinking water supply systems, including water transport, treatment and distribution
C2	The knowledge in various unit operations and processes in water treatment
C3	An ability to design the various functional units in water treatment
C4	An understanding of water quality criteria and standards, and their relation to public health
C5	The ability to design and evaluate water supply project alternatives on basis of chosen

CE8511 Soil Mechanics Laboratory	
C1	Classifying soil based on index properties of soils (course and fine).
C2	Classifying soil based on consistency limit of fine grained soils.
C3	Interpreting the shear strength of all types of soils by conducting lab tests
C4	Interpreting the shear strength of all types of soils by conducting lab tests
C5	Understanding the engineering properties of soils by conducting field tests


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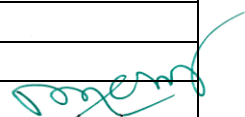
CE8511 SOIL MECHANICS LABORATORY														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	-	2	3	-	2	1	-	1	2	-	-	2	1	2
C2	2	1	2	2	1	1	2	-	-	-	-	-	-	2
C3	3	1	1	2	1	1	-	-	-	-	-	-	1	-
C4	1	2	2	1	3	2	-	3	-	-	3	-	3	-
C5	1	1	2	-	1	-	-	-	1	-	2	2	-	1
Avg	1.7	1.4	2	1.6	1.6	1.2	2	2	1.5	-	2.5	2	1.6	1.6

CE8512 Water And Waste Water Analysis Laboratory	
C1	Quantify the pollutant concentration in water and wastewater
C2	Suggest the type of treatment required and amount of dosage required for the treatment
C3	Examine the conditions for the growth of micro-organisms
C4	Suggest the type of treatment required to reduce e-coli in water
C5	Compare the analysis of treated water among different treatments

CE8512 WATER AND WASTE WATER ANALYSIS LABORATORY														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	-	-	2	-	1	1	-	-	-	-	2	-	3
C2	3	-	2	2	-	-	-	-	-	-	-	2	-	3
C3	3	-	2	2	-	-	-	-	-	-	-	2	1	-
C4	3	-	2	1	-	-	-	-	-	-	-	1	1	-
C5	3	-	2	1	-	-	-	-	-	-	-	1	2	1
Avg	3	-	2	1.6	-	1	1	-	-	-	-	1.6	1.3	2.3

CE8513 SURVEY CAMP														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	2	2	2	3	1	1	2	3	3	2	1	2
C2	3	2	2	3	1	2	1	1	2	3	3	2	2	-
C3	3	2	2	2	1	2	1	1	2	3	3	3	2	3
C4	3	3	2	3	1	2	1	1	2	3	3	2	-	1
C5	3	2	2	2	1	2	1	1	2	3	3	3	-	-
Avg	3	2.4	2	2.4	1.2	2.2	1	1	2	3	3	2.4	1.6	2

CE8513 SURVEY CAMP	
C1	To use all surveying equipment, prepare LS &CS
C2	To prepare contour maps by triangulation method
C3	To prepare maps and grids by Trilateration method
C4	To prepare contour maps by Rectangulation method
C5	To carryout surveying works related to land and civil engineering projects


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CE8601 DESIGN OF STEEL STRUCTURAL ELEMENTS														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	3	3	2	1	1	1	2	1	2	2	2	1
C2	3	3	3	3	2	1	2	1	1	1	1	2	1	-
C3	3	2	3	2	2	1	1	1	2	1	2	2	1	1
C4	3	2	2	3	2	1	1	1	1	1	1	2	2	-
C5	3	3	3	2	2	1	1	1	1	1	2	2	2	-
Avg	3	2.6	2.8	2.6	2	1	1.2	1	1.4	1	1.6	2	1.6	1

CE8601 DESIGN OF STEEL STRUCTURAL ELEMENTS	
C1	Able to understand the concepts of various design philosophies
C2	Able to design common bolted and welded connections for steel structures
C3	Able to design tension members and understand the effect of shear lag.
C4	Able to understand the design concept of axially loaded columns and column base connections.
C5	Able to understand specific problems related to the design of laterally restrained and unrestrained steel beams.

CE8602 STRUCTURAL ANALYSIS II														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	2	1	1	2	-	-	1	-	1	1	-	1	-
C2	2	2	2	1	2	-	-	1	-	1	1	-	1	-
C3	2	2	1	2	3	-	-	-	1	2	1	-	-	1
C4	2	2	1	1	2	1	-	-	1	-	1	3	2	1
C5	2	2	1	2	2	1	-	-	1	2	1	-	-	1
Avg	2	2	1.2	1.4	2.2	1	-	1	1	1.5	1	3	1.3	1

CE8602 Structural Analysis II	
C1	Able to draw influence lines for statically determinate structures and calculate critical stress resultants.
C2	Ability to understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
C3	Able to analyse of three hinged two hinged and fixed arches.
C4	Able to analyse the suspension bridges with stiffening girders
C5	Able to understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.

CE8604 HIGHWAY ENGINEERING	
C1	Able to get knowledge on planning and aligning of highway.
C2	Able to geometric design of highways
C3	Able to design flexible and rigid pavements.
C4	Able to gain knowledge on Highway construction materials, properties, testing methods
C5	Able to understand the concept of pavement management system, evaluation of distress and maintenance of pavements.

CE8604 HIGHWAY ENGINEERING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	1	1	-	2	2	2	1	-	1	-	-	2	1
C2	1	2	3	1	1	1	1	-	-	1	-	-	-	-
C3	1	3	3	2	2	1	1	-	-	1	-	-	2	2
C4	1	1	3	-	-	-	1	-	-	1	-	-	1	1
C5	1	2	3	-	-	-	1	-	-	1	-	-	-	-
Avg	1.4	1.8	2.6	1.5	1.6	1.3	1.2	1	-	1	-	-	1.6	1.3

CE8603 IRRIGATION ENGINEERING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	1	3	2	1	2	2	2	3	2	1	2	2	-
C2	3	2	1	3	1	1	3	1	2	1	2	3	-	1
C3	3	3	2	1	1	2	1	1	1	1	1	3	-	2
C4	1	3	3	2	1	1	1	1	2	1	1	2	1	3
C5	2	2	2	2	1	1	2	1	1	1	1	2	2	1
Avg	2.2	2.2	2.2	2	1	1.4	1.8	1.2	1.8	1.2	1.2	2.4	1.67	1.75

CE8603 IRRIGATION ENGINEERING	
C1	Able to have knowledge and skills on crop water requirements.
C2	Able to understand the methods and management of irrigation.
C3	Able to gain knowledge on types of Impounding structures
C4	Able to understand methods of irrigation including canal irrigation.
C5	Able to get knowledge on water management on optimization of water use.

EN8592 WASTEWATER ENGINEERING	
C1	An ability to estimate sewage generation and design sewer system including sewage pumping stations
C2	The required understanding on the characteristics and composition of sewage, self-purification of streams
C3	An ability to perform basic design of the unit operations and processes that are used in sewage treatment
C4	Understand the standard methods for disposal of sewage.
C5	Gain knowledge on sludge treatment and disposal.

EN8592 WASTEWATER ENGINEERING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	2	3	3	2	3	1	1	1	-	-	-	1	1
C2	3	3	3	2	2	2	3	2	1	-	-	-	2	1
C3	2	2	2	1	1	1	2	2	1	-	-	-	2	1
C4	2	2	2	1	1	1	2	2	1	-	-	-	2	-
C5	2	2	2	1	1	1	2	2	1	-	-	-	2	-
Avg	2.4	2.2	2.4	1.6	1.4	1.6	2	1.8	1	-	-	-	1.8	1

CE8611 Highway Engineering Laboratory														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	-	1	1	1	-	1	-	3	1	-	1	-	3
C2	2	-	1	1	1	-	1	-	3	1	-	1	-	3
C3	-	-	1	1	1	-	1	-	3	1	-	1	1	-
C4	2	-	1	1	1	-	1	-	3	1	-	1	1	-
C5	2	-	1	1	1	-	1	-	3	1	-	1	2	1
Avg	2	-	1	1	1	-	1	-	3	1	-	1	1.3	2.3

CE6612 Highway Engineering Laboratory	
C1	To impart the knowledge of material testing for use in concrete
C2	To understand the mix design for concrete
C3	Able to determine the properties of fresh concrete
C4	Able to determine the properties of hardened concrete
C5	Able to know the techniques to characterize various pavement materials through relevant tests

CE8701 ESTIMATION, COSTING AND VALUATION ENGINEERING	
C1	Able to estimate the quantities of item of works involved in buildings
C2	Able to estimate the water supply and sanitary works, road works and irrigation works
C3	Able to prepare a bill of quantities, make specifications and prepare tender documents
C4	Able to get the knowledge for valuation of properties
C5	Able to prepare the reports for estimation of various items.


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CE8701 ESTIMATION, COSTING AND VALUATION ENGINEERING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	-	-	-	-	-	-	-	2	-	-	2	-	2
C2	3	-	-	-	-	1	-	-	2	-	-	2	-	2
C3	3	-	-	-	-	-	-	2	2	2	1	2	2	2
C4	3	-	-	-	-	-	-	-	2	-	2	2	-	2
C5	2	-	-	-	-	-	-	2	-	3	-	2	2	-
Avg	2.8	-	-	-	-	1	-	2	2	2.5	1.5	2	2	2

CE8702 RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	2	3	3	2	3	-	-	2	-	3	-	3
C2	3	2	2	2	3	-	2	-	-	2	2	3	1	2
C3	2	1	2	1	3	-	2	-	3	3	-	2	-	2
C4	1	1	3	1	3	2	-	1	2	-	3	3	2	2
C5	3	2	3	2	3	-	2	-	2	-	-	2	3	-
Avg	2.4	1.8	2.4	1.8	3	2	2.2	1	2.3	2.3	2.5	2.6	2	2.2

CE8702 RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING	
C1	Able to Plan and Design various civil Engineering aspects of Railways
C2	Able to have an idea about construction and maintenance systems in railway
C3	Ability to create the layouts and components of airport
C4	Able to evaluate the geometric design of airports.
C5	Understand the various terms in harbor engineering and its classification.

CE8703 STRUCTURAL DESIGN AND DRAWING	
C1	Able to design and draw reinforced concrete Cantilever and Counterfort Retaining Walls
C2	Able to design and draw flat slab as per code provisions
C3	Able to design and draw reinforced concrete and steel bridges
C4	Ability to design and draw reinforced concrete and steel water tanks
C5	Able to design and detail the various steel trusses and cantry girders

CE8703 STRUCTURAL DESIGN AND DRAWING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	2	1	2	2	-	1	-	-	-	-	1	2	-
C2	2	2	-	1	1	-	-	-	-	-	-	1	1	-
C3	2	1	1	1	-	1	1	-	-	-	-	1	-	1
C4	1	1	3	2	-	-	1	-	-	-	-	1	-	-
C5	1	-	1	1	1	-	1	-	-	-	-	1	1	-
Avg	1.6	1.5	1.5	1.4	1.3	1	1	-	-	-	-	1	1.3	1


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CE8711 CREATIVE AND INNOVATIVE PROJECT														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	3	3	3	3	3	3	1	3	3	3	3	2
C2	3	3	2	2	2	2	2	-	3	-	-	2	2	-
C3	3	3	2	2	2	2	2	1	-	2	1	1	3	1
C4	3	2	3	2	3	-	1	1	-	2	1	1	3	-
C5	3	2	2	2	3	2	1	1	-	2	1	1	3	1
Avg	3	2.6	2.4	2.2	2.6	1.8	1.8	1.5	2	2.2	1.5	1.6	2.8	1.3

CE8711 CREATIVE AND INNOVATIVE PROJECT	
C1	Will get experience in designing various design problems related to civil Engineering
C2	Able to understand the meaning of team work
C3	To impart and improve the design capability of the student
C4	Analysis and design of structure to meet desired needs within realistic constraints
C5	Able to improve the design of an RC structure

CE8016 Groundwater Engineering														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	2	-	1	2	1	1	2	-	-	-	-	-	1	-
C2	3	3	1	2	1	-	1	-	-	-	-	-	3	-
C3	1	2	1	1	3	-	2	-	-	-	-	-	-	2
C4	1	-	1	1	2	3	2	-	-	-	-	-	-	1
C5	1	2	1	2	2	1	3	-	-	-	-	-	-	2
Avg	1.6	2.3	1	1.6	1.8	1.6	2	-	-	-	-	-	2	1.6

CE8016 Groundwater Engineering	
C1	Able to know the aquifer properties and its dynamics
C2	Able to understand the principles of groundwater governing equations
C3	Able to understand the techniques of development and management of groundwater
C4	Able to understand concepts of groundwater quality.
C5	Able to understand the importance of artificial recharge

EN8591 Municipal Solid Waste Management	
C1	Able to know the sources and characteristics of solid waste
C2	Able to understand the merits of 3R's
C3	Able to gain knowledge on collection, segregation and transfer of MSW
C4	Able to understand the different processing methodology for MSW
C5	Able to gain knowledge on effective disposal of MSW


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EN8591 Municipal Solid Waste Management														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	-	-	-	-	1	2	-	-	-	-	2	2	-
C2	2	-	-	-	-	-	3	-	-	-	-	2	-	-
C3	2	-	2	-	2	1	-	-	-	-	-	-	-	3
C4	-	-	1	-	-	1	2	-	-	-	-	-	1	-
C5	-	-	2	-	-	2	3	-	-	-	-	2	1	2
Avg	2.3	-	1.6	-	2	1.2	2.5	-	-	-	-	2	1	2.5

CE8020 MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	1	2	-	1	1	2	-	1	3	1	3	-	2
C2	3	2	1	3	3	-	-	-	1	2	1	3	3	1
C3	3	3	1	1	3	1	1	-	1	1	1	2	-	1
C4	3	1	1	1	1	1	2	-	1	1	1	3	2	-
C5	3	2	1	3	3	-	-	-	2	1	1	3	1	-
Avg	3	1.8	1.2	2	2.2	1	1.6	-	1.2	1.6	1	2.8	2	1.3

CE8020 MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES	
C1	To gain the knowledge on quality of concrete, durability aspects, causes of deterioration
C2	To gain the knowledge on assessment of distressed structure
C3	To gain the knowledge on repairing methodology of structure
C4	To get to know about special concrete
C5	To obtain more knowledge about retrofitting
CE6811 Project Work	
C1	Able to understand work methodology adopted in industry
C2	Able to find solution for the difficulty during construction
C3	Able to understand the meaning of teamwork
C4	Able to give practical knowledge regarding projects
C5	Able to give the idea to finish work on time

CE8811 Project Work														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C1	3	3	3	3	2	2	2	2	2	3	3	3	2	2
C2	2	2	3	3	3	2	2	2	2	3	3	3	2	2
C3	3	2	3	2	3	2	2	3	3	2	3	3	3	3
C4	2	3	3	2	2	3	3	3	3	2	3	3	3	3
C5	2	3	3	3	2	2	3	3	2	3	3	3	3	2
Avg	2.4	2.6	3	2.6	2.4	2.2	2.4	2.6	2.4	2.6	3	3	2.6	2.4

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Department of Mechanical Engineering
CO PO mapping
Regulation 2017

MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	
CO 1	Understand how to solve the given standard partial differential equations.
CO 2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO 3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations
CO 4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO 5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	2	2	1	-	3	3	-	-	-	-	-	-
2	2	3	2	1	1	-	-	3	3	-	-	-	-	-	-
3	3	2	3	-	1	2	1	3	2	-	-	-	-	-	-
4	3	3	3	1	1	-	-	3	3	-	-	-	-	-	-
5	3	3	3	1	-	1	-	3	3	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8391ENGINEERING THERMODYNAMICS	
CO 1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions.
CO 2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.
CO 3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods.
CO 4	Derive simple thermodynamic relations of ideal and real gases.
CO 5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	1	2	1	3	3	1	-	-	-	-	-	-
2	3	3	3	1	2	1	3	3	1	-	-	-	-	-	-
3	3	3	3	1	2	1	3	3	1	-	-	-	-	-	-
4	3	3	3	1	2	1	3	3	1	-	-	-	-	-	-
5	3	3	3	1	2	1	3	3	1	-	-	-	-	-	-

Low (1); Medium (2); High (3)

CE8394 FLUID MECHANICS AND MACHINERY

CO 1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
CO 2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.
CO 3	Can mathematically predict the nature of physical quantities.
CO 4	Can critically analyse the performance of pumps.
CO 5	Can critically analyse the performance of turbines

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	-	1	-	-	-	-	-	-	-	-	-	-
2	3	3	3	1	1	1	-	-	-	-	-	-	-	-	-
3	3	2	3	2	2	-	-	-	-	-	-	-	-	-	-
4	3	3	3	-	2	-	-	-	-	-	-	-	-	-	-
5	3	3	3	-	2	-	-	-	-	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8351 MANUFACTURING TECHNOLOGY – I

CO 1	Explain different metal casting processes, associated defects, merits and demerits.
CO 2	Compare different metal joining processes.
CO 3	Summarize various hot working and cold working methods of metals.
CO 4	Explain various sheet metal making processes.
CO 5	Distinguish various methods of manufacturing plastic components

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	3	3	3	3	-	3	3	-	-	-	-	-	-
2	-	-	3	3	3	3	1	2	3	-	-	-	-	-	-
3	-	1	3	2	3	2	-	3	3	-	-	-	-	-	-
4	1	-	3	3	3	3	1	2	2	-	-	-	-	-	-
5	-	-	3	3	3	3	-	3	3	-	-	-	-	-	-

Low (1); Medium (2); High (3)

EE8353 ELECTRICAL DRIVES AND CONTROLS

CO 1	Understand the basic concepts of different types of electrical machines and their performance.
CO 2	Knowledge about D.C motors and induction motors.
CO 3	Knowledge about the conventional and solid-state drives.
CO 4	Understanding the conventional and solid state speed control of D.C drives.
CO 5	Understanding the conventional and solid state speed control of A.C drives

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	-	1	1	-	-	1	-	-	-	-	-	-	-
2	1	1	-	1	1	-	-	1	1	-	-	-	-	-	-
3	1	1	-	1	1	-	-	1	-	-	-	-	-	-	-
4	1	1	-	1	1	-	-	1	1	-	-	-	-	-	-
5	1	1	-	1	1	-	-	1	1	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8361 MANUFACTURING TECHNOLOGY LABORATORY – I

CO 1	Demonstrate the safety precautions exercised in the mechanical workshop.
CO 2	Make the workpiece as per given shape and size using Lathe.
CO 3	Join two metals using arc welding.
CO 4	Use sheet metal fabrication tools and make simple tray and funnel.
CO 5	Use different moulding tools, patterns and prepare sand moulds.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	3	3	3	3	-	3	3	-	-	-	-	-	-
2	-	-	3	3	3	3	1	2	3	-	-	-	-	-	-
3	-	1	3	2	3	2	-	3	3	-	-	-	-	-	-
4	1	-	3	3	3	3	1	2	2	-	-	-	-	-	-
5	-	-	3	3	3	3	-	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

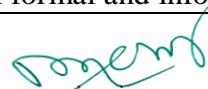
ME8381 COMPUTER AIDED MACHINE DRAWING LABORATORY	
CO 1	Ability to draw assembly drawings both manually and using standard CAD packages.
CO 2	Understand and interpret drawings of machine components.
CO 3	Follow the drawing standards, Fits and Tolerances.
CO 4	Re-create part drawings, sectional views and assembly drawings as per standards.
CO 5	Knowledge in handling 2D drafting, 3D modeling and Dimensioning.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	3	3	3	3	-	3	3	-	-	-	-	-	-
2	-	-	3	3	3	3	1	2	3	-	-	-	-	-	-
3	-	1	3	2	3	2	-	3	3	-	-	-	-	-	-
4	1	-	3	3	3	3	1	2	2	-	-	-	-	-	-
5	-	-	3	3	3	3	-	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

EE8361 ELECTRICAL ENGINEERING LABORATORY	
CO 1	Ability to perform speed characteristic of different electrical machine.
CO 2	EE8361.2 Ability to perform Load test on DC Shunt & DC Series motor.
CO 3	EE8361.3 Ability to perform Speed control of DC shunt motor.
CO 4	EE8361.4 Ability to perform O.C & S.C Test on a single phase transformer.
CO 5	EE8361.5 Ability to perform Load test on three phase squirrel cage Induction motor.
CO 6	EE8361.6 Ability to perform Speed control of three phase slip ring Induction Motor

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	3	-	2	-	1	1	1	-	-	-	-	-	-
2	1	1	3	-	2	1	1	1	1	-	-	-	-	-	-
3	1	1	3	-	2	1	1	1	1	-	-	-	-	-	-
4	1	1	3	-	2	1	1	1	1	-	-	-	-	-	-
5	1	1	3	-	2	-	1	1	1	-	-	-	-	-	-
6	1	1	3	-	2	2	1	1	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

HS8381 INTERPERSONAL SKILLS/LISTENING & SPEAKING	
CO 1	Listen and respond appropriately.
CO 2	HS8381.2 Participate in group discussions
CO 3	HS8381.3 Make effective presentations
CO 4	HS8381.4 Participate confidently and appropriately in conversations both formal and informal.


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CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	1	3	-	-	1	1	-	-	-	-	-	-	-	-
2	-	-	3	1	-	1	1	-	-	-	-	-	-	-	-
3	1	-	3	1	-	-	1	-	-	-	-	-	-	-	-
4	1	-	3	1	-	1	1	-	-	-	-	-	-	-	-

Low (1); Medium (2); High (3)

MA8452 STATISTICS AND NUMERICAL METHODS	
CO 1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO 2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO 3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO 4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO 5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	-	-	1	1	-	1	1	-	-	-	-	-	-
2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	3	3	-	1	-	-	-	-	-	-	-	-	-	-	-
4	3	2	-	-	1	1	-	2	1	-	-	-	-	-	-
5	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8492 KINEMATICS OF MACHINERY	
CO 1	Discuss the basics of mechanism.
CO 2	Calculate velocity and acceleration in simple mechanisms.
CO 3	Develop CAM profiles.
CO 4	Solve problems on gears and gear trains.
CO 5	Examine friction in machine elements.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	-	3	1	-	-	-	-	-	-	-	-	-
2	3	3	3	-	3	-	-	-	1	-	-	-	-	-	-
3	3	3	3	1	3	-	1	-	-	-	-	-	-	-	-
4	3	2	3	-	2	-	-	-	1	-	-	-	-	-	-
5	2	3	3	-	3	-	1	-	-	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8451 MANUFACTURING TECHNOLOGY – II	
CO 1	Explain the mechanism of material removal processes.
CO 2	Describe the constructional and operational features of centre lathe and other special purpose lathes.
CO 3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines.
CO 4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.
CO 5	Summarize numerical control of machine tools and write a part program

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	3	3	-	1	3	3	-	-	-	-	-	-
2	3	-	3	3	3	1	-	3	3	-	-	-	-	-	-
3	3	1	3	3	3	-	1	3	3	-	-	-	-	-	-
4	3	-	2	3	3	1	-	2	3	-	-	-	-	-	-
5	3	1	3	3	3	-	1	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

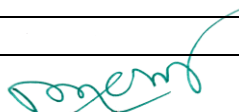
ME8491 ENGINEERING METALLURGY	
CO 1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
CO 2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
CO 3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.
CO 4	Summarize the properties and applications of non metallic materials.
CO 5	Explain the testing of mechanical properties.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	1	-	-	1	3	1	1	-	-	-	-	-	-
2	-	1	-	1	1	-	3	-	-	-	-	-	-	-	-
3	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-
4	1	-	1	-	1	-	3	2	1	-	-	-	-	-	-
5	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

CE8395 STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS	
CO 1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
CO 2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
CO 3	Apply basic equation of simple torsion in designing of shafts and helical spring.
CO 4	Calculate the slope and deflection in beams using different methods.
CO 5	Analyze and design thin and thick shells for the applied internal and external pressures.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	-	-	-	1	-	-	-	-	-	-	-
2	3	3	3	3	1	-	1	-	1	-	-	-	-	-	-
3	3	3	3	3	-	-	-	-	-	-	-	-	-	-	-
4	2	3	3	3	-	1	-	1	-	-	-	-	-	-	-
5	3	3	3	3	-	-	-	-	-	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8493 THERMAL ENGINEERING – I	
CO 1	Apply thermodynamic concepts to different air standard cycles and solve problems.
CO 2	Solve problems in single stage and multistage air compressors.
CO 3	Explain the functioning and features of IC engines, components and auxiliaries.
CO 4	Calculate performance parameters of IC Engines.
CO 5	Explain the flow in Gas turbines and solve problems.


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CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	-	1	3	-	1	-	-	-	-	-	-	-	-
2	3	3	1	-	3	1	1	-	-	-	-	-	-	-	-
3	3	3	-	-	3	-	1	-	-	-	-	-	-	-	-
4	3	3	-	1	3	1	-	-	-	-	-	-	-	-	-
5	3	3	-	-	3	-	-	-	-	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8462 MANUFACTURING TECHNOLOGY LABORATORY – II	
CO 1	Use different machine tools to manufacturing gears.
CO 2	Ability to use different machine tools to manufacturing gears.
CO 3	Ability to use different machine tools for finishing operations.
CO 4	Ability to manufacture tools using cutter grinder.
CO 5	Develop CNC part programming

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	1	3	-	1	-	1	-	1	-	-	-	-	-	-
2	1	-	3	1	-	1	1	-	1	-	-	-	-	-	-
3	1	1	3	1	-	2	1	-	1	-	-	-	-	-	-
4	1	-	3	1	-	1	1	-	-	-	-	-	-	-	-
5	-	1	3	-	1	-	1	-	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

CE 8381 STRENGTH OF MATERIALS AND FLUID MECHANICS AND MACHINERY LABORATORY	
CO 1	Understand the mechanical properties of materials when subjected to different types of loading.
CO 2	Ability to perform Tension & Torsion tests on Solid materials.
CO 3	Ability to perform Hardness & Compression test on Solid materials.
CO 4	Ability to perform Deformation test on Solid materials

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	-	3	1	-	1	1	-	1	-	-	-	-	-	-
2	1	1	3	1	-	-	1	-	1	-	-	-	-	-	-
3	1	-	3	1	-	1	1	-	-	-	-	-	-	-	-
4	-	1	3	-	1	-	1	-	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

HS 8461 ADVANCED READING AND WRITING	
CO 1	Write different types of essays.
CO 2	Write winning job applications.
CO 3	Read and evaluate texts critically.
CO 4	Display critical thinking in various professional contexts

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	1	1	-	-	3	-	-	3	-	-	-	-	-	-
2	-	-	1	1	-	3	-	-	3	-	-	-	-	-	-
3	1	-	1	1	-	3	-	-	3	-	-	-	-	-	-
4	1	-	1	2	-	3	-	-	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

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ME8595 THERMAL ENGINEERING – II	
CO 1	Solve problems in Steam Nozzle.
CO 2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters.
CO 3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.
CO 4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers.
CO 5	Solve problems using refrigerant table / charts and psychrometric charts.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	2	3	1	1	3	2	-	-	-	-	-	-
2	3	3	1	1	3	1	1	3	1	-	-	-	-	-	-
3	3	3	1	1	3	1	1	3	1	-	-	-	-	-	-
4	3	3	1	1	3	1	1	3	1	-	-	-	-	-	-
5	3	3	1	2	3	1	1	3	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8593 DESIGN OF MACHINE ELEMENTS	
CO 1	Understand the influence of steady and variable stresses in machine component design.
CO 2	Apply the concepts of design to shafts, keys and couplings.
CO 3	Apply the concepts of design to temporary and permanent joints.
CO 4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
CO 5	Apply the concepts of design to bearings.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	3	2	3	1	1	3	3	3	-	-	-	-	-	-
2	1	3	1	3	1	1	3	3	3	-	-	-	-	-	-
3	2	3	1	3	1	1	3	3	3	-	-	-	-	-	-
4	1	3	1	3	1	2	3	3	3	-	-	-	-	-	-
5	1	3	1	3	1	1	3	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8501 METROLOGY AND MEASUREMENTS	
CO 1	Describe the concepts of measurements to apply in various metrological instruments
CO 2	Outline the principles of linear and angular measurement tools used for industrial applications
CO 3	Explain the procedure for conducting computer aided inspection
CO 4	Demonstrate the techniques of form measurement used for industrial components
CO 5	Discuss various measuring techniques of mechanical properties in industrial applications

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	3	2	1	3	3	1	-	-	-	-	-	-
2	3	1	3	3	1	1	3	3	1	-	-	-	-	-	-
3	3	1	3	3	1	1	3	3	1	-	-	-	-	-	-
4	3	1	3	3	1	1	3	3	1	-	-	-	-	-	-
5	3	1	3	3	1	1	3	3	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

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ME8594 DYNAMICS OF MACHINES	
CO 1	Calculate static and dynamic forces of mechanisms.
CO 2	Calculate the balancing masses and their locations of reciprocating and rotating masses.
CO 3	Compute the frequency of free vibration.
CO 4	Compute the frequency of forced vibration and damping coefficient.
CO 5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	-	3	-	3	-	3	-	-	-	-	-	-
2	3	3	3	1	3	1	3	1	3	-	-	-	-	-	-
3	3	3	3	1	3	-	3	1	3	-	-	-	-	-	-
4	3	3	3	-	3	-	3	-	3	-	-	-	-	-	-
5	3	3	3	1	3	1	3	1	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8511 KINEMATICS AND DYNAMICS LABORATORY	
CO 1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.
CO 2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	1	1	-	1	-	-	-	-	-	-	-
2	3	3	3	3	1	1	-	1	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8512 THERMAL ENGINEERING LABORATORY	
CO 1	Conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.
CO 2	Conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
CO 3	Conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.
CO 4	Conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.
CO 5	Conduct tests to evaluate the performance of refrigeration and airconditioning test rigs.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	-	1	-	-	-	-	-	-	-	-	-	-
2	3	3	3	1	1	1	-	1	-	-	-	-	-	-	-
3	3	3	3	1	1	1	-	1	1	-	-	-	-	-	-
4	3	3	3	-	1	-	-	-	-	-	-	-	-	-	-
5	3	3	3	1	1	1	-	1	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8513 METROLOGY AND MEASUREMENTS LABORATORY

CO 1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.
CO 2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	1	-	3	1	-	-	-	-	-	-	-
2	3	3	3	3	1	-	3	1	1	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8651 DESIGN OF TRANSMISSION SYSTEMS

CO 1	Apply the concepts of design to belts, chains and rope drives.
CO 2	Apply the concepts of design to spur, helical gears.
CO 3	Apply the concepts of design to worm and bevel gears.
CO 4	Apply the concepts of design to gear boxes.
CO 5	Apply the concepts of design to cams, brakes and clutches

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	3	1	3	1	-	3	1	3	-	-	-	-	-	-
2	1	3	-	3	-	-	3	1	3	-	-	-	-	-	-
3	1	3	2	3	1	1	3	1	3	-	-	-	-	-	-
4	1	3	1	3	-	-	3	1	3	-	-	-	-	-	-
5	1	3	1	3	1	-	3	1	3	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8691 COMPUTER AIDED DESIGN AND MANUFACTURING

CO 1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
CO 2	Explain the fundamentals of parametric curves, surfaces and Solids
CO 3	Summarize the different types of Standard systems used in CAD
CO 4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines
CO 5	Summarize the different types of techniques used in Cellular Manufacturing and FMS

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	3	3	1	3	1	1	1	1	-	-	-	-	-	-
2	1	3	3	1	3	1	2	1	1	-	-	-	-	-	-
3	1	3	3	2	3	1	1	1	2	-	-	-	-	-	-
4	1	3	3	1	3	1	1	2	1	-	-	-	-	-	-
5	1	3	3	1	3	2	1	1	1	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8693 HEAT AND MASS TRANSFER

CO 1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems
CO 2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
CO 3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations

	solve problems
CO 4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
CO 5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	2	1	1	3	3	-	-	-	-	-	-
2	3	3	3	3	1	1	1	3	3	-	-	-	-	-	-
3	3	3	3	3	1	1	1	3	3	-	-	-	-	-	-
4	3	3	3	3	1	1	1	3	3	-	-	-	-	-	-
5	3	3	3	3	2	1	1	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8692 FINITE ELEMENT ANALYSIS	
CO 1	Summarize the basics of finite element formulation.
CO 2	Apply finite element formulations to solve one dimensional Problems.
CO 3	Apply finite element formulations to solve two dimensional scalar Problems.
CO 4	Apply finite element method to solve two dimensional Vector problems.
CO 5	Apply finite element method to solve problems on iso parametric element and dynamic Problems.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	3	1	1	1	1	3	-	-	-	-	-	-
2	3	3	1	3	1	1	2	1	3	-	-	-	-	-	-
3	3	3	2	3	1	2	1	1	3	-	-	-	-	-	-
4	3	3	1	3	1	1	1	2	3	-	-	-	-	-	-
5	3	3	1	3	1	1	1	1	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8694 HYDRAULICS AND PNEUMATICS	
CO 1	Explain the Fluid power and operation of different types of pumps.
CO 2	Summarize the features and functions of Hydraulic motors, actuators and Flow control valves
CO 3	Explain the different types of Hydraulic circuits and systems.
CO 4	Explain the working of different pneumatic circuits and systems.
CO 5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	-	3	3	1	-	3	-	-	-	-	-	-	-
2	3	3	1	3	3	1	-	3	1	-	-	-	-	-	-
3	3	3	1	3	2	-	-	3	-	-	-	-	-	-	-
4	3	3	1	3	3	1	-	3	-	-	-	-	-	-	-
5	3	3	-	3	3	1	-	3	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8681 CAD / CAM LABORATORY

CO 1	Draw 3D and Assembly drawing using CAD software
CO 2	Demonstrate manual part programming with G and M codes using CAM.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	3	3	1	-	3	1	-	2	-	-	-	-	-	-
2	-	3	3	1	-	3	1	-	1	-	-	-	-	-	-

Low (1); Medium (2); High (3)

HS8581 PROFESSIONAL COMMUNICATION

CO 1	Make effective presentations
CO 2	Participate confidently in Group Discussions.
CO 3	Attend job interviews and be successful in them.
CO 4	Develop adequate Soft Skills required for the workplace.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	1	1	-	-	3	3	-	3	-	-	-	-	-	-
2	-	-	1	1	-	3	3	-	3	-	-	-	-	-	-
3	-	-	-	-	-	3	3	-	2	-	-	-	-	-	-
4	-	1	1	-	-	3	3	-	3	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8792 POWER PLANT ENGINEERING

CO 1	Explain the layout, construction and working of the components inside a thermal power plant.
CO 2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
CO 3	Explain the layout, construction and working of the components inside nuclear power plants.
CO 4	Explain the layout, construction and working of the components inside Renewable energy power plants.
CO 5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	1	1	-	3	-	-	-	-	-	-	-
2	3	3	3	2	1	-	1	3	1	-	-	-	-	-	-
3	3	2	3	3	-	-	1	3	2	-	-	-	-	-	-
4	3	3	3	2	1	-	1	3	-	-	-	-	-	-	-
5	3	3	3	3	-	1	-	3	1	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8791 MECHATRONICS

CO 1	Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology.
CO 2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing Modes of Microprocessor and Microcontroller.
CO 3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device interfacing.
CO 4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.
CO 5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	1	3	1	-	3	3	-	-	-	-	-	-
2	3	3	3	1	2	-	1	3	3	-	-	-	-	-	-
3	3	2	3	-	3	-	1	3	3	-	-	-	-	-	-
4	3	3	3	-	2	-	1	3	3	-	-	-	-	-	-
5	3	3	3	-	3	1	-	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8793 PROCESS PLANNING AND COST ESTIMATION	
CO 1	Select the process, equipment and tools for various industrial products.
CO 2	Prepare process planning activity chart.
CO 3	Explain the concept of cost estimation.
CO 4	Compute the job order cost for different type of shop floor.
CO 5	Calculate the machining time for various machining operations.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	3	-	3	1	-	1	-	1	-	-	-	-	-	-
2	1	3	1	3	-	1	-	1	1	-	-	-	-	-	-
3	-	3	1	3	-	-	-	1	2	-	-	-	-	-	-
4	1	3	1	3	-	1	-	1	1	-	-	-	-	-	-
5	-	3	-	3	1	-	1	-	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8711 SIMULATION AND ANALYSIS LABORATORY	
CO 1	Simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.
CO 2	Analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.
CO 3	Calculate the natural frequency and mode shape analysis of 2D components and beams.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	1	1	3	1	3	1	1	-	-	-	-	-	-
2	3	1	1	1	3	1	3	2	1	-	-	-	-	-	-
3	3	1	1	1	3	1	3	1	1	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME8781 MECHATRONICS LABORATORY	
CO 1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.
CO 2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	1	3	1	-	3	3	-	-	-	-	-	-
2	3	3	3	1	2	-	1	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															


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ME8793 PROCESS PLANNING AND COST ESTIMATION**C**

Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	2	2	1	3	3	2	3	-	-	-	-	-	-
2	1	1	1	1	-	3	2	1	3	-	-	-	-	-	-
3	1	-	1	2	-	3	2	-	3	-	-	-	-	-	-
4	1	-	1	1	2	3	2	1	3	-	-	-	-	-	-
5	-	-	2	1	1	3	2	-	3	-	-	-	-	-	-

Low (1); Medium (2); High (3)

ME8811 PROJECT WORK**CO**

On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	2	1	3	3	1	3	-	-	-	-	-	-

Low (1); Medium (2); High (3)

IE8693 PRODUCTION PLANNING AND CONTROL**CO 1**

Upon completion of this course, the students can able to prepare production planning and control activities such as work study, product planning, production scheduling, Inventory Control.

CO 2

They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	-	1	3	-	1	3	3	-	-	-	-	-	-
2	3	1	1	1	3	1	1	3	3	-	-	-	-	-	-

Low (1); Medium (2); High (3)


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Department of Science and Humanities

CO PO mapping

Regulation 2017

HS8151 TECHNICAL ENGLISH	
CO 1	Read technical texts and write area specific texts specifically
CO 2	Listen and comprehend lectures and talks in their areas of specialization successfully
CO 3	Describe a process through technical texts
CO 4	Speak appropriately and effectively in varied formal and informal contexts
CO 5	Write short essays of a general kind and personal letters and emails in English

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	-	-	1	2	2	-	2	-	-	-
2	-	-	-	-	-	-	-	2	2	2	-	2	-	-	-
3	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-
4	-	-	-	-	-	-	-	2	3	3	-	3	-	-	-
5	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-
Low (1); Medium (2); High (3)															

HS8251 COMMUNICATIVE ENGLISH	
CO 1	Read articles of a general kind in magazines and newspapers
CO 2	Participate effectively in informal conversations; introduce themselves and their friends.
CO 3	Express opinions and talk about routine actions
CO 4	comprehend conversations and short talks delivered in English
CO 5	Write short essays of a general kind and personal letters and emails in English

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	-	-	1	2	2	-	2	-	-	-
2	-	-	-	-	-	-	-	1	2	2	-	2	-	-	-
3	-	-	-	-	-	-	-	1	3	3	-	3	-	-	-
4	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-
5	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-
Low (1); Medium (2); High (3)															

CY8151 ENGINEERING CHEMISTRY	
CO 1	To understand the water related problems in boilers and their treatment techniques.
CO 2	To understand the concept and applications of adsorption in the field of water and air pollution abatement.
CO 3	To apply phase rule in the alloying and the behaviour of one component and two component systems using phase diagram
CO 4	To recommend suitable fuels for engineering processes and applications.
CO 5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	-	-	-	1	2	-	-	-	-	1	2	2	-
2	2	2	-	-	-	1	2	-	-	-	-	1	2	2	-
3	3	3	-	-	-	2	2	-	-	-	-	2	3	3	-
4	3	3	-	-	-	2	3	-	-	-	-	2	3	3	-
5	3	3	-	-	-	2	3	-	-	-	-	2	3	3	-
Low (1); Medium (2); High (3)															

GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING	
CO 1	Explaining the concepts of different ecosystem and biodiversity present. Applying the basic concepts of science and engineering for pollution abatement
CO 2	Understanding the basic concepts of science and engineering for pollution abatement
CO 3	Explaining the different types of natural resources, usage and exploitation
CO 4	Implementing scientific, technological, and economic solutions to environmental problems
CO 5	Outline on the impact of population on environment

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1	-	-	2	3	2	1	-	-	1	2	1	1
2	2	1	1	-	-	2	3	2	1	-	-	2	2	1	1
3	2	1	1	-	-	2	3	2	1	-	-	1	2	1	1
4	2	1	1	-	-	2	3	2	1	-	-	1	2	1	1
5	2	1	1	-	-	2	3	2	1	-	-	1	2	1	1
Low (1); Medium (2); High (3)															

PH3151 ENGINEERING PHYSICS	
CO 1	Students will gain knowledge on the basic properties of matter and its applications
CO 2	students will acquire knowledge on the concept of waves and optical devices and their applications in fibre optics
CO 3	students will have adequate knowledge on the concepts of thermal properties of material and their application in expansion of heat exchanges
CO 4	The student will get knowledge on advances physics, concepts of quantum theory and its application in tunneling microscope
CO 5	The student will understand the basic of crystal their structures and different crystal growth techniques

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2										2			
2	2	1										2			
3	2	2	1									2			
4	2	1										1			
5	2	2		1								1			
Low (1); Medium (2); High (3)															

MA8151 ENGINEERING MATHEMATICS I	
CO 1	Use both the limit definition and rules of differentiate function in differential equations.
CO 2	Apply differentiation to solve maxima and minima problems.
CO 3	Apply integrals both by using Integration and Trigonometric methods.
CO 4	Evaluate multiple integrals using techniques of integration (Double and Triple Integral).
CO 5	Evaluate various techniques in solving differential equations.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	-	-	-	-	-	-	1	-	-	2	2	2	-
2	3	3	-	-	-	-	-	-	2	-	-	3	3	3	-
3	3	3	-	-	-	-	-	-	2	-	-	3	3	3	-
4	3	3	-	-	-	-	-	-	2	-	-	3	3	3	-
5	3	3	-	-	-	-	-	-	2	-	-	3	3	3	-
Low (1); Medium (2); High (3)															

MA8251 ENGINEERING MATHEMATICS II	
CO 1	Eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
CO 2	Gradient, divergence and curl of a vector point function and related identities.
CO 3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
CO 4	Analytic functions, conformal mapping and complex integration.
CO 5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	-	-	-	-	-	-	1	-	-	1	2	2	-
2	2	2	-	-	-	-	-	-	1	-	-	2	2	2	-
3	2	2	-	-	-	-	-	-	1	-	-	2	2	2	-
4	2	2	-	-	-	-	-	-	1	-	-	2	2	2	-
5	3	3	-	-	-	-	-	-	3	-	-	2	3	3	-
Low (1); Medium (2); High (3)															

DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING

Mapping of Course outcome with program outcome
Regulation -2021

CO	MA3353-Linear algebra and partial differential equations
CO 1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO 2	Demonstrate accurate and efficient use of advanced algebraic techniques
CO 3	Apply the concept of random processes in engineering disciplines.
CO 4	Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.
CO 5	Understand the basic concepts of one and two dimensional random variables and apply them to model engineering problems.

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

CO	CS3353 C Programming and Data Structures
CO 1	Develop C programs for any real world/technical application
CO 2	Apply advanced features of C in solving problems
CO 3	Write functions to implement linear and non-linear data structure operations.
CO 4	Suggest and use appropriate linear/non-linear data structure operations for solving a given problem
CO 5	Appropriately use sort and search algorithms for a given application.

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

CO	EC3354 Signals and Systems
CO 1	Determine if a given system is linear/causal/stable
CO 2	Determine the frequency components present in a deterministic signal
CO 3	Characterize continuous LTI systems in the time domain and frequency domain
CO 4	Characterize discrete LTI systems in the time domain and frequency domain
CO 5	Compute the output of an LTI system in the time and frequency domains

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3		3		3	2						3		-	1
CO 2	3		3		-	2						3		3	
CO 3	3	3			3	2						3	2		
CO 4	3	3			3	2						3		3	1
CO 5	3	3		3	3	2						3		3	1

CO	EC3353 Electronic Devices and Circuits
CO 1	Explain the structure and working operation of basic electronic devices
CO 2	Design and analyse amplifiers.
CO 3	Analyse frequency response of BJT and MOSFET amplifiers
CO 4	Design and analyse feedback amplifiers and oscillator principles.
CO 5	Design and analyse power amplifiers and supply circuits

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

CO	EC3351 CONTROL SYSTEMS
CO 1	Compute the transfer function of different physical systems.
CO 2	Analyse the time domain specification and calculate the steady state error.
CO 3	Illustrate the frequency response characteristics of open loop and closed loop system response.
CO 4	Analyse the stability using Routh and root locus techniques
CO 5	Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.

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

CO	EC3352 Digital Systems Designs
CO 1	Use Boolean algebra and simplification procedures relevant to digital logic
CO 2	Design various combinational digital circuits using logic gates.
CO 3	Analyse and design synchronous sequential circuits
CO 4	Analyse and design asynchronous sequential circuits
CO 5	: Build logic gates and use programmable devices

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

CO	EC3361 Electronic Devices And Circuits Laboratory
CO 1	Characteristics of PN Junction Diode
CO 2	Characteristics of Zener diode.
CO 3	Design and Testing of BJT amplifiers.
CO 4	Design and Testing of MOSFET amplifiers.
CO 5	Operation of power amplifiers.

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


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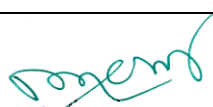
CO	CS3362 C Programming and Data Structures Laboratory
CO 1	Use different constructs of C and develop applications
CO 2	Write functions to implement linear and non-linear data structure operations
CO 3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem
CO 4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
CO 5	Implement Sorting and searching algorithms for a given application

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

CO	GE3361 Professional Development
CO 1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO 2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO 3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects

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

CO	EC3352 Electromagnetic Fields
CO 1	Relate the fundamentals of vector, coordinate system to electromagnetic concepts
CO 2	Analyze the characteristics of Electrostatic field
CO 3	Interpret the concepts of Electric field in material space and solve the boundary conditions
CO 4	Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.
CO 5	Determine the significance of time varying fields


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CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	2	1	1	1	1					1	1	1	1	0
CO 2	2	2	1	1	1	1					1	1	1	1	0
CO 3	3	3	2	2	2	2					2	2	2	2	0
CO 4	2	2	1	1	1	1					1	1	1	1	0
CO 5	3	3	2	2	2	2					2	2	2	2	0

CO	EC3401 Networks and Security
CO 1	Explain the Network Models, layers and functions
CO 2	Categorize and classify the routing protocols.
CO 3	List the functions of the transport and application layer
CO 4	Evaluate and choose the network security mechanisms.
CO 5	Discuss the hardware security attacks and countermeasures.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	3	2	2	1	1					1	1	2	2	2
CO 2	3	3	3	3	0	0					0	0	1	1	1
CO 3	3	3	2	2	1	1					1	1	2	2	2
CO 4	3	3	3	3	0	0					0	0	1	1	1
CO 5	3	3	3	3	0	0					0	0	1	1	1

CO	EC3451 C Linear Integrated Circuits
CO 1	Design linear and nonlinear applications of OP – AMPS
CO 2	Design applications using analog multiplier and PLL
CO 3	Design ADC and DAC using OP – AMPS
CO 4	Generate waveforms using OP – AMP Circuits
CO 5	Analyze special function ICs

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


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CO	EC3492 Digital Signal Processing
CO 1	Apply DFT for the analysis of digital signals and systems
CO 2	Design IIR and FIR filters
CO 3	Characterize the effects of finite precision representation on digital filters
CO 4	Design multirate filters
CO 5	Apply adaptive filters appropriately in communication systems

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

CO	EC3491 Communication Systems
CO 1	Gain knowledge in amplitude modulation techniques
CO 2	Understand the concepts of Random Process to the design of communication systems
CO 3	Gain knowledge in digital techniques
CO 4	Gain knowledge in sampling and quantization
CO 5	Understand the importance of demodulation techniques

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


CO	EC3461 COMMUNICATION SYSTEMS LABORATORY
CO 1	Design AM, FM & Digital Modulators for specific applications.
CO 2	Compute the sampling frequency for digital modulation.
CO 3	Simulate & validate the various functional modules of Communication system
CO 4	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.
CO 5	Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication system.


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

CO	EC3462 LINEAR INTEGRATED CIRCUITS LABORATORY
CO 1	Analyses various types of feedback amplifiers
CO 2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
CO 3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave shaping circuits and multivibrators, filters using SPICE Tool.
CO 4	Design amplifiers, oscillators, D-A converters using operational amplifiers
CO5	Design filters using op-amp and perform an experiment on frequency response

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


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CO PO mapping

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MA3351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	
CO 1	To introduce the basic concepts of PDE for solving standard partial differential equations.
CO 2	To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
CO 3	To acquaint the student with Fourier series techniques in solving heat flow problems used in various situations.
CO 4	To acquaint the student with Fourier, transform techniques used in wide variety of situations.
CO 5	To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	2	2	1	-	3	3	-	-	-	-	-	-
2	2	3	2	1	1	-	-	3	3	-	-	-	-	-	-
3	3	2	3	-	1	2	1	3	2	-	-	-	-	-	-
4	3	3	3	1	1	-	-	3	3	-	-	-	-	-	-
5	3	3	3	1	-	1	-	3	3	-	-	-	-	-	-
Low (1); Medium (2); High (3)															

ME3351 ENGINEERING MECHANICS	
CO 1	To Learn the use scalar and vector analytical techniques for analysing forces in statically determinate structures
CO 2	To introduce the equilibrium of rigid bodies, vector methods and free body diagram
CO 3	To study and understand the distributed forces, surface, loading on beam and intensity.
CO 4	To learn the principles of friction, forces and to determine the apply the concepts of frictional forecast the contact surfaces of various engineering systems.
CO 5	To develop basic dynamics concepts – force, momentum, work and energy

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
2	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
3	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
4	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
5	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
Low (1); Medium (2); High (3)															

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ME3391 ENGINEERING THERMODYNAMICS	
CO 1	Impart knowledge on the basics and application of zeroth and first law of thermodynamics.
CO 2	Impart knowledge on the second law of thermodynamics in analysing the performance of thermal devices.
CO 3	Impart knowledge on availability and applications of second law of thermodynamics
CO 4	Teach the various properties of steam through steam tables and Mollier chart.
CO 5	Impart knowledge on the macroscopic properties of ideal and real gases

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	1	-	-	-	-	-	-	-	2	-	-	-
2	3	3	2	1	-	-	-	-	-	-	-	2	-	-	-
3	3	3	2	1	-	-	-	-	1	-	1	2	3	-	3
4	3	3	2	1	-	1	-	-	2	-	1	2	3	2	-
5	3	3	2	1	-	1	-	-	2	-	1	2	3	2	3
Low (1); Medium (2); High (3)															

CE3391 FLUID MECHANICS AND MACHINERY	
CO 1	To introduce the students about properties of the fluids, behaviour of fluids under static conditions.
CO 2	To impart basic knowledge of the dynamics of fluids and boundary layer concept.
CO 3	To expose to the applications of the conservation laws to a) flow measurements b) flow through pipes (both laminar and turbulent) and c) forces on pipe bends.
CO 4	To exposure to the significance of boundary layer theory and its thicknesses.
CO 5	To expose the students to basic principles of working of hydraulic machineries and to design Pelton wheel, Francis and Kaplan turbine, centrifugal and reciprocating pumps

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	2	1	2	2	1	2	1	1	2	3	2	3
2	3	3	3	2	1	2	2	1	2	1	1	2	3	2	3
3	3	3	3	2	1	2	2	1	2	1	1	2	3	3	3
4	3	3	3	3	1	2	2	1	2	1	1	2	3	2	2
5	3	3	3	3	1	2	2	1	2	1	1	2	3	2	2
Low (1); Medium (2); High (3)															

ME3392 ENGINEERING MATERIALS AND METALLURGY	
CO 1	To learn the constructing the phase diagram and using of iron-iron carbide phase diagram for microstructure formation.
CO 2	To learn selecting and applying various heat treatment processes and its microstructure formation.
CO 3	To illustrate the different types of ferrous and non-ferrous alloys and their uses in engineering field.
CO 4	To illustrate the different polymer, ceramics and composites and their uses in engineering field.
CO 5	To learn the various testing procedures and failure mechanism in engineering field.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	2	-	-	-	-	-	-	-	2	2	1	2
2	3	1	3	1	-	2	-	1	-	-	-	2	2	1	2
3	3	1	3	-	-	-	-	-	-	-	-	2	2	1	2
4	3	1	3	-	-	-	2	-	-	-	-	2	2	1	2
5	3	1	3	2	2	-	-	-	-	-	-	2	2	1	2
Low (1); Medium (2); High (3)															

ME3393 MANUFACTURING PROCESSES	
CO 1	To illustrate the working principles of various metal casting processes.
CO 2	To learn and apply the working principles of various metal joining processes.
CO 3	To analyse the working principles of bulk deformation of metals.
CO 4	To learn the working principles of sheet metal forming process.
CO 5	To study and practice the working principles of plastics molding.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	-	2	-	-	2	3	1	1	-	-	1	3	1	2
2	3	-	2	-	-	2	3	1	1	-	-	1	3	1	2
3	3	-	2	-	-	2	2	1	1	-	-	1	3	1	2
4	3	-	2	-	-	2	2	1	1	-	-	1	3	1	2
5	3	-	2	-	2	2	2	1	1	-	-	1	3	1	2
Low (1); Medium (2); High (3)															

ME3381 COMPUTER AIDED MACHINE DRAWING	
CO 1	To acquaint the skills and practical experience in handling 2D drafting and 3D modelling software systems, standard drawing practices using fits and tolerances.
CO 2	To prepare assembly drawings both manually and using standard CAD packages.
CO 3	To Preparing standard drawing layout for modelled parts, assemblies with BoM.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	2	-	3	3	-	-	-	3	2	-	3	2	2	2
2	1	2	-	3	3	-	-	-	3	2	-	3	2	2	2
3	1	2	-	2	3	-	-	-	3	2	-	3	2	2	2
Low (1); Medium (2); High (3)															

ME3382 MANUFACTURING TECHNOLOGY LABORATORY	
CO 1	Ability to perform speed characteristic of different electrical machine.
CO 2	Ability to perform Load test on DC Shunt & DC Series motor.
CO 3	Ability to perform Speed control of DC shunt motor.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	-	-	-	-	-	1	-	2	-	-	1	1	2	2
2	3	-	-	-	-	-	1	-	2	-	-	1	1	2	2
3	3	-	-	-	-	-	1	-	2	-	-	1	1	2	2
Low (1); Medium (2); High (3)															

GE3361 PROFESSIONAL DEVELOPMENT	
CO 1	Use MS Word to create quality documents, by structuring and organizing content for

	their day to day technical and academic requirements
CO 2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO 3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	-	2	2	-	-	1	-	2	-	-	1	1	2	3
2	3	-	2	2	-	-	1	-	2	-	-	1	1	2	3
3	3	-	2	2	-	-	1	-	2	-	-	1	1	2	3

Low (1); Medium (2); High (3)

SEMESTER IV

ME3491 THEORY OF MACHINES	
CO 1	Discuss the basics of mechanism.
CO 2	Solve problems on gears and gear trains.
CO 3	Examine friction in machine elements.
CO 4	Calculate static and dynamic forces of mechanisms.
CO 5	Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
2	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
3	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
4	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
5	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1

Low (1); Medium (2); High (3)

ME3451 THERMAL ENGINEERING	
CO 1	Apply thermodynamic concepts to different air standard cycles and solve problems.
CO 2	To solve problems in steam nozzle and calculate critical pressure ratio.
CO 3	Explain the flow in steam turbines, draw velocity diagrams, flow in Gas turbines and solve problems.
CO 4	Explain the functioning and features of IC engine, components and auxiliaries.
CO 5	Calculate the various performance parameters of IC engines.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	-	-	-	-	-	-	-	1	2	1	-
2	3	2	2	1	-	-	-	-	-	-	-	1	2	1	-
3	3	2	2	1	-	-	-	-	-	-	-	1	2	1	-
4	3	2	1	1	-	-	-	-	-	-	-	1	2	1	-
5	3	2	1	1	-	-	-	-	-	-	-	1	2	1	-

Low (1); Medium (2); High (3)

ME3492 HYDRAULICS AND PNEUMATICS

CO 1	Apply the working principles of fluid power systems and hydraulic pumps.
CO 2	Apply the working principles of hydraulic actuators and control components.
CO 3	Design and develop hydraulic circuits and systems.
CO 4	Apply the working principles of pneumatic circuits and power system and its components.
CO 5	Identify various troubles shooting methods in fluid power systems

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
2	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
3	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
4	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
5	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1

Low (1); Medium (2); High (3)

ME3493 MANUFACTURING TECHNOLOGY

CO 1	Apply the mechanism of metal removal process and to identify the factors involved in improving machinability.
CO 2	Describe the constructional and operational features of centre lathe and other special purpose lathes.
CO 3	Describe the constructional and operational features of reciprocating machine tools.
CO 4	Apply the constructional features and working principles of CNC machine tools.
CO 5	Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component..

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	1	1	1	3	-	-	3	-	2	3	3	2
2	3	3	3	1	1	1	3	-	-	3	-	2	3	2	2
3	3	3	3	1	1	1	3	-	-	3	-	2	3	2	2
4	3	3	2	1	1	1	3	-	-	3	-	2	3	2	2
5	3	3	3	1	1	1	3	-	-	3	-	2	3	2	3

Low (1); Medium (2); High (3)

CE3491 STRENGTH OF MATERIALS

CO 1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
CO 2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
CO 3	Apply basic equation of torsion in designing of shafts and helical springs
CO 4	Calculate slope and deflection in beams using different methods.
CO 5	Analyze thin and thick shells for applied pressures.

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

Low (1); Medium (2); High (3)

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CE3481 STRENGTH OF MATERIALS AND FLUID MACHINERY LABORATORY	
CO 1	Determine the tensile, torsion and hardness properties of metals by testing
CO 2	Determine the stiffness properties of helical and carriage spring
CO 3	Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction factor of given pipe.
CO 4	Apply the fluid static and momentum principles to determine the met centric height and forces due to impact of jet
CO 5	Determine the performance characteristics of turbine, rot dynamic pump and positive displacement pump.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	3	3	1	1	1	3	1	1	2	2	2	1
2	3	2	1	3	3	1	1	1	3	1	1	2	2	2	1
3	3	3	2	3	2	1	1	1	3	1	1	2	2	2	1
4	3	3	-	1	3	1	-	-	-	1	-	-	-	-	-
5	3	3	1	-	3	-	2	1	1	-	-	-	1	-	1
Low (1); Medium (2); High (3)															

ME3461 THERMAL ENGINEERING LABORATORY	
CO 1	Conduct tests to evaluate performance characteristics of IC engines
CO 2	Conduct tests to evaluate the performance of refrigeration cycle.
CO 3	Conduct tests to evaluate Performance and Energy Balance on a Steam Generator.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	1	-	-	-	-	1	-	-	1	1	1	1
2	2	2	1	1	-	-	-	-	1	-	-	1	1	1	1
3	2	2	1	1	-	-	-	-	1	-	-	1	1	1	1
Low (1); Medium (2); High (3)															


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CO PO Mapping

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ME3351 ENGINEERING MECHANICS	
CO 1	Able to Illustrate the vectorial and scalar representation of forces and moments
CO 2	Able to analyse the rigid body in equilibrium
CO 3	Able to evaluate the properties of distributed forces
CO 4	Able to determine the friction and the effects by the laws of friction
CO 5	Able to calculate dynamic forces exerted in rigid body

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
2	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
3	3	2	3	1	2	-	-	-	-	-	-	2	3	1	1
4	3	2	3	1	2	-	-	-	-	-	-	2	3	1	1
5	3	2	3	1	2	-	-	-	-	-	-	2	3	1	1
Low (1); Medium (2); High (3)															

CE3301 FLUID MECHANICS	
CO 1	Expected to demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.
CO 2	Expected to apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.
CO 3	Expected to formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies
CO 4	Expected to estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.
CO 5	Expected to explain the concept of boundary layer and its application to find the drag force exerted by the fluid on the flat solid surface.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	1	2	2	1	1	1	1	2	3	2	1
2	3	2	1	1	1	2	2	1	1	1	1	2	3	2	1
3	3	2	3	2	1	2	2	1	1	1	1	2	3	3	2
4	3	3	3	2	1	3	2	1	1	1	1	3	3	3	3
5	3	3	2	2	1	3	2	1	1	1	1	3	3	3	3
Low (1); Medium (2); High (3)															

CE3302 CONSTRUCTION MATERIALS AND TECHNOLOGY	
CO 1	Able to identify the good quality brick, stone and blocks for construction.
CO 2	Able to recognize the market forms of timber, steel, aluminum and applications of various composite materials.
CO 3	Able to identify the best construction and service practices such as thermal insulations and air conditioning of the building
CO 4	Able to select various equipments for construction works conditioning of building
CO 5	Able to understand the construction planning and scheduling techniques

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	-	3	-	2	2	-	-	-	-	2	3	-	-
2	3	-	-	2	-	-	2	-	-	-	-	2	3	-	2
3	3	-	-	2	-	-	3	-	-	-	2	-	3	-	2
4	2	-	-	-	-	-	-	-	-	-	2	-	3	3	-
5	2	3	3	3	2	2	-	-	2	-	3	2	3	3	3
Low (1); Medium (2); High (3)															

CE3303 WATER SUPPLY AND WASTE WATER ENGINEERING	
CO 1	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission
CO 2	Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
CO 3	Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process
CO 4	Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and seepage disposal methods.
CO 5	Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	3	-	2	-	-	-	1	1	-	-	-	-	-	-
2	2	3	-	2	-	-	-	1	1	-	-	-	-	-	-
3	3	3	3	-	-	3	2	2	2	-	2	-	-	2	2
4	3	3	3	-	2	3	3	2	3	-	2	-	-	2	2
5	3	3	3	2	2	3	3	2	3	2	2	3	-	2	3
Low (1); Medium (2); High (3)															


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CE3351 SURVEYING AND LEVELLING	
CO 1	Expected to introduce the rudiments of various surveying and its principles.
CO 2	Expected to imparts knowledge in computation of levels of terrain and ground features
CO 3	Expected to imparts concepts of theodolite surveying for complex surveying operations
CO 4	Expected to understand the procedure for establishing horizontal and vertical control
CO 5	Expected to imparts the knowledge on modern surveying instruments

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	3	2	2	3	-	2	2	2	2	-	3	3	3
2	3	3	2	2	2	3	-	2	2	2	2	-	3	3	3
3	3	3	3	2	3	3	-	2	2	2	2	-	3	3	3
4	3	3	3	3	3	3	2	2	3	2	2	2	3	3	3
5	3	3	3	3	3	3	2	3	2	2	2	2	3	3	3
Low (1); Medium (2); High (3)															

CE3361 SURVEYING AND LEVELLING LABORATORY	
CO 1	Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments
CO 2	Able to use levelling instrument for surveying operations
CO 3	Able to use theodolite for various surveying operations
CO 4	Able to carry out necessary surveys for social infrastructures
CO 5	Able to prepare planimetric maps

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	3	2	3	2	3	3	3	3	1	3	3	3
2	3	2	3	-	3	3	3	3	3	3	3	1	3	3	3
3	3	1	2	-	3	2	-	-	3	-	-	2	3	3	3
4	3	3	2	3	2	3	3	2	3	3	3	1	3	3	3
5	3	3	3	2	2	3	3	2	3	3	3	1	3	3	3
Low (1); Medium (2); High (3)															

CE3311 WATER AND WASTEWATER ANALYSIS LABORATORY	
CO 1	Expected to calibrate and standardize the equipment
CO 2	Expected to collect proper sample for analysis
CO 3	Expected to know the sample preservation methods
CO 4	Expected to perform field oriented testing of water, wastewater
CO 5	Expected to perform coliform analysis


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CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1	1	2	1	2	2	1	1	1	3	1	2	2
2	2	1	1	1	1	2	2	2	1	2	2	3	2	2	2
3	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
4	3	3	3	3	3	2	2	3	3	2	3	2	3	3	3
5	2	3	3	3	3	2	2	3	2	2	2	3	2	2	2
Low (1); Medium (2); High (3)															

GE3361 PROFESSIONAL DEVELOPMENT	
CO 1	Able to use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO 2	Able to use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO 3	Able to use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

CE3401 APPLIED HYDRAULICS ENGINEERING	
CO 1	Expected to describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application
CO 2	Expected to analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.
CO 3	Expected to derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.
CO 4	Expected to design turbines and explain the working principle
CO 5	Expected to differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	3	1	2	2	1	2	1	1	3	3	2	2
2	3	3	2	3	2	2	2	1	2	1	1	3	3	2	2
3	3	3	2	3	1	2	2	1	2	1	1	3	3	2	3
4	3	3	3	3	1	2	2	1	2	1	1	3	3	2	3
5	3	3	3	3	1	2	2	1	2	1	1	3	3	2	3
Low (1); Medium (2); High (3)															


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CE3402 STRENGTH OF MATERIALS	
CO 1	Able to understand the concepts of stress and strain, principal stresses and principal planes.
CO 2	Able to determine Shear force and bending moment in beams and understand concept of theory of simple bending
CO 3	Able to calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
CO 4	Able to analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
CO 5	Able to determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	2	3	1	3	2	3	1	3	3	3	3
2	3	3	3	3	2	3	1	3	2	3	1	3	3	3	3
3	3	3	3	3	2	3	1	3	2	3	1	3	3	3	3
4	3	3	3	3	2	3	1	3	2	3	1	3	3	3	3
5	3	3	3	3	2	3	1	3	2	3	1	3	3	3	3
Low (1); Medium (2); High (3)															

CE3403 CONCRETE TECHNOLOGY	
CO 1	Able to understand the requirements of cement, aggregates and water for concrete
CO 2	Able to select suitable admixtures for enhancing the properties of concrete
CO 3	Able to design concrete mixes as per IS method of mix design
CO 4	Able to determine the properties of concrete at fresh and hardened state.
CO 5	Able to know the importance of special concretes for specific requirements.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	1	2	1	3	3	2	1	1	1	2	3	2	3
2	3	1	1	1	1	3	3	1	1	1	1	2	3	2	3
3	3	2	2	3	1	3	3	1	1	1	1	2	3	2	3
4	3	1	1	1	1	3	3	2	1	1	1	2	3	2	3
5	3	1	1	1	1	3	3	2	1	1	2	2	3	2	3
Low (1); Medium (2); High (3)															

CE3404 SOIL MECHANICS	
CO 1	Able to demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems
CO 2	Able to show the basic understanding of flow through soil medium and its impact of engineering solution
CO 3	Able to understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation
CO 4	Able to show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils.
CO 5	Able to demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	3	2	2	3	1	1	1	2	1	2	3	3	3	2
2	3	2	3	2	3	1	1	1	2	1	2	3	2	2	3
3	3	3	2	2	2	2	1	1	2	1	2	3	2	2	3
4	2	3	3	2	2	1	1	1	1	1	2	3	2	2	3
5	3	3	2	2	2	1	1	1	1	1	1	3	2	3	2
Low (1); Medium (2); High (3)															

CE3405 HIGHWAY AND RAILWAY ENGINEERING	
CO 1	Expected to plan a highway according to the principles and standards adopted in various institutions in India.
CO 2	Expected to design the geometric features of road network and components of pavement.
CO 3	Expected to test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management.
CO 4	Expected to understand the methods of route alignment and design elements in railway planning and constructions.
CO 5	Expected to understand the construction techniques and maintenance of track laying and railway stations

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	-	-	2	-	3	1	3	-	-	-	-	3	2	-
2	2	3	3	2	2	-	2	3	2	-	2	3	3	3	-
3	2	3	2	2	2	3	3	3	-	-	3	3	3	3	-
4	3	-	-	-	-	3	-	3	-	1	-	-	3	2	2
5	-	-	3	-	2	-	-	-	2	-	-	2	3	3	3
Low (1); Medium (2); High (3)															

CE3411 HYDRAULIC ENGINEERING LABORATORY	
CO 1	Expected to apply Bernoulli equation for calibration of flow measuring devices.
CO 2	Expected to measure friction factor in pipes and compare with Moody diagram
CO 3	Expected to determine the performance characteristics of rotodynamic pumps.
CO 4	Expected to determine the performance characteristics of positive displacement pumps.
CO 5	Expected to determine the performance characteristics of turbines.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	3	1	2	2	1	2	1	1	2	2	1	1
2	3	2	1	3	1	2	2	1	2	1	1	2	3	1	1
3	3	3	2	3	1	2	2	1	3	1	1	2	3	2	1
4	3	3	2	3	1	2	2	1	3	1	1	2	3	2	1
5	3	3	2	3	1	2	2	1	3	1	1	2	3	2	1
Low (1); Medium (2); High (3)															

CE3412 MATERIALS TESTING LABORATORY	
CO 1	Expected to determine the mechanical properties of steel.
CO 2	Expected to determine the physical properties of cement
CO 3	Expected to determine the physical properties of fine and coarse aggregate.
CO 4	Expected to determine the workability and compressive strength of concrete.
CO 5	Expected to determine the strength of brick and wood.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	3	1	2	2	1	3	1	1	2	2	2	2
2	3	2	1	3	1	2	2	1	3	1	1	2	3	2	2
3	3	3	2	3	1	2	2	1	3	1	1	2	3	2	2
4	3	3	2	3	1	2	2	1	3	1	1	2	3	2	2
5	3	3	2	3	2	2	2	1	3	1	1	2	3	2	2
Low (1); Medium (2); High (3)															

CE3413 SOIL MECHANICS LABORATORY	
CO 1	Expected to conduct tests to determine the index properties of soils
CO 2	Expected to determine the insitu density and compaction characteristics.
CO 3	Expected to conduct tests to determine the compressibility, permeability and shear strength of soils.
CO 4	Expected to understand the various tests on Geosynthetics.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	3	3	1	1	1	1	3	1	1	3	3	3	3
2	1	2	3	3	1	1	1	1	3	2	1	3	2	3	2
3	3	3	3	3	1	1	1	1	3	1	1	3	2	3	3
4	1	2	2	3	2	1	1	1	3	1	1	3	2	2	3
Low (1); Medium (2); High (3)															


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Department of Electrical and Electronics Engineering
CO PO mapping
Regulation 2021

EE3301 ELECTROMAGNETIC FIELDS	
CO 1	Explain Gradient, Divergence, and Curl operations on electromagnetic vector fields.
CO 2	Explain electrostatic fields, electric potential, energy density and their applications.
CO 3	Calculate magneto static fields, magnetic flux density, vector potential.
CO 4	Explain different methods of emf generation and Maxwell's equations.
CO 5	Explain the concept of electromagnetic waves and characterizing parameters.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	2	1								1			3	3	3
CO2	2	1								1			3	3	3
CO3	3	2	1	1						1			3	3	3
CO4	2	1								1			3	3	3
CO5	2	1				2				1			3	3	3
Avg	2.2	1.2	1	1		2				1			3	3	3

EE3302 DIGITAL LOGIC CIRCUITS	
CO 1	Explain various number systems and characteristics of digital logic families.
CO 2	Apply K-maps and Quine McCluskey methods to simplify the given expressions.
CO 3	Explain the implementation of combinational circuit such as multiplexers and demultiplexers - code converters, adders, subtractors, Encoders and Decoders.
CO 4	Design various synchronous and asynchronous circuits using Flip Flops and programmable logic devices.
CO 5	Use VHDL for simulating and testing RTL, combinatorial and sequential circuits.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	3	3	1	3							1	3		1
CO2	3	3	3	1	3							1	3		1
CO3	3	3	3	1	3							1	3		1
CO4	3	3	3	1	3							1	3		1
CO5	3	3	3	1	3							1	3		1
Avg	3	3	3	1	3							1	3		1

EC3301 ELECTRON DEVICES AND CIRCUITS	
CO 1	Explain the structure and operation of PN junction devices (diode, Zener diode and LED and Laser diode).
CO 2	Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes.
CO 3	Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT.
CO 4	Analyze the performance of various configurations of BJT and MOSFET based amplifier.
CO 5	Explain the characteristics of MOS based cascade and differential amplifier and operation of various feedback amplifiers and oscillators.

	PO 1	PO 2	PO 3	PO 4	PO 5	P06	P07	PO8	PO9	PO1 0	PO1 1	PO 12	PS0 1	PS0 2	PS03
CO1	2	2	3	2	2							1	3		1
CO2	2	2	3	2	2							1	3		1
CO3	2	2	3	2	2							1	3		1
CO4	2	2	3	2	2							1	3		1
CO5	2	2	3	2	2							1	3		1
Avg	2	2	3	2	2							1	3		1

EE3303 ELECTRICAL MACHINES – I	
CO 1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.
CO 2	Explain the construction and working principle of DC machines and Interpret various characteristics of DC machines.
CO 3	Compute various performance parameters of the machine, by conducting suitable tests.
CO 4	Draw the equivalent circuit of transformer and predetermine the efficiency and regulation.
CO 5	Describe the working principle of auto transformer, three phase transformer with different types of connections.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	3	1	1	1								3	3	3
CO2	3	3	1	1	1								3	3	3
CO3	3	3	1	1	1								3	3	3
CO4	3	3	1	1	1								3	3	3
CO5	3	3	1	1	1								3	3	3
CO6	3	3	1	1	1								3	3	3
Avg	3	3	1	1	1								3	3	3

EC3311 ELECTRONIC DEVICES AND CIRCUITS LABORATORY	
CO 1	Analyze the characteristics of PN, Zener diode and BJT in CE, CC, CB configurations experimentally.
CO 2	Analyze the characteristics of JFET and UJT experimentally.
CO 3	Analyze frequency response characteristics of a Common Emitter amplifier experimentally.
CO 4	Analyze the characteristics of RC phase shift and LC oscillators experimentally.
CO 5	Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3			3	3						3			3	
CO2	3		3	3	3						3			3	
CO3	3	3	2	3							3			3	
CO4	3	3	3	3							3			3	
CO5	3				3									3	
CO6	3				3									3	
Avg	3	3	2.7	3	3						3			3	

EE3311 ELECTRICAL MACHINES – I LABORATORY	
CO 1	Construct the circuit with appropriate connections for the given DC machine/transformer.
CO 2	Experimentally determine the characteristics of different types of DC machines and demonstrate the speed control techniques for a DC motor for industrial applications.
CO 3	Identify suitable methods for testing of transformer and DC machines.
CO 4	Predetermine the performance parameters of transformers and DC motor.
CO 5	Understand DC motor starters and 3-phase transformer connections.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	3	1	1					1				3		
CO2	3	3	1	1					1				3		
CO3	3	3	1	1					1				3		
CO4	3	3	1	1					1				2		
CO5	3	3	1	1					1				2		
CO6	3	3	1	1					1				2		
Avg	3	3	1	1					1				3		

EE3311 ELECTRICAL MACHINES – I LABORATORY	
CO 1	Construct the circuit with appropriate connections for the given DC machine/transformer.
CO 2	Experimentally determine the characteristics of different types of DC machines and demonstrate the speed control techniques for a DC motor for industrial applications.
CO 3	Identify suitable methods for testing of transformer and DC machines.
CO 4	Predetermine the performance parameters of transformers and DC motor.
CO 5	Understand DC motor starters and 3-phase transformer connections.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	3	1	1					1				3		
CO2	3	3	1	1					1				3		
CO3	3	3	1	1					1				3		
CO4	3	3	1	1					1				2		
CO5	3	3	1	1					1				2		
CO6	3	3	1	1					1				2		
Avg	3	3	1	1					1				3		

EE3401 TRANSMISSION AND DISTRIBUTION	
CO 1	Understand the structure of power system, computation of transmission line parameter for different configurations and the impact of skin and proximity effects.
CO 2	Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance.
CO 3	Do mechanical design of transmission lines, grounding and to understand about the insulators in transmission system.
CO 4	Design the underground cables and understand the performance analysis of underground cable.
CO 5	Understand the modelling, performance analysis and modern trends in distribution system.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	2	1	-	-	-	-	-	1	-	-	-	-	3	1	3
CO2	3	2	1	1	-	1	-	2	-	-	-	-	3	2	3
CO3	3	2	1	1	-	1	-	2	-	-	-	-	3	3	3
CO4	3	2	1	1	-	1	-	2	-	-	-	-	3	3	3
CO5	3	2	1	1	-	1	-	2	-	-	-	-	3	3	3
Avg	2.8	1.8	1	1		1		1.8					3	2.4	3


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EE3402 LINEAR INTEGRATED CIRCUITS	
CO 1	Explain monolithic IC fabrication process.
CO 2	Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell.
CO 3	Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer,differentiator, integrator, V/I and I/V converter) of Op-Amp
CO 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.
CO 5	Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	2	2	3	2	2							1	3		1
CO2	2	2	3	2	2							1	3		1
CO3	2	2	3	2	2							1	3		1
CO4	2	2	3	2	2							1	3		1
CO5	2	2	3	2	2							1	3		1

EE3403 MEASUREMENTS AND INSTRUMENTATION	
CO 1	Ability to understand the fundamental art of measurement in engineering.
CO 2	Ability to understand the importance of bridge circuits.
CO 3	Ability to understand about various transducers and their characteristics by experiments.
CO 4	Ability to understand the concept of digital instrumentation and virtual instrumentation byexperiments.
CO 5	Ability to understand the fundamental art of measurement in engineering.CO2: Ability to understand the structural elements of various instruments.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	2	3		3	2		2				3	3	3	3
CO2	3	2	3	2						3		3	3	3	3
CO3	3	2	3		3	2						3	3	3	3
CO4	3	2	3					2					3	3	3
CO5	3	2	3	2	3					3		3	3	3	3



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EE3404 MICROPROCESSOR AND MICROCONTROLLER	
CO 1	Ability to write assembly language program for microprocessor and microcontroller.
CO 2	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller.
CO 3	Ability to analyze, comprehend, design and simulate microprocessorbased systems used for control and monitoring.
CO 4	Ability to analyze, comprehend, design and simulate microcontroller basedsystems used for control and monitoring.
CO 5	Ability to understand and appreciate advanced architecture evolving microprocessor field.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	2	1	2	3									3	1	3
CO2	2	1	2	3									3	1	3
CO3	2	1	2	3									3	1	3
CO4	2	1	2	3									3	1	3
CO5	2	1	2	3									3	1	3
Avg	2	1	2	3									3	1	3

EE3405 ELECTRICAL MACHINES - II	
CO 1	Ability to understand the construction and working principle of Synchronous generator.
CO 2	Ability to understand the construction and working principle of Synchronous Motor.
CO 3	Ability to understand the construction and working principle of three phase Induction motor.
CO 4	Acquire knowledge about the starting and speed control of induction motors.
CO 5	To gain knowledge about the basic principles and working of Single phase inductionmtr and special electrical machines.

	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	3	1	1	1								3	3	
CO2	3	3	1	1	1								3	3	
CO3	3	3	1	1	1								3	3	
CO4	3	3	1	1	1								3	3	
CO5	3	3	1	1	1								3	3	
CO6	3	3	1	1	1								3	3	


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EE3411 ELECTRICAL MACHINES LABORATORY - II	
CO 1	Ability to understand and analyze EMF and MMF methods.
CO 2	Ability to analyze the characteristics of V and Inverted V curves.
CO 3	Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods.
CO 4	Acquire hands on 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 single and three phase Induction motors.
CO 5	Ability to acquire knowledge on separation of losses.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	3	1	1					1			3	3	3	3
CO2	3	3	1	1					1			3	3	3	3
CO3	3	3	1	1					1			3	3	3	3
CO4	3	3	1	1					1			3	3	3	3
CO5	3	3	1	1					1			2	3	3	3
CO6	3	3	1	1					1			3	3	3	3

EE3412 LINEAR AND DIGITAL CIRCUITS LABORATORY	
CO 1	Ability to understand and implement Boolean Functions.
CO 2	Ability to understand the importance of code conversion.
CO 3	Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.
CO 4	Ability to acquire knowledge on Application of Op-Amp.
CO 5	Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1				3							3		2	1	2
CO2			3	3							3		2	1	2
CO3		3	2	3	3						3		2	1	2
CO4		3	3	3	3						3		2	1	2
CO5															


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EE3413 MICROPROCESSOR AND MICROCONTROLLER LABORATORY	
CO 1	Ability to write assembly language program for microprocessor.
CO 2	Ability to write assembly language program for microcontroller.
CO 3	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
CO 4	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring.
CO 5	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	2	1	2	3									3	1	3
CO2	2	1	2	3									3	1	3
CO3	2	1	2	3									3	1	3
CO4	2	1	2	3									3	1	3
CO5	2	1	2	3									3	1	3


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Department of Science and Humanities

CO PO mapping

Regulation 2021

HS3151 TECHNICAL ENGLISH	
CO 1	Read technical texts and write area specific texts specifically
CO 2	Listen and comprehend lectures and talks in their areas of specialization successfully
CO 3	Describe a process through technical texts
CO 4	Speak appropriately and effectively in varied formal and informal contexts
CO 5	Write short essays of a general kind and personal letters and emails in English

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	-	-	1	2	2	-	2	-	-	-
2	-	-	-	-	-	-	-	2	2	2	-	2	-	-	-
3	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-
4	-	-	-	-	-	-	-	2	3	3	-	3	-	-	-
5	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-

Low (1); Medium (2); High (3)

HS3251 COMMUNICATIVE ENGLISH	
CO 1	Read articles of a general kind in magazines and newspapers
CO 2	Participate effectively in informal conversations; introduce themselves and their friends.
CO 3	Express opinions and talk about routine actions
CO 4	comprehend conversations and short talks delivered in English
CO 5	Write short essays of a general kind and personal letters and emails in English

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	-	-	1	2	2	-	2	-	-	-
2	-	-	-	-	-	-	-	1	2	2	-	2	-	-	-
3	-	-	-	-	-	-	-	1	3	3	-	3	-	-	-
4	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-
5	-	-	-	-	-	-	-	2	3	3	-	2	-	-	-

Low (1); Medium (2); High (3)

CY3151 ENGINEERING CHEMISTRY	
CO 1	To understand the water related problems in boilers and their treatment techniques.
CO 2	To understand the concept and applications of adsorption in the field of water and air pollution abatement.
CO 3	To apply phase rule in the alloying and the behaviour of one component and two component systems using phase diagram
CO 4	To recommend suitable fuels for engineering processes and applications.
CO 5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	-	-	-	1	2	-	-	-	-	1	2	2	-
2	2	2	-	-	-	1	2	-	-	-	-	1	2	2	-
3	3	3	-	-	-	2	2	-	-	-	-	2	3	3	-
4	3	3	-	-	-	2	3	-	-	-	-	2	3	3	-
5	3	3	-	-	-	2	3	-	-	-	-	2	3	3	-
Low (1); Medium (2); High (3)															

PH3151 ENGINEERING PHYSICS	
CO 1	Understand the importance of mechanics.
CO 2	Express their knowledge in electromagnetic waves.
CO 3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO 4	Understand the importance of quantum physics.
CO 5	Comprehend and apply quantum mechanical principles towards the formation of energy

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1									2	2	2	1
2	2	2	1									2	2	2	1
3	2	2	1									2	2	2	1
4	2	1										1	2	1	
5	3	3										2	3	3	
Low (1); Medium (2); High (3)															

PH8253 Physics for Electronics Engineering	
CO 1	Gain knowledge on classical and quantum electron theories, and energy band structures.
CO 2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
CO 3	Get knowledge on magnetic and dielectric properties of materials.
CO 4	Have the necessary understanding on the functioning of optical materials for optoelectronics.
CO 5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1										1	2	1	
2	2	2	1									1	2	2	1
3	2	1		1								2	2	1	
4	2	1	1									1	2	1	1
5	2	1	1									2	2	1	1
Low (1); Medium (2); High (3)															

PH3256 Physics for Information science	
CO 1	Gain knowledge on classical and quantum electron theories, and energy band structures
CO 2	Acquire knowledge on basics of semiconductor physics and its applications in various devices
CO 3	Get knowledge on magnetic properties of materials and their applications in data storage
CO 4	Have the necessary understanding on the functioning of optical materials for optoelectronics
CO 5	Understand the basics of quantum structures and their applications and basics of quantum computing

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2		1								1	2	2	
2	2	2	1									1	2	2	1
3	2	2	1									2	2	2	1
4	2	2	2									2	2	2	2
5	2		2	1								2	2		2
Low (1); Medium (2); High (3)															

MA3151 MATRICES AND CALCULAS	
CO 1	Use the matrix algebra methods for solving practical problems.
CO 2	Apply differential calculus tools in solving various application problems.
CO 3	Able to use differential calculus ideas on several variable functions.
CO 4	Apply different methods of integration in solving practical problems.
CO 5	Apply multiple integral ideas in solving areas, volumes and other practical problems.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	-	-	-	-	-	-	2	-	-	1	2	2	-
2	3	3	-	-	-	-	-	-	3	-	-	1	3	3	-
3	3	3	-	-	-	-	-	-	3	-	-	1	3	3	-
4	3	3	-	-	-	-	-	-	3	-	-	2	3	3	-
5	3	3	-	-	-	-	-	-	3	-	-	1	3	3	-
Low (1); Medium (2); High (3)															

MA3251 STATISTICS AND NUMERICAL METHOD	
CO 1	Understand the concept of testing of hypothesis for small and large samples in real life problems.
CO 2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO 3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO 4	Apply the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO 5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

CO	PO												POS		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	-	-	-	-	-	-	2	-	-	2	2	2	-
2	3	3	-	-	-	-	-	-	3	-	-	2	3	3	-
3	3	3	-	-	-	-	-	-	3	-	-	2	3	3	-
4	3	3	-	-	-	-	-	-	3	-	-	3	3	3	-
5	3	3	-	-	-	-	-	-	3	-	-	3	3	3	-
Low (1); Medium (2); High (3)															


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