Dr. A. D. Shinde College of Engineering, Bhadgaon 416502

Department of Civil Engineering

SEM:03

SR.NO	SUBJECT	CO CODE NO	Course Outcomes (COs)
1	ENGINEERING MATHEMATICS-III	BSC-CV3011	1)1. Solve Liner differential equations and problems related to applications of differential equation.
		BSC-CV3012	Perform vector differentiation.
		BSC-CV3013	3)Find probabilities by using probability distributions.
		BSC-CV3014	4)Find Laplace transform, Inverse Laplace transform of various functions and applications.
		BSC-CV3015	5)Find analytic function.

SEM:03

SR.NO	SUBJECT		Course Outcomes (COs)
2	SURVEYING-I	PCC-CV3021	1)Determine linear and angular measurements.
		PCC-CV3022	2)Record various measurements in the field book.
		PCC-CV3023	3)Find areas of irregular figures.
		PCC-CV3024	4)Prepare plans and sections required for civil engineering projects.

SEM:03

SR.NO	SUBJECT		Course Outcomes (COs)
3	STRENGTH OF MATERIALS	ESC-CV3031	1)Evaluate the response of elastic body for external actions and compute design forces.
		ESC-CV3032	2)Evaluate shear force and bending moment of statically determinate structure.
		ESC-CV3033	3). Analyze the stress, strain and deformation of elastic bodies under bending and shear actions
		ESC-CV3034	4)Analyze the stress, strain and deformation of elastic bodies under external actions.

SEM:03

SR.NO	SUBJECT		Course Outcomes (COs)
4	FLUID MECHANICS - I	ESC-CV3041	To understand the processes and science of fluids.
		ESC-CV3042	To identify the basic properties of fluids and their behavior under application of various force systems.
		ESC-CV3043	To discuss the basic concepts and principles in fluid statics, fluid kinematics and fluid dynamics with their applications in fluid flow problems.
		ESC-CV3044	To study the different types of discharge measurement devices and its applications.
		ESC-CV3045	Recognize the principles of continuity, momentum and energy as applied to fluid in motion
		ESC-CV3046	To study pipe flow problems and the losses in pipe flow system

SEM:03

SR.NO	SUBJECT		Course Outcomes (COs)
5	BUILDING CONSTRUCTION AND MATERIALS	PCC-CV3051	1)Know the building Materials.
		PCC-CV3052	2)Describe properties and suitability of various building materials.
		PCC-CV3053	3)State the different building components
		PCC-CV3054	4)Demonstrate different bonds in brick masonary.
		PCC-CV3055	5)Produce drawings of different building components.
		PCC-CV3056	6)Explain different types of roof coverings & types of flooring

SEM:03

SR.NO	SUBJECT		Course Outcomes (COs)

CO-PO- MAPPING

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

CO-PO- MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2			3							
CO2	2	3								3		
CO3	3	2		3								
CO4			3						2			2

CO-PO- MAPPING

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

CO-PO- MAPPING

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

CO-PO- MAPPING

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

CO-PO- MAPPING

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

6	NUMERICAL METHODS	ESC-CV3061	1). Identify, classify and choose the most appropriate numerical method for solving a problem.
		ESC-CV3062	2)Illustrate basic theory of correlation and regression.
		ESC-CV3063	3) Form and solve Linear Programming Problem.
		ESC-CV3064	4)Use methods of solutions to solve classical problems.
		ESC-CV3065	5)Deploy skills effectively in the solution of problems in civil engineering.

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

SEM:04

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
7	STRUCTURAL MECHANICS	ESC-CV4011	1)Identify the response of elastic body for external actions.
		ESC-CV4012	2)Distinguish engineering properties of the materials are understood.
		ESC-CV4013	3)Compute the design forces in the structures.
		ESC-CV4014	4)Analyze the stress, strain and deformation of elastic bodies under external forces.

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

SEM:04

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
8	SURVEYING - II	PCC-CV401	1)Adopt the principles of advanced surveying instruments
		PCC-CV4022	2)Formulate triangulation stations, Flight planning and Ground control points (GCPs).
		PCC-CV4023	3)Apply GIS and GPS concepts to civil engineering problems.
		PCC-CV4024	4)Design and setout curves by different methods

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

SEM:04

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
9	CONCRETE TECHNOLOGY	PCC-CV4031	1)Impart knowledge of physical properties of ingredients of concrete and their effect on strength and durability.
		PCC-CV4032	2)Explain the fundamentals of process of making good quality concrete and its elastic properties.
		PCC-CV4033	3)Understand the factors affecting properties of concrete.
		PCC-CV4034	4)Design the concrete mix proportion as per Indian standard code of practice
		PCC-CV4035	5)Demonstrate Non Destructive Testing (NDT) and evaluate quality of existing concrete.
		PCC-CV4036	6)Understand different types of concrete and their applications.

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

SEM:04

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
10	FLUID MECHANICS - II	ESC-CV4041	To provide students with basic knowledge of fluid properties and utilizing principles developed in fluid mechanics.
		ESC-CV4042	To develop the principle and equation for pressure flow and momentum analysis.
		ESC-CV4043	Provide the students with the analytical knowledge of pressure and velocity distribution in an open channel in order to solve practical problems
		ESC-CV4044	To illustrate and develop the equations and design principles for open channel flows, including sanitary and storm sewer design and flood control hydraulics.
		ESC-CV4045	To understand the depth energy relationship and velocity distribution in the channel.
		ESC-CV4046	To recognise continuty equation applied to open channel flows and different types of flows and their characteristics in form of mathematical equations.

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

SR.NO	SUBJECT		Course Outcomes (COs)
11	BUILDING DESIGN AND DRAWING	PCC-CV4051	1)Know principles of building planning
		PCC-CV4052	2)Describe Building Bye-Laws and regulations.
		PCC-CV4053	3)Plan and draw residential building considering principle of planning and Building ByeLaws and regulation
		PCC-CV4054	4)Explain techniques of maintenance, repair and rehabilitation of structure.
		PCC-CV4055	5)Draw the working drawing of foundation detail, plumbing and electrification of building.
		PCC-CV4056	6)Illustrate the concept of ventilation, air conditioning and thermal insulation.
		PCC-CV4057	7)Describe different types of building finishes.
SEM:05			

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1		2	2		1		2	1
CO2	3	2	2	2		2	2			2		
CO3	3		2		1	2				1	2	
CO4	3		2	3	2		3				2	
CO5	3	2	2		1	1	2		1		1	2
CO6	3	2	2	1	2		1				2	1
CO7	3		2		2		1		1		2	1

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
12	WATER RESOURCE ENGINEERING - I	PCC-CV5011	1)Apply the knowledge of estimation of hydrometeorological parameters.
		PCC-CV5012	2)Estimate direct runoff and peak discharge using hydrograph technique.
		PCC-CV5013	3)Apply different methods of efficient irrigation and water conservation.
		PCC-CV5014	4)Determine reservoir capacity based on crop water requirement.
SEM:05			

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2				3		2				
CO2	3	3				3		2	2	2		
CO3	3	3				3	3	2	2	2		2
CO4	3	3	2	2		2	3	2	2	2		2

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
13	DESIGN OF STEEL STRUCTURE	PCC-CV5021	1)Describe the design philosophy, behavior of steel structure and failure mechanism.
		PCC-CV5022	2)Analyze and design different types of bolted & welded connections.
		PCC-CV5023	3)Assess the strength of structural members as per Indian Standards.
		PCC-CV5024	4)Analyze and design members subjected to tension, compression and flexure.
SEM:05			

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

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
14	ENVIRONMENTAL ENGINEERING - I	PCC-CV5031	1)Describe the various sources of water with respect to quality and quantity of water.
		PCC-CV5032	2)Design the various water treatment units.
		PCC-CV5033	3)Illustrate the special water treatments and sequencing of treatment for various qualities of surface & ground water.
		PCC-CV5034	4)Describe the various components related to transmission and design of distribution of water.
		PCC-CV5035	5)Summarize the different water supply appurtenances.
SEM:05			

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

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
15	GEOTECHNICAL ENGINEERING- I	PCC-CV5041	1)Able to evaluate the Index and Engineering properties of soil
		PCC-CV5042	2)Understand the fundamental relationships in properties of soils
		PCC-CV5043	3)Evaluate the stress calculations in soil under different soil conditions
		PCC-CV5044	4)Understands the process and importance of compaction and consolidation
		PCC-CV5045	5)Know the shear strength of soil and its determination
		PCC-CV5043	6)Analyze the lateral pressure on vertical retaining walls
SEM:05			

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

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)

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

16	BUILDING PLANNING & DESIGN	PCC-CV5051	1)Specify dimensions and space requirements for various elements of the building in relation to human body measurements.	CO1	3	2					2				2
		PCC-CV5052	2)Plan, design public building considering principles of planning and Building Bye-Laws and regulations.	CO2	3	3	3			2	2				3
		PCC-CV5053	3)Prepare the submission and working drawings of public building.	CO3	3		3							3	2
		PCC-CV5054	4)Illustrate the procedures for preparing perspective drawings of various objects as well as buildings.	CO4	2		2							3	3
		PCC-CV5055	5)Apply knowledge of architectural composition and terms for betterment of aesthetic view.	CO5			2		2		3				3

SEM:05

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
17	WASTE MANAGEMENT	OEC-CV5061	1)To evaluate the effects of various wastes on human beings, animals and on Environment.	CO1	3	2	2			3	3					
		OEC-CV5062	2)To solve the water and wastewater treat by using conventional and advanced treatment methods.	CO2	3	3	3	1	2	2	2					
		OEC-CV5063	3)To estimate quantity of solid waste, E-waste and biomedical wastes and to suggest their disposal methods.	CO3	3	3	3			2	3					
		OEC-CV5064	4)To suggest reuse and recycles techniques of solid waste, E-waste and biomedical wastes and to suggest their disposal methods.	CO4	3		1			2	3					
		OEC-CV5065	5)To characteristics and to select treatment options for selected industrial wastewater.	CO5	3			1			2			2		
		OEC-CV5066	6)To discuss the impacts of hazardous waste and air pollution.	CO6	3					2	3			2		

SEM:06

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
18	THEORY OF STRUCTURE	PCC-CV6012	1)Understand the concept of determinacy and indeterminacy.	CO1	3	2	1	1	2	1	3	2	1	1	1	2
		PCC-CV6014	2)Apply various techniques of structural mechanics to solve indeterminate structures.	CO2	2	3	2	1	3	1	2	3	2	1	2	3
		PCC-CV6013	3)Analyze indeterminate structures by using various approaches.	CO3	1	2	3	2	1	3	1	2	3	2	1	2
		PCC-CV6014	4)Know the limitations of the methods of solution and their outcomes.	CO4	3	1	2	3	2	2	3	1	2	3	2	1

SEM:06

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19	ENGINEERING MANAGEMENT	HM-CV6021	1)Understand importance of management in construction.	CO1	3								3		3	3
		HM-CV6022	2)Use the Project planning and management tools in Construction.	CO2	3	2			3	1	1		3		3	3
		HM-CV6023	3)Evaluate and draw project network for estimating time and cost.	CO3	3	2							3		3	3
		HM-CV6024	4)Know the techniques of Material Management.	CO4	3				2	1	1		3		3	3
		HM-CV6025	5)Explore and understand the concepts of Economics in construction.	CO5	3								3		3	3
		HM-CV6026	6)Know the advance concepts in management.	CO6	3								3		3	3

SEM:06

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20	ENVIRONMENTAL ENGINEERING - II	PCC-CV6031	1)1. Explain sources, characteristics and methods of wastewater collection.	CO1	3	3	-	-	-	2	-	-				
		PCC-CV6032	2)Design the primary and secondary wastewater treatment units and describe low cost wastewater treatment units.	CO2	-	-	3	2	-	2	-	-				
		PCC-CV6033	3)Understand various methods of wastewater disposal	CO3	-	-	-	-	3	2	1	-				
		PCC-CV6034	4)Explain the necessity and importance of solid waste management.	CO4	-	-	-	-	-	3	2	2				
		PCC-CV6035	5)Describe air pollution, its effect and controlling techniques.	CO5	-	3	2	-	-	3	-	-				

SEM:06			
SR.NO	SUBJECT		Course Outcomes (COs)
21	GEOTECHNICAL ENGINEERING- II	PCC-CV6041	1)Use engineering science principles to develop foundation engineering knowledge.
		PCC-CV6042	2)Apply foundation engineering knowledge in the civil engineering projects.
		PCC-CV6043	3)Calculate bearing capacity theoretically as well as practically.
		PCC-CV6044	4)Calculate settlement and design shallow and deep foundation
		PCC-CV6045	5)Apply basics concepts of slope stability on field.
		PCC-CV6046	6)Apply modern foundation techniques.

CO-PO- MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					2	2		1			3
CO2	3				2	2	2		1			3
CO3	3					1	2					3
CO4	3	3	2	2	1				2		2	3
CO5	3				3	2			1			3
CO6	3				3	2			3			3

SEM:06			
SR.NO	SUBJECT		Course Outcomes (COs)
22	SOIL & WATER CONSERVATION TECHNIQUES	OEC-CV6051	1)Understand methods of soil and water conservation.
		OEC-CV6052	2)Develop an integrated model for sustainable natural conservation.
		OEC-CV6053	3)Explain the groundwater exploration techniques and its artificial recharge.
		OEC-CV6054	4)Analyze the needs for protection of banks and preservation of soil.

CO-PO- MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3			2		3					2
CO2	3	3	3	2	2	3	3					3
CO3	3	2		2	3	3	3					2
CO4	3	3		2		3	3					3

SEM:06			
SR.NO	SUBJECT		Course Outcomes (COs)
23	STRUCTURAL DESIGN & DRAWING	PCC-CV6061	1)Analyze and design different types of bolted & welded connections
		PCC-CV6062	2)Demonstrate the knowledge of common sections subjected tension and compression members & its design,
		PCC-CV6063	3)Analyze and design of steel column, flexural members and its elements.
		PCC-CV6064	4)Aware of application of software in structural analysis and design.
		PCC-CV6065	5)Prepare the working drawing as per requirement of project execution.

CO-PO- MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	2	2	2	2	2	2	2	2	2	2	2	2
CO3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	1	1	1	1	1	1	1	1	1	1	1	1

SEM:07			
SR.NO	SUBJECT		Course Outcomes (COs)
24	DESIGN OF CONCRETE STRUCTURE- I	PCC-CV7011	1)Understand the basic data (Basic Mechanics, Mathematics, and structural analysis) required for design of concrete structures.
		PCC-CV7012	2)Understand the design process of concrete structure
		PCC-CV7013	3)Understand the application of limit state method for structural element such as footing, column, beam slab, staircase etc.
		PCC-CV7014	4)Design the individual members and hence building.

CO-PO- MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										2
CO2	3	3	2	2								3
CO3	3	3	3	2								2
CO4	3	3	3	3	2				2	2		3

SEM:07			
SR.NO	SUBJECT		Course Outcomes (COs)
25	EARTHQUAKE ENGINEERING	PCC-CV7021	1)To understand interior of earth and behavior of earth duringearthquake.
		PCC-CV7022	2)To understand the concepts of mathematicalmodeling.
		PCC-CV7023	3)To understand dynamic behavior ofstructure
		PCC-CV7024	4)To understand earthquake resistant philosophy ofstructure.
		PCC-CV7024	5)Tounderstandmoderntechniquesofearthquakeresistantmethod.

CO-PO- MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	1	1	1	1	1	1
CO2	2	2	2	2	2	2	2	2	2	2	2	2
CO3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3

SEM:07			
SR.NO	SUBJECT		Course Outcomes (COs)
26	QUANTITY SURVEY & VALUATION	PCC-CV7031	1) Explain the importance of estimation in Civil Engineering works.
		PCC-CV7032	2)Prepare rate analysis of various items.
		PCC-CV7033	3)To estimate for various construction projects.
		PCC-CV7034	4) Explain importance of valuation in Civil Engineering works.

CO-PO- MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	2	2	2					3
CO2	3	3	1	1	2	2						3
CO3	3	3		1	3	1						3
CO4	3	2			3	2						3

SEM:07			
SR.NO	SUBJECT		Course Outcomes (COs)

CO-PO- MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

27	TRANSPORT ENGINEERING - I	PCC-CV7041	1) Carry out surveys involved in planning and highway alignment
		PCC-CV7042	2)Design the geometric elements of highways and expressways
		PCC-CV7043	3)Carry out traffic studies and implement traffic regulation and control measures and intersection design
		PCC-CV7044	4)Characterize pavement materials and design flexible and rigid pavements as per IRC

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

SEM:07

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
28	SOLID WASTE MANAGEMNET	PCE-CV7051	1)Learn basic concepts of solid waste management, beginning from source generation to waste disposal in a system of municipality organizational structure.
		PCE-CV7052	2)To acquire a fair amount of knowledge on waste characterization and its management practices
		PCE-CV7053	3)Develop understanding on various technological applications for processing of waste and their disposals in various ways.
		PCE-CV7054	4)Acquire knowledge on waste to energy productions in the perspectives of sustainable development.
		PCE-CV7055	5)Apply basic concepts in hazardous waste management and integrated waste management for urban areas.

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

SEM:07

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
29	LEGAL ASPECT IN CIVIL ENGINEERING	HM-CV7061	1). Students will learn Indian contract act, Arbitration act and contract administration.
		HM-CV7062	2) Students will understand the labour laws.
		HM-CV7063	3)Students will be understand safety engineering and relevant acts.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2				3				2		1
CO2	3	2							1			1
CO3	3	2				2			2			1

SEM:08

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
30	DESIGN OF CONCRETE STRUCTURE - II	PCC-CV8011	1)Sections subjected to torsion
		PCC-CV8012	2)Continuous beams
		PCC-CV8013	3)Water tanks resting onground
		PCC-CV8014	4)Prestressed concretesections

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2								2
CO2	3	3	3	3	2				2			3
CO3	3	3	3	2	2							3
CO4	3	3	3	3	3							3

SEM:08

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
31	WATER RESOURCE ENGINEERING - II	PCC-CV8021	1) Identify and understand various issues related to water resources systems.
		PCC-CV8022	2)Understand the role of dams and reservoirs in controlling the floods.
		PCC-CV8023	3)Plan and design different types of hydraulic structures.
		PCC-CV8024	4)Plan, design and monitor an efficient canal network system.
		PCC-CV8025	5)Understand the role of rivers in the development of nation

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

SEM:08

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)
32	TRANSPORT ENGINEERING - II	PCC-CV8031	1)Perform geometric design for the railway tracks.
		PCC-CV8032	2)Plan the layout of different types of air terminals.
		PCC-CV8033	3)Carry out the surveys for layout of railways, airports and harbors.
		PCC-CV8034	4) Design various bridge components

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2								2
CO2	3	3	3	3	2				2			3
CO3	3	3	3	2	2							3
CO4	3	3	3	3	3							3

SEM:08

CO-PO- MAPPING

SR.NO	SUBJECT		Course Outcomes (COs)

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

33	ADVANCED DESIGN OF CONCRETE STRUCTURE	PCE-CV8041	1)Analysis and design of large span concrete roofs and design flat slab as per IS 456 – 2000
		PCE-CV8042	2)Analysis and design deep beams.
		PCE-CV8043	3)Analysis of stresses in concrete chimney and design the chimney
		PCE-CV8044	4)Analysis and design overhead water tank with codal provision of 3370-2009
		PCE-CV8045	5)Analysis and design of cantilever and counter fort retaining wall.
		PCE-CV8046	6)Describe yield line theory and analyze rectangular and circular slab by yield line theory
SEM:08			
SR.NO	**SUBJECT**		**Course Outcomes (COs)**
34	STRUCTURAL DESIGN & DRAWING	PCE-CV8051	1).Translate the ideas into workable plans
		PCE-CV8052	2)Classify the components
		PCE-CV8053	3)Design the units & hence the structure as a whole
		PCE-CV8054	4)Draft the details for execution
		PCE-CV8055	5)To read and understand the supplied drawing for execution on site.

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

CO-PO- MAPPING

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

Dr.A.D.Shinde College of Engineering Bhadgaon • Tal.Gadhinglaj

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Department of General Science and Humanities

SEM:01					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	ENGINEERING CHEMISTRY	BSC-C-1011	1:Student will be able to undestand & comprehend to water quality parameters & there importance	CO1	3	3		2		2				1		
		BSC-C-1012	2.Student will be able to undestand & comprehend use spectrometer for chemical analysis	CO2	3	3		2								
		BSC-C-1013	3.Student will be able to undestand & comprehend to the structure polymers & composite materials	CO3	3			2								
		BSC-C-1014	4. Student will be able to undestand & comprehend the fuels & there anlysis	CO4	3	3				1						1
		BSC-C-1015	5.Student will be able to undestand & comprehend the process of corrosion & remedial measure	CO5	3			2		2						
		BSC-C-1016	6.Student will be able to undestand & comprehend importance of metalic materials	CO6	3		3									

SEM:01					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		BSC-M-I-1021	1:Student will be able to undestand & comprehend matrix method of solving system of linear equations	CO1	1	2									2	
2	ENGINEERING MATHAMATICS-I	BSC-M-I-1022	2.Student will be able to apply De Moiever's Theorem.	CO2	1	2									1	
		BSC-M-I-1023	3. Student will be able to apply Numerical method to solve linear simultaneous equations.	CO3	2	2		2							1	
		BSC-M-I-1024	4. Student will be able to undestand & comprehend the applications of expansions of theorems and L'Hospitals rule.	CO4	1	2									2	
		BSC-M-I-1025	5. Student will be able to undestand & apply partial differentiation to determine maxima and minima	CO5	2	3									1	
				CO6	2	3									2	
SEM:01					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
3	FUNDAMENTAL OF ELECTRONICS AND COMPUTER SCIENCE	ESC-C-1031	1.Converse in basic computer terminology.													
		ESC-C-1032	2.Formulate opinions about the impact of computers on society.	CO1	3	3		2		2						
		ESC-C-1033	3.Possess the knowledge of basic hardware peripherals.	CO2	3	3		2								
		ESC-C-1034	4.Know and use different number systems and the basics of programming.	CO3	3			2								
		ESC-C-1035	5.Ability to analyze PN junctions in semiconductor devices under various conditions.	CO4	3	3				1						
		ESC-C-1036	6.Ability to design and analyze simple rectifiers and voltage regulators using diodes.	CO5	3			2		2						
		ESC-C-1037	7.Ability to describe the behavior of special purpose diodes.	CO6	3		3									

SEM:01					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
4	APPLIED MECHANICS	ESC-C-1041	1. Basic understanding thermodynamics and its applications	CO1	1	2									2	
		ESC-C-1042	2.Understand the basics of Engineering Materials (its applications) and Stress-Strain	CO2	1	2									1	
		ESC-C-1043	3. Understand the basics of Engineering surveying and Smart Infrastructure Development.	CO3	2	2		2							1	
		ESC-C-1044	4. Understand the basics Applied Mechanics, Simple lifting Machines & Power Transmission	CO4	1	2									2	
		ESC-C-1045	5.Understand basics of Manufacturing	CO5	2	3									1	

SEM:01					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	BASIC MECHANICAL ENGINEERING	ESC-C-1051	1. Enhancement of fundamental knowledge of Thermodynamics. …	CO1	1	2									2	
		ESC-C-1052	2.Acquiring knowledge of materials and their properties for engineering applications	CO2	1	2									2	
		ESC-C-1053	3. Enhancement of analytical skills by Learning different mechanism of machines.	CO3	1	2									2	
		ESC-C-1054	4.Evaluate properties of stream.	CO4	1	2									2	
				CO5	1	2									2	
				CO6	1	2									2	

SEM:01					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
6	PROFFESIONAL COMUNNICATION I	HM-I-1061	1. Develop effective communication and presentation skills.	CO1	2	3										3
		HM-I-1062	2. Learn corporate etiquette - organizing and managing professional events and will understand how	CO2	2	2								2		3
		HM-I-1063	3. Conduct effective correspondence and prepare reports which produce results.	CO3	2	2										3
		HM-I-1064	4. Develop all-round personalities with a mature outlook to function effectively in different	CO4	2	2			2							3
				CO5	2				2							3
				CO6	2	3										3

SEM:01					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	WORKSHOP	ESC-W-I-1071	1. Explain the use of safety equipment's and precautions in workshop	CO1	1	2									2	
		ESC-W-I-1072	2. Use the measurement tools for processing of work piece	CO2	1	2									2	

	PRACTICE I	ESC-W-I-1073	3. Explain smithy tools and operations	CO3	1	2									2	
		ESC-W-I-1074	4. Perform smithy operations in workshop Explain2 fitting tools and operations	CO4	1	2									2	
				CO5	1	2									2	
				CO6	1	2									2	

SEM:02					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	ENGINEERING PHYSICS	BSC-P-1011	1. Students can able to understand and comprehend the general scientific concepts of diffraction and	CO1	2	3										3
		BSC-P-1012	2 .Students can able to understand and comprehend the structure of optical fiber and its applications.	CO2	2	2								2		3
		BSC-P-1013	3.Students can able to understand and comprehend. Acoustics parameters and its applications	CO3	2	2										3
		BSC-P-1014	4 Students can able to understand and comprehend crystal structure and its analysis.	CO4	2	2			2							3
		BSC-P-1015	5.Students can able to understand and comprehend synthesis of nanomaterials and their properties	CO5	2				2							3
				CO6	2	3										3

SEM:02					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
8	ENGINEERING MATHAMATICS-II	BSC-M-II-2021	1:Student will be able to undestand the formation and solving differential equations and it's applications.	CO1	2	2										2
		BSC-M-II-2022	3.Students will be able to apply numerical methods to obtain approximate solutions to mathematical	CO2	2	2			2							2
		BSC-M-II-2023	3.Students will be able to apply numerical methods to to solve algebraic and transcendental equations	CO3	3	2			2							2
		BSC-M-II-2024	4.Student will be able to undestand the concept of special functions and it's properties.	CO4	3	2			2							2
		BSC-M-II-2025	5. To set up and evaluate multiple integrals for regions in the plane. To find Area of the region bounded by curves and to find volume, surface area, Mass, C.G and M.I of solid geometric figures.	CO5	3	2			2							2
				CO6	3	2										2

SEM:02					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
9	BASIC ELECTRICAL ENGINEERING	ESC-P-2031	1. Solve numerical on electric circuit using laws of KCL and KVL.	CO1	2	3										3
		ESC-P-2032	2 .Solve numerical on magnetic circuit using laws of Coulomb's Law and magnetic circuits.	CO2	2	2								2		3
		ESC-P-2033	3. Explain different single phase AC circuits and will Solve the numerical relate to it.	CO3	2	2										3
		ESC-P-2034	4 .Recognize the types of three phase supply system as a star or delta by observation and will compare to	CO4	2	2			2							3
		ESC-P-2035	5. Understand the importance of earthing and will explain the different types of earthing	CO5	2				2							3
				CO6	2	3										3

SEM:02					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10	BASIC CIVIL ENGINEERING	ESC-P-2041	1.On completion of this course the students will have the knowledge of construction equipment's	CO1	2	2	1									2
		ESC-P-2042	2.Be able to apply theoretical and practical aspects of project management techniques to achieve project	CO2	2	2			2							2
		ESC-P-2043	3. Plan, analyze, design, prepare cost estimates and execute all kinds of Civil Engineering Projects.	CO3	3	2	1		2							2
		ESC-P-2044	4.Apply modern construction techniques, equipment and management tools so as to complete the project	CO4	3	2	1		2							2
				CO5	3	2	1		2							2
				CO6	3	2										2

SEM:02					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
11	ENGINEERING GRAPHICS	ESC-P-2051	1. Understand standards drawing conventions, draw curve and scale, use of drawing instruments	CO1	1	2									2	
		ESC-P-2052	2. pply the concept of projection on lines, planes and solids	CO2	1	2									2	
		ESC-P-2053	3.Draw development of surface and section of solids	CO3	1	2									2	
		ESC-P-2054	4.Draw isometric view of different plane figure and solid.	CO4	1	2									2	
		ESC-P-2055	5. Use drafting tools for creating 2-D and 3-D shapes	CO5	1	2									2	
				CO6	1	2									2	

SEM:02					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

12	WORKSHOP II	ESC-W-II-2071	1.Ability to design and model different prototypes in the carpentry trade	CO1		2		2							
		ESC-W-II-2072	2.define practical skills in various machining operations. measuring instruments	CO2	2	2								1	
		ESC-W-II-2073	3.use different manufacturing processes and measuring instruments for making a job.	CO3	2	2		2							
		ESC-W-II-2074	4. To make various basic prototypes in the trade of Tin smithy such as	CO4	2			1						1	
				CO5	1			2						1	
				CO6		2									

SEM:02					CO-PO Mapping										
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
13	PROFFESIONAL COMUNNICATION II	HM-II -2061	1. Formulate 6 technical reports.	CO1	1	2	2								2	
		HM-II -2062	2. Develop 6 effective presentation on a given topic using various presentation techniques.	CO2	1	2									2	
		HM-II -2063	3. Write6 Job application letter along with resume for various posts.	CO3	1	2		2							2	
				CO4	1	2	2								2	
				CO5	1	2									2	
				CO6	1	2	2	2							2	

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Department of Computer Science and Engineering

SEM:III					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	PCC-CS701 Advanced Computer Architecture	PCC-CS701 .1	Demonstrate concepts of parallelism in hardware/software	CO1	3	3		2		2					1	
		PCC-CS701 .2	Discuss memory organization and mapping techniques.	CO2	3	3		2								
		PCC-CS701 .3	Describe architectural features of advanced processors.	CO3	3			2								
		PCC-CS701 .4	Interpret performance of different pipelined processors.	CO4	3	3				1						2
		PCC-CS701 .5	Explain data flow in arithmetic algorithms	CO5	3	2		2		2						
		PCC-CS701 .6	Explain data flow in arithmetic algorithms	CO6	3		3									

SEM:III					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
2	PCC- CS702 Cloud Computing	PCC- CS702.1	Describe the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.	CO1	1	2									2	
		PCC- CS702.2	Explain the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.	CO2	2	2									1	
		PCC- CS702.3	Collaboratively research on the state of the art (and open problems)in cloud computing.	CO3	2	2		2							1	
		PCC- CS702.4	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.	CO4	1	2									2	
		PCC- CS702.5	Choose the appropriate technologies, algorithms, and approaches for the related issues.	CO5	2	3									1	

SEM:III					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
3	PCC- CS703 Advanced Database Systems	PCC- CS703.1	Understand and identify issues arising from parallel and distributed processing of data.	CO1	3	2			2							
		PCC- CS703.2	Select appropriate database and construct solution to real world problems of storing large data.	CO2	3	3		2	2							
		PCC- CS703.3	Compare and Contrast NoSQL databases with each other and Relational Database Systems.	CO3	3	3			2							
		PCC- CS703.4	Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex SQL scripts	CO4	2	1			2							1
		PCC- CS703.5	Learn database administration tasks and security measures	CO5	3	3		1	2							
				CO6	2	3			2							1

SEM:III					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
4	PCE- CS704 Elective-I	PCE- CS704 .1	Describe the basic issues and the scope of image processing, and the roles of image processing and systems in a variety of applications.	CO1	2	1										
		PCE- CS704 .2	Explore different techniques in image acquisition and color transformation	CO2	2	2							1		1	1
		PCE- CS704 .3	Understand how digital images are represented	CO3	1											1
		PCE- CS704 .4	Evaluate the mathematical principles of digital image enhancement5	CO4	2	1										
		PCE- CS704 .5	Explore and apply the concepts of Edge detection, segmentation and object recognition	CO5	2								1			

SEM:III					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	PCC- CS705 Web Technologies	PCC- CS705.1	Apply knowledge of client side scripting.	CO1	3	3		2				3				
		PCC- CS705.2	Develop web application using PHP.	CO2	3	3		2				3				
		PCC- CS705.3	Design web application using MVC and Angular JS	CO3	3	2				1	2	1		1		
		PCC- CS705.4	Demonstrate use of server side technologies.	CO4	3	2	1	1	2	2	1			1		
		PCC- CS705.5	Explore newer tools for web development.	CO5	3	2	1	1	2		2	2				1

SEM:III					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		PW- CS706.1	Explain the need of a software project for the society	CO1									2	3		
		PW- CS706.2	Identify requirement analysis like functional and technical requirements for the project	CO2									2	3		

6	PW- CS706 Project – I	PW- CS706.3	Come up with design documents for the project consisting of Architecture, Dataflow diagram, Class Diagram, Algorithmic descriptions of various modules, collaboration diagram, ER Diagrams, Database Design Documents, Sequence Diagram, Use Case Diagram	CO3										2		
		PW- CS706.4	Able to demonstrate analysis and design.	CO4						2	1	1	2	2	1	2
		PW- CS706.5	Prepare the technical report consisting of Requirement specification, Analysis and Design of Project	CO5				1		2				3	2	2

SEM:III					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	SI-CS707 Internship	SI-CS707.1	Have an exposure to industrial practices and to work in teams	CO1	1								1			
		SI-CS707.2	Communicate effectively	CO2	2								2			
		SI-CS707.3	Understand the impact of engineering solutions in a global, economic, environmental, and societal context	CO3	2		1						1			
		SI-CS707.4	Develop the ability to engage in research and to involve in life-long learning	CO4	2	1	1						1			
		SI-CS707.5	Comprehend contemporary issues	CO5												
		SI-CS707.6	Engage in establishing his/her digital footprint	CO6												

SEM:IV					CO-PO Mapping											
SR.NO	SUBJECT	CO No	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	PCC- CS801 Big Data Analytics	PCC- CS801.1	Analyze several key technologies used in manipulating, storing, and analyzing big data.	CO1	2	3										
		PCC- CS801.2	Acquire clear understanding of R & Hadoop.	CO2	2	2										
		PCC- CS801.3	Acquire clear understanding of Integrating R & Hadoop and Acquire clear understanding of Hadoop Streaming and its importance.	CO3	2	2										
		PCC- CS801.4	Manage Big Data and analyze Big Data.	CO4	2	2			2							
		PCC- CS801.5	Apply tools and techniques to analyze Big Data.	CO5	2				2							
				CO6	2	3										

SEM:IV					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
8	PCC- CS802 Deep Learning	PCC- CS802.1	Describe basic concepts of artificial intelligence and deep learning.	CO1		3									1	
		PCC- CS802.2	Develop different deep learning models for given tasks.	CO2	3	3	2								2	
		PCC- CS802.3	Devise the correct parameters and hyper-parameters of developed model for getting improved results.	CO3		3	2								1	

SEM:IV					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
9	PCE- CS803 Elective-II	PCE- CS803 .1	Understand project characteristics and various stages of a project.	CO1	3	2			2							
		PCE- CS803 .2	Understand the conceptual clarity about project organization and feasibility analyses	CO2	3	3		2	2							
		PCE- CS803 .3	Analyze the learning and understand techniques for Project planning, project risk, scheduling and Execution	CO3	3	3	1		2	1			1		2	
		PCE- CS803 .4	Resolve IT related crises using project management	CO4	2	1	1		2	1		1	1	1	2	1
		PCE- CS803 .5	Manage the phases and infrastructure of IT projects	CO5	3	3	1	1	2	1	1	1	3	1	2	2
				CO6	2	3	1		2	1		1	2	1	2	1

SEM:IV					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10	PCE- CS804 Elective-III	PCE- CS804 .1	Describe issues and design goals in Ad Hoc wireless networks	CO1	2							2				
		PCE- CS804 .2	Explain and classify various routing protocols in Ad Hoc wireless networks	CO2	2	2										
		PCE- CS804 .3	Describe design issues and classify transport layer protocols and security protocols in Ad Hoc wireless Networks	CO3	2											
		PCE- CS804 .4	Describe challenges and routing protocols in sensor networks	CO4	2	3										
		PCE- CS804 .5	Explain sensor networks infrastructure management and sensor tasking and control techniques	CO5	2				3							

SEM:IV		CO-PO Mapping

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
11	PCC- CS805 Mobile Application Development	PCC- CS805 .1	To Install and configure Android application development tools.	CO1	2		1			1						
		PCC- CS805 .2	To Install and configure Android application development tools.	CO2	2		2									
		PCC- CS805 .3	To Design and develop database based android application.	CO3	2		2									
		PCC- CS805 .4	To Apply Java programming concepts to Android app development	CO4	2		2									

SEM:IV					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
12	PW- CS806 Project – II	PW- CS806.1	Design and develop usable User Interface	CO1	2		1									
		PW- CS806.2	Analyze and apply emerging technologies in development of a project	CO2	2		1		1	1						
		PW- CS806.3	Test the modules in Project	CO3	2		1			1						
		PW- CS806.4	Demonstrate working of project	CO4	2		1		1							

SEM:IV					CO-PO Mapping											
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
13	HM-CS807 Professional Skills	HM-CS807.1	Recognize own strengths and opportunities.	CO1						2		1		3		2
		HM-CS807.2	Apply the life skills to different situations.	CO2		3						2	1	3		
		HM-CS807.3	Speak fluently in academic and social contexts.	CO3						1		1	1	3		1
		HM-CS807.4	Develop Critical thinking and innovative skills.	CO4										3		

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Department of Electronics and Computer Science

SE ELECTRICAL CO /PO

SEM:03

SR NO	SUBJECT	Subject Code	CO	
1	ENGINEERING MATHEMATICS-III	BSC-ECS-301.1	MAKE USE OF LINEAR DIFFERENTIAL EQUATIONS TO SOLVE THE ELECTRICAL ENGINEERING PROBLEMS.	CO1
		BSC-ECS-301.2	APPLY KNOWLEDGE OF VECTOR DIFFERENTIATION TO FIND DIRECTIONAL DERIVATIVES, CURL AND DIVERGENCE OF VECTOR FIELDS.	CO2
		BSC-ECS-301.3	DEFINE FUZZY SETS USING LINGUISTIC WORDS AND REPRESENT THESE SETS BY MEMBERSHIP FUNCTIONS, CONVEXITY, NORMALITY, SUPPORT, ETC.	CO3
		BSC-ECS-301.4	DEVELOP FOURIER SERIES EXPANSION OF A FUNCTION OVER THE GIVEN INTERVAL.	CO4
		BSC-ECS-301.5	FIND LAPLACE TRANSFORMS OF GIVEN FUNCTIONS AND USE IT TO SOLVE LINEAR DIFFERENTIAL EQUATIONS.	CO5
		BSC-ECS-301.6	SOLVE BASIC PROBLEMS IN PROBABILITY THEORY, INCLUDING PROBLEMS INVOLVING THE BINOMIAL, POISSON, AND NORMAL DISTRIBUTIONS.	CO6

CO-PO Mapping

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

2	ELECTRONIC DEVICES	PCC-ECS-302.1	EXPLAIN THE WORKING OF SEMICONDUCTOR DEVICES.	CO1
		PCC-ECS-302.2	INTERPRET THE CHARACTERISTICS OF SEMICONDUCTOR DEVICES	CO2
		PCC-ECS-302.3	ANALYZE ELECTRONICS CIRCUITS USING BJT AND FET (DC & AC ANALYSIS).	CO3
		PCC-ECS-302.4	COMPARE VARIOUS BIASING CIRCUITS & CONFIGURATIONS OF BJT AND MOSFETS.	CO4
		PCC-ECS-302.5	SELECT BEST CIRCUIT FOR THE GIVEN SPECIFICATIONS/APPLICATION.	CO5
		PCC-ECS-302.6	DESCRIBE THE WORKING OF ADVANCED NANO ELECTRONIC DEVICES	CO6

CO-PO Mapping

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

3	DIGITAL ELECTRONICS	PCC-ECS-302.1	PERFORM CODE CONVERSION AND ABLE TO APPLY BOOLEAN ALGEBRA FOR THE IMPLEMENTATION AND MINIMIZATION OF LOGIC FUNCTIONS.	CO1
		PCC-ECS-302.2	ANALYZE, DESIGN AND IMPLEMENT COMBINATIONAL LOGIC CIRCUITS.	CO2
		PCC-ECS-302.3	ANALYZE, DESIGN AND IMPLEMENT SEQUENTIAL LOGIC CIRCUITS.	CO3
		PCC-ECS-302.4	DESIGN AND IMPLEMENT VARIOUS COUNTER USING FLIP FLOPS AND MSI CHIPS.	CO4
		PCC-ECS-302.5	UNDERSTAND TTL & CMOS LOGIC FAMILIES, PLDS, CPLD AND FPGA	CO5
		PCC-ECS-302.6	UNDERSTAND BASICS OF VERILOG HARDWARE DESCRIPTION LANGUAGE AND ITS PROGRAMMING WITH COMBINATIONAL AND SEQUENTIAL LOGIC CIRCUIT	CO6

CO-PO Mapping

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

4	DATA STRUCTURE AND ALGORITHM	PCC-ECS-303.1	IMPLEMENT VARIOUS LINEAR DATA STRUCTURES.	CO1
		PCC-ECS-303.2	IMPLEMENT VARIOUS NONLINEAR DATA STRUCTURES.	CO2
		PCC-ECS-303.3	SELECT APPROPRIATE SORTING AND SEARCHING TECHNIQUES FOR A GIVEN PROBLEM AND USE IT	CO3
		PCC-ECS-303.4	DEVELOP SOLUTIONS FOR REAL WORLD PROBLEMS BY SELECTING APPROPRIATE DATA STRUCTURE AND ALGORITHMS.	CO4
		PCC-ECS-303.5	ANALYZE THE COMPLEXITY OF THE GIVEN ALGORITHMS.	CO5

CO-PO Mapping

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

		PCC-ECS-304.1	RECOGNIZE THE NEED OF DATABASE MANAGEMENT SYSTEM

CO-PO Mapping

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	DATABASE MANAGEMENT SYSTEM	PCC-ECS-304.2	DESIGN ER AND EER DIAGRAM FOR REAL LIFE APPLICATIONS	CO1	2							2		2		2
		PCC-ECS-304.3	CONSTRUCT RELATIONAL MODEL AND WRITE RELATIONAL ALGEBRA QUERIES.	CO2		2	3					2		2		
		PCC-ECS-304.4	FORMULATE SQL QUERIES	CO3	3	2	3	2	3							2
		PCC-ECS-304.5	APPLY THE CONCEPT OF NORMALIZATION TO RELATIONAL DATABASE DESIGN.	CO4	3	2	3	1	3			2		2		2
		PCC-ECS-304.6	DESCRIBE THE CONCEPTS OF TRANSACTION, CONCURRENCY AND RECOVERY	CO5	2		2									
				CO6	3	3	3									1

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
6	PROGRAMMING IN C	PCC-ECS-305.1	STUDENT WILL BE ABLE TO UNDERSTAND THE BASIC CONCEPTS OF PROCEDURE-ORIENTED PROGRAMMING LANGUAGE.	CO1	1	2	2		2							1
		PCC-ECS-305.2	STUDENT WILL BE ABLE TO USE THE CONTROL STATEMENTS, LOOPING STATEMENTS AND FUNCTIONS CONCEPTS.	CO2	2	3	1		1	1						
		PCC-ECS-305.3	STUDENT WILL BE ABLE TO DESIGN PROGRAMS USING USER DEFINED FUNCTIONS AND DATA TYPE.	CO3	3	2	2		1	1						
		PCC-ECS-305.4	STUDENT WILL BE ABLE TO DESIGN & APPLY THE SKILLS FOR SOLVING THE ENGINEERING PROBLEMS.	CO4	3	3		1		1						1

SEM 4

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	ENVIRONMENTSTUDIES	MC-ECS-401.1	UNDERSTANDING OF ISSUES RELATED TO ENVIRONMENT AND THEIR IMPACT ON THE HUMAN LIFE.	CO1	3	2	2		3	2			2	2		3
		MC-ECS-401.2	UNDERSTANDING ON THE SOLUTIONS RELATED TO THE ENVIRONMENTAL	CO2	3	3	1		3	3	3		3	2		3
		MC-ECS-401.3	UNDERSTANDING OF DIFFERENT COMPONENT OF ENVIRONMENT AND THEIR FUNCTION AND SUSTAINABLE DEVELOPMENT.	CO3	3	2			3	2				3		3
		MC-ECS-401.4	TO UNDERSTAND SOCIAL ISSUES AND SUGGEST SOLUTION	CO4	3	3	2	2								2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
2	ELECTRONIC CIRCUITS	PCC-ECS-401.1	EVALUATE THE PERFORMANCE OF AMPLIFIERS THROUGH FREQUENCY RESPONSE.	CO1	3	3	3								1	3
		PCC-ECS-401.2	ANALYSE DIFFERENTIAL AMPLIFIERS FOR VARIOUS PERFORMANCE PARAMETERS	CO2	3	3		1							1	3
		PCC-ECS-401.3	EXPRESS MATHEMATICALLY THE PERFORMANCE PARAMETERS IN TERMS OF CIRCUIT PARAMETERS	CO3	3	3	3	1							1	3
		PCC-ECS-401.4	CHOOSE APPROPRIATE CIRCUIT FOR THE GIVEN SPECIFICATIONS/ APPLICATIONS	CO4	3	3	3	1	1							3
		PCC-ECS-401.5	DESCRIBE VARIOUS APPLICATIONS AND CIRCUITS BASED ON OPERATIONAL AMPLIFIERS	CO5	3	3	3	1							1	3
		PCC-ECS-401.6	DESIGN AN APPLICATION WITH THE USE OF INTEGRATED CIRCUITS.	CO6	3			1							1	3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
3	CONTROLS AND INSTRUMENTATION	PCC-ECS-402.1	DERIVE THE TRANSFER FUNCTIONS FOR THE GIVEN CONTROL SYSTEMS.	CO1	3	3	3	2								3
		PCC-ECS-402.2	ANALYSE THE PERFORMANCE OF CONTROL SYSTEMS BASED ON THE TIME DOMAIN AND FREQUENCY DOMAIN SPECIFICATIONS	CO2	3	2		2								3
		PCC-ECS-402.3	JUDGE THE STABILITY OF THE GIVEN CONTROL SYSTEMS USING APPROPRIATE STABILITY CRITERIA.	CO3	3	3	3									3
		PCC-ECS-402.4	UNDERSTAND AND EXPLAIN THE WORKING PRINCIPLE OF SENSORS AND TRANSDUCERS.	CO4	3	3	3	3	2							3
		PCC-ECS-402.5	EXPLAIN VARIOUS PARAMETERS OF DATA ACQUISITION SYSTEMS.													
		PCC-ECS-402.6	DESCRIBE INSTRUMENT COMMUNICATION STANDARDS.													

CO5	3												3
CO6	3				2								3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
4	COMPUTER NETWORK	PCC-ECS-403.1	DEMONSTRATE CONCEPTS OF COMPUTER NETWORKS.	CO1	3	2	1	1	1					2		2
		PCC-ECS-403.2	EXPLAIN OSI AND TCP/IP LAYERED ARCHITECTURE	CO2	3	2	1	1						2		2
		PCC-ECS-403.3	IMPLEMENT NETWORK AND DATA LINK LAYER.	CO3	3	2	3	3	2					2		2
		PCC-ECS-403.4	DEMONSTRATE TCP PROTOCOL IN DETAIL.	CO4	3	2	1	1						2		2
		PCC-ECS-403.5	TO ANALYZE THE PROTOCOL STRUCTURE USING NETWORK ANALYZING TOOLS.	CO5	3	3	2	3	3					2		2
		PCC-ECS-403.6	APPLY THE PRINCIPALS OF SOCKET PROGRAMMING IN THE NETWORKS.	CO6	3	3	3	3	3					2		2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	MICROPROCESSORS & MICROCONTROLLERS	PCC-ECS-404.1	EXPLAIN 16-BIT MICROPROCESSOR ARCHITECTURES AND FUNDAMENTAL CONCEPTS OF MICROCONTROLLERS	CO1	3				2							3
		PCC-ECS-404.2	TO DEVELOP PROGRAMMING SKILLS FOR MICROPROCESSORS AND MICROCONTROLLERS	CO2	3	2	2	1	2							3
		PCC-ECS-404.3	TO INTERFACE VARIOUS DEVICES IN MICROPROCESSOR AND MICROCONTROLLER SYSTEMS	CO3	3	2	3	2	3							3
		PCC-ECS-404.4	TO DESIGN AND IMPLEMENT MICROPROCESSOR AND MICROCONTROLLER BASED SYSTEMS.	CO4	3	3	3	3	2							3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
6	DISCRETE STRUCTURE & AUTOMATA THEORY	PCC-ECS-405.1	UNDERSTAND THE NOTION OF MATHEMATICAL THINKING, MATHEMATICAL PROOFS AND TO APPLY THEM IN PROBLEM SOLVING.	CO1	3	3	2	2						2		3
		PCC-ECS-405.2	REASON LOGICALLY.	CO2	3	2								2		3
		PCC-ECS-405.3	PERFORM OPERATIONS WITH SETS, RELATIONS, FUNCTIONS, GRAPHS AND THEIR APPLICATIONS.	CO3	3	2	3	2						2		3
		PCC-ECS-405.4	DESIGN DETERMINISTIC FINITE AUTOMATA (DFA) AND NON-DETERMINISTIC FINITE AUTOMATA (NFA) AND PUSHDOWN AUTOMATA WITH UNDERSTANDING OF POWER AND LIMITATIONS.	CO4	3	2	3	2						2		3
		PCC-ECS-405.5	DESIGN CONTEXT FREE GRAMMAR AND PERFORM THE OPERATIONS LIKE SIMPLIFICATION AND NORMAL FORMS.	CO5	3	2	3	2						2		3
		PCC-ECS-405.6	APPLY DISCRETE STRUCTURES AND AUTOMATA THEORY CONCEPTS INTO SOLVING REAL WORLD COMPUTING PROBLEMS IN THE DOMAIN OF FORMAL SPECIFICATION, VERIFICATION, ARTIFICIAL INTELLIGENCE ETC.	CO6	3	3	3	2	3					2		3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	PROGRAMMING IN C++	PCC-ECS-406.1	STUDENT WILL BE ABLE TO UNDERSTAND THE BASIC CONCEPTS OF PROCEDURE-ORIENTED PROGRAMMING LANGUAGE.	CO1	3	2	1		2							2
		PCC-ECS-406.2	STUDENT WILL BE ABLE TO USE THE CLASS, OBJECTS, FUNCTION AND OPERATOR OVERLOADING CONCEPTS	CO2	3	3										
		PCC-ECS-406.3	STUDENT WILL BE ABLE TO UNDERSTAND AND IMPLEMENT THE CONCEPT OF INHERITANCE, TEMPLATE AND EXCEPTION HANDLING APPLICATIONS	CO3	3	3	1		2							2
		PCC-ECS-406.4	STUDENT WILL BE ABLE TO DESIGN & APPLY THE SKILLS FOR SOLVING THE ENGINEERING PROBLEMS.	CO4	3	2	2		3							3

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Department of Electrical Engineering

SE ELECTRICAL CO /PO

SEM:03

SR NO	SUBJECT	Subject Code	CO		CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	ENGINEERING MATHEMATICS-III	BSC-EE2011	Liner differential equations and problems related to applications of differential equation.	CO1	1	2		3		1						
		BSC-EE2012	Perform vector differentiation and integration.	CO2	1	2		2								
		BSC-EE2013	Find Laplace transform and Inverse Laplace transform of various functions	CO3	1	3				2			3			
		BSC-EE2014	Apply Laplace transform to solve Linear differential equations.	CO4	1								2			
		BSC-EE2015	Find Z-Transform and inverse Z-transform by using different properties.	CO5												
		BSC-EE2016	Find Expansions of function by using Fourier series.	CO6												

2	ELECTRICAL ENGINEERING MATERIALS AND ENERGY CONVERSION	PCC-EE.1	To understand properties of conducting materials		CO-PO Mapping											
		PCC-EE.2	To understand properties of insulating materials		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		PCC-EE.3	To understand properties of magnetic materials	CO1	3	2									2	2
		PCC-EE.4	To understand properties of dielectric materials	CO2	3	2									1	2
		PCC-EE.5	To understand the principles of Electro-mechanical Energy Conversion	CO3	3	2									2	2
		PCC-EE.6	Use materials for energy conversion	CO4	3	1									2	2
				CO5	3	1									1	2
				CO6	3	1									1	2

3	ANALOG ELECTRONICS ENGINEERING	PCC-EE.1	Explain various semiconductor devises and its applications.		CO-PO Mapping											
		PCC-EE.2	Illustrate & Compare BJT and JFET.		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		PCC-EE.3	Classify feedback amplifiers &analyze various oscillators	CO1	3	3	2	-	-	-	-	-	-	-	-	3
		PCC-EE.4	List op-amp characteristics and distinguish its configurations	CO2	3	3	2	-	-	-	-	-	-	-	-	3
		PCC-EE.5	Explain applications of op-amp.	CO3	3	3	2	2	-	-	-	-	-	-	2	3
		PCC-EE.6	Interpret applications of IC 555 timers	CO4	3	2	2	-	-	-	-	-	-	-	3	3
				CO5	3	2	-	-	-	-	-	-	-	2	-	3
				CO6	3	3	2	-	-	-	-	-	-	-	-	3

4	BASIC CIRCUIT THEORY	PCC-EE2041	Analyze the A. C and D.C. Circuit		CO-PO Mapping											
		PCC-EE2042	Apply network theorems to solve problems		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		PCC-EE2043	Solve problem on coupled circuit	CO1	3	1	2	-	-	-	-	-	-	-	-	-
		PCC-EE2044	Solve problem on two port network	CO2	3	1	2	-	-	-	-	-	-	-	-	-
		PCC-EE2045	Solve problem on Laplace Transformation	CO3	3	2	2	-	-	-	-	-	-	-	-	-
				CO4	3	2	2	-	-	-	-	-	-	-	-	-
				CO5	-	2	2	-	-	-	-	-	-	-	-	-

5	ELECTRICAL MEASUREMENT	PCC-EE2051	TO IDENTIFY ERRORS IN THE INSTRUMENTS.		CO-PO Mapping											
		PCC-EE2052	TO IDENTIFY UNKNOWN ELECTRICAL PARAMETERS BY USING VARIOUS METHODS.		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		PCC-EE2053	TO SOLVE THE NUMERICAL ON RANGE EXTENSION OF METERS.	CO1	3								2	2		2
		PCC-EE2054	TO DISCUSS VARIOUS METHODS OF MEASUREMENT OF POWER & ENERGY.	CO2	3								2	2		
		PCC-EE2055	TO DEMONSTRATE DIGITAL AND ADVANCE INSTRUMENTS.	CO3	3	2							2	2		
		PCC-EE2056	TO EXAMINE THEORETICALLY THE PERFORMANCE OF CTâ€™S AND PTâ€™S.	CO4	3								2	2		
				CO5	3								2	2		
				CO6	3								2	2		

SEM:04

				CO-PO Mapping											
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	PCC-EE.1	TO UNDERSTAND THE CONSTRUCTIONAL DETAILS OF DC MACHINE	CO1	3	3	3								1	3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
6	DCMT	PCC-EE.2	TO UNDERSTAND THE CONSTRUCTION, WORKING PRINCIPLE OF DC MOTOR	CO2	3	3									1	3
		PCC-EE.3	TO UNDERSTAND THE CONSTRUCTION, WORKING PRINCIPLE DIFFERENT UNIVERSAL MOTORS	CO3	3											3
		PCC-EE.4	TO UNDERSTAND THE CONSTRUCTION, WORKING AND PARALLEL OPERATION OF SINGLE PHASE TRANSFORMER.	CO4	3	3									1	3
		PCC-EE.5	TO UNDERSTAND THE CONSTRUCTION, WORKING OF POLYPHASE TRANSFORMERS	CO5	3											3
		PCC-EE.6	TO UNDERSTAND THE CONSTRUCTION, WORKING AND PARALLEL OPERATION OF THREE PHASE TRANSFORMER.	CO6	3	3									1	3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	POWER ELECTRONICS	PCC-EE.1	TO UNDERSTAND THE POWER ELECTRONICS DEVICE	CO1	3	2		1	2							3
		PCC-EE.2	TO STUDY THE SINGLE PHASE AND THREE PHASE RECTIFIERS AND ITS APPLICATIONS	CO2	3	2	1	2	3							3
		PCC-EE.3	TO STUDY THE CLASSIFICATION OF CONVERTER AND TIS PERFORMANCE	CO3	3		1	2	3							3
		PCC-EE.4	TO PERFORM PHASE CONTROLLED AC TO DC CONVERTERS	CO4	3	2	1	2	2							3
		PCC-EE.5	BASIC CONCEPTS OF SWITCH MODE INVERTERS	CO5	3	2			2							3
		PCC-EE.6	TO STUDY CYCLO- CONVERTERS AND MATRIX CONVERTER	CO6	3	2	1		1							3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
8	POWER SYSTEM - I	PCC-EE.1	UNDERSTAND BASICS OF POWER SYSTEM	CO1	3	2			2				2	2		2
		PCC-EE.2	MODELING & REPRESENTATION OF THE SYSTEM COMPONENTS USED IN POWER SYSTEM	CO2	3	3			2				2	2		2
		PCC-EE.3	UNDERSTAND USE OF CABLES IN DISTRIBUTION NETWORK	CO3	3	3			2				2	2		2
		PCC-EE.4	CONCEPT OF DESIGNING TRANSMISSION LINE PARAMETERS	CO4	2	1			2				2	2		1
		PCC-EE.5	THE BASIC CONCEPT OF POWER FACTOR IMPROVEMENT	CO5	3	3			2				2	2		2
		PCC-EE.6	ANALYZE PERFORMANCE OF GENERATION & TURBINES AND ECONOMIC ASPECTS OF POWER GENERATION	CO6	2	3			2				2	2		1

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
9	ELECTROMAGNETIC	PCC-EE.1	APPLY KNOWLEDGE OF MATHEMATICS, SCIENCE, AND ENGINEERING TO DESIGN, ANALYZE AND CONTROL THE DIFFERENT SYSTEMS	CO1	3	3	1	2								2
		PCC-EE.2	EXPLAIN TIME & FREQUENCY DOMAIN ANALYSIS FOR DIFFERENT CONTROL SYSTEMS	CO2	3	3	2	2								2
		PCC-EE.3	DEMONSTRATE & COMPARE DIFFERENT CONTROL SYSTEMS	CO3	3	3	1	2								2
		PCC-EE.4	DESCRIBE STATE VARIABLES 5 DESIGN MODEL FOR CONTROL SYSTEM	CO4	3	2	1	2								2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10	CONTROL SYSTEM –I	PCC-EE.1	TO UNDERSTAND DIFFERENT TYPES OF CONTROL SYSTEM AND EFFECT OF FEEDBACK	CO1	3	3	2	2	2							3
		PCC-EE.2	EXPLAIN TIME & FREQUENCY DOMAIN ANALYSIS FOR DIFFERENT CONTROL SYSTEMS	CO2	3	3		2	2							3
		PCC-EE.3	TO UNDERSTAND CONCEPT OF THE ROOT LOCUS	CO3	3	3	3	2	2							3
		PCC-EE.4	TO UNDERSTAND CONCEPT OF FREQUENCY RESPONSE ANALYSIS	CO4	3	3	3	2	2							3
		PCC-EE.5	TO UNDERSTAND CLASSICAL CONTROL DESIGN TECHNIQUES	CO5	3	3		2	2							3
		PCC-EE.6	DESCRIBE STATE VARIABLES 5 DESIGN MODEL FOR CONTROL SYSTEM	CO6	3	3		2	1							3

SEM:05					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

Sl. No	SUBJECT	CO NUMBERS	CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	DIGITAL ELECTRONICS AND MICROCONTROLLER	PCC-EE3011	Understand , Assess and solve basic binary math operations Number System, Logic Gates, Theorems, Properties of Boolean Algebra.	CO1	1	2	2	2				1	2			2
		PCC-EE3012	Understand , Solve and Analyze 2, 3 and 4 variable K-Map	CO2	2	1	2									2
		PCC-EE3013	Design and analyze different types Adders, Substractors, FlipFlops and Counters.	CO3	2	1	2					1				3
		PCC-EE3014	Apply Knowledge and Demonstrate various addressing modes and data transfer instructions	CO4	2	1	2	2					1			1
		PCC-EE3015	Analyze assembly language programs select appropriate assemble into machine a cross assembler utility of a microcontroller	CO5	1	2						1	2			2
		PCC-EE3016	Design and Analyze different types of Interfacing	CO6	2	2	1		1	1		1				2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
2	AC MACHINES	PCC-EE3021	Analyze the performance of 3-phase induction motors	CO1	3	3	2									3
		PCC-EE3022	Determine and analyze the Losses and efficiency and performance of alternators	CO2	3	2	3									3
		PCC-EE3023	familiarize with principle of operation and application of 1 -phase induction motors.	CO3	3	2				2						3
		PCC-EE3024	Analyze performance of special purpose motors and Make use of special designed motors for different applications	CO4	3	1	3						1			3
		PCC-EE3025	Analyze and Evaluate performance of different types of alternators	CO5	3	3	3		3							3
		PCC-EE3026	Analyze the performance of 3-phase induction motors	CO6	3	3	3						2			3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
3	POWER SYSTEM-II	PCC-EE3031	Understand the need of power factor improvement and substation layout.	CO1	3	2	2	2					1	2		1
		PCC-EE3032	Identify sequence components and to draw sequence network of different Power system component	CO2	3	3		3	2				1	2		1
		PCC-EE3033	Analyze power system in P.U and will be able to represent power system with its components	CO3	3	3	2						1	2		1
		PCC-EE3034	Evaluate system fault Analysis	CO4	3	3	2	3					1	2		1
		PCC-EE3035	SOLVE LOAD FLOW PROBLEMS USING ITERATIVE METHODS LIKE GAUSS-SEIDEL AND NEWTON-RAPHSON.	CO5	3	3		3	3				1	2		2
		PCC-EE3036	EVALUATE POWER FACTOR IMPROVEMENT TECHNIQUES AND SUBSTATION ENGINEERING ESSENTIALS.	CO6	2	2		2					1	2		2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
4	ADVANCED CONTROL SYSTEM	PCC-EE3041	The students will be able to design a compensation techniques like Lag, Lead and Lead-Lag Controllers in frequency domain, design of PID controller	CO1	3	2	2									
		PCC-EE3042	Derive and Design a Lead, Lag, and Lead-Lag Compensation using Root Locus	CO2	3	2	2									
		PCC-EE3043	Derive and Design a Lead, Lag, and Lead-Lag Compensation using Bode Plot	CO3	3	2	2									
		PCC-EE3044	Analyse the state space representation of digital control system, derive state space equation, and its Transfer function	CO4	3	2	2									
		PCC-EE3045	Design a state space using controllability, Observability, Pole Placement techniques for controller, Pole placement technique by Transformation method, Direct Substitution Method and by Ackermann's formula	CO5	3	2	2									
		PCC-EE3046	The students will be able tounderstand the digital control systemof Z-Transform and sampling, mapping between S-Plane & Z-Plane, stability analysis, transient & steady state analysis	CO6	3	2	2									

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	SIGNALS AND SYSTEMS	PCC-EE3051	Define CT and DT signals mathematically and Classify systems based on their properties	CO1	3	3									1	2
		PCC-EE3052	Explain concept of LTI system and Evaluate convolution.	CO2	3	3									1	2
		PCC-EE3053	Make use of Laplacetransform to analyze CT signals and systems.	CO3	3	3	3	3								

	SIGNALS AND SYSTEMS	PCC-EE3054	Make use of Z transforms to analyze DT signals and systems.	CO4	3	3	3	3								
		PCC-EE3055	Determine Fourier transforms for CT & DT.	CO5	3	3									1	2
		PCC-EE3056	Explain sampling theorem in time domain and frequency domain.	CO6	3	3									1	2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
6	ELECTRICAL APPLIANCES AND LUMINORIES (Open Elective -I)	OCE-EE-3011	Apply Knowledge to maintain the different electrical appliances	CO1	3	3									1	2
		OCE-EE-3012	Construct And repair domestic appliances	CO2	3	3									1	2
		OCE-EE-3013	Design and troubleshooting of UPS and Inverters	CO3	3	3	3	3								
		OCE-EE-3014	Illustrate basic concepts of illumination.	CO4	3	3	3	3								
		OCE-EE-3015	Designing of lighting for domestic purpose	CO5	3	3									1	2
		OCE-EE-3016	Designing of lighting for special purpose	CO6	3	3									1	2

SEM:06					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	DIGITAL SIGNAL PROCESSING	PCC-EE3071	Explain & Evaluate concept of convolution, DFT & FFT	CO1	3	3							3	3		3
		PCC-EE3072	Analyze & Design DSP filters.	CO2	3	3							3	3		3
		PCC-EE3073	Analyze & ConstructDSP filter.	CO3	3	3							3	3		3
		PCC-EE3074	Illustrate & Distinguish DSP processors	CO4	3								2	2		3
		PCC-EE3075	Define & Explain various modulation techniques	CO5	3								2	2		3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
8	ELECTRICAL MACHINE DESIGN	PCC-EE3081	Recognize thefundamentals and essential standards to design electrical machine	CO1	2	1	2									3
		PCC-EE3082	Design of entire transformer in detail	CO2	1		2	1								3
		PCC-EE3083	Design of armature, field winding and Commutator of DC machines	CO3	1	1	2									3
		PCC-EE3084	Design of stator core ,stator winding and rotor bars of three phase induction motor	CO4	1	2	2	2								3
		PCC-EE3085	Design of stator core ,stator winding and rotor bars of three phase induction motor	CO5	1	2	1	2								3
		PCC-EE3086	Design of transformer, induction motor, DC machines and synchronous machines using Computer application .	CO6	1	2	1									3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
9	POWER SYSTEM STABILITY AND CONTROL	PCC-EE3091	Understand Power System Dynamics Problems, Current Status & Recent Trends.	CO1	3	3		1	2							3
		PCC-EE3092	To develop ability to analyze and use various methods to improve stability of power systems.	CO2	3	3	1	2	3							3
		PCC-EE3093	Evaluate Methods of Improving Stability	CO3	3		1	2	3							3
		PCC-EE3094	To illustratethe automatic frequency and voltage control strategies for single and two area case.	CO4	3	3	1	2	2							3
		PCC-EE3095	To understand formulation of unit commitment and economic load dispatch tasks and solve it using optimization techniques	CO5	3	3			2							3
		PCC-EE3096	Explicate need of System State Classification, Security Analysis and Factors Affecting Power System Security.	CO6	3											2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10	ELECTRICAL DRIVES-I	PCC-EE3101	Understand the concept, classification, Parts and advantages of electrical drives with types of loads and conditions of dynamic and stability considerations.	CO1	3	2	2	2					1	2		1
		PCC-EE3102	Basics of DC motor and the speed control methods of D.C. motor by Single & Three-Phase Converters.	CO2	3	3		3	2				1	2		1
		PCC-EE3103	Outline of Chopper operation, configuration and control techniques to control the DC Motor.	CO3	3	3	2						1	2		1
		PCC-EE3104	Appraise the Voltage and frequency control method of Induction motor drive in Stator side control.	CO4	3	3	2	3					1	2		1

		PCC-EE3105	Appraise the rotor resistance control method of Induction motor drive in Rotor side control.	CO5	3	3		3	3				1	2		2
		PCC-EE3106	Appraise the speed and frequency control method of synchronous motor.	CO6	2	2		2					1	2		2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
11	ELECTRICAL INSTALLATIONS TESTING AND MAINTENANCE	PCC-EE3111	Read and interprets electrical installationdrawings	CO1	3											3
		PCC-EE3112	Understand and apply IErules	CO2	3											3
		PCC-EE3113	To learn testing methods of various electricalequipment	CO3	3	3			1							3
		PCC-EE3114	Describe corrective and preventive maintenance of electricalequipment's	CO4	3											3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
12	ELECTRICAL ENERGY AUDIT AND CONSERVATION (Open Elective -II)	OCE-EE3021	Prepare energy flow diagrams and energy audit report .	CO1	3	2				2					2	3
		OCE-EE3022	Carryout energy audit for Mechanical Systems.	CO2	3	2				2					2	3
		OCE-EE3023	Relevant tariff for reducing losses in facilities.	CO3	3	2				2					2	3
		OCE-EE3024	Interpret energy conservation policies in India.	CO4	3	2				2					2	3
		OCE-EE3025	Identify and evaluate the energy conservation opportunities in different electric system.	CO5	3	2				2					2	3
		OCE-EE3026	Identify and assess energy conservation opportunities in thermal system.	CO6	3	2				2					2	3

SEM:07					CO-PO Mapping											
Sl. No	SUBJECT	CO NUMBER	CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	FLEXIBLE AC TRANSMISSION SYSTEM	PCC-EE4011	understand the interconnection system, Power flow systems, loading effects and important of FACTS and basics of types of FACTS controller	CO1	3		1									
		PCC-EE4012	understand the Statics shunt compensators	CO2	3		1									
		PCC-EE4013	understand the Static Synchronous compensator STATCOM	CO3	3		1									
		PCC-EE4014	understand the Static Series compensators	CO4	3		1									
		PCC-EE4015	understand the Static voltage and phase angle regulation TCVR and TCPAR	CO5	3		1									
		PCC-EE4016	understand the combined compensator: UPFC and IPFC.	CO6	3		1									

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
2	POWER QUALITY AND HARMONICS	PCC-EE4021	To study various methods of power quality monitoring.	CO1	3	2									1	2
		PCC-EE4022	To Study the production of voltages sags.	CO2	3	2									1	2
		PCC-EE4023	To Study the interruptions types and its influence in various components	CO3	3	2									1	2
		PCC-EE4024	To Study the Effects of harmonics on various equipment"s	CO4	3	2									1	2
		PCC-EE4025	Understand power quality monitoring and classification techniques	CO5	3	2									1	2
		PCC-EE4026	UNDERSTAND POWER QUALITY MONITORING	CO6	3	2									1	2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10		PO12
3	Computer Methods in Power System	PCC-EE4031	Calculate impedance and admittance matrices	CO1	1	2	1					1				3
		PCC-EE4032	Study load flow studies	CO2	1	1	3				1	2				3
		PCC-EE4033	Find fault current using 2 component theory	CO3	1	2	1				2	1				3
		PCC-EE4034	TO LEARN LOAD FLOW STUDIES	CO4	1	2	1		1		1	2				2
		PCC-EE4035	FIND FAULT CURRENT USING 2 COMPONENT THEORY	CO5	2	1	2				1	2				2
		PCC-EE4036	TO LEARN FAULT ANALYSIS	CO6	1	2	1				1	1				3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
4	SWITCHGEAR AND PROTECTION	PCC-EE4041	Understand the types of Circuit breakers and choice of Relays for appropriate protection of power system equipment	CO1	3	2	1	1					2	2		3
		PCC-EE4042	Understand various types of Protective devices in Electrical Power Systems.	CO2	3	1	1	1					2	2		3
		PCC-EE4043	Interpret the existing transmission voltage levels and various means to protect the system against over voltages.	CO3	3	2	1	1					2	2		3
		PCC-EE4044	EXPLAIN DIFFERENTIAL RELAY PRINCIPLES AND ANALYZE LINE AND TRANSFORMER PROTECTION, HARMONIC RESTRAINT, AND BUCHHOLZ RELAY FUNCTIONS	CO4	3	2	1	1					2	2		3
		PCC-EE4045	MPLEMENT GENERATOR AND DISTANCE PROTECTION SCHEMES AND ASSESS OVERVOLTAGE PROTECTION USING SURGE ARRESTORS AND INSULATION COORDINATION FOR SYSTEM RELIABILITY.	CO5	3	2	1	1					2	2		3
		PCC-EE4046	Understand the importance of Neutral Grounding, Effects of Ungrounded Neutral grounding on system performance, Methods and Practices.	CO6	3	2	1	1					2	2		3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	INDUSTRIAL TRAINING & PRESENTATION	PCC-EE4051	Exhibit the corporate culture/ethics in their work-space/career.	CO1	3	2	2	2					1	2	2	
		PCC-EE4052	Identify the size and scale of operations in Industry.	CO2	3	2	2	2					2	2	2	
		PCC-EE4053	Accomplish allotted tasks within deadlines.	CO3	3	2	2	2					2	2	2	
		PCC-EE4054	Demonstrate an understanding of various constraints in industry.	CO4	3	2	2	2					2	2	2	
		PCC-EE4055	Learn problem solving techniques and also work as a team.	CO5	3	2	2	2					2	2	2	

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
6	ELECTRIC VEHICLE (Open Elective I)	OCE-EE4011	Understand working of different configurations of electric vehicles	CO1	1	2	2		2							2
		OCE-EE4012	Understand hybrid vehicle configuration and its components, performance analysis	CO2	2	1	1									1
		OCE-EE4013	Understand of electric vehicle drive systems	CO3	2	1	2									2
		OCE-EE4014	Discuss about the different types of energy storage system.	CO4	1	1	1		1							2
		OCE-EE4015	Describe about the battery characteristic & parameters.	CO5	1	2	2		1							3
		OCE-EE4016	Explain about the battery testing, disposal and recycling.	CO6	2	2	2		1							1

SEM:08

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	Management & Entrepreneurship Development	PCC-EE4071	Understand the concept and significance of project.	CO1	3								2	3	3	3
		PCC-EE4072	Understand management of functional dimensions of Project	CO2	3								3	3	3	3
		PCC-EE4073	Analyze risk and opportunities involved in project management.	CO3	3								3	3	3	3
		PCC-EE4074	Prepare feasibility report for a project.	CO4	3									2	3	3
		PCC-EE4075	TO UNDERSTAND THE ROLE OF MODERN SMALL BUSINESS ENTERPRISES	CO5	3									2	3	3
		PCC-EE4076	UNDERSTAND THE CONCEPT AND SIGNIFICANCE OF PROJECT MANAGEMENT	CO6	3								3	3	3	3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
8	H.V.D.C. SYSTEMS	PCC-EE4081	Explain about HVDC.	CO1	3		1		3							
		PCC-EE4082	Explain the analysis of HVDC converters.	CO2	3		2		3							
		PCC-EE4083	Explain The Multi Terminal HVDC Systems.	CO3	3		1		3							
		PCC-EE4084	Apply the knowledge of reactive power and design the filters.	CO4	3		1		3							
		PCC-EE4085	Explain HVDC Cables and simulation of systems.	CO5	3		3		3							

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
9	Extra High Voltage AC Transmission	PCC-EE4091	Calculate EHVAC line parameters	CO1	3	3		2								3
		PCC-EE4092	Study voltage gradients and corona effects	CO2	3	3		2								3
		PCC-EE4093	Find over-voltages and methods of protection	CO3	3	3		2								3
		PCC-EE4094	STUDY OF LIGHTNING AND LIGHTNING PROTECTION & INSULATION CO-ORDINATIONS	CO4	3	3		2								3
		PCC-EE4095	STUDY OF OVER VOLTAGE IN EHV SYSTEM CAUSED BY SWITCHING OPERATIONS	CO5	3	3		2								3
		PCC-EE4096	STUDY OF POWER FREQUENCY VOLTAGE CONTROL AND OVER VOLTAGES	CO6	3	3		2								3

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10	ELECTRICAL GENERATION & UTILIZATION	PCC-EE4101	Explain about Electrical Utilization application	CO1	1	2	2									2
		PCC-EE4102	Explain the Non-Conventional energy	CO2	2	1	3									3
		PCC-EE4103	Explain about Electric traction. Use.	CO3	2	1	2		1							2
		PCC-EE4104	TO UNDERSTAND ELECTRIC HEATING AND WELDING	CO4	2	2	1			1						1
		PCC-EE4105	TO EXPLAIN THE AC / DC ELECTRIC TRACTION	CO5	1	2	2	1								2
		PCC-EE4106	TO UNDERSTAND TRAIN MOVEMENT AND ENERGY CONSUMPTION	CO6	2	2	2									2

					CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
11	Electrical Maintenance and Electrical Energy Audit	OCE-EE4021	Comply with published electrical codes and safety standards	CO1	3	2	1									1
		OCE-EE4022	Install electrical systems/equipment in new construction under supervision of a journey person.	CO2	3	3	1									
		OCE-EE4023	Troubleshoot, repair, and conduct routine maintenance of electrical systems/equipment.	CO3	3	2	1									1
		OCE-EE4024	Conceptual knowledge of the technology, economics and regulation related issues associated with energy conservation and energy auditing	CO4	3	2										
		OCE-EE4025	Identify and evaluate the common energy conservation opportunities in different energy intensive industrial equipment"s.	CO5	3											
		OCE-EE4026	Understand the need for energy audit and examine the economic evaluation of energy conservation solutions adopted.	CO6	3											1

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PRINCIPAL
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Department of Mechanical Engineering

SEM:03

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	M-III	ME211.01	1) SolveLinear Differential Equations with constant coefficients.	CO1	3	3	2	1	1						3	3		
		ME211.02	2) Describe the statistical data numerically by using Lines of regression and Curve fittings.	CO2	3	3	2	1	1						3	3		
		ME211.03	3) Find Laplace transforms of given functions and use it to solve linear differential equations	CO3	3	3	2	1	1						3	3		
		ME211.04	fields.	CO4	3		2	1	1						3	3		
		ME211.05	5)Develop Fourier series expansion of a function over the given interval.	CO5	3	3	2	1	1						3	3		
		ME211.06	6)Make use ofPartial Differential Equation to solve the Mechanical Engineering problems	CO6	3	3	2	1	1						3	3		

SEM:03

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
2	ELECTRICAL TECHNOLOGY	ME212.01	student will be able to Deals the principles of Electrical Engineering															
		ME212.02	student will be able to Understands the theoretical and practical's concepts of Electric motors	CO1	2		2						2			2	3	1
		ME212.03	student will be able to Apply Electrical heating methods for Industrial furnaces.	CO2	2	2					2					1	2	1
		ME212.04	student will be able to Identify and select suitable types of motors and drives	CO3	3	3							2			3	3	2
		ME212.05	student will be able to Design various speed control techniques for Electric motors.	CO4	3	3							2			2	2	2
				CO5	3								3			2	3	1
				CO6														

SEM:03

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
3	APPLIED THERMODYNAMICS	ME213.01	Remember the fundamental laws of thermodynamics	CO1	3	2							2	2		2		
		ME213.02	Understand and Solve the introductory problems on Rankine cycle	CO2	3	3							2	2		2		
		ME213.03	Classify steam generators and condensers and Steam turbines.	CO3	3	2							2	2		2		1
		ME213.04	Design the steam nozzle.	CO4	3	2							3	2		2		2
		ME213.05	Understand and Solve problems on Steam turbines	CO5	3	2							3	2		2		2
		ME213.06	Understand the property of lubricants and selection of lubricants	CO6	3	2							3	2		2		2

SEM:03

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
4	METALLURGY	ME214.01	Understand basic concept of metal structure.	CO1	3								2	2		2		
		ME214.02	Understand Fe- Fe3C equilibrium diagram and Selection of Metals and Alloys for different application	CO2	3								2	2		2		
		ME214.03	Understand the destructive and non- destructive testing methods.	CO3	3		2				2		2	2		2		
		ME214.04	Understand need & principles of Heat treatment.	CO4	3						2		2			2		
		ME214.05	Understand the various heat treatment processes.	CO5	3								2	2		2		
		ME214.06	Understand Powder metallurgy technology & industrial practices.	CO6	3						2			2		2		

SEM:03

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
5	FLUID MECHANICS	ME215.01	Understand properties of fluids and classification of fluid flows	CO1	1													
		ME215.02	kinematics and fluid dynamics	CO2	2												1	
		ME215.03	Equation and momentum equation for different fluid flow applications	CO3	2													
		ME215.04	Make basic analysis of laminar flow to calculate resistance to it through circular pipe	CO4	2													

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		ME215.05	Calculate different losses in fluid flow through different arrangements of pipes	CO5	3												2	
		ME215.06	Apply theory of boundary layer, Drag and lift forces in proper cases	CO6	3	2											1	

SEM:03					CO-PO Mapping													
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
6	MACHINE DRAWING	ME216.01	Use BIS conventions in machine drawings.	CO1	2				2							2		
		ME216.02	Find line/curve of intersection between two solids	CO2	2				2							2		
		ME216.03	Sketch the various machine components.	CO3	2				2							2		
		ME216.04	Read and interpret the given production drawings.	CO4	2				2							2		
		ME216.05	Understand significance of assembly and detail drawings.	CO5	2				2							2		
		ME216.06	Details and Assembly Drawing	CO6	2				2							2		

SEM:03					CO-PO Mapping													
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
7	Computer Programming Using C++	ME217.01	To understand how C++ improves C with object-oriented features.	CO1	3	2	2								2	2	1	2
		ME217.02	control structures.	CO2	2											3	2	
		ME217.03	Design programs involving decision control statements, loop control statements and case control structures.	CO3	3	1	2								2	2	1	2
		ME217.04	Develop algorithms for solving problems using object oriented language.	CO4	1		2									1	2	
		ME217.05	To develop and enhance the programming skills amongst the students in general aswell as application of it in the field of Mechanical Engineering.	CO5	3	2									2	2	2	
				CO6														

SEM:03					CO-PO Mapping													
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
8	WORKSHOP PRACTICE III	ME218.01	Understand types of Patterns, Core boxes and Preparation of Pattern for solid casting.	CO1	2		2		2					2				
		ME218.02	strength.	CO2	3		2		2							2		
		ME218.03	Understand gating system for metal casting with casting defects	CO3	3		2											
				CO4														
				CO5														
				CO6														

SEM:03					CO-PO Mapping													
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
9	ENVIRONMENTAL STUDIES	ME219.01	UNDERSTANDING OF ISSUES RELATED TO ENVIRONMENT AND THEIR IMPACT ON THE HUMAN LIFE.	CO1	3	3	2			3			2			3		
		ME219.02	UNDERSTANDING ON THE SOLUTIONS RELATED TO THE ENVIRONMENTAL PROBLEMS.	CO2	3	2				2		2		2	2	3		
		ME219.03	UNDERSTANDING OF DIFFERENT COMPONENT OF ENVIRONMENT AND THEIR FUNCTION AND SUSTAINABLE DEVELOPMENT.	CO3	2	3	1						2			1		
		ME219.04	STUDENT WILL BE ABLE TO COMPREHEND THE IMPORTANCE OF ECOSYSTEM AND BIODIVERSITY	CO4	3		2			2		2			2	1		
		ME219.05	TO CORRELATE THE HUMAN POPULATION GROWTH AND ITS TREND TO THE ENVIRONMENTAL DEGRADATION AND DEVELOP THE AWARENESS ABOUT HIS/HER ROLE TOWARDS ENVIRONMENTAL PROTECTION AND PREVENTION	CO5	2	2	1						2			3		
		ME215.06	IDENTIFY DIFFERENT TYPES OF ENVIRONMENTAL POLLUTION AND CONTROL MEASURES	CO6	3	1	1			2				2	2	2		

SEM:04					CO-PO Mapping													
SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		ME210.01	Understand and apply various methods to find roots of equations.	CO1	3	2	1	1							1	2		

10	APPLIED NUMERICAL METHODS	ME210.02	Learn and Implement different methods to solve simultaneous equations.	CO2	3	1									1	2		
		ME210.03	Understand and apply the methods of Regression and interpolation.	CO3	3	2									1	1		
		ME210.04	Implement various numerical methods for differentiation and Integration	CO4	3	1									1	1		
		ME210.05	Apply various methods to solve engineering problems with Ordinary differential equations.	CO5	3	2									1	1		
		ME210.06	Understand the methods to solve Partial differential equations involved in Engineering Problems.	CO6	3	1									1	1		

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
11	ANALYSIS OF MECHANICAL ELEMENTS	ME211.01	Apply concepts of analysis of mechanical elements to obtain solution to various types of loading and stresses induced in real time engineering problems.	CO1	3	2											2	2
		ME211.02	Draw shear force and bending moment diagrams for simple beams subjected to various loads and support conditions.	CO2	2	2											2	2
		ME211.03	Compute and analyze bending and shear stresses in mechanical components.	CO3	3	2	2										2	2
		ME211.04	Determine plane stress, principal stress .maximum shear stress and their orientations using analytical method and Mohr's circle.	CO4	3	2											2	
		ME211.05	Analyze the effect of deflection in beams.	CO5	2	2	2										2	3
		ME211.06	Evaluate buckling and strain energy in beams subject to various types of loading.	CO6	2	2											2	3

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
12	FLUID AND TURBO MACHINERY	ME212.01	To learn the working principles of Impulse water turbines and also to study its velocity triangles .To study design parameters related to Turbines	CO1	1	2											1	
		ME212.02	To learn the working principles of Reaction water turbines and also to study its velocity trianglesstudy design parameters related to Turbines	CO2	1	2	3										1	
		ME212.03	To understand the concept of Centrifugal pumps and its construction. To understand NPSH terms related to centrifugal pumps	CO3	1	2	3										1	
		ME212.04	To illustrate the concept of Reciprocating Air Compressors. To understand various parameters related to Air Compressors.	CO4	2	2	3										1	
		ME212.05	To illustrate the concept of centrifugal compressor, Axial compressors. To understand variousparameters related to rotodynamic air compressors	CO5	1	2											1	
		ME212.06	To discuss the working of Gas Turbines, and Jet engine and know its various configurations.To determine the efficiencies of gas turbines	CO6	2	1											1	

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
13	THEORY OF MACHINES-I	ME213.01	Understand different types of mechanisms and their applications	CO1	3	1	3	3									3	
		ME213.02	Analyze kinematic theories of mechanism,	CO2	3	3	3	3									2	
		ME213.03	Design cam with follower for different applications	CO3	3	2	2	2									2	
		ME213.04	Select different power transmitting elements according to application	CO4	3	3	3	3									2	
		ME213.05	Select different power transmitting elements according to application	CO5	3	3	3	2	2								2	
		ME213.06	Select different governing mechanisms according to application.	CO6	3	2	3	3	2								2	

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
14	MACHINE TOOLS AND PROCESSES	ME214.01	Identify various kinds of machine tools of previous and present era tools.	CO1	1	2	2	2								1		
		ME214.02	Describe construction and working of basic machine tools.	CO2	2											1		
		ME214.03	Demonstrate their understanding of plastic processing, injection moulding, extrusion and thermoforming.	CO3		2	2	2								1		
		ME214.04	Analyze the concept, mechanism of material removal with respect different processes.	CO4	2		3		1							1		
		ME214.05	In position to appreciate the merits of non-traditional machining and its applications in industries.	CO5	2	1	2	2								1		
				CO6												1		

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
14	Testing and Measurement	ME215.01	Understand basic constriction of working of various instruments	CO1	2	2			3								2	
		ME215.02	Continuity equation, Bernoulli's Equation and momentum equation for different fluid flow applications.	CO2	1		2				2			2		3		2
				CO3														
				CO4														
				CO5														
				CO6														

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
14	COMPUTER AIDED DRAFTING	ME216.01	Draw 2D drawings and 3D models of simple components	CO1	2				3							1		
		ME216.02	Select the various of types of instruments for the measurement system	CO2	2	2			3	2						1		
		ME216.03	Use modern engineering techniques, tools and skills for engineering practice	CO3	2			2	3							1		
		ME216.04	Develop the skills for drafting using CAD software and get the knowledge to enhance the CAD utilities.	CO4	2		2		3							1		
				CO5														
				CO6														

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
14	Computer Graphics	ME217.01	To acquire the knowledge of basics of computer graphics.	CO1	2	2										1	2	
		ME217.02	To Apply basic programming in C for line, rectangle, circle etc for different shapes.	CO2	2	2	2									1	2	
		ME217.03	scaling and rotating.	CO3	2	2	2									1	2	
		ME217.04	To Analyzing the hidden unwanted parts in graphics and do the program on animation	CO4	2	2										1	2	
		ME217.05	To choose the different of curves and surfaces	CO5	2	2	1									1	2	
				CO6														

SEM:04

SR.NO	SUBJECT	CO No.	Course Outcomes (COs)		CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15	WORKSHOP PRACTICE IV	ME218.01	Understand Machine layout, method of Machine Tool installation, selection of Tools for various machining operation.	CO1	3	2			2							2
		ME218.02	Understand Construction, Mechanism and Application of Lathe Machine, Drilling Machine, and Milling Machine	CO2	3	2										
		ME218.03	along with its process sheet	CO3	2				2							2
		ME218.04	Understand basics of CNC and VMC Machine	CO4	2				3							2
				CO5												
				CO6												

SEM:05

SR.NO	SUBJECT	co no	Course Outcomes (COs)		CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Control Engineering	PCC-ME 301.01	To understand control system, its type andapplications	CO1	1											
		PCC-ME 301.02	To model physical System	CO2	2				2							
		PCC-ME301.03	To determine system stability and systemresponse.	CO3	2		2		2							
		PCC-ME301.04	To understand various controlactions	CO4	1		2		2							
		PCC-ME301.05	To use MATLAB software to analyze controlsystem	CO5	2		2									
		PCC-ME301.06	To understand various controlactions	CO6	2	2										

SEM:05

SR.NO	SUBJECT	co no	Course Outcomes (COs)		CO-PO Mapping											
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
2		PCC-ME 302.01	Identify the various types of gears	CO1	2	2										

	Theory of Machines - II	PCC-ME302.02	Select a gear drive for practical purpose	CO2	2	2											
		PCC-ME302.03	Analyze the gyroscopic effects for practical life	CO3		2											
		PCC-ME302.04	Solve a balancing problem	CO4	2		2										
		PCC-ME302.05	Do the balancing of practical devices to reduce vibration'	CO5				1									
		PCC-ME302.06	Do force analysis of mechanisms.	CO6	2		2										

SEM:05					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
3	Heat & Mass Transfer	PCC-ME 303.01	Formulate basic equations for heat transferproblems.	CO1	1	1										
		PCC-ME303.02	Applyheattransferprinciplestodesignandevaluateperformanceofthermal systems	CO2	1			3								
		PCC-ME303.03	Calculate the effectiveness and ratingof heat exchangers.	CO3	1	2								3		
		PCC-ME303.04	Calculate heat transfer byradiation between objects withsimple geometries.	CO4	1	2						3		2		
		PCC-ME303.05	problems.	CO5	1	2										
		PCC-ME303.06	Evaluate the relative contributions of different modes of heat transfer	CO6	1	2									3	

SEM:05					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
4	Machine Design-I	PCC-ME304.01	Apply basic principles of machine design	CO1	3											
		PCC-ME304.02	Design machine elements on the basis of strength concept.	CO2	2	3										
		PCC-ME304.03	Use design data books and standard practices.	CO3	3	2										2
		PCC-ME304.04	Select machine elements from Manufacturer's catalogue.	CO4		2	2									
		PCC-ME304.05	Springs Used For Static Loads.	CO5	3	2	2			1						1
		PCC-ME304.06	Understand And Design The Pulley And Belts.	CO6	3	2	2			1						1

SEM:05					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	Manufacturing Engineering	PCC-ME305.01	Understand various metal cutting technology including the process and measurement etc	CO1												
		PCC-ME305.02	Identify and select proper cutting tool with respect to work piece materials	CO2												
		PCC-ME35.03	Identify parameters of single and multipoint cutting tools	CO3	1	2										
		PCC-ME305.04	Design and Draw Jig and Fixture.	CO4			3		2							
		PCC-ME305.05	Select and design dies for press working operations.	CO5			3		2							
		PCC-ME305.06	Understand and apply CNC Technology	CO6	1	3									2	

SEM:05					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
6	Enterprise Resource Planning	PCC-ME306.01	Understand the structure of an ERP system and know how process chains in Materialsmanagement, production, controlling and sales are implemented in an ERP	CO1	2											
		PCC-ME306.02	Implementation and customize an ERP system using the appropriate modelingmethods,that are Entity Relationship M	CO2				2								
		PCC-ME306.03	materials management, production, controlling and sales in SAP ECC	CO3			2									
		PCC-ME306.04	theimportance of project management in an ERP implementation project	CO4		1			2							
		PCC-ME306.05	Understand what to expect, and not to expect, from a consultant implementing anERPsystem	CO5				1								
		PCC-ME306.06	Understand the importance of IT governance in long-term relationships with a softwarevendor, such as SAP	CO6												1

SEM:05					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		PCC-ME307.01	Understand and read engineering Drawings.	CO1	3	1	1		2							1
		PCC-ME307.02	Prepare solid and surface models from 2D drawings	CO2	3	1	1		2							1

7	CAD CAM Laboratory	PCC-ME307.03	Prepare assemblies and BOM	CO3	3	1	1		2							1
		PCC-ME307.04	Conversion of 3D Models into orthographic views.	CO4	3	1	1		2							1
		PCC-ME307.05	Know the process of CAD data exchange between the software.	CO5	3	1	1		2							1
		PCC-ME307.06	Understand the basics of Computer Aided Manufacturing.	CO6	3	1	1		2							1

SEM:05					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Z	WORKSHOP PRACTICE – V	PCC-ME308.01	Select the suitable machining operations and prepare process sheet to manufacture a Component and implement the same.	CO1	2				2							
		PCC-ME308.02	Control key dimensions on a component using principles of metrology and assembly To make any one assembly / sub -- assembly comprising of minim	CO2	3				5							

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
9	Industrial Management and Operations Research	PCC-ME311.01	Apply the concepts of Industrial management and operations research approaches. Know various functional areas of management Component and implement the same.	CO1	3	2		2					1			2
		PCC-ME311.02	Control key dimensions on a component using principles of metrology and assembly They will analyses issues in Managing operations and projects and various approaches to resolve those issues.	CO2	3	2		2					1			2
		PCC-ME311.03	Formulate and solve a wide variety of applications and problems that can be addressed using Operations Research techniques as Linear programming problems.	CO3	3	1		2					1			2
		PCC-ME311.04	Formulate and solve a wide variety of applications and problems that can be addressed using Operations Research techniques as Transportation and Assignment problems	CO4	3	2		2					1			2
		PCC-ME311.05	Apply the various techniques of Project Management such as Network Model and Sequencing Model.	CO5	3	2		2					1			2
		PCC-ME311.06	Formulate and solve a wide variety of applications and problems that can be addressed using Operations Research techniques as Transportation and Assignment problems	CO6	3	2		2					1			2

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10	Industrial Fluid Power	PCC-ME312.01	Do analysis of performance of Hydraulic and pneumatic system	CO1	2											
		PCC-ME312.02	Demonstrate Hydraulic and pneumatic system	CO2		2										
		PCC-ME312.03	Apply Hydraulic and pneumatic system fundamentals to industrial applications	CO3	1	2			2							
		PCC-ME312.04	Demonstrate knowledge about the fundamentals of Hydraulic and pneumatic system	CO4												
		PCC-ME312.05	Understating Of Hydraulic Circuits And Applications In Various Industries	CO5		2			2							
		PCC-ME312.06	Understating Of Pneumatic Circuits And Applications In Various Industries	CO6	2											

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
11	Metrology and Quality Control	PCC-ME313.01	Identify and use various measuring instruments and select appropriate instrument for particular feature measurement.	CO1	3	2										
		PCC-ME313.02	Distinguish and understand quality assurance and quality control. They can use control charts and sampling plans to manufacturing and service sector problems.	CO2	3											
		PCC-ME313.03	Learn advanced techniques of metrology in various industrial applications.	CO3	2											1
		PCC-ME313.04	Prepare and understand drawings with general dimensions, tolerances and surface finish.	CO4	3	2										
		PCC-ME313.05	Plans To Manufacturing And Service Sector Problems.	CO5			3		2				3	3		
		PCC-ME313.06	Prepare And Understand Drawings With General Dimensions, Tolerances And Surface Finish.	CO6	2	2			2							

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
12	Machine Design-II	PCC-ME314.01	Design machine elements subjected to fluctuating loading particular feature measurement.	CO1	3	2	2									1
		PCC-ME314.02	Understand effect of tribological considerations on design	CO2	3	2	2									1
		PCC-ME314.03	Select rolling contact bearings from manufacturer's catalogue.	CO3	3	3	1									1
		PCC-ME314.04	Design sliding contact bearings used in various mechanical systems	CO4	3	2	1									1

		PCC-ME314.05	Design various types of gears such as spur, helical, bevel and worm gear	CO5	3	2	2									1
		PCC-ME314.06	To Understand And Apply Principles Of Gear Design To Spur Gears And Industrial Spur Gear Boxes.	CO6	3	2	2									1

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
13	Internal Combustion Engines	PCC-ME315.01	Demonstrate engine construction, function of various parts of theengine and classify I.C.Engines.	CO1	3	2		1					2		1	1
		PCC-ME315.02	Demonstrate combustionmechanism.	CO2	2	2		1							1	1
		PCC-ME315.03	Demonstrate importance and functions of various systems on theengine.	CO3	3	1							2		1	2
		PCC-ME315.04	Demonstrate need and methods of enginetesting.	CO4	2	2									2	2
		PCC-ME315.05	Understand the impact of vehicular pollution and ways to reduce or control thepollution	CO5	3	1							2		1	2
		PCC-ME315.06	Students Will Demonstrate Knowledge Of The Operating Characteristics Of Common Ic Engines	CO6	3	1							2		2	2

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5			PO8	PO9	PO10	PO11	PO12
14	Computer Aided Design and Manufacturing	PCC-ME316.01	To Compare and Represent 2-D and 3-D entities	CO1	2	2										
		PCC-ME316.02	To Apply transform techniques on 2-D and 3-D entities	CO2	1		2									
		PCC-ME316.03	To Examine CNC program for production of components	CO3	2		2									
		PCC-ME316.04	To Express the principles and methods of Rapid Prototyping	CO4	2				2							
		PCC-ME316.05	To Examine Cnc Program For Production Of Components	CO5	2		2									
		PCC-ME316.06	To Express The Principles And Methods Of Rapid Prototyping	CO6	2				2							

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15	Workshop Practice–VI	PCC-ME318.01	Select the suitable machining operations and prepare process sheet to manufacture a Components and implement the same	CO1	3	2			2							2
		PCC-ME318.02	Control key dimensions on a component using principles of metrology and assembly	CO2	3	3			2							3
		PCC-ME318.03	Design the sequence of various processes required to manufacture the components	CO3	3	3			2							3
		PCC-ME318.04	Implement principles of metrology.	CO4	3	2			2							2
		PCC-ME318.05	Understand and perform the various machining operations.	CO5	3	3			2							3
		PCC-ME318.06	Understand and perform the various machining operations.	CO6	3	2			2							2

SEM:06					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
16	Professional Skill Development	PCC-ME319.01	Effectively use techniques for self-awareness and self-development to increase confidence in abilities	CO1	1		2		2							
		PCC-ME319.02	Strengthen soft skills to achieve success in professional career	CO2	3		2		2		2					
		PCC-ME319.03	Smoothly transit from student life to professional life	CO3	2				2							
		PCC-ME319.04	Create professional documents using MS office tools	CO4	2		3									
		PCC-ME319.05	Strengthen soft skills to achieve success in professional career	CO5	1		2		2							
		PCC-ME319.06	Smoothly transit from student life to professional life	CO6	3		2		2		2					

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Refrigeration and Air Conditioning	PCC-ME401.01	Demonstrate an understanding of the need and importance of HVAC technology, the typical and some advanced and innovative schematic designs, and the goals of HVAC engineering and HVACsystems confidence in abilities	CO1	2											
		PCC-ME401.02	Demonstrate an understanding thermal comfort conditions with respect to temperature and humidity and human clothing and activities and its impact on human comfort, productivity,andhealth.	CO2	2				1							
		PCC-ME401.03	and design and will practice or observe psychometric measurements.	CO3	2											
		PCC-ME401.04	heating and cooling load estimation especially including thermal lag effects by conducting a detailed annual load	CO4	3				1							
				CO5												
				CO6												

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
2	Mechanical System Design	PCC-ME402.01	Understand the role of aesthetics, ergonomics and creativity in design.	CO1	3		2		2							
		PCC-ME402.02	Understand theories and principles used in design of pressure vessels. IC Engine and material handling equipments.	CO2	2	3										
		PCC-ME402.03	vessels, IC engine components, machine tool gear box and material handling systems as per industrial and societal requirement.	CO3	3	2										
		PCC-ME402.04	Evaluate the load carrying capacity, stress bearing capacity in various mechanical systems like unfired pressure vessels, IC engine components.	CO4	3	3										
		PCC-ME402.05	Design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. as per industrial and societal requirement.	CO5	2	3										
		PCC-ME402.06	Create the competency in mechanical system design by applying industrial design aspect	CO6	2											

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
3	FINITE ELEMENT ANALYSIS	PCC ME 403.01	Elaborate the fundamental concepts of Finite Element method	CO1	1										2	
		PCC ME 403.02	Understand the key concepts like Shape function, element stiffness and boundary conditions by	CO2		2	2								2	2
		PCC ME 403.03	Apply the finite element formulations for two dimensional problems using constant strain triangle.	CO3		2	2								2	2
		PCC ME 403.04	Demonstrate the modeling aspects of axisymmetric solids subjected to axisymmetric loading.	CO4		2	2								2	2
		PCC ME 403.05	Apply the finite element formulations for Planer Trusses using 1D element.	CO5		2	2								2	2
		PCC ME 403.06	Solve Scalar field problems by Finite element formulation.	CO6				1							2	2

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
4	AUTOMOBILE ENGINEERING (Elective–I)	PCE ME 404.01	Explain components ofautomobile.	CO1	3					2	2		2	2		
		PCE ME 404.02	Distinguish various types of automobile lay outs as per drive given towheels.	CO2	3					2	2					
		PCE ME 404.03	Identify types of automobile bodies and materials used for the same	CO3	3					2			2			
		PCE ME 404.04	Demonstrate various automobile systems like clutch, gearbox final drive, brake,steering suspension wheels and Tyres, and its construction andworking.	CO4	3								2	2		
		PCE ME 404.05	Demonstrate various electrical and electronic systems like lighting, starting charging electronic controlled management system and its construction and working principle, sensors	CO5	3					2	2			2		
		PCE ME 404.06	Solve the problems related with various resistances for the automobile, engine power calculation,Explain modern trends, techniques used inindustries	CO6	3					2	2					

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
5	TOTAL QUALITY MANAGEMENT (Elective–II)	PCE ME 405.01	Understand the concepts of total quality and quality assurance approaches. They will identify and solve issues in quality related problems in manufacturing or	CO1	2											
		PCE ME 405.02	service sector at various stages by using various TQM tools and techniques,	CO2					2							
		PCE ME 405.03	Understand vendor rating and select suitable vendor	CO3	2											
		PCE ME 405.04	Interpret various quality attributes and discuss the various quality approaches	CO4	2											
		PCE ME 405.05	Calculate reliability of system	CO5		2		1								
		PCE ME 405.06	They will identify and solve issues in industries using the various techniques of TQM suchas 5S, JIT, TPM, Reliability Engineeri	CO6		2		1								

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		PCC ME 406:01	Have and develop presentation skills.	CO1	2	2			2		1		1		2	

6	SEMINAR	PCC ME 406.02	Impart knowledge in different aspects of knowledge domains	CO2	1		2			2						2
		PCC ME 406.03	Make them aware of knowledge in industry perspective and new industry trends	CO3	2				1			2	1			
		PCC ME 406.04	Build confidence and improve communication skills	CO4	1									2	2	
		PCC ME 406.05	Collect ideas through literature survey about new innovations, analyze and present them	CO5	2	2										1
		PCC ME 406.06	Sharpen their personality and intelligence.	CO6	2						2					

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
7	SUMMER INTERNSHIP	SI ME 407.01	Understand Industrial Practices And Working Culture In Industry.	CO1	3								3	3		3
		SI ME 407.02	Demonstrate Their Knowledge And Skills While Working With Real Life Problems	CO2	3								3	3		3
		SI ME 407.03	Analyse Available Technologies For Designing Solutions To The Problems.	CO3	3	2			2				3	3		3
		SI ME 407.04	Demonstrate Their Communication Skills In Oral And Written Form.	CO4	3								3	3		3
		SI ME 407.05	Organize Their Career Options Through Exposure To Future Technologies.	CO5	3				2				3	3		3
		SI ME 407.06	Analyse Available Technologies For Designing Solutions To The Problems.	CO6	3				2				3	3		3

SEM:07					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
8	PROJECT PHASE–I	PW ME408.01	Understand The Context Of The Problem/Issues And Describe The Problem With Constraints Involved.	CO1	2	1				2						
		PW ME408.02	Apply Design Thinking To Generate Alternative Solutions To The Problem With Respect To Available Resources.	CO2			2		1						2	
		PW ME408.03	Evaluate The Alternative Solutions With Respect To Sustainability, Economic Feasibility, Scalability And Ecofriendly Process By Using Modern Tools And Techniques.	CO3							2	1				2
		PW ME408.04	create a model of the designed solution and test it for validation.	CO4				2	2				1			
		PW ME408.05	Write A Technical Report Of The Project Work Done And Present The Same.	CO5									1	2		
		PW ME408.06	create a model of the designed solution and test it for validation.	CO6									1	2		

SEM:08					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
9	Mechatronics	PCC ME 409.01	Developasimulationmodelforsimplephysicalsystemsandexplain Mechatronics design process.	CO1	3											
		PCC ME 409.02	Outline appropriate sensors and actuators for an engineering application	CO2	2		1									
		PCC ME 409.03	Write simple PLC programs	CO3	2											
		PCC ME 409.04	Explain various applications of design of Mechatronic systems	CO4	2		1									
		PCC ME 409.05	Write A Simple Plc Programme	CO5												
		PCC ME 409.06	Understanding Of Industrial Control System(Ics)	CO6	1		2									

SEM:08					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10	Energy And Power Engineering	PCC ME 410.01	Remember need of different energy sources and their importance.	CO1	3											
		PCC ME 410.02	Apply the principle of conversion of available energy resources	CO2	3	2					2			1		1
		PCC ME 410.03	Analyze the utilization of solar, wind energy etc	CO3	3	3			1							
		PCC ME 410.04	Understand various energy resources in details.	CO4	2					2	2					
		PCC ME 410.05	Illustrate power plant economics	CO5	3	2		1								
		PCC ME 410.06	Comprehend various equipments/systems utilized in power plants.	CO6	2	2										

SEM:08					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

11	Noise and Vibration	PCC ME 411.01	Understand relevance of noise in mechanical systems.	CO1	1											
		PCC ME 411.02	Carryout measurement of various vibration parameters.	CO2	1											
		PCC ME 411.03	Analyze vibratory response of mechanical element/system.	CO3	2	2		2								
		PCC ME 411.04	Estimate natural frequency of mechanical element/system.	CO4	1											
		PCC ME 411.05	Develop mathematical model to represent dynamic system	CO5	2	2		2								
		PCC ME 411.06	Understand Relevance Of Noise In Mechanical Systems.	CO6	1											

SEM:08					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
12	INDUSTRIAL ENGINEERING (ELECTIVE-III)	PCE ME 412.01	Manage and implement different concepts involved in methods stud yand understandin of work content in different situations.	CO1	2			3								
		PCE ME 412.02	Measure and estimate standard time for job.	CO2		2										
		PCE ME 412.03	Understand different types of plant layouts.	CO3		2										
		PCE ME 412.04	Interpret job evaluation and merit rating.	CO4								2				
		PCE ME 412.04	Understand Different Types Of Plant Layouts.	CO5			2									
		PCE ME 412.04	Interpret Job Evaluation And Merit Rating	CO6												

SEM:08					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
13	INDUSTRIAL AUTOMATION & ROBOTICS (Elective –IV)	PCE ME413.01	Design techniques for the analysis and control of discrete event system	CO1	3	2										
		PCE ME413.02	Applyknowledgeofautomationtoolsandotherequipment'sformanufacturingandassembly components	CO2	3	2										
		PCE ME413.03	Operate in research and development centre for automation	CO3	3	2	2									
		PCE ME413.04	Identify efficiencies and limitation and provide in depth evaluation of robotic system for	CO4	3	2			1							
		PCE ME413.05	Getting The Knowledge Of Sensor And Robot End Effector	CO5	3	2										
		PCE ME413.06	Familiar With Various Language's Of Robot And Application.	CO6	3	2				1						

SEM:08					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
14	online Certificate Course****	PCE ME41401	On successful completion of the course	CO1	3								3	3		3
		PCE ME41402	Knowledge Enhancement: Youâ€™Ll Gain In-Depth Knowledge Of The Topic, Which Could Include Theoretical Understanding And Practical Applications.	CO2	3								3	3		3
		PCE ME41403	Access To Resources: You Might Gain Access To Additional Resources, Such As Reading Materials, Software Tools, Or Exclusive Content, That Can Further Support Your Learning.	CO3	3		3						3	3		3
		PCE ME41404	Confidence Boost: Completing A Certificate Course Can Increase Your Confidence In Your Abilities And Expertise In The Subject Area.	CO4	3								3	3		3
		PCE ME41405	Improved Problem-Solving Abilities: Depending On The Course, You Might Develop Better Problem-Solving Skills Relevant To The Field Of Study.	CO5	3	2							3	3		3
		PCE ME41406	Certification: Upon Successful Completion, Youâ€™Ll Receive A Certificate That Acknowledges Your Participation And Achievements	CO6	3								3	3		3

SEM:08					CO-PO Mapping											
SR.NO	SUBJECT	co no	Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15	PROJECT PHASE–II	PWME 415.01	Improve the professional competency and research aptitude in relevantarea	CO1	3	3				3	3		3			
		PWME 415.02	Develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and currentresearch.	CO2	3	3	3		2			3	3			3
		PWME 415.03	Able To Analyze And Solve The Complex Problems	CO3			3	3	3	2	2	3	3			3
		PWME 415.04	Able To Plan, Implement And Execute The Project	CO4					3	2	3	3	3	3	3	3
		PWME 415.05	Able To Write Effective Technical Report And Demonstrate Through Presentation	CO5								2	3	3		3
		PWME 415.06	Able To Plan, Implement And Execute The Project	CO6								2	3	3		3