

DURGAPUR INSTITUTE OF ADVANCED TECHNOLOGY & MANAGEMENT

NH2, G.T. Road, Rajbandh, Durgapur, Pashchim Bardhaman, West Bengal- 713212

POs, PSOs and COs for All Programs

(2022-2023)

1. Program Outcomes:

1.1. CSE

- PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex problems engineering.
- PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
- PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1.2. IT

- PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis: Identify, formulates, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental considerations.
- PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO 9: MaulanaAbulKalamAzadUniversityofTechnology, WestBengal Syllabus for 4-Years B.Tech. in Information Technology
- PO 10: Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 11: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO 12: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO 13: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1.3. ECE

- PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the

public health and safety, and the cultural, societal, and environmental considerations.

- PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

- PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1.4. EE

- PO 1: Engineering Knowledge: Ability to apply mathematical, scientific, and engineering principles to the identification, formulation, and solution of practical electrical engineering problems
- PO 2: Problem Analysis: Ability to do experiments & to sense, process, analyze and interpret data using modern engineering tools and techniques leading to decision making in real time for electrical engineering systems and processes
- PO 3: Design/ development of solutions: Ability to design engineering processes and products to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
- PO 4: Conduct investigation of Complex Problem: Ability to conduct complex electrical designs and interpret different experimental data using research-based knowledge and research methods
- PO 5: Modern Tool Usage: Ability to apply modern tools like MATLAB,PSCAD, LABVIEW and also different other IT tools for modeling, prediction of complex electrical engineering activities with an understanding of limitation.
- PO 6: The engineer and Society: Ability to analyze important social problems and identify ways to contribute to solutions, including professional, economic, and ethical considerations in generation, transmission, and distribution of electrical energy
- PO 7: Environment and sustainability: Ability to analyze important environmental issues and identify ways for sustainable development, in generation, transmission, and distribution of electrical energy
- PO 8: Ethics: To understand and commit to professional ethics and responsibilities and norms of engineering practice.
- PO 9: Individual and Team Work: Ability to function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
- PO 10: Communication: Ability to communicate effectively in both writing and speaking and to prepare formal technical plans leading to solutions and detailed reports for electrical systems

- PO11: Project management and finance: Ability to understand management and business practices in engineering works and multidisciplinary areas.
- PO 12: Life-long learning: Ability to recognize the need for identifying contemporary issues due to changing technical scenario and engage in lifelong learning

1.5. ME

- PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of the need for sustainable development.
- PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

1.6. CHE

2. Program Specific Outcomes:

2.1. CSE

- PSO1: Professional Skills: The ability to understand, analyse and develop computer programs for efficient design of computer based systems of varying complexity.
- PSO2: Problem solving Skills: The ability to apply innovative practices and strategies in software projects development using recent state-of-the-art programming environments to deliver quality products.
- PSO3: Innovation and Entrepreneurship: Knowledge of social & environmental awareness along with ethical responsibility to achieve a successful career addresses the real world applications using optimal resources as an entrepreneur.

2.2. IT

- PSO 1: Ability to plan and design information systems to standard specifications
- using efficient algorithms in the relevant programming language(s).
- PSO 2: Ability to use knowledge in diverse domains to recognize research gaps and thus to offer solutions to innovative ideas.

2.3. EE

- PSO1: Be able to analyze and understand mathematical, scientific and engineering fundamentals to identify complex engineering problems and design system components or processes considering health, safety, cultural, societal and environmental aspects.

- PSO2: Conduct research based investigation including design of experiments interpretation of data Synthesis of information usages of modern engineering tool to solve complex engineering activities with an understanding of the limitations related to societal health safety and legal issues.
- PSO3:Apply ethical principles related to societal and environmental context in a multidisciplinary Setting as an individual or in a team.
- PSO4:Able to comprehend effective reports and design documentation considering management and financial principles that will benefit the society at large for life long period in the broadest context of technological changes.

2.4. ECE

- PSO 1: (Engineering Knowledge and Analysis): Analyze specific engineering problems relevant to Electronics & Communication Engineering by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.
- PSO 2: (System Design): Design electrical, electronics and communication systems containing electrical/electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication Engineering and Computer Sciences, and applying modern tools.
- PSO 3: (Application of the knowledge on society/environment): Apply the contextual knowledge of Electronics and Communication Engineering to assess societal, environmental, health, safety, legal and cultural issues with professional ethics and function effectively as an individual or a leader in a team to manage different projects in multidisciplinary environments as the process of life-long learning.

2.5. ME

- PSO1: Inspiring students and preparing them for successful professional careers by applying the

- Knowledge of applied science and fundamental Mechanical Engineering core subjects and advanced Mechanical Engineering software.
- PSO2: Ability to co-ordinate and communicate in groups by diversifying their knowledge domain in different engineering disciplinary area.

2.6. CHE

**COMPUTER SCIENCE & ENGINEERING
SEMESTER-I
THEORY**

Course Title: Mathematics –IA	Code: BS-M101
Type of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M101.CO1	Learn the basic mathematical tools to deal with problems of engineering sciences.	Learn	Level I
BS-M101.CO2	Understand properties and application of Calculus and Linear Algebra .	Understand	Level II
BS-M101.CO3	Analyze of physical or engineering problems.	Analyze	Level IV
BS-M101.CO4	Acquire problem solving skills related to engineering science.	Acquire	Level II
BS-M101.CO5	Apply Calculus and Linear Algebra in real life problems.	Apply	Level III
BS-M101.CO6	Classify ensembles and differentiate between Calculus and Linear Algebra.	Classify	Level IV

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	-	-	-	-	3	3	2
CO2	3	3	3	3	-	-	-	-	-	-	-	3	2	1
CO3	3	3	3	2	-	-	-	-	-	-	-	3	2	1
CO4	3	1	2	1	-	-	-	-	-	-	1	3	2	2
CO5	2	2	2	2	-	-	-	-	-	-	2	3	1	-
CO6	3	2	2	2	-	-	-	-	-	-	2	3	-	-
AVG.	2.83	2.33	2.5	2.33	0	0	0	0	0	0	1.6667	3	2	1.5

Course Title: Basic Electrical Engineering	Code: ES-EE101
Type Of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE101.CO1	Understand and analyze basic electric and magnetic circuits.	Understand	K2
ES-EE101.CO2	Study the working principles of electrical machines and power converters.	Study	K1
ES-EE101.CO3	Introduce the components of low voltage electrical installations.	Introduce	K1
ES-EE101.CO4	Understand the general structure of electrical power system.	Understand	K2
ES-EE101.CO5	Understand the construction and operation of single-phase transformer.	Understand	K2
ES-EE101.CO6	Explain the working principle of power converters.	Explain	K2

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO2	2	3	3	2	2	-	-	-	-	-	-	-	-	-
CO3	2	-	3	1	-	-	-	-	-	-	-	1	-	-
CO4	2	-	2	2	3	-	-	-	-	-	-	2	-	-
CO5	2	2	-	2	3	-	-	-	-	-	-	1	-	-
CO6	2	1	3	3	3	-	-	-	-	-	-	1	-	-
AVG.	2.17	2	2.75	2	2.6	0	0	0	0	0	0	1.25	0	0

**SEMESTER – I
PRACTICAL**

Course Title: Physics-I Laboratory	Code: BS-PH191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-PH191.CO1	Observe and read data in slide calliper's, screw gauge. Calculate different modulus of elasticity to apply basic knowledge Physics of Elasticity and apply viscosity principle of streamline motion of water to calculate its viscosity coefficient required in fluid mechanics	Observe	K1
BS-PH191.CO2	Arrange sequential connection in electrical experiment to verify principles of Kirchhoff's law to verify passive elements of electrical circuit	Arrange	K3
BS-PH191.CO3	Operate optical instruments to illustrate physical properties of light and to observe spectral lines of light to verify medium specific characteristics. Calculate Rydberg constant by studying Hydrogen spectrum to visualize visible spectra and to assess this empirical fitting parameter as a fundamental physical constant	Operate	K3
BS-PH191.CO4	Determine Band Gap and Hall coefficient of a given intrinsic semiconductor and distinguish between different intrinsic semiconductors. Determine the dielectric constant of different capacitors to correlate their usage like insulator and limitation of their usage as a dielectric material.	Determine	K5
BS-PH191.CO5	Apply concepts of quantum mechanics to verify Bohr's atomic orbital theory	Apply	K3
BS-PH191.CO6	Determine Planck's constant and Stefan's constant applying modern Physics	Determine	K5

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

Course Title: Basic Electrical Engineering Lab	Code: ES-EE191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE191.CO1	Calibrate Ammeter and Wattmeter	Calibrate	K3
ES-EE191.CO2	Demonstrate the measuring instrument and electrical machines	Demonstrate	K3
ES-EE191.CO3	Conduct open circuit and short circuit test of single-phase transformer	Conduct	K2
ES-EE191.CO4	Measure 3 phase power using two wattmeters	Measure	K5
ES-EE191.CO5	Identify the components of LT switchgear	Identify	K1
ES-EE191.CO6	Understand the characteristic of RLC series and parallel circuit	Understand	K2

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	3	-	-	-	2	-	-	-	-	-
CO2	2	3	3	1	2	-	-	-	3	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	2	-	-	-	-	-
CO4	2	-	2	-	3	-	-	-	3	-	-	-	-	-
CO5	1	-	-	-	1	-	-	-	-	-	-	-	-	-
CO6	2	1	2	1	3	-	-	-	2	-	-	-	-	-
AVG.	1.83	2	2.5	1	2.4	0	0	0	2.4	0	0	0	0	0

Course Title: Workshop	Code: ES-ME192
Type Of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME192.CO1	Understanding the applications of hand tools and machine tools.	Understand	K2
ES-ME192.CO2	Comprehend the safety measures required to be taken while using the tools.	Comprehend	K2
ES-ME192.CO3	Select the appropriate tools required to manufacture an object of predetermined shape and size considering least wastage and cost.	Select	K2
ES-ME192.CO4	Fabricate components with their own hands	Fabricate	K6
ES-ME192.CO5	Practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes	Analyze	K6
ES-ME192.CO6	Produce small devices of their interest, by assembling different components,	Produce	K6

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	1	-	-	-	-	-	-
CO3	1	-	-	-	-	1	-	1	1	-	-	-	-	-
CO4	1	-	-	-	-	-	2	-	2	1	1	-	-	1
CO5	1	-	-	-	-	-	2	-	2	1	1	1	-	-
CO6	1	-	-	-	-	-	2	-	2	1	2	1	-	1
AVG.	1	0	0	0	0	1	2	1	1.75	1	1.33	1	0	1

Course Title:Mathematics –IIA	Code: BS-M201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M201.CO1	Learn the basic mathematical tools to deal with problems of engineering sciences.	Learn	K1
BS-M201.CO2	Understand properties and application of Linear Algebra, Ordinary Differential Equations (ODE) and numerical analysis.	Understand	K2
BS-M201.CO3	Analyze of physical or engineering problems.	Analyze	K4
BS-M201.CO4	Acquire problem solving skills related to engineering science.	Acquire	K2
BS-M201.CO5	Apply Linear Algebra, Ordinary Differential Equations (ODE) and Numerical analysis in real life problems.	Apply	K3
BS-M201.CO6	Classify ensembles and differentiate among Linear Algebra, Ordinary Differential Equations (ODE) and numerical analysis.	Classify	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	-	-	-	-	-	-	-	3	1	-
CO2	2	2	3	1	-	-	-	-	-	-	-	3	2	-
CO3	3	3	3	1	-	-	-	-	-	-	-	3	1	-
CO4	3	2	3	2	-	-	-	-	-	-	1	3	3	1
CO5	3	2	3	2	-	-	-	-	-	-	2	3	3	-1
CO6	3	2	3	2	-	-	-	-	-	-	2	3	3	2
AVG.	2.83	2.17	3	1.5	0	0	0	0	0	0	1.67	3.00	2.17	1.33

Course Title: Programming for Problem Solving	Code: ES-CS201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS201.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS201.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS201.CO3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
ES-CS201.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS201.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS201.CO6	Build analytical skill.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG.	3	3	3	3	2	1	1	1	1	1	2	2	2.33	2.33

Course Title:English	Code: HM-HU201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 2L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU201.CO1	Understand and apply English Speech Sounds for enhancing English Communication	Understand	K2
HM-HU201.CO2	Apply English Language Presentation Skill in Academic and in Professional Communication	Apply	K3
HM-HU201.CO3	Apply Receptive Skills of English in Academics and in Engineering Profession	Apply	K3
HM-HU201.CO4	Apply Writing Skill of English in Academics and in Profession	Apply	K3
HM-HU201.CO5	Apply Grammar Skill of English in Academic and in Professional Communication	Apply	K3
HM-HU201.CO6	Apply Critical Thinking Skill of English in Academic and in professional Communication	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO2	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO3	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO4	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO5	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO6	2	2	2	2	2	2	-	2	-	3	-	2	1	1
AVG.	2	2	2	2	2	2	0	2	0	3	0	2	1	1

Course Title: Programming for Problem Solving	Code: ES-CS291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS291.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS291.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS291.CO3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
ES-CS291.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS291.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS291.CO6	Build analytical skill.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO2	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO3	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO4	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO5	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO6	2	2	2	2	-	-	-	-	-	-	-	2	2	1
AVG.	2	2	2	2	0	0	0	0	0	0	0	2	2	1

Course Title:Engineering Graphics & Design	Code: ES-ME291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME291.CO1	Understand the applications of hand tools and machine tools.	Understand	K2
ES-ME291.CO2	Comprehend the safety measures required to be taken while using the tools.	Create	K6
ES-ME291.CO3	Select the appropriate tools required to manufacture an object of predetermined shape and size considering least wastage and cost.	Evaluate	K5
ES-ME291.CO4	Fabricate components with their own hands.	Create	K6
ES-ME291.CO5	Confident on practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.	Understand	K2
ES-ME291.CO6	Produce small devices of their interest by assembling different components.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	1	-	-	-	-	-	-
CO3	1	-	-	-	-	1	-	1	1	-	-	-	-	-
CO4	1	-	-	-	-	-	2	-	2	1	1	-	-	1
CO5	1	-	-	-	-	-	2	-	2	1	1	1	-	-
CO6	1	-	-	-	-	-	2	-	2	1	2	1	-	1
AVG.	1	0	0	0	0	1	2	1	1.75	1	1.333	1	0	1.00

Course Title:Language Laboratory	Code: HM-HU291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU291.CO1	Understand and apply English Speech Sounds for enhancing English Communication	Understand	K2
HM-HU291.CO2	Apply English Language Presentation Skill in Academic and in Professional Communication	Apply	K3
HM-HU291.CO3	Apply Receptive Skills of English in Academics and in Engineering Profession	Apply	K3
HM-HU291.CO4	Apply Writing Skill of English in Academics and in Profession	Apply	K3
HM-HU291.CO5	Apply Grammar Skill of English in Academic and in Professional Communication	Apply	K3
HM-HU291.CO6	Apply Critical Thinking Skill of English in Academic and in professional Communication	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO2	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO3	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO4	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO5	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO6	2	2	2	2	2	2	-	2	1	3	-	2	1	1
AVG.	2	2	2	2	2	2	0	2	1	3	0	2	1	1

**SEMESTER – III
THEORY**

Course Title: Analog and Digital Electronics	Code: ESC 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC 301.CO1	Explain Different Classes of Amplifiers - (Class-A, B, AB and C, power, efficiency; Summarize the basic concepts of Feedback and Oscillation. Demonstrate Phase Shift, Wein Bridge oscillators Astable & Monostable Multivibrators; Schmitt Trigger circuits, 555 Timer.	Explain	K2
ESC 301.CO2	Define the basic concepts of Boolean algebra, binary number system. 1's and 2's complement methods, Binary arithmetic. Define the representation in SOP and POS forms;	Define	K1
ESC 301.CO3	Demonstrate the concept of Minimization of logic using algebraic and k-map. Build various combinational circuits like Adder and Subtractor circuits, Encoder, Decoder, Comparator, Multiplexer, De-Multiplexer and Parity Generator.	Demonstrate	K2
ESC 301.CO4	Explain Sequential Circuits - Basic Flip-flop & Latch, Flip-flops -SR, JK, D, T and JK Master-slave Flip Flops.	Explain	K2
ESC 301.CO5	Build Registers (SISO, SIPO, PIPO, PISO) Ring counter, Johnson counter, Synchronous and Asynchronous counters, Mod N Counter.	Build	K6
ESC 301.CO6	Explain A/D and D/A conversion techniques – Basic concepts (D/A :R-2-R only A/D: successive approximation). Explain Logic families- TTL, ECL, MOS and CMOS - basic concepts.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	3	3	3
CO2	3	3	2	2	-	-	-	-	-	1	-	3	3	3
CO3	3	2	2	2	1	-	-	-	-	1	-	3	3	3
CO4	3	3	3	2	3	-	-	-	-	1	1	3	3	3
CO5	3	3	2	2	2	-	-	-	-	-	2	3	3	3
CO6	3	2	1	1	-	-	-	-	-	-	2	3	3	3
AVG.	3	2.6	2	1.8	2	0	0	0	0	1	1	3	3	3

Course Title: Data Structure & Algorithms	Code: PCC-CS301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3 rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS301.CO1	Construct algorithms from problems.	Construct	K3
PCC-CS301.CO2	Understand the basics of abstract data types.	Understand	K2
PCC-CS301.CO3	Categorize the property of linear and nonlinear data structures.	Categorize	K4
PCC-CS301.CO4	Learn the use of Tree and graph.	Learn	K3
PCC-CS301.CO5	Compare different shorting and searching methods.	Compare	K5
PCC-CS301.CO6	Learn the use of hashing.	Learn	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG.	3	3	3	3	2	1	1	1	1	1	2	2.00	2.33	2.33

Course Title:Computer Organisation	Code: PCC-CS302
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS302.CO1	Illustrate the history of modern computers and the Von Neumann architecture.	Illustrate	K2
PCC-CS302.CO2	Demonstrate basic number systems, Binary numbers, representation of signed and unsigned numbers, Floating point representation.	Demonstrate	K2
PCC-CS302.CO3	Define addressing modes, instruction formats.	Define	K1
PCC-CS302.CO4	Distinguish the organization of various parts of a system memory hierarchy i.e. cache memory , virtual memory etc.	Distinguish	K4
PCC-CS302.CO5	Classify basics of systems topics like, single-cycle (MIPS), multi-cycle (MIPS), parallel, pipelined, superscalar, and RISC/CISC architectures.	Classify	K4
PCC-CS302.CO6	Define different control unit operations and I/O organization.	Define	K1

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	-	-	3	2
CO2	3	3	3	3	3	-	-	-	-	-	1	-	3	2
CO3	3	3	3	1	3	-	-	-	-	-	2	-	1	3
CO4	3	2	3	3	2	-	-	-	-	-	1	-	2	3
CO5	3	2	3	3	-	-	-	-	-	-	2	2	3	3
CO6	3	3	3	2	3	-	-	-	-	-	3	3	3	3
AVG.	3	2.67	3	2.5	2.6	0	0	0	0	0	1.8	2.5	2.5	2.33

Course Title: Economics for Engineers (Humanities-II)	Code: HSMC 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HSMC 301.CO1	Understand major principles of economic analysis for decision making among alternative courses of action in engineering.	Understand	K2
HSMC 301.CO2	Apply economic principles to prices and quantities in competitive supply and demand for goods and for money.	Apply	K3
HSMC 301.CO3	Solve economic problems involving comparison and selection of alternatives by using analytical techniques including benefit-cost ratio and breakeven analysis.	Solve	K3
HSMC 301.CO4	Evaluate the effect of inflation, deflation and price change with indexes in Engineering Economic Analysis	Evaluate	K5
HSMC 301.CO5	Analyze the effect of uncertainty in economic analysis by using various concepts like expected value, estimates and simulation	Analyze	K4
HSMC 301.CO6	Understand the concepts of depreciation and replacement analysis and solve associated problems	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO2	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO3	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO4	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO5	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO6	2	2	2	2	-	2	-	1	-	-	3	1	1	1
AVG.	2	2	2	2	0	2	0	1	0	0	3	1	1	1

**SEMESTER – III
PRACTICAL**

Course Title: Analog and Digital Electronics	Code: ESC 391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC 391.CO1	Understand of the fundamental concepts and techniques used in digital electronics.	Understand	K2
ESC 391.CO2	Understand and examine the structure of various number systems and its application in digital design.	Understand	K2
ESC 391.CO3	Apply the basic requirements for a design application and propose a cost effective solution of various combinational circuits.	Apply	K3
ESC 391.CO4	Analyze basic requirements for a design application and propose a cost effective solution of various sequential circuits.	Analyze	K4
ESC 391.CO5	Identify and prevent various hazards and timing problems in a digital design for developing skill to build, and troubleshoot in digital circuits.	Identify	K3
ESC 391.CO6	Design and examine the structure of analog circuits and verify its operations.	Design	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	1	0	0	-	-	-	1	3	3	3
CO2	3	3	3	1	1	0	0	-	-	1	1	3	3	3
CO3	3	3	3	-	-	0	0	1	-	1	1	3	3	3
CO4	3	3	2	2	1	0	0	1	2	1	1	3	3	3
CO5	3	2	1	-	2	0	0	2	2	1	1	3	3	3
CO6	3	2	2	-	2	0	0	2	2	-	1	3	3	3
AVG.	3	2.67	2.33	1.33	1.4	0	0	1.5	2	1	1	3.00	3.00	3

Course Title:Data Structure & Algorithm Lab	Code: PCC-CS391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS391.CO1	Construct algorithms from problems.	Construct	K3
PCC-CS391.CO2	Understand the basics of Stack, Queue.	Understand	K2
PCC-CS391.CO3	Categorize the necessarily of linked list and array implementation.	Categorize	K4
PCC-CS391.CO4	Learn the real life use of Tree and graph.	Learn	K3
PCC-CS391.CO5	Compare different shorting and searching methods.	Compare	K5
PCC-CS391.CO6	Understand the implementation mechanism of shorting and searching.	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	2	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	2	-	-	-	-	1	1	-	2	2	2
CO4	3	2	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	2	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG.	3	2.67	2.83	2.83	2	1	1	1	1	1	2	2	2.33	2.33

Course Title: Computer Organization Lab	Code: PCC-CS392
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS392.CO1	Understand the behaviour of logic gates.	Understand	K2
PCC-CS392.CO2	Design combinational circuits for basic components of computer system and Applications.	Design	K6
PCC-CS392.CO3	Analyze the operational behaviour and applications of various flip-flop.	Analyze	K4
PCC-CS392.CO4	Implement Arithmetic logic units and different types of memory blocks.	Implement	K3
PCC-CS392.CO5	Design to cascade multiple RAM chips for vertical and horizontal expansion.	Design	K6
PCC-CS392.CO6	Implement Carry-Look-Ahead Adder and BCD adder circuit .	Implement	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	3	3	1	2	3	3	2	2	3	1
CO2	3	3	1	2	1		1	2	3	3	2	2	-	1
CO3	3	3	2	2	2	1	1	2	2	2	1	3	2	1
CO4	3	3	2	2	2	1	1	2	2	2	2	3	1	3
CO5	3	3	3	2	3	1	1	2	2	2	1	3	-	1
CO6	3	3	3	2	3		1	2	3	3	2	3	3	2
AVG.	3	3	2.33	2	2.3	1.5	1	2	2.5	2.5	1.67	2.67	2.25	1.5

Course Title:IT Workshop	Code: PCC-CS393
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS393.CO1	Interpret the basic syntax of python variables, datatypes and operator in python and	Interpret	K2
PCC-CS393.CO2	Make use of conditional and control flow statement in python fluently.	Make use of	K3
PCC-CS393.CO3	Define the use of string and list datatype in proficiency level.	Define	K1
PCC-CS393.CO4	Discover the method to create and manipulation of python data structure like tuple and dictionary.	Discover	K4
PCC-CS393.CO5	Explain the use of python function and uses of different modules in python.	Explain	K5
PCC-CS393.CO6	Discuss the concepts of object oriented programming like exception handling.	Discuss	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	1	1	1	-	-	1	-	3	3	2
CO2	3	2	1	-	1	1	1	1	-	1	-	2	3	1
CO3	3	3	3	1	3	-	2	-	2	1	1	2	3	2
CO4	3	3	3	1	2	-	-	1	1	-	1	3	2	1
CO5	3	3	3	2	3	-	-	1	2	-	1	3	3	2
CO6	3	3	3	2	3	-	2	2	2	3	1	3	3	2
AVG.	3	2.83	2.5	1.5	2.17	1	1.5	1.25	1.75	1.5	1	2.67	2.83	1.67

**SEMESTER – IV
THEORY**

Course Title: Discrete Mathematics	Code: PCC-CS401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS401.CO1	Define fundamental mathematical concepts such as sets, relations, functions, and integers.	Define	K1
PCC-CS401.CO2	Demonstrate induction hypotheses and simple induction proofs.	Demonstrate	K2
PCC-CS401.CO3	Solve numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations.	Solve	K3
PCC-CS401.CO4	Explain a logic sentence in terms of predicates, quantifiers, and logical connectives.	Explain	K2
PCC-CS401.CO5	Classify algebraic structure for a given mathematical problem.	Classify	K4
PCC-CS401.CO6	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction.	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	2	2	-	-	-	-	-	3	-	1
CO2	3	3	-	-	3	3	-	-	-	-	-	3	-	1
CO3	3	3	3	2	3	-	-	-	-	-	-	3	1	1
CO4	3	3	1	3	2	2	-	-	-	-	-	3	2	2
CO5	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO6	3	3	3	3	3	2	-	-	-	-	-	3	3	3
AVG.	3	3	2.5	2.75	2.6	2.25	0	0	0	0	0	3.00	2.25	1.84

Course Title:Computer Architecture	Code: PCC-CS402
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS402.CO1	Understand The basic of Computer architecture	Understand	K2
PCC-CS402.CO2	Discuss the Pipelining technique of Computer architecture	Discuss	K6
PCC-CS402.CO3	Illustrate Different memory management technology	Illustrate	K2
PCC-CS402.CO4	Develop The Instruction level parallelism	Develop	K3
PCC-CS402.CO5	Analyze array and vector processors.	Analyze	K4
PCC-CS402.CO6	Explain the multiprocessor architecture and different taxonomy	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	2	3
CO2	2	2	2	1	-	-	-	-	-	-	-	-	3	3
CO3	1	-	2	2	1	-	1	-	-	-	-	-	3	2
CO4	-	3	2	-	1	-	-	-	-	-	-	-	3	2
CO5	-	1	3	-	2	1	-	-	-	-	-	1	2	3
CO6	-	2	2	1	2	1	1	1	-	1	-	-	2	2
AVG.	1.67	2	2.2	1.33	1.5	1	1	1	0	1	0	1.00	2.50	2.5

Course Title: Formal Language & Automata Theory	Code: PCC-CS403
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS403.CO1	Write a formal notation for strings, languages and machines.	Write	K6
PCC-CS403.CO2	Design finite automata to accept a set of strings of a language.	Design	K6
PCC-CS403.CO3	For a given language determine whether the given language is regular or not	Determine	K5
PCC-CS403.CO4	Design context free grammars to generate strings of context free language.	Design	K6
PCC-CS403.CO5	Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars	Determine	K5
PCC-CS403.CO6	Write the hierarchy of formal languages, grammars and machines and Distinguish between computability and non-computability and Decidability and undecidability	Write	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG.	3	2.5	2.17	2	2.5	0	0	0	0	0	1.67	3	2.33	2.17

Course Title: Design and Analysis of Algorithms	Code: PCC-CS404
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS404.CO1	Analyse the complexities of different algorithms.	Analyze	K4
PCC-CS404.CO2	Develop the algorithm techniques (example Divide & Conquer, Dynamic Programming etc) to solve different mathematical models.	Develop	K3
PCC-CS404.CO3	Illustrate the techniques of Greedy paradigm, Branch and Bound, Backtracking etc and compare and contrast them.	Illustrate	K2
PCC-CS404.CO4	Discuss the types of Minimal spanning tree and traversal algorithm with their applications.	Discuss	K6
PCC-CS404.CO5	Understand the variations among tractable and intractable problems to introduce polynomial and non-polynomial reduction.	Understand	K2
PCC-CS404.CO6	Explain the randomized algorithms and approximation algorithms to illustrate their applications.	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	-
CO3	3	3	3	3	2	-	-	-	-	-	-	-	3	1
CO4	3	3	3	2	2	-	-	-	-	-	-	-	3	2
CO5	3	3	3	1	1	-	2	-	-	-	-	-	2	3
CO6	3	3	3	2	2	2	1	-	-	-	-	-	2	3
AVG.	3	2.83	3	2	1.75	2	1.5	0	0	0	0	0	2.67	2.25

Course Title: Environmental Sciences	Code: MC-401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 1L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
MC-401.CO1	Resolve different open-ended problems related to air pollution acquiring the detailed knowledge about source, effect and mechanism of the pollution.	Resolve	K3
MC-401.CO2	Solve various societal problems related to land pollution after detailed understanding about source, effect and mechanism of the pollution	Solve	K3
MC-401.CO3	Conceive the basic of the need of natural resource management, environmental protection and population control. Extend the knowledge as well as the consciousness related to environmental issues to the society considering the related laws, acts and legislations	Conceive	K2
MC-401.CO4	Acquire skills for scientific problem-solving related to air, water, noise& land pollution.	Acquire	K1
MC-401.CO5	Determine the issues related to noise pollution after studying the existing situation in detail.	Determine	K5
MC-401.CO6	Develop awareness about the geographical feature of the country considering biodiversity and the variety of ecological systems present in the nature.	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO2	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO3	-	2	2	-	-	2	1	-	-	-	-	-	-	-
CO4	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO5	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO6	-	1	1	-	-	1	1	-	-	-	-	-	-	-
AVG.	0	1.83	1.17	0	0	1.17	1.67	0	0	0	0	0	0	0

SEMESTER – IV
PRACTICAL

Course Title: Computer Architecture Lab	Code: PCC-CS492
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS492.CO1	Discuss the various logic gates using the VHDL programming language.	Discuss	K6
PCC-CS492.CO2	Understanding the arithmetic operations of n- bit numbers using VHDL.	Understand	K2
PCC-CS492.CO3	Analyzing the synthesis of different combinational circuits using VHDL.	Analyze	K4
PCC-CS492.CO4	Illustrate the synthesis of the different sequential circuits using VHDL.	Illustrate	K2
PCC-CS492.CO5	Explain the construction of different memory elements using VHDL.	Explain	K5
PCC-CS492.CO6	Develop different processing elements using VHDL.	Develop	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	2	2	1	-	-	0	-	-	-	-	2	3
CO2	2	2	2	1	1	-	-	0	-	-	-	-	2	2
CO3	2	1	2	2	-	-	-	0	1	-	-	-	2	2
CO4	3	3	3	2	-	-	-	0	1	-	-	-	3	2
CO5	3	2	2	1	1	2	2	0	1	-	-	1	2	2
CO6	3	2	3	2	1	2	1	0	1	1	2	2	3	3
AVG.	2.67	2	2.33	1.67	1	2	1.5	0	1	1	2	1.50	2.33	2.33

Course Title: Design & Analysis Algorithm Lab	Code: PCC-CS494
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS494.CO1	Analyse different types of applications of Divide & Conquer techniques	Analyze	K4
PCC-CS494.CO2	Understanding to implement Dynamic Programming techniques	Understand	K2
PCC-CS494.CO3	Examine to implement knapsack, Job sequencing with deadlines, Prim's and Kruskal's algorithms by using greedy method	Examine	K4
PCC-CS494.CO4	Discuss the implementation of the N-Queen and Graph Coloring Problem by using Backtracking	Discuss	K6
PCC-CS494.CO5	Develop 15 Puzzle problem by using Branch & Bound	Develop	K3
PCC-CS494.CO6	Explain the way of implementation of BFS and DFS by using Graph Traversal Algorithms	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	3	2
CO3	3	3	3	2	-	-	-	-	-	-	-	-	3	1
CO4	3	3	3	1	-	-	-	-	-	-	-	-	3	1
CO5	3	3	3	1	1	-	-	-	-	-	-	-	3	2
CO6	3	3	3	3	2	-	-	1	-	-	-	-	3	3
AVG.	3	3	3	1.67	1.5	0	0	1	0	0	0	0	3	1.8

**SEMESTER – V
THEORY**

Course Title: Software Engineering	Code: ESC501
Type Of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC501.CO1	Identify and define the various phases of lifecycle for a given project and the appropriate process model depending on the user requirements in order to develop a cost effective software product.	Identify	K1
ESC501.CO2	Distinguish between a structure chart and a flow chart and Identify the activities carried out during transform.	Distinguish	K4
ESC501.CO3	Choose between the coding style(structured or OO)and Perform Code review, Code analysis, build process	Choose	K3
ESC501.CO4	Judge appropriate software testing techniques to the quality of a software product at modules, integration, and system granularity levels.	Judge	K5
ESC501.CO5	Apply the principles, processes and main knowledge areas for Software Project Management	Apply	K3
ESC501.CO6	Design different types of UML diagram with knowledge when and why use a particular type of dig based on the software product requirements	Design	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	1	-	-	-	-	2	3	3	2
CO2	3	3	2	2	2	-	1	-	-	1	-	3	3	2
CO3	3	1	3	2	2	1	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	2	-	-	-	-	1	3	3	3
CO5	3	3	2	2	3	-	1	1	-	-	2	3	3	3
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG.	3	2.5	2.33	2	2.5	1.33	1	1	0	1	1.75	3.00	2.66	2.33

Course Title: Compiler Design	Code: PCC-CS501
Type of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS501.CO1	Understand and list the different stages in the process of compilation.	Understand	K2
PCC-CS501.CO2	Identify different methods of lexical analysis	Identify	K3
PCC-CS501.CO3	Design top-down and bottom-up parsers	Design	K6
PCC-CS501.CO4	Identify synthesized and inherited attributes	Identify	K3
PCC-CS501.CO5	Develop syntax directed translation schemes	Develop	K3
PCC-CS501.CO6	Develop algorithms to generate code for a target machine	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	2	2	3	2	2	3	1
CO2	3	3	3	3	3	1	-	-	2	2	1	2	3	2
CO3	3	3	3	1	3	-	2	1	3	-	-	2	3	2
CO4	3	3	3	3	-	2	2	2	3	3	2	2	3	2
CO5	3	3	3	3	2	-	-	3	-	2	2	2	2	2
CO6	3	3	3	2	3	-	-	3	2	2	2	3	3	3
AVG.	3	3	3	2.5	2.6	1.5	2	2.2	2.4	2.4	1.8	2.6	2.83	2

Course Title: Operating Systems	Code: PCC-CS502
Type Of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS502.CO1	Demonstrate the concepts of Operating System Services, System calls, structure and types.	Demonstrate	K2
PCC-CS502.CO2	Discuss processes and threads for multiprogramming and multi-threading.	Discuss	K6
PCC-CS502.CO3	Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response	Develop	K3
PCC-CS502.CO4	Explain algorithmic solutions to process synchronization problems for Inter-Process communication	Explain	K5
PCC-CS502.CO5	Analyse the necessary conditions for Deadlock avoidance and prevention to solve them.	Analyze	K6
PCC-CS502.CO6	Explain Memory management, Virtual Memory, I/O Hardware, File and Disk Management system.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1	-	2	2	3	2	3	-	2	3	3
CO2	3	2	1	1	2	-	-	3	3	1	1	3	3	2
CO3	3	2	3	1	1	-	-	2	3	2	2	2	3	2
CO4	3	3	3	2	-	-	-	3	3	2	2	2	3	2
CO5	3	2	1	1	3	-	-	2	3	1	2	2	3	2
CO6	3	2	2	1	-	-	-	2	2	-	2	1	3	2
AVG.	3	2	1.83	1.167	2	2	2	2.5	2.667	1.8	1.8	2	3.00	2.17

Course Title: Object Oriented Programming	Code: PCC-CS503
Type of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS503.CO1	Describe classes, objects, members of a class and relationships among them needed for a specific problem.	Describe	K1
PCC-CS503.CO2	Explain the features of object-oriented principles such as encapsulation, polymorphism and composition of systems based on object identity.	Explain	K2
PCC-CS503.CO3	Analyze the concepts of inheritance and its application in OO design with different design patterns.	Analyze	K4
PCC-CS503.CO4	Discuss simple abstract data types and design implementations using abstraction functions to document them.	Discuss	K2
PCC-CS503.CO5	Apply some common object-oriented design patterns and give examples of their use.	Apply	K3
PCC-CS503.CO6	Design applications with an event-driven graphical user interface.	Design	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	-	-	-	2	-	-	2	2	2	1
CO2	3	3	1	3	-	-	-	1	-	-	2	2	2	3
CO3	3	3	2	3	-	-	-	3	-	-	2	2	3	2
CO4	3	3	2	3	-	-	-	3	-	-	2	2	3	2
CO5	3	3	-	1	-	-	-	2	2	2	2	2	2	1
CO6	3	3	-	3	-	-	-	3	2	2	2	2	3	2
AVG.	3	3	1.5	2.5	0	0	0	2.33	2	2	2	2	2.5	1.83

Course Title: Introduction to Industrial Management (Humanities III)	Code: HSMC-501
Type of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HSMC-501.CO1	Recall the concepts of Accounting and Recognize different systems used in industrial applications.	Recall	K1
HSMC-501.CO2	Discuss on the design of appropriate accounting tool required for real life problems.	Discuss	K1
HSMC-501.CO3	Apply and demonstrate the use of Economical concepts.	Apply	K3
HSMC-501.CO4	Analyze and Simulate a sequential accounting tool for a system or process appropriate for required accuracy.	Analyze	K4
HSMC-501.CO5	Design a sequential economic policy that can work according to the required specifications.	Design	K6
HSMC-501.CO6	Justify a specific accounting technique for an specific purpose.	Justify	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	1	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	1	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG.	3	3	3	0	3	0	1	0	1	0	0	0	0	0

Course Title: Artificial Intelligence	Code: PEC-IT501B
Type of Course: Theory	Course Designation: Elective
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-IT501B.CO1	Understand the various search techniques, constraint satisfaction problems along with problem solving techniques in strategic games.	Understand	K2
PEC-IT501B.CO2	Apply such techniques in real world problems which involve perception, reasoning and learning.	Apply	K3
PEC-IT501B.CO3	Understand the role of agents and identify ways to evaluate their performance in achieving goals.	Understand	K2
PEC-IT501B.CO4	Understand and Apply Predicate Logic to process natural language texts.	Apply	K3
PEC-IT501B.CO5	Analyze and apply machine learning techniques to solve real world problems.	Analyze	K4
PEC-IT501B.CO6	Design and employ expert systems for the societal needs.	Design	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	2	-	-	-	-	-	-	2	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO5	-	-	2	3	3	-	-	-	-	-	-	-	-	-
CO6	3	-	-	-	3	-	-	-	3	-	-	3	-	2
AVG.	3	2.5	2	3	3	0	0	0	2.5	0	0	3	2	2

SEMESTER – V
PRACTICAL

Course Title: Software Engineering Lab	Code: ESC591
Type of Course: Practical	Course Designation: Compulsory
Semester: 5th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC591.CO1	Understand the software engineering methodologies involved in the phases for project development.	Understand	K2
ESC591.CO2	Extract functional and non-functional requirement for given problem statement.	Extract	K2
ESC591.CO3	Choose between different design strategies for real life problem	Choose	K3
ESC591.CO4	Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.	Develop	K6
ESC591.CO5	Design Test Script/Test Plan using Black box and White Box approach.	Design	K6
ESC591.CO6	Evaluate Process and Product Metrics using different models.	Evaluate	K5

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO2	1	2	2	1	1	-	1	-	-	-	-	-	1	-
CO3	1	1	3	1	2	-	1	-	-	-	-	-	3	-
CO4	1	1	3	1	2	-	1	-	-	-	-	-	3	-
CO5	3	2	2	2	3	-	-	-	-	-	-	-	2	-
CO6	2	2	2	2	2	-	-	-	-	-	2	-	1	-
AVG.	1.66	1.83	2.16	1.33	2	0	1	0	0	0	2	0	2	0

Course Title: Operating System Lab	Code: PCC-CS592
Type of Course: Practical	Course Designation: Compulsory
Semester: 5th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS592.CO1	Understanding of different Unix/Linux commands and shell programming	Understand	K2
PCC-CS592.CO2	Demonstrate the creation of processes and POSIX threads.	Demonstrate	K3
PCC-CS592.CO3	Develop the problems of process scheduling and process synchronization (Signal and Semaphore)	Develop	K6
PCC-CS592.CO4	Determine the deadlock avoidance and detection algorithms.	Determine	K5
PCC-CS592.CO5	Analyse different Memory allocation and File accessing techniques	Analyse	K4
PCC-CS592.CO6	Illustrate Inter-Process Communication through system calls.	Illustrate	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	1	-	-	-	-	-	-	1	3	3
CO2	3	3	3	2	3	-	-	2	-	-	-	2	3	1
CO3	3	3	3	2	3	-	-	2	1	-	-	2	3	2
CO4	3	3	3	2	3	-	-	2	-	-	1	2	3	3
CO5	3	3	3	2	3	-	-	1	1	-	1	2	3	3
CO6	3	3	2	1	1	-	-	-	1	-	-	1	3	3
AVG.	3.00	3.00	2.83	1.67	2.33	0	0	1.75	1.00	0	1.00	1.67	3.00	2.50

Course Title: Object Oriented Programming Lab	Code: PCC-CS593
Type of Course: Practical	Course Designation: Compulsory
Semester: 5th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS593.CO1	Define an object oriented programming language, and associated class libraries and learn how to develop object oriented programs.	Define	K1
PCC-CS593.CO2	Understand the concepts of class, constructor, data encapsulation, inheritance, overriding and polymorphism to describe large scale software.	Understand	K2
PCC-CS593.CO3	Develop and debug programs using object oriented principles with wrapper class, arrays.	Develop	K3
PCC-CS593.CO4	Apply the concept of interfaces- multiple inheritance, extending interfaces.	Apply	K3
PCC-CS593.CO5	Analyze and use an integrated environment development by creating and accessing packages and multithreaded programming	Analyze	K4
PCC-CS593.CO6	Develop programs with Graphical User Interfaces capabilities and solve related problems.	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	2	-	-	-	2	-	-	2	2	1
CO2	3	3	3	1	3	-	-	-	1	-	-	2	2	3
CO3	3	3	3	2	3	-	-	-	3	-	-	2	3	2
CO4	3	3	3	2	3	-	-	-	3	-	-	2	3	2
CO5	3	3	3	-	1	-	-	-	2	2	2	2	2	1
CO6	3	3	3	-	3	-	-	-	3	2	2	2	3	2
AVG.	3	3	3	1.5	2.5	0	0	0	2.3	2	2	2	2.5	1.8

SEMESTER – VI
THEORY

Course Title: Database Management Systems	Code: PCC- CS601
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC- CS601.CO1	Describe the basic concept of database and different database models along with database languages like DDL, DML etc, Data Abstraction, and Data Independence.	Describe	K1
PCC- CS601.CO2	Identify different approaches for solving queries such as Relational algebra, Tuple and domain relational calculus, considering the query optimization strategies, and different normal forms for relational database normalization.	Identify	K3
PCC- CS601.CO3	Evaluate the applications of different storage strategies such as Indices, B-trees, hashing	Evaluate	K5
PCC- CS601.CO4	Understand the transaction processing and concurrency control strategies including ACID property, serializability of scheduling, locking and timestamp based schedulers, Database recovery.	Understand	K2
PCC- CS601.CO5	Analyze the database security approaches including authentication, authorization and access control, DAC, MAC and RBAC models, intrusion detection, SQL injection etc.	Analyze	K4
PCC- CS601.CO6	Explain the advanced concepts related to DBMS such as object oriented and object relational databases, logical databases, web databases, distributed databases, data warehousing and data mining.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	1	-	-	-	-	-	-	1	2	-
CO2	2	-	2	2	-	-	1	-	-	-	-	-	2	-
CO3	-	2	2	2	2	-	-	2	-	-	1	-	3	1
CO4	1	3	3	1	2	-	-	-	-	-	-	-	3	2
CO5	1	2	-	2	1	-	-	-	-	-	2	-	2	-
CO6	2	2	2	2	2	3	-	-	-	-	-	-	2	1
AVG.	1.6	2.2	2.2	1.6	1.6	3	1	2	0	0	1.5	1.00	2.33	1.33

Course Title: Computer Networks	Code: PCC- CS602
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC- CS602.CO1	Describe the fundamental concepts of computer networking, Data Communications System and learn its components.	Describe	K1
PCC- CS602.CO2	Explain the concept of function(s) of each layer of the OSI model and learn about TCP/IP.	Explain	K2
PCC- CS602.CO3	Identify the different types of network topologies, protocols, networking devices and make concepts about their functions within a network.	Identify	K3
PCC- CS602.CO4	Simplify building the skills of subnetting and routing mechanisms.	Simplify	K4
PCC- CS602.CO5	Justify the different system component parts of the network	Justify	K5
PCC- CS602.CO6	Develop an expertise in some specific areas of networking such as the design and learn about maintenance of individual networks	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	2	2	-	-	-	-	-	-	3	3	2
CO2	3	2	1	2	2	-	-	-	-	-	-	3	3	2
CO3	3	2	-	2	2	-	-	-	-	-	-	3	2	2
CO4	3	3	2	2	3	-	-	-	-	-	1	3	2	3
CO5	2	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	2	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG.	2.66	2.33	1.75	2	2.5	0	0	0	0	0	1.67	3.00	2.33	2.17

Course Title: Image Processing	Code: PEC-IT601D
Type of Course: Theory	Course Designation: Elective
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-IT601D.CO1	Understand the fundamental concepts of a digital image processing (DIP) system.	Understand	K2
PEC-IT601D.CO2	Remember different techniques employed for the enhancement of images.	Remember	K1
PEC-IT601D.CO3	Apply the Frequency domain Techniques to real life image Processing.	Apply	K3
PEC-IT601D.CO4	Analyse image segmentation and representation techniques.	Analyse	K4
PEC-IT601D.CO5	Analyse image restoration procedures	Analyse	K4
PEC-IT601D.CO6	Understand the rapid advances of (DIP) in Machine vision	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG.	3	2.5	2.16	2	2.5	0	0	0	0	0	1.67	3	2.33	2.16

Course Title: Research Methodology	Code: PROJ- CS601
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PROJ- CS601.CO1	Define and understand the motivation and objectives of research work	Define	K1
PROJ- CS601.CO2	Explain how to define and formulate a research problem	Explain	K2
PROJ- CS601.CO3	Identify the importance of literature review in a research work	Identify	K3
PROJ- CS601.CO4	Examine the appropriate statistical methods required for a particular research design and develop the appropriate research hypothesis for a research project	Examine	K4
PROJ- CS601.CO5	Explain the ethical issues involved while undertaking research	Explain	K2
PROJ- CS601.CO6	Develop the skill set to correctly present a research work by following the protocols of writing a standard research report.	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	1	-	2	3	3	2
CO2	3	3	2	2	2	-	-	-	1	-	2	3	3	2
CO3	3	1	2	2	2	-	-	-	1	-	2	3	3	2
CO4	3	2	2	2	3	-	-	-	1	-	2	3	3	2
CO5	-	-	-	-	-	-	-	3	1	-	-	3	2	3
CO6	3	3	2	2	3	-	-	-	1	-	2	3	2	3

AVG.	3	2.4	2.2	2	2.4	0	0	3	1	0	2	3.00	2.66	2.33
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Course Title: Data Warehousing and Data Mining	Code: PEC-IT602B
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PROJ- CS601B.CO1	Introduction to Data Warehousing; Data Mining	Define	K1
PROJ- CS601B.CO2	Classification and prediction; Cluster Analysis – Types of Data in Cluster Analysis	Explain	K2
PROJ- CS601B.CO3	Mining Time series Data, Periodicity Analysis for time related sequence data, Trend analysis, Similarity search in Time-series analysis	Identify	K3
PROJ- CS601B.CO4	Mining Data Streams, Methodologies for stream data processing and stream data systems	Examine	K4
PROJ- CS601B.CO5	Web Mining, Mining the web page layout structure, mining web link structure	Explain	K2
PROJ- CS601B.CO6	Recent trends in Distributed Warehousing and Data Mining, Class Imbalance	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	1	-	2	3	3	2
CO2	3	3	2	2	2	-	-	-	1	-	2	3	3	2
CO3	3	1	2	2	2	-	-	-	1	-	2	3	3	2
CO4	3	2	2	2	3	-	-	-	1	-	2	3	3	2
CO5	-	-	-	-	-	-	-	3	1	-	-	3	2	3
CO6	3	3	2	2	3	-	-	-	1	-	2	3	2	3

AVG.	3	2.4	2.2	2	2.4	0	0	3	1	0	2	3.00	2.66	2.33
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Course Title: Human Resource Development and Organizational Behavior	Code: OEC-IT601 B
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
OEC-IT601 B.CO1	Organizational Behaviour: Definition, Importance, Historical Background, Fundamental Concepts of OB	Describe	K1
OEC-IT601 B.CO2	Perception: Definition, Nature and Importance, Factors influencing Perception, Perceptual Selectivity.	Identify	K3
OEC-IT601 B.CO3	Motivation: Definition, Theories of Motivation - Maslow's Hierarchy of Needs Theory, McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory	Evaluate	K5
OEC-IT601 B.CO4	Group Behaviour: Characteristics of Group, Types of Groups, Stages of Group Development, Group Decision	Understand	K2
OEC-IT601 B.CO5	Leadership: Definition, Importance, Theories of Leadership Styles.	Analyze	K4
OEC-IT601 B.CO6	Organizational Politics: Definition, Factors contributing to Political Behaviour.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	1	-	-	-	-	-	-	1	2	-
CO2	2	-	2	2	-	-	1	-	-	-	-	-	2	-
CO3	-	2	2	2	2	-	-	2	-	-	1	-	3	1
CO4	1	3	3	1	2	-	-	-	-	-	-	-	3	2
CO5	1	2	-	2	1	-	-	-	-	-	2	-	2	-
CO6	2	2	2	2	2	3	-	-	-	-	-	-	2	1
AVG.	1.6	2.2	2.2	1.6	1.6	3	1	2	0	0	1.5	1.00	2.33	1.33

PRACTICAL

Course Title: Database Management System Lab	Code: PCC-CS691
Type of Course: Practical	Course Designation: Compulsory
Semester: 6th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS691.CO1	Analyze and transform an Entity Relationship Model into a relational database schema and to use a data definition language to implement the schema using a DBMS	Analyze	K4
PCC-CS691.CO2	Declare and enforce integrity constraints on a database using a DBMS	Declare	K1
PCC-CS691.CO3	Populate and query a database using SQL DML/DDDL commands.	Populate	K3
PCC-CS691.CO4	Retrieve of data from a database.	Retrieve	K3
PCC-CS691.CO5	Describe and implement relational algebra expression using aggregate functions, joins and sub-queries.	Describe	K1
PCC-CS691.CO6	Compile programs in PL/SQL including stored procedures, stored functions, cursors, packages.	Compile	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	3	1	-	1	2	-	1	2	2	1
CO2	3	2	3	2	3	1	-	-	2	-	1	2	2	1
CO3	3	2	3	2	3	1	-	2	2	-	1	2	2	1

CO4	3	2	3	2	3	1	-	2	2	-	1	2	2	1
CO5	3	2	3	3	3	1	-	2	2	-	1	2	2	1
CO6	3	2	3	2	3	1	-	2	2	-	1	2	2	1
AVG.	3	2	3	3	3	1	0	1.8	2	0	1	2	2	1

Course Title: Computer Networks Lab	Code: PCC-CS692
Type of Course: Practical	Course Designation: Compulsory
Semester: 6th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS692.CO1	Describe the Networking cables (CAT5, UTP), Connectors (RJ45, T-connector) and installation of Network Interface Card .	Describe	K1
PCC-CS692.CO2	Explain the working and difference of various networking devices like Hub, Bridge, Network Switch, Router and Modem.	Explain	K2
PCC-CS692.CO3	Developed a client server socket programming using TCP and UDP approach in C and Java.	Develop	K3
PCC-CS692.CO4	Generate techniques Data link Layer Flow control mechanisms like Stop & Wait and Sliding Window using C.	Generate	K4
PCC-CS692.CO5	Explain how to implement Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check) and error control mechanism like Selective Repeat and GoBack-N algorithm using C.	Explain	K5
PCC-CS692.CO6	Create the server setup configuration using different process like FTP, DNS, TelNet, NFS and concept of Firewall.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	-	3	-	-	-	2	-	3	-	3	3
CO2	3	2	3	-	3	-	-	-	0	-	3	-	3	1
CO3	3	2	3	-	3	-	-	-	2	-	3	3	3	1
CO4	3	2	3	-	3	-	-	-	2	-	3	3	3	2
CO5	3	2	3	-	3	-	-	-	0	-	3	0	3	3
CO6	3	2	3	-	3	-	-	-	3	-	3	3	3	3
AVG.	3	2	3	0	3	0	0	0	2.25	0	3	3	3	2.17

SEMESTER – VII

THEORY

Course Title: Machine Learning	Code: PEC-CS701E
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-CS701E.CO1	Explain the basic concepts of Regression/ Classification. Extend the concepts of statistical learning theory of various Regression/ Classification methods.	Explain	K2
PEC-CS701E.CO2	Analyze the linear discriminant, logistic regression, non-linear SVM, Kernel methods.	Analyze	K4
PEC-CS701E.CO3	Analyze the various concepts of unsupervised learning, Generative Models (mixture models and latent factor models), Dimension reduction, Kernel PCA, Matrix factorization.	Analyze	K4
PEC-CS701E.CO4	Explain Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning	Explain	K2
PEC-CS701E.CO5	Evaluate Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests)	Evaluate	K5
PEC-CS701E.CO6	Explain the concepts of Scalable Machine Learning (Online and Distributed Learning), Inference in Graphical Models, Introduction to Bayesian Learning and Inference, the recent trends in various learning techniques of machine learning and classification methods.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	2	-	-	3	3	3
CO2	3	3	2	3	3	-	-	-	2	1	-	3	3	3
CO3	3	2	2	3	3	-	-	-	2	1	-	3	3	3
CO4	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO5	2	2	2	2	3	-	-	-	1	-	-	3	3	3
CO6	3	1	1	1	-	-	-	-	1	-	-	3	3	3
AVG.	2.83	2.33	2.167	2.5	3	0	0	0	1.67	1	0	3	3	3

Course Title: Soft Computing	Code: PEC-CS702B
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-CS702B.CO1	Describe the basic concepts of soft computing; fuzzy sets and fuzzy logic systems, artificial neural network and Genetic Algorithm.	Describe	K1
PEC-CS702B.CO2	Explain Fuzzy sets and Fuzzy logic systems including relationship between the Classical Sets and Fuzzy Sets, Membership functions, fuzzification and defuzzification methods, Fuzzy Inference System and Applications of Fuzzy Logic.	Explain	K2
PEC-CS702B.CO3	Analyze the different Learning Methods and Neural Network models and Competitive learning networks	Analyze	K4
PEC-CS702B.CO4	Understand the components of GA, crossover and mutation, Multi-objective Genetic Algorithm (MOGA).	Understand	K2
PEC-CS702B.CO5	Apply the soft computing techniques such as fuzzy logic, neural network and genetic algorithm in different problem domains.	Apply	K3
PEC-CS702B.CO6	Evaluate other popular soft computing techniques such as Simulated Annealing, Tabu search, Ant colony optimization (ACO), Particle Swarm Optimization (PSO).	Evaluate	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO2	3	3	2	3	2	-	-	-	-	-	-	1	2	2
CO3	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO4	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO5	3	3	2	3	2	-	-	-	-	-	-	1	2	2
CO6	3	3	2	3	2	-	-	-	-	-	-	1	2	2
AVG.	3	3	2	3	2	0	0	0	0	0	0	1.5	2	2

Course Title: Cloud Computing	Code: PEC-CS701B
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-CS701B.CO1	Definition of Cloud Computing and its Basics (Lectures). Defining a Cloud, Cloud Types – NIST model	Describe	K1
PEC-CS701B.CO2	Cloud Reference model, Characteristics of Cloud Computing – a shift in paradigm Benefits and advantages of Cloud Computing	Explain	K2
PEC-CS701B.CO3	Use of Platforms in Cloud Computing Concepts of Abstraction and Virtualization Virtualization technologies	Analyze	K4
PEC-CS701B.CO4	Load Balancing and Virtualization: Basic Concepts, Network resources for load balancing, Advanced load balancing	Understand	K2
PEC-CS701B.CO5	Cloud Infrastructure:Cloud Management: An overview of the features of network management systems	Apply	K3
PEC-CS701B.CO6	Concepts of Services and Applications	Evaluate	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO2	3	3	2	3	2	-	-	-	-	-	-	1	2	2
CO3	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO4	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO5	3	3	2	3	2	-	-	-	-	-	-	1	2	2
CO6	3	3	2	3	2	-	-	-	-	-	-	1	2	2
AVG.	3	3	2	3	2	0	0	0	0	0	0	1.5	2	2

Course Title: Adhoc –Sensor Network	Code: PEC-CS702C
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-CS702C.CO1	Discuss the wireless network and MANET.	Discuss	K6
PEC-CS702C.CO2	Understand the sensor node architecture	Understand	K2
PEC-CS702C.CO3	Illustrate the different Communication protocol for WSN	Illustrate	K2
PEC-CS702C.CO4	Analyze the routing protocol for WSN	Analyze	K4
PEC-CS702C.CO5	Develop the topology control for WSN	Develop	K3
PEC-CS702C.CO6	Explain the mote architecture OS used in WSN	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG.	3	2.5	2.17	2	2.5	0	0	0	0	0	1.67	3	2.33	2.17

Course Title: Operation Research	Code: OEC-CS701A
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
OEC-CS701A.CO1	Describe the basic concept of linear programming problem and various component of LPP formulation for solving Business Problems.	Describe	K1
OEC-CS701A.CO2	Identify different approaches for solving LPP problems such as Graphical Method, Simplex Method, Charnes' Big-M Method, Duality Theory, Transportation Problems and Assignment Problems etc.	Identify	K3
OEC-CS701A.CO3	Evaluate the applications of game theory such as 2-Person Zero-sum Game; Saddle Point; Mini-Max and Maxi-Min Theorems, Games without Saddle Point; Graphical Method; Principle of Dominance etc.	Evaluate	K5
OEC-CS701A.CO4	Understand the terms Feasible Solution, Basic and non- basic Variables, Basic Feasible Solution, Degenerate and Non-degenerate Solution, Convex set and the use of game theory.	Understand	K2
OEC-CS701A.CO5	Analyze different types of algorithms such as Floyd Algorithm, PERT-CPM etc. for Cost Analysis, Crashing, and Resource Allocation.	Analyze	K4
OEC-CS701A.CO6	Explain the concepts of Queuing Theory along with the some models such as Axiomatic Derivation of the Arrival & Departure (Poisson Queue), Poisson Queue Models: (M/M/1): (∞ / FIFO) and (M/M/1: N / FIFO) etc.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	1	1	-	-	-	2	-	2	2	2	1
CO2	2	2	-	2	-	-	-	-	2	-	2	-	3	2
CO3	2	2	1	2	1	-	-	-	2	-	2	-	2	1
CO4	1	2	1	2	-	-	-	-	1	-	1	2	2	1
CO5	1	2	-	2	-	-	-	-	1	-	2	-	3	2
CO6	1	1	-	1	-	-	-	-	-	-	1	-	2	-
AVG.	1.5	1.83	1	1.67	1	0	0	0	1.6	0	1.67	2	2.33	1.4

Course Title: Project Management and Entrepreneurship	Code: HSMC 701
Type of Course: Theory	Course Designation: Compulsory
Semester: 7th	Contact Hours: 2L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HSMC 701.CO1	Examine role of entrepreneur in economic development	Examine	K3
HSMC 701.CO2	Describe the steps to establish an enterprise	Describe	K1
HSMC 701.CO3	Compare and classify types of entrepreneurs	Compare	K4
HSMC 701.CO4	Evaluate the entrepreneurial support in India	Evaluate	K5
HSMC 701.CO5	Describe Special institutions for entrepreneurial development and assistance in India	Describe	K1
HSMC 701.CO6	Explain project Identification	Explain	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	-	3	3	1
CO2	3	3	3	3	3	-	-	-	-	-	-	2	3	2
CO3	3	3	3	1	3	1	1	-	-	-	-	3	3	2
CO4	3	3	3	3		-	-	-	-	-	-	3	3	2
CO5	3	3	3	3	2	-	-	-	-	-	-	3	2	2
CO6	3	3	3	2	3	2	2	-	-	-	1	3	3	3
AVG.	3	3	3	2.5	2.6	1.5	1.5	0	0	0	1	2.83	2.83	2

SEMESTER – VII

Sessional

Course Title: Project-II	Code: PROJ-CS781
Type of Course: Sessional	Course Designation: Compulsory
Semester: 7th	Contact Hours: 12P/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PROJ-CS781.CO1	Identify the Problem & Problem Domain in the broad field of Computer Science & Engineering.	Identify	K3
PROJ-CS781.CO2	Understand the Research Methodologies and Field Study	Understand	K2
PROJ-CS781.CO3	Understand the Tools and Techniques used	Understand	K2
PROJ-CS781.CO4	Identify of the Relevant Resources and Data Set	Identify	K3
PROJ-CS781.CO5	Prepare of s/w and h/w requirement analysis	Prepare	K6
PROJ-CS781.CO6	Develop goal in line with flow of work	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3	3	3	3	-	-	-	2	2	2	3
CO2	2	3	3	3	1	2	3	-	-	-	-	-	1	3
CO3	2	2	-	2	3	-	-	-	-	-	-	-	3	1
CO4	2	2	-	2	3	-	-	-	-	-	-	-	2	2
CO5	1	1	1	2	2	-	-	-	-	-	-	-	2	1
CO6	1	1	1	2	-	2	2	2	2	-	2	-	1	2
AVG.	1.66	2	2	2.33	2.4	2.33	2.66	2	2	0	2	2	1.83	2

SEMESTER – VIII

THEORY

Course Title: Cryptography and Network Security	Code: PEC-CS801B
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-CS801B.CO1	Describe conceptual understanding of network security issues, challenges and mechanisms common network vulnerabilities and attacks and basic concept of cryptography.	Describe	K1
PEC-CS801B.CO2	Evaluate various techniques of cryptography.	Evaluate	K5
PEC-CS801B.CO3	Illustrate the algorithms of different key symmetric cryptography.	Illustrate	K2
PEC-CS801B.CO4	Apply the public key algorithms, digital signature and message digest.	Apply	K3
PEC-CS801B.CO5	Analyze the approaches of security protocol and authentication.	Analyze	K4
PEC-CS801B.CO6	Explain the concept of electronic mail security and types of firewall and its configurations.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	-	-	-	-	-	-	1	3	3
CO2	3	3	3	-	2	-	-	-	-	-	-	-	3	2
CO3	2	2	1	2	3	1	-	1	1	3	-	-	3	2
CO4	3	3	2	2	3	1	2	1	0	2	-	-	3	2
CO5	3	2	3	2	1	-	-	-	-	1	-	-	2	2
CO6	3	2	3	2	2	2	-	-	-	-	-	-	2	2
AVG.	2.83	2.5	2.33	2	2.2	1.33	2	1	0.5	2	0	1	2.67	2.167

Course Title: Internet of Things	Code: PEC-CS801E
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-CS801E.CO1	Understand the vision of IoT from a global context.	Understand	K2
PEC-CS801E.CO2	Determine the Market perspective of IoT.	Determine	K5
PEC-CS801E.CO3	Use of Devices, Gateways and Data Management in IoT.	Use of	K3
PEC-CS801E.CO4	Analysed the use of IoT in Industrial and Commercial Building Automation and Real World Design Constraints.	Analysed	K4
PEC-CS801E.CO5	Understand the architecture of smart sensor.	Understand	K2
PEC-CS801E.CO6	Build the interfacing among IoT components.	Build	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG.	3	3	3	3	2	1	1	1	1	1	2	2	2.33	2.33

Course Title: Big Data Analytics	Code: OEC-CS801A
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
OEC-CS801A.CO1	Understand Big Data and its Business Implications.	Understand	K2
OEC-CS801A.CO2	Analyze the nonrelational database framework like, NOSQL to efficiently store and process Big Data to generate analytics. Analyze HDFS distributed file system, HADOOP streaming and I/O.	Analyze	K4
OEC-CS801A.CO3	Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm, YARN job scheduling and shuffle sort task execution.	Design	K6
OEC-CS801A.CO4	Explain the concepts of Hbase data model, client and implementations. Cassandra data model, Cassandra examples, Cassandra clients, Hadoop integration.	Explain	K2
OEC-CS801A.CO5	Design with Implementation of Big Data Analytics using Apache pig and spark to solve data intensive problems and to generate analytics	Design	K6
OEC-CS801A.CO6	Implement Big Data Activities using Hive.	Implement	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG.	3	2.5	2.16667	2	2.5	0	0	0	0	0	1.6667	3	2.33	2.166

Course Title: Economic Policies in India	Code: OEC-CS802C
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
OEC-CS802C.CO1	Approaches to economic development and its measurement – sustainable development; Role of State, market and other institutions	Describe	K1
OEC-CS802C.CO2	Objectives and strategy of planning; Failures and achievements of Plans	Explain	K2
OEC-CS802C.CO3	Energy; social infrastructure – education and health; Environment; Regional imbalance; Issues and policies in financing infrastructure development.	Understand	K2
OEC-CS802C.CO4	Industrial policy; Public Sector enterprises and their performance; Problem of sick units in India; Privatization	Analyze	K4
OEC-CS802C.CO5	Structure and direction of foreign trade; Balance of payments; Issues in export-import policy and FEMA	Apply	K3
OEC-CS802C.CO6	Rationale of internal and external reforms; Globalization of Indian economy; WTO and its impact on the different sectors of the economy	Elaborate	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	-	-	1	2	-	-	-	-	1	1	1	1
CO2	1	2	2	1	1	1	-	-	-	-	1	-	2	-
CO3	1	1	1	1	1	-	-	-	-	-	1	-	1	-
CO4	1	1	1	1	1	1	-	-	-	-	1	-	2	1
CO5	1	1	1	1	1	1	-	-	-	-	1	-	2	-
CO6	2	2	2	2	3	2	-	-	1	-	2	1	2	2

AVG.	1.16	1.5	1.4	1.2	1.33	1.4	0	0	1	0	1.16	1	1.66	1.33
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SEMESTER – VIII
SESSIONAL

Course Title: Project-III	Code: PROJ-CS881
Type of Course: Sessional	Course Designation: Compulsory
Semester: 8th	Contact Hours: 12P/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PROJ-CS881.CO1	Understand the underlying technical concepts and theory.	Understand	K2
PROJ-CS881.CO2	Practice hands on experience to build the basic models	Apply	K3
PROJ-CS881.CO3	Develop mathematical generalize of the solution	Create	K6
PROJ-CS881.CO4	Integrate all the parts and deployment of the project	Apply	K3
PROJ-CS881.CO5	Prepare a Dissertation and Presentation in the standard format for being evaluated by the Department.	Create	K6
PROJ-CS881.CO6	Prepare a paper for Conference presentation/Publication in Journals, if possible.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	2	1	1	-	-	-	-	-	3	1
CO2	2	2	3	3	3	1	-	-	-	-	-	-	3	1
CO3	3	3	3	2	1	-	1	-	-	-	-	-	2	3
CO4	2	2	2	2	2	-	-	-	2	2	2	2	2	3
CO5	2	-	2	-	2	-	-	2	3	3	3	3	2	3
CO6	2	-	2	-	2	-	-	2	3	3	3	3	2	3
AVG.	2	2.25	2.16	2.25	2	1	1	2	2.66	2.66	2.66	2.66	2.33	2.33

Course Title: E-Commerce	Code: IT703A
Type of Course: Theory	Course Designation: Elective
Semester: 7 ^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
IT703A.CO1	Describe the fundamental concept and scope of E-Commerce, relation between E-Commerce and Networking and their concerned hardware.	Describe	K1
IT703A.CO2	Explain various business model and E-commerce strategies for developing E-Commerce	Explain	K2
IT703A.CO3	Understand the role of Convergence, Collaborative Computing, Content Management & Call Center in E-Commerce and Supply Chain Management	Understand	K2
IT703A.CO4	Analyze the mechanism & security issues related to E-Payment and E-Marketing.	Analyze	K4
IT703A.CO5	Apply the knowledge of EDI Models and Security Standards in E-Commerce applications.	Apply	K3
IT703A.CO6	Elaborate the concept of Enterprise Resource Planning using different ERP Packages	Elaborate	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	-	-	1	2	-	-	-	-	1	1	1	1
CO2	1	2	2	1	1	1	-	-	-	-	1	-	2	-
CO3	1	1	1	1	1	-	-	-	-	-	1	-	1	-
CO4	1	1	1	1	1	1	-	-	-	-	1	-	2	1
CO5	1	1	1	1	1	1	-	-	-	-	1	-	2	-
CO6	2	2	2	2	3	2	-	-	1	-	2	1	2	2

Course Title: Sensor Network	Code: IT704D
Type of Course: Theory	Course Designation: Elective
Semester: 7 ^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
IT704D.CO1	Discuss the wireless network and MANET.	Discuss	K6
IT704D.CO2	Understand the sensor node architecture	Understand	K2
IT704D.CO3	Illustrate the different Communication protocol for WSN	Illustrate	K2
IT704D.CO4	Analyze the routing protocol for WSN	Analyze	K4
IT704D.CO5	Develop the topology control for WSN	Develop	K3
IT704D.CO6	Explain the mote architecture OS used in WSN	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG	3	2.5	2.17	2	2.5	0	0	0	0	0	1.67	3	2.33	2.17

**SEMESTER – VIII
THEORY**

Course Title: Project Management	Code: HU801B
Type of Course: Theory	Course Designation: Compulsory
Semester: 8 th	Contact Hours: 2L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HU801B.CO1	Examine role of entrepreneur in economic development	Examine	K3
HU801B.CO2	Describe the steps to establish an enterprise	Describe	K1
HU801B.CO3	Compare and classify types of entrepreneurs	Compare	K4
HU801B.CO4	Evaluate the entrepreneurial support in India	Evaluate	K5
HU801B.CO5	Describe Special institutions for entrepreneurial development and assistance in India	Describe	K1
HU801B.CO6	Explain project Identification	Explain	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	-	3	3	1
CO2	3	3	3	3	3	-	-	-	-	-	-	2	3	2
CO3	3	3	3	1	3	1	1	-	-	-	-	3	3	2
CO4	3	3	3	3		-	-	-	-	-	-	3	3	2
CO5	3	3	3	3	2	-	-	-	-	-	-	3	2	2
CO6	3	3	3	2	3	2	2	-	-	-	1	3	3	3
AVG	3	3	3	2.5	2.6	1.5	1.5	0	0	0	1	2.83	2.83	2

Course Title: Cryptography and Network Security	Code: IT801D
Type of Course: Theory	Course Designation: Elective
Semester: 8 ^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
IT801D.CO1	Describe conceptual understanding of network security issues, challenges and mechanisms common network vulnerabilities and attacks and basic concept of cryptography.	Describe	K1
IT801D.CO2	Evaluate various techniques of cryptography.	Evaluate	K5
IT801D.CO3	Illustrate the algorithms of different key symmetric cryptography.	Illustrate	K2
IT801D.CO4	Apply the public key algorithms, digital signature and message digest.	Apply	K3
IT801D.CO5	Analyze the approaches of and security protocol authentication.	Analyze	K4
IT801D.CO6	Explain the concept of electronic mail security and types of firewall and its configurations.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	-	-	-	-	-	-	1	3	3
CO2	3	3	3	-	2	-	-	-	-	-	-	-	3	2
CO3	2	2	1	2	3	1	-	1	1	3	-	-	3	2
CO4	3	3	2	2	3	1	2	1	0	2	-	-	3	2
CO5	3	2	3	2	1	-	-	-	-	1	-	-	2	2
CO6	3	2	3	2	2	2	-	-	-	-	-	-	2	2
AVG	2.83	2.5	2.33	2	2.2	1.33	2	1	0.5	2	0	1	2.67	2.167

ELECTRICAL ENGINEERING

SEMESTER – I THEORY

Course Title: Mathematics –IA	Code: BS-M101
Type of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M101.CO1	Learn the basic mathematical tools to deal with problems of engineering sciences.	Learn	Level I
BS-M101.CO2	Understand properties and application of Calculus and Linear Algebra .	Understand	Level II
BS-M101.CO3	Analyze of physical or engineering problems.	Analyze	Level IV
BS-M101.CO4	Acquire problem solving skills related to engineering science.	Acquire	Level II
BS-M101.CO5	Apply Calculus and Linear Algebra in real life problems.	Apply	Level III
BS-M101.CO6	Classify ensembles and differentiate between Calculus and Linear Algebra.	Classify	Level IV

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	-	-	-	-	3	3	2
CO2	3	3	3	3	-	-	-	-	-	-	-	3	2	1
CO3	3	3	3	2	-	-	-	-	-	-	-	3	2	1
CO4	3	1	2	1	-	-	-	-	-	-	1	3	2	2
CO5	2	2	2	2	-	-	-	-	-	-	2	3	1	-
CO6	3	2	2	2	-	-	-	-	-	-	2	3	-	-
AVG	2.83	2.33	2.5	2.33	0	0	0	0	0	0	1.6667	3	2	1.5

Course Title: Physics-I	Code: BS-PH101
Type of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

Course Outcomes	Details	Action Verb	Knowledge Level
BS-PH101.CO1	Apply basic concepts of mechanics	Apply	K3
BS-PH101.CO2	Discuss Physical optics and analyze principles of lasers with applications	Discuss	K6
BS-PH101.CO3	Categorize di electric and magnetic properties of materials leading to Electromagnetic laws	Categorize	K4
BS-PH101.CO4	Differentiate between Classical Physics and Quantum Physics by introducing Planck's law	Differentiate	K5
BS-PH101.CO5	Apply wave particle duality in real life problems followed by simple quantum mechanics calculations	Apply	K3
BS-PH101.CO6	Classify ensembles and differentiate between classical and Quantum statistical mechanics	Classify	K4

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO2	1	3	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO4	1	3	2	-	-	-	-	-	-	-	-	-	-	-
CO5	1	3	2	0	-	-	-	-	-	-	-	-	-	-
CO6	-	1	3	2	-	-	-	-	-	-	-	-	-	-
AVG	1.80	2.33	1.83	1.00	0	0	0	0	0	0	0	0	0	0

Course Title: Basic Electrical Engineering	Code: ES-EE101
Type Of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE101.CO1	Understand and analyze basic electric and magnetic circuits.	Understand	K2
ES-EE101.CO2	Study the working principles of electrical machines and power converters.	Study	K1
ES-EE101.CO3	Introduce the components of low voltage electrical installations.	Introduce	K1
ES-EE101.CO4	Understand the general structure of electrical power system.	Understand	K2
ES-EE101.CO5	Understand the construction and operation of single-phase transformer.	Understand	K2
ES-EE101.CO6	Explain the working principle of power converters.	Explain	K2

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO2	2	3	3	2	2	-	-	-	-	-	-	-	-	-
CO3	2	-	3	1	-	-	-	-	-	-	-	1	-	-
CO4	2	-	2	2	3	-	-	-	-	-	-	2	-	-
CO5	2	2	-	2	3	-	-	-	-	-	-	1	-	-
CO6	2	1	3	3	3	-	-	-	-	-	-	1	-	-
AVG	2.17	2	2.75	2	2.6	0	0	0	0	0	0	1.25	0	0

PRACTICAL

Course Title: Physics-I Laboratory	Code: BS-PH191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1 st	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Title: Basic Electrical Engineering Lab	Code: ES-EE191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE191.CO1	Calibrate Ammeter and Wattmeter	Calibrate	K3
ES-EE191.CO2	Demonstrate the measuring instrument and electrical machines	Demonstrate	K3
ES-EE191.CO3	Conduct open circuit and short circuit test of single-phase transformer	Conduct	K2
ES-EE191.CO4	Measure 3 phase power using two wattmeters	Measure	K5
ES-EE191.CO5	Identify the components of LT switchgear	Identify	K1
ES-EE191.CO6	Understand the characteristic of RLC series and parallel circuit	Understand	K2

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	3	-	-	-	2	-	-	-	-	-
CO2	2	3	3	1	2	-	-	-	3	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	2	-	-	-	-	-
CO4	2	-	2	-	3	-	-	-	3	-	-	-	-	-
CO5	1	-	-	-	1	-	-	-	-	-	-	-	-	-
CO6	2	1	2	1	3	-	-	-	2	-	-	-	-	-
AVG	1.83	2	2.5	1	2.4	0	0	0	2.4	0	0	0	0	0

Course Title: Workshop	Code: ES-ME192
Type Of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME192.CO1	Understanding the applications of hand tools and machine tools.	Understand	K2
ES-ME192.CO2	Comprehend the safety measures required to be taken while using the tools.	Comprehend	K2
ES-ME192.CO3	Select the appropriate tools required to manufacture an object of predetermined shape and size considering least wastage and cost.	Select	K2
ES-ME192.CO4	Fabricate components with their own hands	Fabricate	K6
ES-ME192.CO5	Practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes	Analyze	K6
ES-ME192.CO6	Produce small devices of their interest, by assembling different components,	Produce	K6

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	1	-	-	-	-	-	-
CO3	1	-	-	-	-	1	-	1	1	-	-	-	-	-
CO4	1	-	-	-	-	-	2	-	2	1	1	-	-	1
CO5	1	-	-	-	-	-	2	-	2	1	1	1	-	-
CO6	1	-	-	-	-	-	2	-	2	1	2	1	-	1
AVG	1	0	0	0	0	1	2	1	1.75	1	1.33	1	0	1

Course Title:Mathematics –IIA	Code: BS-M201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M201.CO1	Learn the basic mathematical tools to deal with problems of engineering sciences.	Learn	K1
BS-M201.CO2	Understand properties and application of Linear Algebra, Ordinary Differential Equations (ODE) and numerical analysis.	Understand	K2
BS-M201.CO3	Analyze of physical or engineering problems.	Analyze	K4
BS-M201.CO4	Acquire problem solving skills related to engineering science.	Acquire	K2
BS-M201.CO5	Apply Linear Algebra, Ordinary Differential Equations (ODE) and Numerical analysis in real life problems.	Apply	K3
BS-M201.CO6	Classify ensembles and differentiate among Linear Algebra, Ordinary Differential Equations (ODE) and numerical analysis.	Classify	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	-	-	-	-	-	-	-	3	1	-
CO2	2	2	3	1	-	-	-	-	-	-	-	3	2	-
CO3	3	3	3	1	-	-	-	-	-	-	-	3	1	-
CO4	3	2	3	2	-	-	-	-	-	-	1	3	3	1
CO5	3	2	3	2	-	-	-	-	-	-	2	3	3	-1
CO6	3	2	3	2	-	-	-	-	-	-	2	3	3	2
AVG.	2.83	2.17	3	1.5	0	0	0	0	0	0	1.67	3.00	2.17	1.33

Course Title:Programming for ProblemSolving	Code: ES-CS201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS201.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS201.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS201.CO3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
ES-CS201.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS201.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS201.CO6	Build analytical skill.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG	3	3	3	3	2	1	1	1	1	1	2	2	2.33	2.33

Course Title:English	Code: HM-HU201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 2L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU201.CO1	Understand and apply English Speech Sounds for enhancing English Communication	Understand	K2
HM-HU201.CO2	Apply English Language Presentation Skill in Academic and in Professional Communication	Apply	K3
HM-HU201.CO3	Apply Receptive Skills of English in Academics and in Engineering Profession	Apply	K3
HM-HU201.CO4	Apply Writing Skill of English in Academics and in Profession	Apply	K3
HM-HU201.CO5	Apply Grammar Skill of English in Academic and in Professional Communication	Apply	K3
HM-HU201.CO6	Apply Critical Thinking Skill of English in Academic and in professional Communication	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO2	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO3	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO4	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO5	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO6	2	2	2	2	2	2	-	2	-	3	-	2	1	1
AVG	2	2	2	2	2	2	0	2	0	3	0	2	1	1

Course Title:Programming for ProblemSolving	Code: ES-CS291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS291.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS291.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS291.CO3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
ES-CS291.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS291.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS291.CO6	Build analytical skill.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO2	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO3	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO4	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO5	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO6	2	2	2	2	-	-	-	-	-	-	-	2	2	1
AVG	2	2	2	2	0	0	0	0	0	0	0	2	2	1

Course Title:Engineering Graphics & Design	Code: ES-ME291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME291.CO1	Understand the applications of hand tools and machine tools.	Understand	K2
ES-ME291.CO2	Comprehend the safety measures required to be taken while using the tools.	Create	K6
ES-ME291.CO3	Select the appropriate tools required to manufacture an object of predetermined shape and size considering least wastage and cost.	Evaluate	K5
ES-ME291.CO4	Fabricate components with their own hands.	Create	K6
ES-ME291.CO5	Confident on practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.	Understand	K2
ES-ME291.CO6	Produce small devices of their interest by assembling different components.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	1	-	-	-	-	-	-
CO3	1	-	-	-	-	1	-	1	1	-	-	-	-	-
CO4	1	-	-	-	-	-	2	-	2	1	1	-	-	1
CO5	1	-	-	-	-	-	2	-	2	1	1	1	-	-
CO6	1	-	-	-	-	-	2	-	2	1	2	1	-	1
AVG	1	0	0	0	0	1	2	1	1.75	1	1.333	1	0	1.00

Course Title:Language Laboratory	Code: HM-HU291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU291.CO1	Understand and apply English Speech Sounds for enhancing English Communication	Understand	K2
HM-HU291.CO2	Apply English Language Presentation Skill in Academic and in Professional Communication	Apply	K3
HM-HU291.CO3	Apply Receptive Skills of English in Academics and in Engineering Profession	Apply	K3
HM-HU291.CO4	Apply Writing Skill of English in Academics and in Profession	Apply	K3
HM-HU291.CO5	Apply Grammar Skill of English in Academic and in Professional Communication	Apply	K3
HM-HU291.CO6	Apply Critical Thinking Skill of English in Academic and in professional Communication	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO2	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO3	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO4	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO5	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO6	2	2	2	2	2	2	-	2	1	3	-	2	1	1
AVG	2	2	2	2	2	2	0	2	1	3	0	2	1	1

**SEMESTER – III
THEORY**

Course: ANALOG ELECTRONICS	Code: PC-EE 302
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE 302.CO1	Describe analog electronic components and analog electronics circuits	Explain	K2
PC-EE 302.CO2	Explain principle of operation of analog electronic components, filters, regulators and analog electronic circuits.	Define	K1
PC-EE 302.CO3	Compute parameters and operating points of analog electronic circuits.	Demonstrate	K2
PC-EE 302.CO4	Determine response of analog electronic circuits.	Explain	K2
PC-EE 302.CO5	Distinguish different types amplifier and different types oscillators based on application.	Build	K6
PC-EE 302.CO6	Construct operational amplifier based circuits for different applications.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	3	3	3
CO2	3	3	2	2	-	-	-	-	-	1	-	3	3	3
CO3	3	2	2	2	1	-	-	-	-	1	-	3	3	3
CO4	3	3	3	2	3	-	-	-	-	1	1	3	3	3
CO5	3	3	2	2	2	-	-	-	-	-	2	3	3	3
CO6	3	2	1	1	-	-	-	-	-	-	2	3	3	3
AVG	3	2.6	2	1.8	2	0	0	0	0	1	1	3	3	3

Course Title: Electric Circuit Theory	Code: PC-EE301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE301.CO1	Describe different type of networks, sources and signals with examples.	Construct	K3
PC-EE301.CO2	Explain different network theorems, coupled circuit and tools for solution of networks.	Understand	K2
PC-EE301.CO3	Apply network theorems and different tools to solve network problems.	Categorize	K4
PC-EE301.CO4	Select suitable techniques of network analysis for efficient solution.	Learn	K3
PC-EE301.CO5	Estimate parameters of two-port networks.	Compare	K5
PC-EE301.CO6	Design filter circuits.	Learn	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG	3	3	3	3	2	1	1	1	1	1	2	2.00	2.33	2.33

Course Title: Electromagnetic Field Theory	Code: PC-EE303
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE303.CO1	Relate different coordinate systems for efficient solution of electromagnetic problems.	Illustrate	K2
PC-EE303.CO2	Describe mathematical tools to solve electromagnetic problems.	Demonstrate	K2
PC-EE303.CO3	Explain laws applied to electromagnetic field.	Define	K1
PC-EE303.CO4	Apply mathematical tools and laws to solve electromagnetic problems.	Distinguish	K4
PC-EE303.CO5	Analyze electromagnetic wave propagation	Classify	K4
PC-EE303.CO6	Estimate transmission line parameters	Define	K1

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	-	-	3	2
CO2	3	3	3	3	3	-	-	-	-	-	1	-	3	2
CO3	3	3	3	1	3	-	-	-	-	-	2	-	1	3
CO4	3	2	3	3	2	-	-	-	-	-	1	-	2	3
CO5	3	2	3	3	-	-	-	-	-	-	2	2	3	3
CO6	3	3	3	2	3	-	-	-	-	-	3	3	3	3
AVG	3	2.67	3	2.5	2.6	0	0	0	0	0	1.8	2.5	2.5	2.33

Course Title:Mathematics-III	Code: BS-M 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 2L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M 301.CO1	Explain basics of probability theories, rules, distribution and properties of Z transform	Apply	K3
BS-M 301.CO2	Describe different methods of numerical analysis.	Learn	K2
BS-M 301.CO3	Solve numerical problems based on probability theories , numerical analysis and Z transform	Apply	K3
BS-M 301.CO4	Apply numerical methods to solve engineering problem	Apply	K3
BS-M 301.CO5	Solve engineering problems using z transform and probability theory.	Solve	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	-	-	-	-	-	-	-	-	2	1
CO2	3	3	2	1	-	-	-	-	-	-	-	-	2	1
CO3	3	3	2	1	-	-	-	-	-	-	-	-	2	1
CO4	3	3	2	1	-	-	-	-	-	-	-	-	2	1
CO5	3	2	2	-	-	-	-	-	-	-	-	-	2	1
CO6	3	3	2	1	-	-	-	-	-	-	-	-	2	1
AVG	3	3	2	1	0	0	0	0	0	0	0	0	2	1

Course Title: Indian Constitution	Code: MC-EE301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
MC-EE 301.CO1	Different features of Indian constitution.	Understand	K2
MC-EE 301.CO2	Power and functioning of Union, state and local self-government.	Apply	K3
MC-EE 301.CO3	Structure, jurisdiction and function of Indian Judiciary	Solve	K3
MC-EE 301.CO4	Basics of PIL and guideline for admission of PIL	Evaluate	K5
MC-EE 301.CO5	Functioning of local administration starting from block to Municipal Corporation.	Analyze	K4
MC-EE 301.CO6	Identify authority to redress a problem in the profession and in the society.	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO2	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO3	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO4	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO5	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO6	2	2	2	2	-	2	-	1	-	-	3	1	1	1
AVG	2	2	2	2	0	2	0	1	0	0	3	1	1	1

Course Title: ENGINEERING MECHANICS	Code: ES-ME 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3 rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME 301.CO1	explain the co-ordinate system, principle of three dimensional rotation, kinematics and kinetics of rigid bodies.	Understand	K2
ES-ME 301.CO2	elaborate the theory of general motion, bending moment, torsional motion and friction.	Apply	K3
ES-ME 301.CO3	develop free body diagram of different arrangements	Solve	K3
ES-ME 301.CO4	solve problems with the application of theories and principle of motion , friction and rigid bodies	Evaluate	K5
ES-ME 301.CO5	analyze torsional motion and bending moment.	Analyze	K4

Course Title: BIOLOGY FOR ENGINEERS	Code: BS- 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS- 301.CO1	describe with examples the biological observations lead to major discoveries.	Understand	K2
BS- 301.CO2	explain the classification of kingdom of life the building blocks of life different techniques of bio physics used to study biological phenomena. the role of imaging in the screening, diagnosis, staging, and treatments of cancer.	Apply	K3
BS- 301.CO3	identify DNA as a genetic material in the molecular basis of information transfer	Solve	K3
BS- 301.CO4	analyze biological processes at the reductionistic level.	Evaluate	K5
BS- 301.CO5	apply thermodynamic principles to biological systems.	Analyze	K4
BS- 301.CO6	identify microorganisms.	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO2	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO3	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO4	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO5	2	2	2	2	-	2	-	1	-	-	3	1	1	1
CO6	2	2	2	2	-	2	-	1	-	-	3	1	1	1
AVG	2	2	2	2	0	2	0	1	0	0	3	1	1	1

PRACTICAL

Course Title: Numerical Methods laboratory	Code: PC-CS391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 2Hr/week
Continuous Internal Assessment:40	External Assessment: 60
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-CS391.CO1	problems with Newton forward /backward, Lagrange's interpolation	Understand	K2
PC-CS391.CO2	problems of numerical integration using Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule	Understand	K2
PC-CS391.CO3	problems to find numerical solution of a system of linear equations using Gauss elimination and Gauss-Seidel iterations.	Apply	K3
PC-CS391.CO4	problems to find numerical solution of Algebraic Equation by Regular- falsi and Newton Raphson methods.	Analyze	K4
PC-CS391.CO5	ordinary differential equation by Euler's and Runge-Kutta methods.	Identify	K3
PC-CS391.CO6	find appropriate numerical methods to solve engineering problems.	Design	K6
PC-CS391.CO7	use software package to solve numerical problems.		

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	1	0	0	-	-	-	1	3	3	3
CO2	3	3	3	1	1	0	0	-	-	1	1	3	3	3
CO3	3	3	3	-	-	0	0	1	-	1	1	3	3	3
CO4	3	3	2	2	1	0	0	1	2	1	1	3	3	3
CO5	3	2	1	-	2	0	0	2	2	1	1	3	3	3
CO6	3	2	2	-	2	0	0	2	2	-	1	3	3	3
AVG	3	2.67	2.33	1.33	1.4	0	0	1.5	2	1	1	3.00	3.00	3

Course Title: Electric circuit theory Laboratory	Code: PC-EE391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 2Hr/week
Continuous Internal Assessment:40	External Assessment: 60
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE391.CO1	Describe different type of networks, sources and signals with examples.	Construct	K3
PC-EE391.CO2	Explain different network theorems, coupled circuit and tools for solution of networks.	Understand	K2
PC-EE391.CO3	apply network theorems and different tools to solve network problems.	Categorize	K4
PC-EE391.CO4	Select suitable techniques of network analysis for efficient solution.	Learn	K3
PC-EE391.CO5	Estimate parameters of two-port networks.	Compare	K5
PC-EE391.CO6	Design filter circuits.	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	2	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	2	-	-	-	-	1	1	-	2	2	2
CO4	3	2	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	2	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG	3	2.67	2.83	2.83	2	1	1	1	1	1	2	2	2.33	2.33

Course Title: Analog electronic laboratory	Code: PC-EE392
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 2hr/week
Continuous Internal Assessment: 40	External Assessment: 60
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE392.CO1	Describe analog electronic components and analog electronics circuits	Understand	K2
PC-EE392.CO2	Explain principle of operation of analog electronic components, filters, regulators and analog electronic circuits.	Design	K6
PC-EE392.CO3	Compute parameters and operating points of analog electronic circuits.	Analyze	K4
PC-EE392.CO4	Determine response of analog electronic circuits.	Implement	K3
PC-EE392.CO5	Distinguish different types amplifier and different types oscillators based on application.	Design	K6
PC-EE392.CO6	Construct operational amplifier based circuits for different applications.	Implement	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	3	3	1	2	3	3	2	2	3	1
CO2	3	3	1	2	1		1	2	3	3	2	2	-	1
CO3	3	3	2	2	2	1	1	2	2	2	1	3	2	1
CO4	3	3	2	2	2	1	1	2	2	2	2	3	1	3
CO5	3	3	3	2	3	1	1	2	2	2	1	3	-	1
CO6	3	3	3	2	3		1	2	3	3	2	3	3	2
AVG	3	3	2.33	2	2.3	1.5	1	2	2.5	2.5	1.67	2.67	2.25	1.5

**SEMESTER – IV
THEORY**

Course Title: ELECTRIC MACHINE-I	Code: PC-EE-401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE-401.CO1	Describe the function of different components of magnetic circuit, dc machines and transformers	Define	K1
PC-EE-401.CO2	Explain the principle of operation of different types of dc machines and transformers	Demonstrate	K2
PC-EE-401.CO3	Solve numerical problems of dc machines and transformers	Solve	K3
PC-EE-401.CO4	Estimate the parameters and efficiency of transformer.	Explain	K2
PC-EE-401.CO5	Determine the characteristics of dc machines	Classify	K4
PC-EE-401.CO6	Recommend methods to control output of dc machines	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	2	2	-	-	-	-	-	3	-	1
CO2	3	3	-	-	3	3	-	-	-	-	-	3	-	1
CO3	3	3	3	2	3	-	-	-	-	-	-	3	1	1
CO4	3	3	1	3	2	2	-	-	-	-	-	3	2	2
CO5	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO6	3	3	3	3	3	2	-	-	-	-	-	3	3	3
AVG	3	3	2.5	2.75	2.6	2.25	0	0	0	0	0	3.00	2.25	1.84

Course Title: DIGITAL ELECTRONICS	Code: PC-EE-402
Type of Course: Theory	Course Designation: Compulsory
Semester: 4 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE-402.CO1	Describe the function of different building blocks of digital electronics, semiconductor memories and programmable logic devices.	Understand	K2
PC-EE-402.CO2	Explain the principle of operation of combinational and sequential digital circuits, A/D and D/A converter	Discuss	K6
PC-EE-402.CO3	Solve numerical problems of Boolean algebra, number system, combinational & sequential digital circuits and A/D and D/A converter	Illustrate	K2
PC-EE-402.CO4	Specify applications of combinational and sequential digital circuits.	Develop	K3
PC-EE-402.CO5	Determine specifications of different digital circuits.	Analyze	K4
PC-EE-402.CO6	Design combinational and sequential digital circuits	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	2	3
CO2	2	2	2	1	-	-	-	-	-	-	-	-	3	3
CO3	1	-	2	2	1	-	1	-	-	-	-	-	3	2
CO4	-	3	2	-	1	-	-	-	-	-	-	-	3	2
CO5	-	1	3	-	2	1	-	-	-	-	-	1	2	3
CO6	-	2	2	1	2	1	1	1	-	1	-	-	2	2
AVG	1.67	2	2.2	1.33	1.5	1	1	1	0	1	0	1.00	2.50	2.5

Course Title: ELECTRICAL & ELECTRONICS MEASUREMENTS	Code: PC-EE-403
Type of Course: Theory	Course Designation: Compulsory
Semester: 4 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE-403.CO1	Explain the terms accuracy, precision, resolution, speed of response, errors in measurement, loading effect	Write	K6
PC-EE-403.CO2	Describe methods of measurement of power, energy by instruments and resistance, capacitance and inductance by bridges and potentiometer	Design	K6
PC-EE-403.CO3	Explain the principle of operation of analog meters, instrument transformer, digital multimeter, digital voltmeter, digital frequency meter, signal generator, strain gauge, LVDT and temperature transducers	Determine	K5
PC-EE-403.CO4	Explain the different building block, principle of operation of oscilloscope and measurement techniques of voltage, current, frequency and phase by oscilloscope	Design	K6
PC-EE-403.CO5	Solve numerical problems related to analog meters, instrument transformer, measurement of power, energy, resistance, inductance and capacitance	Determine	K5
PC-EE-403.CO6	Specify applications of analog and digital measuring instruments, sensors and transducers	Write	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG	3	2.5	2.17	2	2.5	0	0	0	0	0	1.67	3	2.33	2.17

Course Title: THERMAL POWER ENGINEERING	Code: ES-EE-401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4 ^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE-401.CO1	Describe the function of different components of boilers. Engines and turbines	Analyze	K4
ES-EE-401.CO2	Explain the principle of operation of different types of boilers, turbines, ic engines and gas turbines.	Develop	K3
ES-EE-401.CO3	Solve numerical problems of boilers, turbines, ic engines and gas turbines.	Illustrate	K2
ES-EE-401.CO4	Analyze the performance of boilers, engines and turbines.	Discuss	K6
ES-EE-401.CO5	Determine efficiency of boilers, engines and turbines.	Understand	K2
ES-EE-401.CO6	Explain methods to control boiler, engines and turbines parameters.	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	-
CO3	3	3	3	3	2	-	-	-	-	-	-	-	3	1
CO4	3	3	3	2	2	-	-	-	-	-	-	-	3	2
CO5	3	3	3	1	1	-	2	-	-	-	-	-	2	3
CO6	3	3	3	2	2	2	1	-	-	-	-	-	2	3
AVG	3	2.83	3	2	1.75	2	1.5	0	0	0	0	0	2.67	2.25

Course Title: Environmental Sciences	Code: MC-EE-401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4 th	Contact Hours: 1L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
MC-EE-401.CO1	Understand the natural environment and its relationships with human activities	Resolve	K3
MC-EE-401.CO2	Apply the fundamental knowledge of science and engineering to assess environmental and health risk	Solve	K3
MC-EE-401.CO3	Develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations	Conceive	K2
MC-EE-401.CO4	Acquire skills for scientific problem-solving related to air, water, noise & land pollution.	Acquire	K1

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO2	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO3	-	2	2	-	-	2	1	-	-	-	-	-	-	-
CO4	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO5	-	2	1	-	-	1	2	-	-	-	-	-	-	-
CO6	-	1	1	-	-	1	1	-	-	-	-	-	-	-
AVG	0	1.83	1.17	0	0	1.17	1.67	0	0	0	0	0	0	0

SEMESTER – IV PRACTICAL

Course Title: ELECTRIC MACHINE-I LABORATORY	Code: PC-EE491
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 2Hrs/week
Continuous Internal Assessment:40	External Assessment: 60
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE491.CO1	Identify appropriate equipment and instruments for the experiment.	Discuss	K6
PC-EE491.CO2	Test the instrument for application to the experiment.	Understand	K2
PC-EE491.CO3	Construct circuits with appropriate instruments and safety precautions	Analyze	K4
PC-EE491.CO4	Validate different characteristics of DC machine , methods of speed control of DC motor and parallel operation of the transformer	Illustrate	K2
PC-EE491.CO5	Work effectively in a team	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	2	2	1	-	-	0	-	-	-	-	2	3
CO2	2	2	2	1	1	-	-	0	-	-	-	-	2	2
CO3	2	1	2	2	-	-	-	0	1	-	-	-	2	2
CO4	3	3	3	2	-	-	-	0	1	-	-	-	3	2
CO5	3	2	2	1	1	2	2	0	1	-	-	1	2	2
CO6	3	2	3	2	1	2	1	0	1	1	2	2	3	3
AVG	2.67	2	2.33	1.67	1	2	1.5	0	1	1	2	1.50	2.33	2.33

Course Title: DIGITAL ELECTRONICS LABORATORY	Code: PC-EE492
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Internal Assessment: 40	External Assessment: 60
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE492.CO1	Identify appropriate equipment and instruments for the experiment	Analyze	K4
PC-EE492.CO2	Test the instruments for application to the experiment	Understand	K2
PC-EE492.CO3	Construct decoder , multiplexer, adder and subtractor circuits with appropriate instruments and precaution	Examine	K4
PC-EE492.CO4	Realize RS-JK and D flip flop, universal register with gates, multiplexer and flip-flops and asynchronous and synchronous up down counters	Discuss	K6
PC-EE492.CO5	Validate the operation of code conversion circuit –BCD to Excess 3 & vice versa, 4 bit parity	Develop	K3
PC-EE492.CO6	Generator & comparator circuits	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	3	2
CO3	3	3	3	2	-	-	-	-	-	-	-	-	3	1
CO4	3	3	3	1	-	-	-	-	-	-	-	-	3	1
CO5	3	3	3	1	1	-	-	-	-	-	-	-	3	2
CO6	3	3	3	3	2	-	-	1	-	-	-	-	3	3
AVG	3	3	3	1.67	1.5	0	0	1	0	0	0	0	3	1.8

Course Title: ELECTRICAL & ELECTRONICS MEASUREMENT LABORATORY	Code: PC-EE493
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Internal Assessment:40	External Assessment: 60
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-EE493.CO1	Identify appropriate equipment and instruments for the experiment	Analyze	K4
PC-EE493.CO2	Test the instrument for application to the experiment	Understand	K2
PC-EE493.CO3	Construct circuits with appropriate instruments and safety precautions	Examine	K4
PC-EE493.CO4	Evaluate and adjust the precision and accuracy of AC energy meter, moving iron and dynamometer type ammeter, voltmeter and wattmeter by potentiometer	Discuss	K6
PC-EE493.CO5	Measure voltage, current, power, energy, phase, frequency, resistance, inductance, capacitance	Develop	K3
PC-EE493.CO6	Work Effectively In A Team	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	3	2
CO3	3	3	3	2	-	-	-	-	-	-	-	-	3	1
CO4	3	3	3	1	-	-	-	-	-	-	-	-	3	1
CO5	3	3	3	1	1	-	-	-	-	-	-	-	3	2
CO6	3	3	3	3	2	-	-	1	-	-	-	-	3	3
AVG	3	3	3	1.67	1.5	0	0	1	0	0	0	0	3	1.8

University Syllabus :

Course Title: Thermal power Engg Laboratory	Code: ES-ME-491
Type of Course: Practical	Course Designation: Compulsory
Semester: 4 th	Contact Hours: 2Hrs/week
Continuous Internal Assessment:40	External Assessment: 60
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME-491.CO1	Identify appropriate equipment and instruments for the experiment	Analyze	K4
ES-ME-491.CO2	Construct experimental setup with appropriate instruments and safety precautions	Understand	K2
ES-ME-491.CO3	Identify different parts of Lanchashire Boiler, Bahcock & Willcox Boiler, Cochran Boiler, Vertical Tubular Boiler, Locomotive Boiler, 4S Diesel Engine, 4S Petrol Engine, 2S Petrol engine	Examine	K4
ES-ME-491.CO4	Test 4 stroke petrol engine by electrical load box and diesel engine by electrical load box and rope brake dynamometer	Discuss	K6
ES-ME-491.CO5	Find calorific value, flash point, fire point, cloud point, pour point of fuel.work effectively in a team	Develop	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	3	2
CO3	3	3	3	2	-	-	-	-	-	-	-	-	3	1
CO4	3	3	3	1	-	-	-	-	-	-	-	-	3	1
CO5	3	3	3	1	1	-	-	-	-	-	-	-	3	2
CO6	3	3	3	3	2	-	-	1	-	-	-	-	3	3
AVG	3	3	3	1.67	1.5	0	0	1	0	0	0	0	3	1.8

**SEMESTER – V
THEORY**

Course Title: Economics for Engineers	Code: HU-501
Type Of Course: Theory	Course Designation: Compulsory
Semester: 5*	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HU-501.CO1	Evaluate the economic theories, cost concepts and pricing policies	Identify	K1
HU-501.CO2	Explain the market structures and integration concepts	Distinguish	K4
HU-501.CO3	Apply the concepts of financial management for project appraisal	Choose	K3
HU-501.CO4	Explain accounting systems , the impact of inflation, taxation, depreciation	Judge	K5
HU-501.CO5	Analyze financial statements using ratio analysis	Apply	K3
HU-501.CO6	Explain financial planning, economic basis for replacement, project scheduling, legal and Regulatory issues applied to economic investment and project-management problems	Design	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	1	-	-	-	-	2	3	3	2
CO2	3	3	2	2	2	-	1	-	-	1	-	3	3	2
CO3	3	1	3	2	2	1	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	2	-	-	-	-	1	3	3	3
CO5	3	3	2	2	3	-	1	1	-	-	2	3	3	3
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG	3	2.5	2.33	2	2.5	1.33	1	1	0	1	1.75	3.00	2.66	2.33

Course Title: ELECTRIC MACHINE-II	Code: EE-501
Type of Course: Theory	Course Designation: Compulsory
Semester: 5^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-501.CO1	Describe the arrangement of winding of ac machines.	Understand	K2
EE-501.CO2	Explain the principle of operation of induction machines, synchronous machines and special Machines.	Identify	K3
EE-501.CO3	Solve numerical problems of induction machines, synchronous machines and special machines.	Design	K6
EE-501.CO4	Estimate the parameters and efficiency of induction machines and synchronous machines.	Identify	K3
EE-501.CO5	Determine the characteristics of induction machines and synchronous machines.	Develop	K3
EE-501.CO6	Select appropriate methods for starting , braking and speed control of induction machines.	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	2	2	3	2	2	3	1
CO2	3	3	3	3	3	1	-	-	2	2	1	2	3	2
CO3	3	3	3	1	3	-	2	1	3	-	-	2	3	2
CO4	3	3	3	3	-	2	2	2	3	3	2	2	3	2
CO5	3	3	3	3	2	-	-	3	-	2	2	2	2	2
CO6	3	3	3	2	3	-	-	3	2	2	2	3	3	3
AVG	3	3	3	2.5	2.6	1.5	2	2.2	2.4	2.4	1.8	2.6	2.83	2

Course Title: POWER SYSTEM-I	Code: EE-502
Type Of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-502.CO1	Explain the principle of generation of electric power from different sources	Demonstrate	K2
EE-502.CO2	Determine parameters of transmission lines and its performance	Discuss	K6
EE-502.CO3	Explain the principle of formation of corona and methods of its reduction	Develop	K3
EE-502.CO4	Conduct electrical tests on insulators	Explain	K5
EE-502.CO5	Solve numerical problems related to overhead transmission line, cable, insulators and tariff	Analyze	K6
EE-502.CO6	Analyze overhead transmission line based on short medium and long lines.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1	-	2	2	3	2	3	-	2	3	3
CO2	3	2	1	1	2	-	-	3	3	1	1	3	3	2
CO3	3	2	3	1	1	-	-	2	3	2	2	2	3	2
CO4	3	3	3	2	-	-	-	3	3	2	2	2	3	2
CO5	3	2	1	1	3	-	-	2	3	1	2	2	3	2
CO6	3	2	2	1	-	-	-	2	2	-	2	1	3	2
AVG	3	2	1.83	1.167	2	2	2	2.5	2.667	1.8	1.8	2	3.00	2.17

Course Title: CONTROL SYSTEM-I	Code: EE-503
Type of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 4L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-503.CO1	Develop mathematical model of mechanical, electrical, thermal, fluid system and different control system components like servomotors, synchros, potentiometer, tacho-generators etc.	Recall	K1
EE-503.CO2	Analyse stability of LTI system using routh-hurwitz (RH) criteria, root locus techniques in time domain and bode plot and nyquist technique in frequency domain.	Discuss	K1
EE-503.CO3	Design different control law or algorithms like proportional control, proportional plus derivative(PD) control, proportional plus integration(PI) control, and proportional plus integration plus derivative (PID) control and compensators like lag, lead, lag-lead for LTI Systems.	Apply	K3
EE-503.CO4	Apply state variable techniques for analysis of linear systems.	Analyze	K4
EE-503.CO5	Analyze the stability of linear discrete system	Design	K6
EE-503.CO6	Solve numerical problems on LTI system modelling, responses, error dynamics and stability .	Justify	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	1	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	1	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	3	3	0	3	0	1	0	1	0	0	0	0	0

Course Title: MICROPROCESSOR & MICROCONTROLLER	Code: EE-504C
Type of Course: Theory	Course Designation: Elective
Semester: 5^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-504C.CO1	Explain the architecture of 8086 and 8051.	Understand	K2
EE-504C.CO2	Do assembly language programming of 8086, 8051	Apply	K3
EE-504C.CO3	Interface different peripheral with 8086 and 8051	Understand	K2
EE-504C.CO4	Develop micro processor/ microcontroller based systems.	Apply	K3
EE-504C.CO5	Compare microprocessor, microcontroller, PIC and ARM processors	Analyze	K4
EE-504C.CO6	Explain the architecture of 8086 and 8051.	Design	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	2	-	-	-	-	-	-	2	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO5	-	-	2	3	3	-	-	-	-	-	-	-	-	-
CO6	3	-	-	-	3	-	-	-	3	-	-	3	-	2
AVG	3	2.5	2	3	3	0	0	0	2.5	0	0	3	2	2

Course Title: MICROPROCESSOR & MICROCONTROLLER LABORATORY	Code: EE-594C
Type of Course: Theory	Course Designation: Elective
Semester: 5^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-594C.CO1	Identify appropriate equipment and instruments for the experiment	Understand	K2
EE-594C.CO2	Test the instrument for application to the experiment	Apply	K3
EE-594C.CO3	Construct circuits with appropriate instruments and safety precautions	Apply	K3
EE-594C.CO4	Program 8086 for arithmetic operation, sorting of array, searching for a number in a string and	Apply	K3
EE-594C.CO5	String manipulation	Apply	K3
EE-594C.CO6	Interface ADC/DAC, 8255, 8251 to 8086 and LCD, keyboard to 8051	Analyze	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO2	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO3	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO4	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO5	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO6	-	-	-	-	-	2	-	2	3	1	-	2	1	1
AVG	0	0	0	0	0	2	0	2	3	1	0	2	1	1

Course Title: CONTROL SYSTEM-I LABORATORY	Code: EE-593
Type of Course: Practical	Course Designation: Compulsory
Semester: 5 th	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-593.CO1	Identify appropriate equipment and instruments for the experiment.	Understand	K2
EE-593.CO2	Test the instrument for application to the experiment.	Extract	K2
EE-593.CO3	Construct circuits with appropriate instruments and safety precautions.	Choose	K3
EE-593.CO4	Use MAT-Lab control system tool box, MAT-Lab-simulink tool box & PSPICE for simulation of system	Develop	K6
EE-593.CO5	Validate step response & impulse response for type-0, type-1 & Type-2 system with unity Feedback using MATLAB & PSPICE.	Design	K6
EE-593.CO6	Determine control system specifications of first and second order systems.	Evaluate	K5

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO2	1	2	2	1	1	-	1	-	-	-	-	-	1	-
CO3	1	1	3	1	2	-	1	-	-	-	-	-	3	-
CO4	1	1	3	1	2	-	1	-	-	-	-	-	3	-
CO5	3	2	2	2	3	-	-	-	-	-	-	-	2	-
CO6	2	2	2	2	2	-	-	-	-	-	2	-	1	-
AVG	1.66	1.83	2.16	1.33	2	0	1	0	0	0	2	0	2	0

Course Title: ELECTRIC MACHINE-II	Code: EE-591
Type of Course: Practical	Course Designation: Compulsory
Semester: 5 th	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-591.CO1	Identify appropriate equipment and instruments for the experiment.	Understand	K2
EE-591.CO2	Test the instrument for application to the experiment.	Demonstrate	K3
EE-591.CO3	Construct circuits with appropriate instruments and safety precautions.	Develop	K6
EE-591.CO4	Validate different characteristics of single phase Induction motor, three phase Induction	Determine	K5
EE-591.CO5	Motor, Induction generator and synchronous motor , methods of speed control of Induction	Analyse	K4
EE-591.CO6	Motors and parallel operation of the 3 phase Synchronous generator.	Illustrate	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	1	-	-	-	-	-	-	1	3	3
CO2	3	3	3	2	3	-	-	2	-	-	-	2	3	1
CO3	3	3	3	2	3	-	-	2	1	-	-	2	3	2
CO4	3	3	3	2	3	-	-	2	-	-	1	2	3	3
CO5	3	3	3	2	3	-	-	1	1	-	1	2	3	3
CO6	3	3	2	1	1	-	-	-	1	-	-	1	3	3
AVG	3.00	3.00	2.83	1.67	2.33	0	0	1.75	1.00	0	1.00	1.67	3.00	2.50

Course Title: POWER SYSTEM-I	Code: EE-592
Type of Course: Practical	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-592.CO1	Explain the principle of generation of electric power from different sources	Define	K1
EE-592.CO2	Determine parameters of transmission lines and its performance	Understand	K2
EE-592.CO3	Explain the principle of formation of corona and methods of its reduction	Develop	K3
EE-592.CO4	Conduct electrical tests on insulators	Apply	K3
EE-592.CO5	Solve numerical problems related to overhead transmission line, cable, insulators and tariff	Analyze	K4
EE-592.CO6	Analyze overhead transmission line based on short medium and long lines.	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	2	-	-	-	2	-	-	2	2	1
CO2	3	3	3	1	3	-	-	-	1	-	-	2	2	3
CO3	3	3	3	2	3	-	-	-	3	-	-	2	3	2
CO4	3	3	3	2	3	-	-	-	3	-	-	2	3	2
CO5	3	3	3	-	1	-	-	-	2	2	2	2	2	1
CO6	3	3	3	-	3	-	-	-	3	2	2	2	3	2
AVG	3	3	3	1.5	2.5	0	0	0	2.3	2	2	2	2.5	1.8

**SEMESTER – VI
THEORY**

Course Title: PRINCIPLE OF MANAGEMENT	Code: HU-601
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 2 hrs/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HU-601.CO1	Explain the concepts and approaches of management.	Describe	K1
HU-601.CO2	Demonstrate the roles, skills and functions of management.	Identify	K3
HU-601.CO3	Diagnose and solve organizational problems.	Evaluate	K5
HU-601.CO4	Identify the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.	Understand	K2
HU-601.CO5	Apply different methods of Customer, Operation and Technology management.	Analyze	K4
HU-601.CO6	Acquire skills of good leader in an organization.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	1	-	-	-	-	-	-	1	2	-
CO2	2	-	2	2	-	-	1	-	-	-	-	-	2	-
CO3	-	2	2	2	2	-	-	2	-	-	1	-	3	1
CO4	1	3	3	1	2	-	-	-	-	-	-	-	3	2
CO5	1	2	-	2	1	-	-	-	-	-	2	-	2	-
CO6	2	2	2	2	2	3	-	-	-	-	-	-	2	1
AVG	1.6	2.2	2.2	1.6	1.6	3	1	2	0	0	1.5	1.00	2.33	1.33

Course Title: CONTROL SYSTEM-II	Code: EE-602
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 4 hrs/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-602.CO1	Explain the principle of sampling and reconstruction of analog signal.	Describe	K1
EE-602.CO2	Perform Z-transformation and inverse Z-transformation of systems.	Explain	K2
EE-602.CO3	Analyse and design digital control systems.	Identify	K3
EE-602.CO4	Design compensators for digital control system to achieve desired specifications.	Simplify	K4
EE-602.CO5	Represent digital control systems using state space models.	Justify	K5
EE-602.CO6	Analyze the effect sampling on stability, controllability and observability.	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	2	2	-	-	-	-	-	-	3	3	2
CO2	3	2	1	2	2	-	-	-	-	-	-	3	3	2
CO3	3	2	-	2	2	-	-	-	-	-	-	3	2	2
CO4	3	3	2	2	3	-	-	-	-	-	1	3	2	3
CO5	2	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	2	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG	2.66	2.33	1.75	2	2.5	0	0	0	0	0	1.67	3.00	2.33	2.17

Course Title: POWER SYSTEM-II	Code: EE-602
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 4hrs/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-602.CO1	Represent power system components in line diagrams.	Define	K1
EE-602.CO2	Determine the location of distribution substation.	Design	K6
EE-602.CO3	Determine the performance of power system with the help of load flow studies.	Evaluate	K5
EE-602.CO4	Analyse faults in Electrical systems.	Identify	K3
EE-602.CO5	Determine the stability of Power system.	Illustrate	K2
EE-602.CO6	Explain principle of operation of different power system protection equipments.	Examine	K4
EE-602.CO7	Solve numerical problems related to representation, load flow, faults, stability and protection of power system.	Examine	K7

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	1	-	-	-	-	-	-	1	-	3	1
CO2	3	2	3	1	-	1	1	-	-	-	1	1	3	-
CO3	3	2	-	1	2	1	-	-	1	-	-	1	3	2
CO4	3	3	3	1	2	1	-	-	1	1	-	2	2	3
CO5	2	3	2	3	1	-	-	1	3	1	-	1	3	2
CO6	2	3	2	3	2	1	1	2	3	-	1	2	2	1
AVG	2.67	2.3	2.4	1.67	1.75	1	1	1.5	2	1	1	1.4	2.67	1.8

Course Title: POWER ELECTRONICS	Code:EE-603
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 4hrs/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-603.CO1	Differentiate between signal level and power level devices.	Understand	K2
EE-603.CO2	Construct triggering and commutation circuits of SCR.	Remember	K1
EE-603.CO3	Explain the principle of operation of AC-DC, DC-DC and DC-AC converters.	Apply	K3
EE-603.CO4	Analyse the performance of AC-DC, DC-DC and DC-AC converters.	Analyse	K4
EE-603.CO5	Apply methods of voltage control and harmonic reduction to inverters.	Analyse	K4
EE-603.CO6	Solve numerical problems of switching devices, AC-DC, DC-DC and DC-AC converters.	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG	3	2.5	2.16	2	2.5	0	0	0	0	0	1.67	3	2.33	2.16

Course Title: SOFTWARE ENGINEERING	Code:EE-604(B)
Type of Course: Theory	Course Designation: Elective
Semester: 6th	Contact Hours: 3hrs/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-604(B)CO1	Describe the Overview of system analysis & design: Business system concept, System development life cycle, waterfall model, Spiral Model, Feasibility Analysis, Technical feasibility, Cost- benefit Analysis, COCOMO model.	Describe	K1
EE-604(B).CO2	Explain the System design: Context diagram and DFD, Problem partitioning, Top down and bottom up design, decision tree, decision table and structured English, Functional Vs object oriented approach.	Explain	K2
EE-604(B).CO3	Analyze the Levels of testing, Integration testing, Test case specification, Reliability assessment, Validation & Verification metrics, Monitoring & control	Analyze	K4
EE-604(B).CO4	Explain the System project management: Project scheduling, Staffing, software configuration management, Quality assurance, Project monitoring.	Exemplify	K6
EE-604(B).CO5	Apply the Static and dynamic models, necessity of modeling, UML diagrams, Class diagrams, Interaction diagrams, Collaboration diagram, Sequence diagram, State chart diagram, Activity diagram, Implementation diagram.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	1	1	-	-	-	2	1	3	2
CO2	3	3	2	2	2	1	1	-	-	-	2	1	3	2
CO3	3	3	2	2	2	1	1	-	-	-	2	1	3	2
CO4	3	3	2	2	2	1	1	-	-	-	1	1	3	2
CO5	3	3	2	2	2	1	1	-	-	-	2	1	3	2
CO6	3	3	2	2	2	1	1	-	-	-	2	1	3	2
AVG	3	3	2	2	2	1	1	0	0	0	1.833	1	3	2

Course Title: DIGITAL SIGNAL PROCESSING	Code: EE-605A
Type of Course: Theory	Course Designation: Elective
Semester: 6th	Contact Hours: 3hrs/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-605A.CO1	Represent signals mathematically in continuous and discrete-time and in the frequency domain.	Understand	K2
EE-605A.CO2	Analyse discrete-time systems using z-transform.	Understand	K2
EE-605A.CO3	Explain the Discrete-Fourier Transform (DFT) and the FFT algorithms.	Apply	K3
EE-605A.CO4	Design digital filters for various applications.	Evaluate	K5
EE-605A.CO5	Apply digital signal processing for the analysis of real-life signals.	Evaluate	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	-	-	-	-	-	2	-	-	-	3	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	2	-	2	-	-	2	-	-	2	-	-	-	-
CO4	-	-	-	-	2	-	-	3	-	-	-	2	-	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	0	2	0	2	2	0	2	2.5	0	2	0	2.5	2	2

Course Title: CONTROL SYSTEM-II LABORATORY	Code: EE691
Type of Course: Practical	Course Designation: Compulsory
Semester: 6th	Contact Hours: 2 hrs/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE691.CO1	Identify appropriate equipment and instruments for the experiment	Define	K1
EE691.CO2	Test the instrument for application to the experiment	Explain	K2
EE691.CO3	Construct circuits with appropriate instruments and safety precautions	Identify	K3
EE691.CO4	Design of Lead, Lag and Lead-Lag compensation circuit for the given plant transfer function. Analyze step response of the system by simulation.	Examine	K4
EE691.CO5	Performance analysis of a discrete time system using simulation tools. Study of closed response of a continuous system with a digital controller and sample and hold circuit by simulation.	Explain	K2
EE691.CO6	Work effectively in a team	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	1	-	2	3	3	2
CO2	3	3	2	2	2	-	-	-	1	-	2	3	3	2
CO3	3	1	2	2	2	-	-	-	1	-	2	3	3	2
CO4	3	2	2	2	3	-	-	-	1	-	2	3	3	2
CO5	-	-	-	-	-	-	-	3	1	-	-	3	2	3
CO6	3	3	2	2	3	-	-	-	1	-	2	3	2	3
AVG	3	2.4	2.2	2	2.4	0	0	3	1	0	2	3.00	2.66	2.33

Course Title: POWER SYSTEM-II LABORATORY	Code: EE692
Type of Course: Practical	Course Designation: Compulsory
Semester: 6th	Contact Hours: 2 hrs/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE692.CO1	Identify appropriate equipment and instruments for the experiment.	Analyze	K4
EE692.CO2	Test the instrument for application to the experiment.	Declare	K1
EE692.CO3	Construct circuits with appropriate instruments and safety precautions.	Retrieve	K3
EE692.CO4	Validate the characteristics of under voltage relay, over current relay, earth fault relay, on load time delay relay, off load time delay relay, CT and PT.	Describe	K1
EE692.CO5	Validate protection schemes of transformer, generator, motor and feeder.	Compile	K6
EE692.CO6	Apply software tools to find bus voltage, currents and power flows throughout the electrical system.	Explain	K2
EE692.CO7	Work effectively in a team	Develop	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	3	1	-	1	2	-	1	2	2	1
CO2	3	2	3	2	3	1	-	-	2	-	1	2	2	1
CO3	3	2	3	2	3	1	-	2	2	-	1	2	2	1
CO4	3	2	3	2	3	1	-	2	2	-	1	2	2	1
CO5	3	2	3	3	3	1	-	2	2	-	1	2	2	1
CO6	3	2	3	2	3	1	-	2	2	-	1	2	2	1
AVG	3	2	3	3	3	1	0	1.8	2	0	1	2	2	1

Course Title: POWER ELECTRONICS LABORATORY	Code: EE-693
Type of Course: Practical	Course Designation: Compulsory
Semester: 6th	Contact Hours: 2 hrs/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-693.CO1	Identify appropriate equipment and instruments for the experiment.	Describe	K1
EE-693.CO2	Test the instrument for application to the experiment.	Explain	K2
EE-693.CO3	Construct circuits with appropriate instruments and safety precautions.	Develop	K3
EE-693.CO4	Validate characteristics of SCR, Triac, and performance of phase controlled converter, DC-DC converter, inverters and resonant pulse converters.	Generate	K4
EE-693.CO5	Demonstrate the relation between the speed and firing angle of Universal motor.	Explain	K5
EE-693.CO6	Work effectively in a team	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	-	3	-	-	-	2	-	3	-	3	3
CO2	3	2	3	-	3	-	-	-	0	-	3	-	3	1
CO3	3	2	3	-	3	-	-	-	2	-	3	3	3	1
CO4	3	2	3	-	3	-	-	-	2	-	3	3	3	2
CO5	3	2	3	-	3	-	-	-	0	-	3	0	3	3
CO6	3	2	3	-	3	-	-	-	3	-	3	3	3	3
AVG	3	2	3	0	3	0	0	0	2.25	0	3	3	3	2.17

Course Title: Software engineering Laboratory	Code: EE 694A
Type of Course: Practical	Course Designation: Elective
Semester: 7^a	Contact Hours: 2L/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE 694A.CO1	Explain the basic concepts of document for proposed project in standard format.	Explain	K2
EE 694A.CO2	Analyze the Project schedule preparation using tools like MSP project, Generation of Gantt and PERT chart from schedule. Prepare project management plan in standard format..	Analyze	K4
EE 694A CO3	Analyze the case diagram, Class diagram, Sequence diagram and prepare Software design document using tools like Rational Rose.	Analyze	K4
EE 694A CO4	Explain the Estimate of project size using Function Point (FP)/Use Case Point. Use Excel/Open Office template for calculation.	Explain	K2
EE 694A CO5	Evaluate Test Script/Test Plan (both Black box and White Box approach) for a small component of the proposed project. (Develop that component using programming languages like c/Java/VB etc.)	Evaluate	K5
EE 694A.CO6	Explain the Generate test result and perform defect cause analysis using Pareto or Fishbone diagram.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	2	-	-	3	3	3
CO2	3	3	2	3	3	-	-	-	2	1	-	3	3	3
CO3	3	2	2	3	3	-	-	-	2	1	-	3	3	3
CO4	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO5	2	2	2	2	3	-	-	-	1	-	-	3	3	3
CO6	3	1	1	1	-	-	-	-	1	-	-	3	3	3
AVG	2.83	2.33	2.167	2.5	3	0	0	0	1.67	1	0	3	3	3

**SEMESTER – VII
THEORY**

Course Title: Electric Drive	Code: EE-701
Type of Course: Theory	Course Designation: Compulsory
Semester: 7th	Contact Hours: 4L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-701.CO1	Explain the principle of operation of electric drive	Explain	K2
EE-701.CO2	Describe different methods of starting and braking of electric drive.	Analyze	K4
EE-701.CO3	Model and control dc drive	Analyze	K4
EE-701.CO4	Control speed of induction and synchronous motors	Explain	K2
EE-701.CO5	Recommend drives for different applications	Evaluate	K5
EE-701.CO6	Estimate ratings, variables and parameters of electric drives.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	2	-	-	3	3	3
CO2	3	3	2	3	3	-	-	-	2	1	-	3	3	3
CO3	3	2	2	3	3	-	-	-	2	1	-	3	3	3
CO4	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO5	2	2	2	2	3	-	-	-	1	-	-	3	3	3
CO6	3	1	1	1	-	-	-	-	1	-	-	3	3	3
AVG	2.83	2.33	2.167	2.5	3	0	0	0	1.67	1	0	3	3	3

Course Title: UTILISATION OF ELECTRIC POWER	Code: EE-702
Type of Course: Theory	Course Designation: Elective
Semester: 7 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-702.CO1	Explain the fundamentals of illumination and different lighting schemes.	Describe	K1
EE-702.CO2	Explain the fundamental of Electrolytic processes, Electric heating and Welding.	Explain	K2
EE-702.CO3	Able to select appropriate lighting, heating and welding techniques for specific applications.	Analyze	K4
EE-702.CO4	Apply different electrolysis process for different applications.	Understand	K2
EE-702.CO5	Explain the principle of different aspect of Electric traction and control of traction motor.	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO2	3	3	2	3	2	-	-	-	-	-	-	1	2	2
CO3	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO4	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO5	3	3	2	3	2	-	-	-	-	-	-	1	2	2
CO6	3	3	2	3	2	-	-	-	-	-	-	1	2	2
AVG	3	3	2	3	2	0	0	0	0	0	0	1.5	2	2

Course Title: Power System III	Code: EE-703A
Type of Course: Theory	Course Designation: Elective
Semester: 7 th	Contact Hours: 4L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-703A.CO1	Explain the principle of generation of electric power from different sources	Discuss	K6
EE-703A.CO2	Determine parameters of transmission lines and its performance	Understand	K2
EE-703A.CO3	Explain the principle of formation of corona and methods of its reduction	Illustrate	K2
EE-703A.CO4	Conduct electrical tests on insulators	Analyze	K4
EE-703A.CO5	Solve numerical problems related to overhead transmission line, cable, insulators and tariff	Develop	K3
EE-703A.CO6	Analyze overhead transmission line based on short medium and long lines.	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG	3	2.5	2.17	2	2.5	0	0	0	0	0	1.67	3	2.33	2.17

Course Title: Renewable & Non-Conventional Energy	Code: EE-704D
Type of Course: Theory	Course Designation: Elective
Semester: 7^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-704D.CO1	Describe the basic concept of linear programming problem and various component of LPP formulation for solving Business Problems.	Describe	K1
EE-704D.CO2	Identify different approaches for solving LPP problems such as Graphical Method, Simplex Method, Charnes' Big-M Method, Duality Theory, Transportation Problems and Assignment Problems etc.	Identify	K3
EE-704D.CO3	Evaluate the applications of game theory such as 2-Person Zero-sum Game; Saddle Point; Mini-Max and Maxi-Min Theorems, Games without Saddle Point; Graphical Method; Principle of Dominance etc.	Evaluate	K5
EE-704D.CO4	Understand the terms Feasible Solution, Basic and non-basic Variables, Basic Feasible Solution, Degenerate and Non-degenerate Solution, Convex set and the use of game theory.	Understand	K2
EE-704D.CO5	Analyze different types of algorithms such as Floyd Algorithm, PERT-CPM etc. for Cost Analysis, Crashing, and Resource Allocation.	Analyze	K4
EE-704D.CO6	Explain the concepts of Queuing Theory along with the some models such as Axiomatic Derivation of the Arrival & Departure (Poisson Queue), Poisson Queue Model s: (M/M/1): (∞ / FIFO) and (M/M/1: N / FIFO) etc.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	1	1	-	-	-	2	-	2	2	2	1
CO2	2	2	-	2	-	-	-	-	2	-	2	-	3	2
CO3	2	2	1	2	1	-	-	-	2	-	2	-	2	1
CO4	1	2	1	2	-	-	-	-	1	-	1	2	2	1
CO5	1	2	-	2	-	-	-	-	1	-	2	-	3	2
CO6	1	1	-	1	-	-	-	-	-	-	1	-	2	-
AVG	1.5	1.83	1	1.67	1	0	0	0	1.6	0	1.67	2	2.33	1.4

Course Title: COMPUTER NETWORKS	Code: EE-705A
Type of Course: Theory	Course Designation: Elective
Semester: 7 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-705A.CO1	Explain the concepts of data communication and networking.	Learn	K1
EE-705A.CO2	Identify the different types of network topologies and protocols.	Understand	K2
EE-705A.CO3	Describe the function of a network system with OSI and TCP/IP model.	Design	K6
EE-705A.CO4	Differentiate different types of routing protocol	Compare	K4
EE-705A.CO5	Apply principles of congestion control .	Explain	K2
EE-705A.CO6	Implement different schemes for security of the networks	Develop	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
CO2	-	-	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	1	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	1	-	-	-	-	-	-	-	1	-
CO5	-	-	-	2	1	-	-	-	-	-	-	-	1	-
CO6	-	-	3	2	1	-	-	-	-	-	-	-	1	2
AVG	0	0	3	2	1	0	0	0	0	0	0	0	1	1.5

Course Title: Electric Drive Laboratory	Code: EE-791
Type of Course: Practical	Course Designation: Compulsory
Semester: 7 ^a	Contact Hours: 2Hrs/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-791.CO1	Identify appropriate equipment and instruments for the experiment.	Examine	K3
EE-791.CO2	Test the instrument for application to the experiment.	Describe	K1
EE-791.CO3	Construct circuits with appropriate instruments and safety precautions.	Compare	K4
EE-791.CO4	Apply different methods of control of Electric Drive in the laboratory.	Evaluate	K5
EE-791.CO5	Analyse experimental data obtained in the laboratory.	Describe	K1
EE-791.CO6	Work effectively in a team	Explain	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	-	3	3	1
CO2	3	3	3	3	3	-	-	-	-	-	-	2	3	2
CO3	3	3	3	1	3	1	1	-	-	-	-	3	3	2
CO4	3	3	3	3		-	-	-	-	-	-	3	3	2
CO5	3	3	3	3	2	-	-	-	-	-	-	3	2	2
CO6	3	3	3	2	3	2	2	-	-	-	1	3	3	3
AVG	3	3	3	2.5	2.6	1.5	1.5	0	0	0	1	2.83	2.83	2

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Course Title: Computer network laboratory	Code: EE-792A
Type of Course: Practical	Course Designation: Compulsory
Semester: 7 th	Contact Hours: 3 Hrs/week
Continuous Assessment: 40Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-792A.CO1	Explain the concepts of data communication and networking.	Identify	K3
EE-792A.CO2	Identify the different types of network topologies and protocols.	Understand	K2
EE-792A.CO3	Describe the function of a network system with OSI and TCP/IP model.	Understand	K2
EE-792A.CO4	Differentiate different types of routing protocol.	Identify	K3
EE-792A.CO5	Explain the concepts of data communication and networking.	Prepare	K6
EE-792A.CO6	Identify the different types of network topologies and protocols.	Develop	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3	3	3	3	-	-	-	2	2	2	3
CO2	2	3	3	3	1	2	3	-	-	-	-	-	1	3
CO3	2	2	-	2	3		-	-	-	-	-	-	3	1
CO4	2	2	-	2	3	-	-	-	-	-	-	-	2	2
CO5	1	1	1	2	2	-	-	-	-	-	-	-	2	1
CO6	1	1	1	2	-	2	2	2	2	-	2	-	1	2
AVG	1.66	2	2	2.33	2.4	2.33	2.66	2	2	0	2	2	1.83	2

**SEMESTER – VIII
THEORY**

Course Title: SENSORS & TRANSDUCERS	Code: EE-802B
Type of Course: Theory	Course Designation: Elective
Semester: 8 ^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-802B.CO1	Describe conceptual understanding of network security issues, challenges and mechanisms common network vulnerabilities and attacks and basic concept of cryptography.	Describe	K1
EE-802B.CO2	Evaluate various techniques of cryptography.	Evaluate	K5
EE-802B.CO3	Illustrate the algorithms of different key symmetric cryptography.	Illustrate	K2
EE-802B.CO4	Apply the public key algorithms, digital signature and message digest.	Apply	K3
EE-802B.CO5	Analyze the approaches of security and protocol authentication.	Analyze	K4
EE-802B.CO6	Explain the concept of electronic mail security and types of firewall and its configurations.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	-	-	-	-	-	-	1	3	3
CO2	3	3	3	-	2	-	-	-	-	-	-	-	3	2
CO3	2	2	1	2	3	1	-	1	1	3	-	-	3	2
CO4	3	3	2	2	3	1	2	1	0	2	-	-	3	2
CO5	3	2	3	2	1	-	-	-	-	1	-	-	2	2
CO6	3	2	3	2	2	2	-	-	-	-	-	-	2	2
AVG	2.83	2.5	2.33	2	2.2	1.33	2	1	0.5	2	0	1	2.67	2.167

Course Title: Organisational Behaviour

Code: HU801

Type of Course: Theory

Course Designation: Elective

Semester: 8^a

Contact Hours: 2hrs/week

Continuous Assessment: 25 Marks

Final Exam: 70 Marks

Writer: Course Coordinator
Approved by HoD (convenor of DAB)
COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HU801A.CO1	Definition, Importance, Historical Background, Fundamental Concepts of OB, Challenges and Opportunities for OB.	Describe	K1
HU801A.CO2	Evaluate Personality and Attitudes: Meaning of personality, Personality Determinants and Traits, Development of Personality, Types of Attitudes, Job Satisfaction.	Evaluate	K5
HU801A.CO3	Illustrate Perception: Definition, Nature and Importance, key Factors influencing Perception, Perceptual Selectivity, Link between Perception and Decision Making.	Illustrate	K2
HU801A.CO4	Apply the Motivation: Definition, Theories of Motivation - and Maslow's Hierarchy of Needs Theory	Apply	K3
HU801A.CO5	Analyze McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs,	Analyze	K4
HU801A.CO6	Apply the Organizational Design: Various Organizational Structures and their Effects on Human Behaviour, Concepts of Organizational Climate and Organizational Culture.	Explain	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	-	-	-	-	-	-	1	3	3
CO2	3	3	3	-	2	-	-	-	-	-	-	-	3	2
CO3	2	2	1	2	3	1	-	1	1	3	-	-	3	2
CO4	3	3	2	2	3	1	2	1	0	2	-	-	3	2
CO5	3	2	3	2	1	-	-	-	-	1	-	-	2	2
CO6	3	2	3	2	2	2	-	-	-	-	-	-	2	2
AVG	2.83	2.5	2.33	2	2.2	1.33	2	1	0.5	2	0	1	2.67	2.167

Course Title: HVDC TRANSMISSION	Code: EE-801A
Type of Course: Theory	Course Designation: Elective
Semester: 8^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-801A.CO1	Choose intelligently AC and DC transmission systems for the dedicated application(s).	Understand	K2
EE-801A.CO2	Identify the suitable two-level/multilevel configuration for high power converters.	Determine	K5
EE-801A.CO3	Select the suitable protection method for various converter faults.	Use of	K3
EE-801A.CO4	Identify suitable reactive power compensation method.	Analysed	K4
EE-801A.CO5	Decide the configuration for harmonic mitigation on both AC and DC sides..	Understand	K2
EE-801A.CO6	Solve numerical problems related to converters, power flow analysis, reactive power control.	Build	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG	3	3	3	3	2	1	1	1	1	1	2	2	2.33	2.33

Course Title: ENERGY MANAGEMENT & AUDIT	Code: EE-801C
Type of Course: Theory	Course Designation: Elective
Semester: 8 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-801C.CO1	Explain the basic of energy resources, energy security, energy conservation and pollution.	Understand	K2
EE-801C.CO2	The energy conservation opportunities in different thermal systems	Analyze	K4
EE-801C.CO3	Quantify the energy conservation opportunities in different electrical systems	Design	K6
EE-801C.CO4	Identify the common energy conservation opportunities in different energy intensive industrial equipments	Explain	K2
EE-801C.CO5	Explain the methods of energy management and audit.	Design	K6
EE-801C.CO6	Analyse and report the outcome of energy audit.	Implement	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO2	3	3	2	2	2	-	-	-	-	-	-	3	3	2
CO3	3	1	2	2	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	-	-	-	-	-	1	3	2	3
CO5	3	3	2	2	3	-	-	-	-	-	2	3	2	2
CO6	3	3	2	2	3	-	-	-	-	-	2	3	2	2
AVG	3	2.5	2.16667	2	2.5	0	0	0	0	0	1.6667	3	2.33	2.166

SESSIONAL

Course Title: Project	Code: EE-881
Type of Course: Sessional	Course Designation: Compulsory
Semester: 8 th	Contact Hours: NA
Continuous Assessment: NA	Final Exam: 100 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-881.CO1	Understand the underlying technical concepts and theory.	Understand	K2
EE-881.CO2	Practice hands on experience to build the basic models	Apply	K3
EE-881.CO3	Develop mathematical generalize of the solution	Create	K6
EE-881.CO4	Integrate all the parts and deployment of the project	Apply	K3
EE-881.CO5	Prepare a Dissertation and Presentation in the standard format for being evaluated by the Department.	Create	K6
EE-881.CO6	Prepare a paper for Conference presentation/Publication in Journals, if possible.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	2	1	1	-	-	-	-	-	3	1
CO2	2	2	3	3	3	1	-	-	-	-	-	-	3	1
CO3	3	3	3	2	1	-	1	-	-	-	-	-	2	3
CO4	2	2	2	2	2	-	-	-	2	2	2	2	2	3
CO5	2	-	2	-	2	-	-	2	3	3	3	3	2	3
CO6	2	-	2	-	2	-	-	2	3	3	3	3	2	3
AVG	2	2.25	2.16	2.25	2	1	1	2	2.66	2.66	2.66	2.66	2.33	2.33

Course Title: ELECTRICAL SYSTEMS LABORATORY-II	Code: EE-882
Type of Course: Sessional	Course Designation: Elective
Semester: 8 ^a	Contact Hours: NA
Continuous Assessment: NA	Final Exam: 100 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-882.CO1	Designing a heating element with specified wattage	Understand	K2
EE-882.CO2	Learning and Design the control circuit	Determine	K5
EE-882.CO3	Design a controller for speed control of DC machine.	Use of	K3
EE-882.CO4	Modification and Design the control circuit	Analysed	K4
EE-882.CO5	Designing of a substation	Understand	K2
EE-882.CO6	Design a controller for speed control of AC machine	Build	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG	3	3	3	3	2	1	1	1	1	1	2	2	2.33	2.33

Course Title: Grand Viva	Code: EE-883
Type of Course: Sessional	Course Designation: Compulsory
Semester: 8 th	Contact Hours: NA
Continuous Assessment: NA	Final Exam: 100 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
EE-883.CO1	Analyze and apply the entire knowledge of electrical engineering	Understand	K2
EE-883.CO2	Revision all the important topics of electrical engineering	Determine	K5
EE-883.CO3	Develop a whole knowledge in the domain	Use of	K3
EE-883.CO4	Deal with core technical question	Analysed	K4
EE-883.CO5	Scaling the total course outcome	Understand	K2
EE-883.CO6	Evaluated the domain knowledge.	Build	K5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG	3	3	3	3	2	1	1	1	1	1	2	2	2.33	2.33

Grand Viva Voce covering the whole syllabus

**MECHANICAL ENGINEERING
SEMESTER – I
THEORY**

Course Title: Mathematics –IA	Code: BS-M101
Type of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M101.CO1	Learn the basic mathematical tools to deal with problems of engineering sciences.	Learn	Level I
BS-M101.CO2	Understand properties and application of Calculus and Linear Algebra .	Understand	Level II
BS-M101.CO3	Analyze of physical or engineering problems.	Analyze	Level IV
BS-M101.CO4	Acquire problem solving skills related to engineering science.	Acquire	Level II
BS-M101.CO5	Apply Calculus and Linear Algebra in real life problems.	Apply	Level III
BS-M101.CO6	Classify ensembles and differentiate between Calculus and Linear Algebra.	Classify	Level IV

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	-	-	-	-	3	3	2
CO2	3	3	3	3	-	-	-	-	-	-	-	3	2	1
CO3	3	3	3	2	-	-	-	-	-	-	-	3	2	1
CO4	3	1	2	1	-	-	-	-	-	-	1	3	2	2
CO5	2	2	2	2	-	-	-	-	-	-	2	3	1	-
CO6	3	2	2	2	-	-	-	-	-	-	2	3	-	-
AVG	2.83	2.33	2.5	2.33	0	0	0	0	0	0	1.6667	3	2	1.5

Course Title: Physics-I	Code: BS-PH101
Type of Course: Theory	Course Designation: Compulsory
Semester: 1 st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

Course Outcomes	Details	Action Verb	Knowledge Level
BS-PH101.CO1	Apply basic concepts of mechanics	Apply	K3
BS-PH101.CO2	Discuss Physical optics and analyze principles of lasers with applications	Discuss	K6
BS-PH101.CO3	Categorize di electric and magnetic properties of materials leading to Electromagnetic laws	Categorize	K4
BS-PH101.CO4	Differentiate between Classical Physics and Quantum Physics by introducing Planck's law	Differentiate	K5
BS-PH101.CO5	Apply wave particle duality in real life problems followed by simple quantum mechanics calculations	Apply	K3
BS-PH101.CO6	Classify ensembles and differentiate between classical and Quantum statistical mechanics	Classify	K4

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO2	1	3	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO4	1	3	2	-	-	-	-	-	-	-	-	-	-	-
CO5	1	3	2	0	-	-	-	-	-	-	-	-	-	-
CO6	-	1	3	2	-	-	-	-	-	-	-	-	-	-
AVG	1.80	2.33	1.83	1.00	0	0	0	0	0	0	0	0	0	0

Course Title: Basic Electrical Engineering	Code: ES-EE101
Type Of Course: Theory	Course Designation: Compulsory
Semester: 1 st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE101.CO1	Understand and analyze basic electric and magnetic circuits.	Understand	K2
ES-EE101.CO2	Study the working principles of electrical machines and power converters.	Study	K1
ES-EE101.CO3	Introduce the components of low voltage electrical installations.	Introduce	K1
ES-EE101.CO4	Understand the general structure of electrical power system.	Understand	K2
ES-EE101.CO5	Understand the construction and operation of single-phase transformer.	Understand	K2
ES-EE101.CO6	Explain the working principle of power converters.	Explain	K2

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO2	2	3	3	2	2	-	-	-	-	-	-	-	-	-
CO3	2	-	3	1	-	-	-	-	-	-	-	1	-	-
CO4	2	-	2	2	3	-	-	-	-	-	-	2	-	-
CO5	2	2	-	2	3	-	-	-	-	-	-	1	-	-
CO6	2	1	3	3	3	-	-	-	-	-	-	1	-	-
AVG	2.17	2	2.75	2	2.6	0	0	0	0	0	0	1.25	0	0

PRACTICAL

Course Title: Physics-I Laboratory	Code: BS-PH191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1 st	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Title: Basic Electrical Engineering Lab	Code: ES-EE191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1 st	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE191.CO1	Calibrate Ammeter and Wattmeter	Calibrate	K3
ES-EE191.CO2	Demonstrate the measuring instrument and electrical machines	Demonstrate	K3
ES-EE191.CO3	Conduct open circuit and short circuit test of single-phase transformer	Conduct	K2
ES-EE191.CO4	Measure 3 phase power using two wattmeters	Measure	K5
ES-EE191.CO5	Identify the components of LT switchgear	Identify	K1
ES-EE191.CO6	Understand the characteristic of RLC series and parallel circuit	Understand	K2

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	3	-	-	-	2	-	-	-	-	-
CO2	2	3	3	1	2	-	-	-	3	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	2	-	-	-	-	-
CO4	2	-	2	-	3	-	-	-	3	-	-	-	-	-
CO5	1	-	-	-	1	-	-	-	-	-	-	-	-	-
CO6	2	1	2	1	3	-	-	-	2	-	-	-	-	-
AVG	1.83	2	2.5	1	2.4	0	0	0	2.4	0	0	0	0	0

Course Title: Workshop	Code: ES-ME192
Type Of Course: Practical	Course Designation: Compulsory
Semester: 1 st	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME192.CO1	Understanding the application of hand tools and machine tools.	Understand	K2
ES-ME192.CO2	Comprehend the safety measures required to be taken while using the tools.	Comprehend	K2
ES-ME192.CO3	Select the appropriate tools required to manufacture an object of predetermined shape and size considering least wastage and cost.	Select	K2
ES-ME192.CO4	Fabricate components with their own hands	Fabricate	K6
ES-ME192.CO5	Practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes	Analyze	K6
ES-ME192.CO6	Produce small devices of their interest, by assembling different components,	Produce	K6

Mapping of COs with Pos and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	1	-	-	-	-	-	-
CO3	1	-	-	-	-	1	-	1	1	-	-	-	-	-
CO4	1	-	-	-	-	-	2	-	2	1	1	-	-	1
CO5	1	-	-	-	-	-	2	-	2	1	1	1	-	-
CO6	1	-	-	-	-	-	2	-	2	1	2	1	-	1
AVG	1	0	0	0	0	1	2	1	1.75	1	1.33	1	0	1

Course Title: Mathematics –IIA	Code: BS-M201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2 nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M201.CO1	Learn the basic mathematical tools to deal with problems of engineering sciences.	Learn	K1
BS-M201.CO2	Understand properties and application of Linear Algebra, Ordinary Differential Equations (ODE) and numerical analysis.	Understand	K2
BS-M201.CO3	Analyze of physical or engineering problems.	Analyze	K4
BS-M201.CO4	Acquire problem solving skills related to engineering science.	Acquire	K2
BS-M201.CO5	Apply Linear Algebra, Ordinary Differential Equations (ODE) and Numerical analysis in real life problems.	Apply	K3
BS-M201.CO6	Classify ensembles and differentiate among Linear Algebra, Ordinary Differential Equations (ODE) and numerical analysis.	Classify	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	-	-	-	-	-	-	-	3	1	-
CO2	2	2	3	1	-	-	-	-	-	-	-	3	2	-
CO3	3	3	3	1	-	-	-	-	-	-	-	3	1	-
CO4	3	2	3	2	-	-	-	-	-	-	1	3	3	1
CO5	3	2	3	2	-	-	-	-	-	-	2	3	3	-1
CO6	3	2	3	2	-	-	-	-	-	-	2	3	3	2
AVG.	2.83	2.17	3	1.5	0	0	0	0	0	0	1.67	3.00	2.17	1.33

Course Title: Programming for Problem Solving	Code: ES-CS201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2 nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS201.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS201.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS201.CO3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
ES-CS201.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS201.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS201.CO6	Build analytical skill.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG	3	3	3	3	2	1	1	1	1	1	2	2	2.33	2.33

Course Title: English	Code: HM-HU201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2 nd	Contact Hours: 2L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU201.CO1	Understand and apply English Speech Sounds for enhancing English Communication	Understand	K2
HM-HU201.CO2	Apply English Language Presentation Skill in Academic and in Professional Communication	Apply	K3
HM-HU201.CO3	Apply Receptive Skills of English in Academics and in Engineering Profession	Apply	K3
HM-HU201.CO4	Apply Writing Skill of English in Academics and in Profession	Apply	K3
HM-HU201.CO5	Apply Grammar Skill of English in Academic and in Professional Communication	Apply	K3
HM-HU201.CO6	Apply Critical Thinking Skill of English in Academic and in professional Communication	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO2	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO3	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO4	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO5	2	2	2	2	2	2	-	2	-	3	-	2	1	1
CO6	2	2	2	2	2	2	-	2	-	3	-	2	1	1
AVG	2	2	2	2	2	2	0	2	0	3	0	2	1	1

PRACTICAL

Course Title: Chemistry-I Laboratory	Code: BS-CH291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2 nd	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-CH291.CO1	Determine some physical parameter like viscosity of a solution and rate constant of a reaction	Determine	K5
BS-CH291.CO2	Determine the strength of an acid using conductometric method.	Determine	K5
BS-CH291.CO3	Determine the strength of an acid using pH metric method.	Determine	K5
BS-CH291.CO4	Determine partition coefficient of a compound	Determine	K5
BS-CH291.CO5	Estimate the amount of an ion present in a given solution using permanganometric and argentometric methods.	Estimate	K5
BS-CH291.CO6	Evaluate alkalinity (in terms of CaCO ₃ equivalent), hardness (in ppm) and amount of dissolved oxygen (in mg/l) present in a given water sample using volumetric method.	Evaluate	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	3	-	-	-	-	-	-	-	-	-	-
CO2	1	1	2	3	-	-	-	-	-	-	-	-	-	-
CO3	1	1	2	3	-	-	-	-	-	-	-	-	-	-
CO4	1	2	2	3	-	-	-	-	-	-	-	-	-	-
CO5	1	2	2	3	-	-	-	-	-	-	-	-	-	-
CO6	1	2	2	3	-	-	-	-	-	-	-	-	-	-
AVG	1	1.5	2	3	0	0	0	0	0	0	0	0	0	0

Course Title: Programming for Problem Solving	Code: ES-CS291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2 nd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS291.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS291.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS291.CO3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
ES-CS291.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS291.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS291.CO6	Build analytical skill.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO2	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO3	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO4	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO5	2	2	2	2	-	-	-	-	-	-	-	2	2	1
CO6	2	2	2	2	-	-	-	-	-	-	-	2	2	1
AVG	2	2	2	2	0	0	0	0	0	0	0	2	2	1

Course Title:Engineering Graphics & Design	Code: ES-ME291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2 nd	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME291.CO1	Understand the applications of hand tools and machine tools.	Understand	K2
ES-ME291.CO2	Comprehend the safety measures required to be taken while using the tools.	Create	K6
ES-ME291.CO3	Select the appropriate tools required to manufacture an object of predetermined shape and size considering least wastage and cost.	Evaluate	K5
ES-ME291.CO4	Fabricate components with their own hands.	Create	K6
ES-ME291.CO5	Confident on practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.	Understand	K2
ES-ME291.CO6	Produce small devices of their interest by assembling different components.	Create	K6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	1	-	-	-	-	-	-
CO3	1	-	-	-	-	1	-	1	1	-	-	-	-	-
CO4	1	-	-	-	-	-	2	-	2	1	1	-	-	1
CO5	1	-	-	-	-	-	2	-	2	1	1	1	-	-
CO6	1	-	-	-	-	-	2	-	2	1	2	1	-	1
AVG	1	0	0	0	0	1	2	1	1.75	1	1.333	1	0	1.00

Course Title: Language Laboratory	Code: HM-HU291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2 nd	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU291.CO1	Understand and apply English Speech Sounds for enhancing English Communication	Understand	K2
HM-HU291.CO2	Apply English Language Presentation Skill in Academic and in Professional Communication	Apply	K3
HM-HU291.CO3	Apply Receptive Skills of English in Academics and in Engineering Profession	Apply	K3
HM-HU291.CO4	Apply Writing Skill of English in Academics and in Profession	Apply	K3
HM-HU291.CO5	Apply Grammar Skill of English in Academic and in Professional Communication	Apply	K3
HM-HU291.CO6	Apply Critical Thinking Skill of English in Academic and in professional Communication	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO2	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO3	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO4	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO5	2	2	2	2	2	2	-	2	1	3	-	2	1	1
CO6	2	2	2	2	2	2	-	2	1	3	-	2	1	1
AVG	2	2	2	2	2	2	0	2	1	3	0	2	1	1

SEMESTER – III THEORY

Course Title: Basic Electronics Engineering	Code: ES-ECE 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ECE301.CO1	Demonstrate the operating principle and output characteristics of PN junction diodes, Zener diode, rectifiers and different diode circuits, BJT.	Demonstrate	K2
ES-ECE301.CO2	Understand the principles of semiconductor devices and their applications	Understand	K2
ES-ECE301.CO3	Design an application using Operational amplifier.	Apply	K3
ES-ECE301.CO4	Understand the working of timing circuits and oscillators.	Understand	K2
ES-ECE301.CO5	Understand logic gates, flip flop as a building block of digital systems.	Understand	K2
ES-ECE301.CO6	Learn the basics of Electronic communication system	Understand	K2

Mapping of COs with POs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	3	3	1	1	1	1	1	2	1	1
CO2	1	3	3	3	1	1	1	1	1	1	1	1
CO3	1	2	3	3	1	1	1	1	1	1	1	1
CO4	1	3	3	3	1	1	1	1	1	1	1	1
CO5	1	3	3	3	1	1	1	1	1	1	1	1
CO6	1	3	3	3	2	2	1	1	1	1	2	2
Average	1	2.83	3	3	1.2	1.16	1	1	1	1.16	1.16	1.16

Course Title: Biology	Code: BS-BIO 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 2L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator:	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-BIO 301.CO1	Describe with examples the biological observations lead to major discoveries	Describe	K1
BS-BIO 301.CO2	Explain the classification of kingdom and building blocks of life, classification at cellular, energy and excretory level, habitat, study of model organisms, explain techniques of biophysics to study biological phenomena, cancer diagnosis and treatment.	Explain	K2
BS-BIO 301.CO3	Identify DNA as genetic material in the molecular basis of information transfer	Identify	K3
BS-BIO 301.CO4	Analyze biological processes at the reductionistic level.	Analyze	K4
BS-BIO 301.CO5	Apply thermodynamic principles to biological systems.	Apply	K3
BS-BIO 301.CO6	Identify microorganism	Identify	K3

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3							2				1
CO2			2				3					2
CO3		3		1		1						
CO4						2						2
CO5	3				2	2	2					1
CO6	3	1		2	2		2					
AVG	2.8	2	2	1.5	2	1.6	2.3	2				1.5

Course Title: Engineering Mechanics	Code: ES-ME301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME301.CO1	To calculate Forces and Moments acting on the given statically determinant Structure & support reaction by using of concept of Free Body Diagram (FBD).	calculate	K2
ES-ME301.CO2	To explain Friction, limiting friction, static and dynamic friction, wedge friction	explain	K2
ES-ME301.CO3	To analysis of having structure like trusses, beams and frames	analysis	K4
ES-ME301.CO4	To determine centroid, centre of gravity, moment of inertia for both area and mass of the given lamina and solid- standard and composite.	determine	K4
ES-ME301.CO5	To illustrate the stability of an equilibrium and equilibrium of rigid body using the concept of virtual work and energy method.	illustrate	K4
ES-ME301.CO6	To calculate the velocity, acceleration, dynamics forces acting on practical and rigid bodies under rectilinear and curve linear motion.	calculate	K1

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	2	1	-	1	2	1	-	2	3	2
CO2	2	3	2	2	1	1	-	1	2	2	-	2	3	2
CO3	2	2	2	1	2	1	-	1	1	2	-	2	3	2
CO4	3	2	2	2	1	1	-	1	1	2	-	2	3	2
CO5	3	2	2	1	1	1	-	1	1	1	-	2	3	2
CO6	2	3	2	2	2	1	-	1	2	1	-	2	3	2
AVG	2.5	2.5	2	1.5	1.5	1	0	1	1.5	1.5	0	2	3	2

Course Title: Thermodynamics	Code: PC-ME301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME301.CO1	Explain the fundamental thermodynamic properties to solve the problems involving thermodynamic properties viz. Internal energy, enthalpy, entropy, temperature, pressure and specific volume etc	Explain	K1
PC-ME301.CO2	Interpret the phases of the pure substances from their thermodynamics properties.	Interpret	K2
PC-ME301.CO3	Evaluate changes in thermodynamic properties of pure substances.	Evaluate	K5
PC-ME301.CO4	Apply the first and second law of thermodynamics to the thermodynamic process, cycles and devices.	Apply	K3
PC-ME301.CO5	Analyse thermodynamic systems using entropy and exergy.	Analyse	K4
PC-ME301.CO6	Understand the basics of Vapour power cycles and Gas Power cycles.	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1	1	2	1	2	1	-	2	3	2
CO2	3	2	2	2	1	1	2	1	2	1	-	2	3	2
CO3	3	2	2	2	1	1	2	1	2	1	-	2	3	2
CO4	3	2	2	2	1	1	2	1	2	1	-	2	3	2
CO5	3	2	3	2	1	1	2	1	2	1	-	2	3	2
CO6	3	2	2	2	1	1	2	1	2	1	-	2	3	2
AVG	3	2	2	2	1	1	2	1	2	1	-	2	3	2

Course Title: Manufacturing Processes	Code: PC-ME302
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME302.CO1	Describe the fundamental principles and concepts of various manufacturing processes used in industry.	Describe	K1
PC-ME302.CO2	Apply the knowledge of metal casting principles to effectively address shrinkage, casting defects, and residual stresses in manufacturing	Apply	K3
PC-ME302.CO3	Explain the fundamentals of hot and cold working and Estimate loads and forces involved in bulk forming and sheet forming processes.	Explain	K2
PC-ME302.CO4	Apply the principles of orthogonal machining, chip formation and tool geometry in machining operations for improved tool performance and surface finish.	Apply	K3
PC-ME302.CO5	Examine the various force components involved in machining to address tool wear, and tool life	Examine	K2
PC-ME302.CO6	Discuss the physics behind welding, brazing, and soldering processes.	Discuss	K1

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1	1	2	1	1	1	2	1	2	3	2
CO2	3	1	1	1	1	2	1	1	1	2	1	2	3	2
CO3	3	1	1	2	1	1	1	1	1	2	1	2	3	2
CO4	3	1	1	2	1	2	1	1	1	2	1	2	3	2
CO5	3	1	1	1	1	1	1	1	1	2	1	2	3	2
CO6	3	1	1	1	1	1	1	1	1	2	1	2	3	2
AVG	3	1	1	1.333333333	1	1.5	1	1	1	2	1	2	3	2

SEMESTER – III PRACTICAL

Course Title: Practice of Manufacturing Process	Code: PC ME391
Type of Course: Laboratory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC ME391.CO1	Practice pattern & mould making	Practice	P
PC ME391.CO2	Illustrate the fitting operation using hand tools	Illustrate	P
PC ME391.CO3	Perform basic forging processes	Perform	P
PC ME391.CO4	Perform sheet metal works	Perform	P
PC ME391.CO5	Practice GMAW, SMAW & Gas Welding	Practice	P
PC ME391.CO6	Demonstrate machining of typical products involving lathe, milling/shaping/machines	Demonstrate	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2	1	1	1	1	1	1	1	2	3	3	2
CO2	1	2	2	1	1	1	1	1	1	1	2	3	3	2
CO3	1	2	2	1	1	1	1	1	1	1	2	3	3	2
CO4	1	2	2	1	3	1	1	1	2	1	2	3	3	2
CO5	1	2	3	2	1	2	1	1	2	1	3	3	3	2
CO6	1	2	2	1	1	1	1	1	1	1	2	3	3	2
AVG	1.0	2.0	2.2	1.2	1.3	1.2	1.0	1.0	1.3	0.8	2.2	3.0	3.0	2.0

SEMESTER – IV THEORY

Course Title: Materials Engineering	Code: ES-ME401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME401.CO1	Analyze and classify crystal structures and imperfections in solids using unit cells and defect mechanisms.	Analyze	A
ES-ME401.CO2	Evaluate mechanical properties of materials through testing methods and understand their relationships, including stress-strain curves, hardness, and strength.	Evaluate	E
ES-ME401.CO3	Apply static failure theories and fracture mechanics to predict failure modes and analyze fatigue behaviour and non-destructive testing methods.	Apply	P
ES-ME401.CO4	Interpret phase diagrams and microstructures in alloys, including the iron- carbide phase diagram and micro structural aspects of the given steel types.	Interpret	U
ES-ME401.CO5	Apply heat treatment techniques to control microstructure development in steel and understand the effects on properties.	Apply	P
ES-ME401.CO6	Examine the properties and applications of alloyed steels, cast irons, copper alloys, aluminium alloys, nickel-based super alloys, and titanium alloys.	Examine	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1	-	2	1	-	1	-	1	2	3	1
CO2	3	1	1	1	-	2	1	-	1	-	1	2	3	1
CO3	3	1	1	1	-	2	1	-	1	-	1	2	3	1
CO4	3	1	1	1	-	2	1	-	1	-	1	2	3	1
CO5	3	1	1	1	-	2	1	-	1	-	1	2	3	1
CO6	3	1	1	1	-	2	1	-	1	-	1	2	3	1
AVG	3	1	1	1	-	2	1	-	1	-	1	2	3	1

Course Title: Fluid Mechanics and Fluid Machines	Code: PC-ME402
Type of Course: Theory	Course Designation: Compulsory
Semester: 4^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME402.CO1	UNDERSTAND the fluid properties and conservation laws in fluid mechanics	Understand	U
PC-ME402.CO2	APPLY the conservation laws in fluid flow system	Apply	P
PC-ME402.CO3	EVALUATE pressure drop in pipe flow using Hagen-Poiseuli's equation for laminar flow in pipe	Evaluate	E
PC-ME402.CO4	DEMONSTRATE boundary layer concept	Apply	P
PC-ME402.CO5	ANALYSE the dimensional analysis in fluid machines and in fluid flow systems	Analyse	A
PC-ME402.CO6	Analyse the simple flow situation mathematically and EVALUATE the performance of hydraulic machines (Turbine and pump)	Evaluate	E

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	1	1	1	-	2
CO2	2	3	2	1	1	1	1	1	1	1	-	2
CO3	2	3	2	1	1	2	1	1	2	1	-	2
CO4	3	2	1	1	2	2	1	1	2	1	-	2
CO5	3	2	2	1	1	2	1	1	1	1	-	2
CO6	3	2	2	1	1	2	1	1	1	1	-	2
AVG	2.7	2.3	1.8	1	1.2	1.7	1	1	1.3	1	-	2

Course Title: Strength of Materials	Code: PC-ME403
Type of Course: Theory	Course Designation: Compulsory
Semester: 4^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME403.CO1	EXPLAIN the concept of normal and shear stresses and strains and the relation amongst three elastic constants (E, K, G).	Explain	Understand/ U
PC-ME403.CO2	Discuss the bending theory to CALCULATE shear force and bending moment.	Calculate	Apply/ P
PC-ME403.CO3	DETERMINE the slope and deflection of cantilever, simply supported beams under the given loading conditions (UDL, point load, varying loads).	Determine	Apply/ P
PC-ME403.CO4	CALCULATE the critical load by using the buckling theory of columns.	Calculate	Apply/ P
PC-ME403.CO5	SOLVE the parameters (maximum shear stress, diameter, working stress, factor of safety) of the given problem related to torsion of circular shaft, helical springs.	Solve	Apply/ P
PC-ME403.CO6	CALCULATE the hoop and longitudinal stresses in thin/thick walled cylindrical/ spherical pressure vessels.	Calculate	Apply/ P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

Course Title: Metrology & Instrumentation	Code: PC-ME404
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME404.CO1	Understand the working of linear and angular measuring instruments and Determine the error and least count	Determine	P
PC-ME404.CO2	Calculate the limits, fits and tolerances of the Hole and Shaft system	Calculate	P
PC-ME404.CO3	Apply measurement techniques to determine the screw thread and surface roughness parameters	Apply	P
PC-ME404.CO4	Acquire an overview of performance characteristics of sensors and transducers for motion and dimension measurement	Acquire	U
PC-ME404.CO5	Demonstrate the working principle and applications of devices for measurement of force, torque, strain and stress	Demonstrate	P
PC-ME404.CO6	Interpret the use of vibration and temperature measuring instruments	Interpret	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	1	1	1	1	1	2	1	2	3	2
CO2	3	2	1	1	1	1	1	1	1	2	1	2	3	2
CO3	3	3	1	1	1	1	1	1	1	2	1	2	3	2
CO4	3	1	1	1	1	1	1	1	1	2	1	2	2	2
CO5	3	1	1	1	1	1	1	1	1	2	1	2	2	2
CO6	3	1	1	1	1	1	1	1	1	2	1	2	2	2
AVG	3.0	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	2.0	2.5	2.0

SEMESTER – IV PRACTICAL

Course Title: Practice of Manufacturing Processes & system laboratory	Code: PC-ME491
Type of Course: Laboratory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC ME491.CO1	Measure the surface roughness & angles of different jobs	Measure	E
PC ME491.CO2	Develop simple digital logic circuit using 7400 series ICs.	Develop	P
PC ME491.CO3	Design and develop simple pneumatic circuits	Design	P
PC ME491.CO4	Acquire skill set to use precision length measuring instruments (Micro meter, Vernier, Height Gauge)	Acquire	P
PC ME491.CO5	Determine angles using sign bar & profile protector	Determine	P
PC ME491.CO6	Assess errors & correction factors of measuring devices (Micro meter, Vernier, Height Gauge)	Assess	E

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	2	1	-	-	-	-	2	-	-	2	2	3
CO2	-	3	2	2	-	-	-	-	2	-	-	2	2	3
CO3	-	3	2	2	-	-	-	-	2	-	-	2	2	3
CO4	-	3	2	1	-	-	-	-	2	-	-	2	2	3
CO5	-	3	2	1	-	-	-	-	2	-	-	2	2	3
CO6	-	3	2	1	-	-	-	-	2	-	-	2	2	3
AVG	0.0	3.0	2.0	1.3	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	3.0

Course Title: Machine Drawing I	Code: PC-ME492
Type of Course: Laboratory	Course Designation: Compulsory
Semester: 4^a	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC ME492.CO1	UNDERSTAND the product symbol of standard components in mechanical, electrical & electronic engineering symbol, welding symbol and pipe joints	Understand	U
PC ME492.CO2	DRAW orthographic projection, sectional and auxiliary sections of given machine components.	Draw	A
PC ME492.CO3	DRAW assembly and detailed drawing of different mechanical components and tools such as plumber block, flange coupling etc.	Draw	A
PC ME492.CO4	UNDERSTAND the commands and GUI of AutoCAD software	Understand	U
PC ME492.CO5	DRAW orthographic and isometric projections of given mechanical components by using AutoCAD or similar software	Draw	A

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	3	1	1	1	1	1	1	2		2	3	1
CO2	2	2	3	1	1	2	1	1	1	2		2	3	1
CO3	2	2	3	1	1	2	1	1	1	2		2	3	1
CO4	2	2	3	1	3	2	1	1	1	2		2	3	1
CO5	2	2	3	1	3	2	1	1	1	2		2	3	1
AVG	2.0	1.8	3.0	1.0	3.0	1.8	1.0	1.0	1.0	2.0		2.0	3.0	1.0

SEMESTER – IV SESSIONAL

Course Title: Environmental Science	Code: MC-481 (ME)
Type of Course: Sessional	Course Designation: Compulsory
Semester: 4th	Contact Hours: NA
Continuous Assessment:	Final Exam:
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
MC-481 (ME).CO1	Understand the natural environment and its relationships with human activities.	Understand	L2
MC-481 (ME).CO2	Apply the fundamental knowledge of science and engineering to assess environmental and health risk.	Apply	L3
MC-481 (ME).CO3	Develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations.	Create	L6
MC-481 (ME).CO4	Acquire skills for scientific problem-solving related to air, water, noise & land pollution.	Analyse	L4
MC-481 (ME).CO5	Apply the laws and protection act of India for Environmental Management and Environmental Audit.	Analyse	L4
MC-481 (ME).CO6	Analyze the population growth in different perspectives of environmental scenarios.	Analyse	L4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

SEMESTER – V THEORY

Course Title: Heat Transfer	Code: PC-ME501
Type of Course: Theory	Course Designation: Compulsory
Semester: 5^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME501.CO1	CLASSIFY the modes of heat transfer.	Understand	U
PC-ME501.CO2	ANALYSE steady and unsteady conduction phenomena.	Analyse	A
PC-ME501.CO3	SOLVE convections problems of laminar and turbulent flow situations.	Apply	P
PC-ME501.CO4	CALCULATE radiation heat transfer between surfaces, using radiative properties, view factors etc.	Apply	P
PC-ME501.CO5	ILLUSTRATE and design of heat exchangers.	Analyse	A
PC-ME501.CO6	UNDERSTAND similarities between heat and mass transfer.	Understand	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

Course Title: Solid Mechanics	Code: PC-ME502
Type of Course: Theory	Course Designation: Compulsory
Semester: 5^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME502.CO1	Understand the basic tensors, notations of the theory of elasticity including strain/displacement and Hooke's law relationship to solve the practical problems related to the theory of elasticity.	Understand	U
PC-ME502.CO2	Discuss derivation of Cauchy's relations, principal stresses and directions.	Discuss	R
PC-ME502.CO3	Determine plane stress & plane strain of the given axisymmetric problems by using governing equations in cartesian, cylindrical and spherical coordinates.	Determine	P
PC-ME502.CO4	To Solve problem by using concept of solid mechanics in thick cylinders, rotating discs, torsion of noncircular cross-sections & stress concentration including thermo-elasticity & 2D contact stresses.	Solve	P
PC-ME502.CO5	Examine the influence the influence of geometric and loading parameters in plain stress and plain strain problems.	Examine	A
PC-ME502.CO6	To Solve given structural problems by applying the concepts of potentials and energy methods and plasticity.	Solve	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	2	1	1	1	1	1	1	-	-	1	3	2
CO2	1	3	2	1	1	1	1	1	1	-	-	1	3	2
CO3	1	3	2	1	1	1	1	1	1	-	-	1	3	2
CO4	1	3	2	1	1	1	1	1	1	-	-	1	3	2
CO5	1	3	2	1	1	1	1	1	1	-	-	1	3	2
CO6	1	3	2	1	1	1	1	1	1	-	-	1	3	2
AVG	1	3	2	1	1	1	1	1	1	-	-	1	3	2

Course Title: Kinematics and Theory of Machines	Code: PC-ME503
Type of Course: Theory	Course Designation: Compulsory
Semester: 5 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME503.CO1	ANALYZE the motion of simple mechanisms in terms of the displacement, velocity and acceleration at any point on a rigid link. Also, determine the degree of freedom of simple mechanisms and their inversions.	Analyze	A
PC-ME503.CO2	SYNTHESIZE higher pair mechanisms (cam & gear systems) to generate specified output motion.	Synthesize	A
PC-ME503.CO3	Understand the relative motion of friction surfaces in contact and APPLY the knowledge during the design of the machine parts which work on the principle of rolling and sliding friction.	Apply	P
PC-ME503.CO4	Understand basic concepts of vibration and DETERMINE vibration parameters related to problems of SDOF vibratory systems (Free, Forced with or without damping).	Determine	P
PC-ME503.CO5	EXPLORE rotary and reciprocating unbalanced systems.	Explore	P
PC-ME503.CO6	Understand the working principle of governors, flywheel & gyroscope and DETERMINE their operational parameters.	Determine	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	1	2	1	1	1	1	2	2	-	2	3	2
CO2	1	3	1	2	1	2	1	1	2	2	-	2	3	2
CO3	3	3	1	2	1	1	1	1	1	1	-	1	3	1
CO4	3	3	2	2	2	2	1	1	1	1	-	2	3	1
CO5	1	3	3	2	1	2	2	1	1	1	-	2	3	1
CO6	1	2	1	3	1	2	1	1	1	1	-	2	3	1
AVG	1.67	2.83	1.50	2.16	1.16	1.67	1.16	1.00	1.33	1.33	-	1.83	3.00	1.33

Course Title: Effective Technical Communication	Code: HM-HU501
Type of Course: Theory	Course Designation: Elective
Semester: 5 ^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU501.CO1	Understand the dynamics of Verbal and non-verbal aspects of technical communication	Understand	L2
HM-HU501.CO2	Practice multi-step writing process to plan, draft, and revise reports, correspondence, and presentations.	Remember	L1
HM-HU501.CO3	Illustrate and examine the knowledge of ethical aspects of engineering	Apply	L3
HM-HU501.CO4	Demonstrate and explain social and professional etiquettes	Analyse	L4
HM-HU501.CO5	Plan self-development and practice self-assessment to function on multi-disciplinary teams.	Evaluate	L5
HM-HU501.CO6	Organize and write business correspondence properly and correctly, using appropriate formats, grammar, vocabulary, and syntax, and demonstrate effective writing and editing skills.	Create	L6

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	1	1	1	1	1	1	3	1	3
CO2	3	2	2	1	1	1	1	1	3	3	2	3
CO3	1	2	2	1	1	1	1	3	3	3	1	2
CO4	3	3	3	3	1	2	1	2	3	3	3	3
CO5	2	3	3	2	2	2	2	2	3	3	3	3
CO6	3	3	3	2	1	1	1	1	2	3	2	3
AVG	2.5	2.3	2.3	1.7	1.2	1.3	1.2	1.7	2.5	3	2	2.8

Course Title:Essence of Indian Knowledge Tradition	Code: MC-ME501
Type of Course: Theory	Course Designation:Compulsory
Semester: 5^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
MC-ME501.CO1	To facilitate students with the concepts of Indian traditional knowledge	Understand	K1
MC-ME501.CO2	To make them understand the importance of the root of knowledge system	Understand	K1
MC-ME501.CO3	Understand the concept of Traditional knowledge and its importance	Understand	K1
MC-ME501.CO4	Know the need and importance of protecting traditional knowledge	Understand	K1
MC-ME501.CO5	Know the various enactments related to the protection of traditional knowledge	Understand	K1
MC-ME501.CO6	Understand the concepts of Intellectual property to protect the traditional knowledge	Understand	K1

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	2	1	1	1	1	2	2	-	2
CO2	1	3	1	2	1	2	1	1	2	2	-	2
CO3	3	3	1	2	1	1	1	1	1	1	-	1
CO4	3	3	2	2	2	2	1	1	1	1	-	2
CO5	1	3	3	2	1	2	2	1	1	1	-	2
CO6	1	2	1	3	1	2	1	1	1	1	-	2
AVG	1.67	2.83	1.50	2.16	1.16	1.67	1.16	1.00	1.33	1.33	-	1.83

SEMESTER – V PRACTICAL

Course Title: Mechanical Engineering Laboratory (Thermal) I	Code: PC-ME591
Type of Course: Laboratory	Course Designation: Compulsory
Semester: 5 ^a	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME591.CO1	DEMONSTRATE the operation of fluid flow measuring devices.	Apply	P
PC-ME591.CO2	CONDUCT experiments on water turbines and pumps.	Apply	P
PC-ME591.CO3	DETERMINE the calorific value of fuels and their flash and fire points.	Apply	P
PC-ME591.CO4	DETERMINE the performance parameters of four- stroke Diesel engines.	Apply	P
PC-ME591.CO5	EXAMINE the thermal conductivity, emissivity and the convective heat transfer coefficient of solid and fluid materials.	Apply	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

Course Title: Machine Drawing-II	Code: PC-ME592
Type of Course: Laboratory	Course Designation: Compulsory
Semester: 5^a	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME592.CO1	To acquire an ability to apply knowledge of Modeling, science & engineering	Apply	P
PC-ME592.CO2	To model this drawing even in CAD/CAM software by applying the basic knowledge of machine drawing	Apply	P
PC-ME592.CO3	To demonstrate an ability to design and conduct experiments, analyze and interpret data and assembly and disassembly drawings knowledge will be provided.	Apply	P
PC-ME592.CO4	To understand and apply the knowledge of machine drawing as a system of Communication in which ideas are expressed clearly and all information fully conveyed	Apply	P
PC-ME592.CO5	To understand the design a system, component or process to meet desired needs within, realistic constraints such as manufacturability, economic, environmental, safety & sustainability etc., to represent a part drawing and assembly drawings	Apply	P
PC-ME592.CO6	To identify, formulates, analyzes and solve Engineering Problems in Optimum time	Apply	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

SEMESTER – V SESSIONAL

Course Title: Project-I (Summer internship)	Code: PW-ME581
Type of Course: Sessional	Course Designation: Compulsory
Semester: 5 th	Contact Hours: NA
Continuous Assessment:	Final Exam:
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PW-ME581.CO1	Develop the skills, knowledge and points of view needed by engineering professionals	Develop	P
PW-ME581.CO2	Develop critical thinking and problem-solving skills by analyzing underlying issue/s to challenges	Develop	P
PW-ME581.CO3	Communicate with different professionals in the work environment through written and oral means	Communicate	U
PW-ME581.CO4	Exhibit professional ethics by displaying positive disposition during internship	Exhibit	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	1	2	1	2	2	3	1
CO2	2	2	1	2	1	1	2	1	2	2	3	1
CO3	1	1	1	1	1	1	1	1	2	3	3	2
CO4	1	1	1	1	1	1	1	2	2	2	3	2
AVG	1.5	1.5	1.25	1.5	1.25	1	1.5	1.25	2	2.25	3	1.5

SEMESTER – VI THEORY

Course Title: Manufacturing Technology	Code: PC-ME601
Type of Course: Theory	Course Designation: Compulsory
Semester: 6*	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME601.CO1	Illustrate principles of tooling design and selection for conventional and non-conventional machining processes.	Illustrate	U
PC-ME601.CO2	Use the principle of measurement for tool wear, part quality, and inspection in manufacturing processes.	Use	P
PC-ME601.CO3	Describe assembly practices, process planning, and material handling in manufacturing and assembly operations.	Describe	U
PC-ME601.CO4	Discuss the understanding of NC/CNC machine tools and systems, including their components, functions, and automation capabilities.	Discuss	U
PC-ME601.CO5	Write the part programming for CNC lathe and milling machines	Write	P
PC-ME601.CO6	Demonstrate rapid prototyping methods and their applications in manufacturing	Demonstrate	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	1	2	1	1	1	2	1	2	3	2
CO2	3	1	1	1	1	1	1	1	1	2	1	2	3	2
CO3	3	1	1	1	1	1	1	1	1	2	1	2	3	2
CO4	3	1	1	1	1	1	1	1	1	2	1	2	3	2
CO5	2	2	1	1	3	1	1	1	1	2	1	2	3	2
CO6	3	1	1	1	1	1	1	1	1	2	1	2	3	2
AVG	2.83	1.33	1.00	1.00	1.33	1.17	1.00	1.00	1.00	2.00	1.00	2.00	3.00	2.00

Course Title: Design of Machine Elements	Code: PC-ME602
Type of Course: Theory	Course Designation: Compulsory
Semester: 6 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME602.CO1	Understand the failure criteria, concept of mechanics of materials, empirical design formula & safety considerations, codes & standards for design.	Understand	U
PC-ME602.CO2	Analyze permanent and temporary joints viz. riveted joints, welded joints and bolted joints based on design aspect.	Analyze	A
PC-ME602.CO3	Analyze design of shafts, belts, gears, chains and pulleys.	Analyze	A
PC-ME602.CO4	Solve design problems on spring, cotter joint, knuckle joint based on optimum criteria.	Solve	P
PC-ME602.CO5	Determine optimum design of Coupling, brakes and screw jack based on friction principle.	Determine	P
PC-ME602.CO6	Apply knowledge of design principles and calculations to design springs, clutches and bearings.	Apply	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO	PSO2
CO1	2	1	2	2	1	3	1	1	1	1	-	2	3	1
CO2	2	2	2	2	1	3	2	1	1	1	-	2	3	1
CO3	2	2	2	2	1	3	2	1	1	1	-	2	3	1
CO4	2	2	2	2	1	3	2	1	1	1	-	2	3	1
CO5	2	2	2	2	1	3	2	1	1	1	-	2	3	1
CO6	2	2	2	2	1	3	2	1	1	1	-	2	3	1
AVG	2	1.8	2	2	1	3	1.8	1	1	1	-	2	3	1

Course Title: Internal Combustion Engines & Gas Turbines	Code: PE-ME601A
Type of Course: Theory	Course Designation: Elective
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PE-ME601A.CO1	UNDERSTAND the basic concepts, components and operations of IC Engines.	Understand	U
PE-ME601A.CO2	ILLUSTRATE the process of carburation and ignition of SI Engines and injections of CI Engines.	Illustrate	P
PE-ME601A.CO3	DESCRIBE the conventional and alternative fuels and combustion phenomena in SI and CI engines.	Describe	U
PE-ME601A.CO4	EVALUATE the performance parameters of IC engines.	Evaluate	E
PE-ME601A.CO5	CLASSIFY the essential components of gas turbines along with its performance improving methods (intercooling, reheating and regenerating).	Classify	A
PE-ME601A.CO6	ILLUSTRATE the working principles of various types jet propulsive rockets.	Illustrate	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

Course Title: Refrigeration & Air Conditioning	Code: PE-ME602B
Type of Course: Theory	Course Designation: Compulsory
Semester: 6 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME501.CO1	To know about the basics of refrigeration and air-conditioning system	Understand	K1
PC-ME501.CO2	To learn about different types of Refrigeration, Air-Conditioning and ventilation systems	Understand	K1
PC-ME501.CO3	To know about designing a Refrigeration and Air-Conditioning system	Understand	K1
PC-ME501.CO4	To know about the equipment of Refrigeration, Air-Conditioning and Ventilation	Understand	K1
PC-ME501.CO5	To learn about different components of these systems	Understand	K1
PC-ME501.CO6	To know definitions and principles related to Psychometry	Understand	K1

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	1	2	1	1	1	1	2	2	-	2
CO2	1	3	1	2	1	3	1	1	2	2	-	2
CO3	3	3	1	2	1	1	1	1	1	1	-	1
CO4	3	3	2	2	2	2	1	1	1	1	-	2
CO5	1	3	3	2	1	2	2	1	1	1	-	2
CO6	1	3	3	2	1	2	2	1	1	1	-	2
AVG	1.67	3	1.83	2	1.16	1.83	1.33	1	1.33	1.33	-	1.83

Course Title: Operations Research	Code: HM-HU601
Type of Course: Theory	Course Designation: Elective
Semester: 6*	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU601.CO1	To study the various Operations Research tools	Understand	K2
HM-HU601.CO2	To study to apply an appropriate model to the given situation	Apply	K3
HM-HU601.CO3	Apply forecasting methods for predicting demands	Apply	K3
HM-HU601.CO4	Make decisions under certainty, uncertainty and conflicting situations	Analyze	K4
HM-HU601.CO5	Apply linear programming tools for optimal utilization of resources in various types of industries	Apply	K3
HM-HU601.CO6	Solve transportation problems to minimize cost and understand the principles of assignment	Solving	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO	PSO2
CO1	1	1	1	3	1	1	1	1	2	1		1	3	2
CO2	1	1	1	3	1	2	1	1	2	1		1	3	2
CO3	1	1	1	3	1	2	1	1	2	1		1	3	2
CO4	1	1	1	3	1	2	1	1	2	1		1	3	2
CO5	1	1	1	3	1	2	1	1	2	1		1	3	2
CO6	1	1	1	3	1	2	1	1	2	1		1	3	2
AVG	1	1	1	3	1	1.8	1	1	2	1		1	3	2

Course Title: Constitution of India	Code: MC-ME601
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
MC-ME601.CO1	Understand Basic Structure of the Constitution of India	Understand	K2
MC-ME601.CO2	Apply the understanding in Engineering Profession	Apply	K3
MC-ME601.CO3	Apply Constitutional Values in Engineering Education	Apply	K3
MC-ME601.CO4	Apply Constitutional Provisions in Policy matters of CSE	Apply	K3
MC-ME601.CO5	Apply Team Spirit and Constitutional Legislative Provisions for Industrial Design	Apply	K3
MC-ME601.CO6	Analyze Constitutional Values of Legislation, Executive & Judiciary in the light of the Professional requirements of Computer Science Engineering	Analyze	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO	PSO2
CO1	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO2	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO3	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO4	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO5	-	-	-	-	-	2	-	2	3	1	-	2	1	1
CO6	-	-	-	-	-	2	-	2	3	1	-	2	1	1
AVG	0	0	0	0	0	2	0	2	3	1	0	2	1	1

SEMESTER – VI PRACTICAL

Course Title: Mechanical Engineering Laboratory II (Design)	Code: PC-ME691
Type of Course: Laboratory	Course Designation: Compulsory
Semester: 6 th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME691.CO1	DEMONSTRATE kinematic characteristics of mechanisms (Cam-Follower, 4 BAR linkages)	Demonstrate	U
PC-ME691.CO2	ANALYZE rotating balancing problem and vibration characteristics of different undamped and damped system (free, forced)	Analyze	A
PC-ME691.CO3	CONDUCT the experiment of hardness and toughness of given materials and apply them practically	Conduct	A
PC-ME691.CO4	DETERMINE elastic parameters of given materials in tension/compression and in shear test	Determine	A
PC-ME691.CO5	PREPARE standard metallographic heat-treated samples for the given engineering materials to examine microstructure.	Prepare	A
PC-ME691.CO6	MEASURE strain of the given materials by using strain gauge rosettes.	Measure	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	3	1	1		1	2	1		2	3	2
CO2	1	2	1	3	1	1		1	2	1		2	3	2
CO3	2	2	1	3	1	1		1	2	1		2	3	2
CO4	2	2	1	3	1	1		1	2	1		2	3	2
CO5	1	2	3	3	1	1		1	2	1		2	3	2
CO6	1	2	2	3	1	1		1	2	1		2	3	2
AVG	1.67	2	1.5	3	1.0	1.0		1.0	2.0	1.0		2.0	3.0	2.0

SEMESTER – VI SESSIONAL

Course Title: Project-II (Summer internship)	Code: PW-ME681
Type of Course: Sessional	Course Designation: Compulsory
Semester: 6 th	Contact Hours: NA
Continuous Assessment:	Final Exam:
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PW-ME681.CO1	Develop the skills, knowledge and points of view needed by engineering professionals	Develop	P
PW-ME681.CO2	Develop critical thinking and problem-solving skills by analyzing underlying issue/s to challenges	Develop	P
PW-ME681.CO3	Communicate with different professionals in the work environment through written and oral means	Communicate	U
PW-ME681.CO4	Exhibit professional ethics by displaying positive disposition during internship	Exhibit	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

SEMESTER – VII THEORY

Course Title: Advanced Manufacturing Technology	Code: PC-ME701
Type of Course: Theory	Course Designation: Compulsory
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME701.CO1	Identify different nontraditional machining processes and their applications.	Identify	U
PC-ME701.CO2	Describe the basic working principles and mechanism of metal removal in ultrasonic machining and Abrasive jet machining and assess its effectiveness in various applications	Describe	A
PC-ME701.CO3	Apply the knowledge of process parameters, tool selection, and working medium to achieve desired MRR and accuracy in ECM & EDM	Apply	P
PC-ME701.CO4	Illustrate the characteristics and applications of laser beam machining, electron beam machining, ion beam machining, and plasma arc machining.	Illustrate	U
PC-ME701.CO5	Discuss the working principles, process variables, and performance of advanced finishing processes such as abrasive flow machining (AFM), magnetic abrasive finishing (MAF), and chemo-mechanical polishing.	Discuss	U
PC-ME701.CO6	Describe the principles of micromachining, including chip formation and size effect, and identify the challenges associated with micro-machining and its applications	Describe	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1	1	2	1	1	1	2	1	2	3	2
CO2	3	1	1	1	1	2	1	1	1	2	1	2	3	2
CO3	3	1	1	2	1	1	1	1	1	2	1	2	3	2
CO4	3	1	1	2	1	2	1	1	1	2	1	2	3	2
CO5	3	1	1	1	1	1	1	1	1	2	1	2	3	2
CO6	3	1	1	1	1	1	1	1	1	2	1	2	3	2
AVG	3.0	1.0	1.0	1.3	1.0	1.5	1.0	1.0	1.0	2.0	1.0	2.0	3.0	2.0

Course Title: Advanced Welding Technology	Code: PE-ME701H
Type of Course: Theory	Course Designation: Elective
Semester: 7 ^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PE-ME701H.CO1	Understand the principles and characteristics of various welding processes and their parametric influences.	Understand	U
PE-ME701H.CO2	Discuss appropriate welding techniques and joint design for different types of materials and welding processes.	Discuss	R
PE-ME701H.CO3	Apply the knowledge of power sources, polarity, and electrode characteristics for the selection of suitable arc welding technique.	Apply	P
PE-ME701H.CO4	Explain critical and precision welding processes, such as USW, PAW, LBW, and EBW, in terms of their advantages and limitations.	Explain	U
PE-ME701H.CO5	Assess the weldability of different materials, including plain carbon steel, stainless steel, cast iron, and aluminium alloys, based on their metallurgical properties and behaviour during welding.	Assess	P
PE-ME701H.CO6	Identify common welding defects, understand their causes and remedies, and Select appropriate inspection and testing methods for welded joints.	Identify	A

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	2	1	1	1	1	1	1	1	2	2	2
CO2	2	2	3	2	1	2	2	1	1	1	1	2	2	2
CO3	2	2	2	3	2	2	1	1	2	1	1	2	2	3
CO4	2	2	3	3	1	2	1	1	1	1	1	2	2	1
CO5	2	2	3	3	1	2	1	1	1	1	1	2	2	3
CO6	2	2	3	2	1	2	1	1	1	1	1	2	2	3
AVG	2.0	2.0	2.8	2.5	1.2	1.8	1.2	1.0	1.2	1.0	1.0	2.0	2.0	2.3

Course Title: Automobile Engineering	Code: PE-ME701A
Type of Course: Theory	Course Designation: Compulsory
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PE-ME701A.CO1	Understand the basic lay-out of an automobile and engines for two-wheelers, three wheelers, four wheelers, & other passenger and commercial vehicles.	Describe	U
PE-ME701A.CO2	Explain the operation of engine cooling, lubrication, ignition, electrical, electronics and air conditioning systems.	Explain	U
PE-ME701A.CO3	Illustrate the principles of transmission, suspension, steering and braking systems and construction of wheels and tyres.	Illustrate	A
PE-ME701A.CO4	Determine the tractive effort and power requirements & learn the use of torque-speed curve.	Determine	P
PE-ME701A.CO5	Learn automobile restraint system.	Illustrate	P
PE-ME701A.CO6	Know the latest developments in automobiles.	Tell	R

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	1	2	2	2	1	2	1	1	2
CO2	2	3	2	1	2	2	2	2	2	1	1	2
CO3	2	3	2	1	2	1	1	1	2	1	1	2
CO4	2	3	2	1	2	1	1	1	2	1	1	2
CO5	2	3	2	1	2	2	1	2	2	1	1	2
CO6	2	3	2	1	2	2	1	2	2	1	1	2
AVG	2	3	2	1	2	1.66	1.33	1.5	2	1	1	2

Course Title: Economics for Engineers	Code: HM-HU701
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU701.CO1	EXPLAIN principles of decision making in fixed and variable cost, life cycle cost, estimating models, improvement and learning curve.	Explain	U
HM-HU701.CO2	ANALYZE economic conditions viz. inflation, deflation, economic criterion and present worth.	Analyze	A
HM-HU701.CO3	ANALYZE cash flow, rate of return, cost ratio, and break-even analysis.	Analyze	A
HM-HU701.CO4	UNDERSTAND depreciation, types of property, tax regulation and capital allowance.	Understand	A
HM-HU701.CO5	DESCRIBE inflation, price change, types of index and use of price index.	Describe	U
HM-HU701.CO6	UNDERSTAND accounting, balance sheet, income statement, cost accounting, direct and Indirect cost.	Understand	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2	2		2	2	1	1	1	3	2	1	3
CO2	1	2	2	2		2	2	1	1	1	3	2	1	3
CO3	1	2	2	2		2	2	1	1	1	3	2	1	3
CO4	1	2	2	2		2	2	1	1	1	3	2	1	3
CO5	1	2	2	2		2	2	1	1	1	3	2	1	3
CO6	1	2	2	2		2	2	1	1	1	3	2	1	3
AVG	1.0	2.0	2.0	2.0		2.0	2.0	1.0	1.0	1.0	3.0	2.0	1.0	3.0

Type of Course: Theory	Course Designation: Elective
Semester: 7 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
OE-ME701A.CO1	Understand the concepts of Industrial Engineering	Understand	K2
OE-ME701A.CO2	Explain production systems and their characteristics	Explain	K2
OE-ME701A.CO3	Understand the role of productivity in streamlining a production system	Understand	K2
OE-ME701A.CO4	Describe different aspects of work system design and facilities design pertinent to manufacturing industries	Describe	K2
OE-ME701A.CO5	Apply forecasting and scheduling techniques to production systems	Apply	K3
OE-ME701A.CO6	Apply the inventory management tools in managing inventory	Apply	K3

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	3	1	1	1	1	1	-	1	1	3
CO2	2	2	2	2	3	1	1	1	1	1	-	1	1	3
CO3	2	2	2	2	3	1	1	1	1	1	-	1	1	3
CO4	2	2	2	2	3	1	1	1	1	1	-	1	1	3
CO5	2	1	2	2	3	1	1	1	1	1	-	1	1	3
CO6	2	1	2	2	3	1	1	1	1	1	-	1	1	3
AVG	2	1.6	2	2	3	1	1	1	1	1	-	1	1	3

SEMESTER – VII PRACTICAL

Course Title: Mechanical Engineering Laboratory III (Manufacturing)	Code: PC-ME791
Type of Course: Laboratory	Course Designation: Compulsory
Semester: 7 th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PC-ME791.CO1	Perform Part Programming on CNC Lathe for Multi Stepped Shaft & Single Stepped Shaft with Round End.	Perform	P
PC-ME791.CO2	Apply Part Programming on CNC Milling for Single Slot, Curve Slot and Square Loop.	Apply	P
PC-ME791.CO3	Demonstrate various axes movement of vertically articulated robot arm.	Demonstrate	U
PC-ME791.CO4	Determine cutting forces in turning by using Dynamometer	Determine	P
PC-ME791.CO5	Conduct experiment in MMA welding and Examine dye penetration test for determination of welding joint defect.	Conduct	P
PC-ME791.CO6	Determine fineness number, AFS clay content and permeability number of moulding sand.	Determine	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	3	1	2	1	1	1	1	2	3	2
CO2	2	2	2	2	3	1	2	1	1	1	1	2	3	2
CO3	2	2	2	2	3	1	2	1	1	1	1	2	3	1
CO4	2	2	3	2	1	1	1	1	1	1	1	2	2	1
CO5	2	2	3	2	1	1	2	1	1	1	1	2	2	1
CO6	2	2	3	2	1	1	1	1	1	1	1	2	2	1
AVG	2.0	2.0	2.5	2.0	2.0	1.0	1.7	1.0	1.0	1.0	1.0	2.0	2.5	1.3

SEMESTER – VII SESSIONAL

Course Title: Project III	Code: PW-ME781
Type of Course: Sessional	Course Designation: Compulsory
Semester: 7 th	Contact Hours: NA
Continuous Assessment:	Final Exam:
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
MC-481 (ME).CO1	Selecting topic of the project & Generating its objectives	Create	C
MC-481 (ME).CO2	Practice finding relevant course material on the Internet and non-electronic sources	Create	C
MC-481 (ME).CO3	Preparing work plan and Preliminary report	Create	C
MC-481 (ME).CO4	Preparing presentation and explaining it to the audience	Create	C
MC-481 (ME).CO5	Selecting topic of the project & Generating its objectives	Create	C

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	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	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3	3
AVG	3	3	3	3	3	3	3	3	3	3	3	3

SEMESTER – VIII THEORY

Course Title: Power Plant Engineering	Code: PE-ME801B
Type of Course: Theory	Course Designation: Elective
Semester: 8^a	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PE-ME801B.CO1	Analyze the vapour power cycles and their modifications.	Analyze	A
PE-ME801B.CO2	Understand boilers & calculate its performance parameters.	Understand	U
PE-ME801B.CO3	Analyze the combustion phenomenon of fuels.	Analyze	A
PE-ME801B.CO4	Determine the performance parameters of steam nozzles and steam turbines.	Determine	P
PE-ME801B.CO5	Illustrate and Design the condensers and cooling towers.	Design	C
PE-ME801B.CO6	Determine power plant economic parameters and know about the Diesel and gas plants, pollution and its control.	Determine	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	1	1	1	1	1	2	1	1	2	2	3
CO2	2	3	2	1	2	2	2	2	2	1	2	2	2	3
CO3	2	3	2	1	1	1	1	1	2	1	1	2	2	3
CO4	2	3	2	1	2	1	1	1	2	1	2	2	2	3
CO5	2	3	3	1	2	2	2	2	2	1	2	2	2	3
CO6	2	3	2	1	1	2	2	2	2	1	2	2	2	3
AVG	2	3	2.167	1	1.5	1.5	1.5	1.5	2	1	1.67	2	2	3

Course Title: Maintenance Engineering	Code: PE-ME802I
Type of Course: Theory	Course Designation: Elective
Semester: 8 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PE-ME802I.CO1	UNDERSTAND maintenance systems through condition monitoring; Maintainability, failure pattern, availability of equipment / systems and design for maintainability.	Understand	U
PE-ME802I.CO2	ANALYZE the Total Productive Maintenance (TPM).	Analyze	A
PE-ME802I.CO3	UNDERSTAND the Organizational structures for maintenance.	Understand	U
PE-ME802I.CO4	ANALYZE the Economic Aspect of Maintenance.	Analyze	
PE-ME802I.CO5	UNDERSTAND the Function and use of Maintenance Equipment.	Understand	U
PE-ME802I.CO6	UNDERSTAND the lubrication, Repair & Maintenance Procedures	Understand	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	1	3	1	2	1	1	1	1	2	2	2	3
CO2	1	-	1	3	1	2	1	1	1	1	2	2	2	3
CO3	1	-	1	3	1	2	1	1	1	1	2	2	2	3
CO4	1	-	1	2	1	2	1	1	1	1	2	2	2	2
CO5	1	-	1	3	1	2	1	1	1	1	2	2	2	3
CO6	1	-	1	3	1	2	1	1	1	1	2	2	2	3
AVG	1.0	-	1.0	3.0	1.0	2.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	3.0

Course Title: Industrial Pollution and Control	Code: OE-ME802D
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
OE-ME802D.CO1	Describe types of pollution caused by the industries and their effects on the environment	Describe	U
OE-ME802D.CO2	Explain the physical effects, sampling method of air pollution	Explain	U
OE-ME802D.CO3	Discuss the processes and control techniques of air pollution	Discuss	U
OE-ME802D.CO4	Demonstrate the causes, processes and control techniques of water pollution	Demonstrate	P
OE-ME802D.CO5	Learn the physics of sound generation, transmission and physical characteristics of noise	Learn	U
OE-ME802D.CO6	Illustrate measuring instruments, assessment processes and techniques to control the noise pollution	Illustrate	P

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	2	-	-	3	1	1	1	-	1	3	2
CO2	1	1	2	2	-	-	3	1	1	1	-	1	3	2
CO3	1	1	2	2	-	-	3	1	1	1	-	1	3	2
CO4	1	1	2	2	-	-	3	1	1	1	-	1	3	2
CO5	1	1	2	2	-	-	3	1	1	1	-	1	3	2
CO6	1	1	2	2	-	-	3	1	1	1	-	1	3	2
AVG	1	1	2	2	0	0	3	1	1	1	0	1	3	2

Course Title: Total Quality Management	Code: OE-ME801A
Type of Course: Theory	Course Designation: Open Elective
Semester: 8 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
OE-ME801A.CO1	To express knowledge about various aspects of quality and total quality management	Understand	K2
OE-ME801A.CO2	To understand different tools of TQM and related standards	Understand	K2
OE-ME801A.CO3	To understand quality management philosophies, techniques, and frameworks	Understand	K2
OE-ME801A.CO4	To apply tools and techniques of TQM in manufacturing and service sectors	Apply	K3
OE-ME801A.CO5	To know various quality management tools and their applications	Understand	K2
OE-ME801A.CO6	To Understand the implications of quality management standards and systems	Understand	K2

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	2	3	2	1	1	1	1		1	3	2
CO2	1	1	1	2	3	2	1	1	1	1		1	3	2
CO3	1	1	1	2	3	2	1	1	1	1		1	3	2
CO4	1	2	2	3	3	2	1	1	1	1		1	3	2
CO5	1	2	2	3	3	2	1	1	1	1		1	3	2
CO6	1	2	2	3	3	2	1	1	1	1		1	3	2
AVG	3	2	2	2.5	3	2	1	1	1	1		1	3	2

SEMESTER – VIII

SESSIONAL

Course Title: Project IV	Code: PW-ME881
Type of Course: Sessional	Course Designation: Compulsory
Semester: 8 ^a	Contact Hours: NA
Continuous Assessment:	Final Exam:
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PW-ME881.CO1	DEMONSTRATING qualitative solutions to research/industry problems involving contemporary issues.	Create	C
PW-ME881.CO2	FORMULATING hypothesis/design/methodology	Create	C
PW-ME881.CO3	ACQUIRING the knowledge of the techniques, skills, and modern engineering tools necessary for Mechanical Engineering practice	Create	C
PW-ME881.CO4	PRESENTING features of the developed project to the targeted group through written and oral communication.	Create	C
PW-ME881.CO5	CONTRIBUTING in a team in development of technical seminar.	Create	C

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	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	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3	3
AVG	3	3	3	3	3	3	3	3	3	3	3	3

Course Title: Comprehensive Viva-Voce	Code: PW-ME882
Type of Course: Sessional	Course Designation: Compulsory
Semester: 8 ^a	Contact Hours: NA
Continuous Assessment:	Final Exam:
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PW-ME882.CO1	Demonstrate systematic understanding of knowledge related to 4 years study of B. Tech. in ME	Demonstrate	U
PW-ME882.CO2	Apply critical thinking skills to analyze and evaluate complex engineering problems.	Apply	P
PW-ME882.CO3	Demonstrate effective communication skills in presenting technical concepts and ideas to both technical and non-technical audiences.	Demonstrate	U
PW-ME882.CO4	Demonstrate confidence and versatility in answering the varieties of questions posed by a group of interviewers in a moderately short duration.	Demonstrate	U

Mapping of COs with POs and PSOs (Course Articulation Matrix):

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

DEPARTMENT OF ECE

**SEMESTER – III
THEORY**

Course Title: Electronic Devices	Code: EC301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours:
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Energy bands & Current Carriers in Semiconductors: Bonding Forces in Solids, Energy Bands theory in crystals (Qualitative Analysis), Metals, Semiconductors, & Insulators, Fermi-Level, Intrinsic and Extrinsic Semiconductors, Concept of Holes, Carrier Concentration.	Explain	K2
CO2	drift of carriers, continuity equation, Injected minority carrier charge, Recombination and generation of charge carriers. Generation and recombination of carriers	Define	K1
CO3	. P-N junction: Physical Description of p-n junction, Basic device technologies for fabrication of a p-n junction, I-V characteristics, and small signal switching models; Avalanche breakdown, Zener diode, Schottky diode	Demonstrate	K2
CO4	. Bipolar Junction Transistor: Basic Construction, I-V characteristics, Ebers-Moll Model	Explain	K2
CO5	. Opto-Electronics: Optical absorption in semiconductors, photovoltaic effects, solar cells (p-n junction), Photoconductors, Photodiode, PIN photodiode, Avalanche photodiode, Phototransistor, LED, Semiconductor Laser (p-n junction)	Build	K6
CO6	Integrated circuit: fabrication process: oxidation, diffusion, ion implantation, photolithography, etching, chemical vapor deposition, sputtering, twin-tub CMOS process.	Explain	K2

Course Title: Digital System Design	Code: EC302
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Design and analyze combinational logic circuits	Construct	K3
.CO2	Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder	Understand	K2
.CO3	. Design & analyze synchronous sequential logic circuits	Categorize	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	1	1	1	1	2	2	3	3
CO2	3	3	3	3	-	1	1	1	1	1	2	2	3	3
CO3	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO4	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO5	3	3	3	3	-	-	-	-	1	1	-	2	2	2
CO6	3	3	3	3	-	-	-	-	1	1	-	2	2	2
AVG.	3	3	3	3	2	1	1	1	1	1	2	2.00	2.33	2.33

Course Title: Signals and System	Code: EC303
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Analyze different types of signals	Illustrate	K2
.CO2	Represent continuous and discrete systems in time and frequency domain using different transforms	Demonstrate	K2
.CO3	Investigate whether the system is stable	Define	K1
CO4	Sampling and reconstruction of a signal	Distinguish	K4

Course Title: Network Theory	Code: EC304
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 2L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand basics electrical circuits with nodal and mesh analysis	Apply	K3
CO2	Appreciate electrical network theorems	Learn	K2
CO3	. Apply Laplace Transform for steady state and transient analysis.	Apply	K3
CO4	Determine different network functions.	Apply	K3
CO5	Appreciate the frequency domain techniques.	Solve	K3

Course Title: Data Structure & Algorithms	Code: ES-CS301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness..	Understand	K2
CO2	2. For a given Search problem (Linear Search and Binary Search) student will able to implement it	Apply	K3
CO3	. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.	Solve	K3
CO4	Evaluate the effect of inflation, deflation and price change with indexes in Engineering Economic Analysis	Evaluate	K5
CO5	Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.	Analyze	K4
CO6	. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.	Understand	K2

Course Title: Probability and Statistics	Code: BS-M301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	.. The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.	Understand	K2
CO2	The basic ideas of statistics including measures of central tendency, correlation and regression.	Apply	K3
CO3	. The statistical methods of studying data samples.	Solve	K3
CO4	Evaluate the effect of inflation, deflation and price change with indexes in Engineering Economic Analysis	Evaluate	K5
CO5	Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.	Analyze	K4
CO6	. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.	Understand	K2

**SEMESTER – III
PRACTICAL**

Course Title: Electronics Devices Lab	Code: EC391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	credits 1

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	identifying and study of different components like resistor, capacitors, diodes, LED, Transistors, FET(JFET & MOSFET) etc 2. Study of different instruments used in the laboratories like, power supply, Oscilloscope, Multi.	Understand	K2
.CO2	CHARACTERISTICS OF PN JUNCTION DIODE a) To Plot the Volt Ampere Characteristics of PN Junction Diode under Forward and Reverse Bias Conditions. b) To find the Cut-in voltage, Static Resistance, Dynamic Resistance for Forward Bias & Reverse Bias	Understand	K2
CO3	CHARACTERISTICS OF ZENER DIODE & LOAD REGULATION a) To Obtain the Forward Bias and Reverse Bias characteristics of a Zener diode. b) Find out the Zener Break down Voltage from the Characteristics. c) To Obtain the Load Regulation Characteristics. 5. COMMON BASE BIPOLAR TRANSISTOR CHARACTERISTICS a) To plot the Input and Output characteristics of a transistor connected in Common Base Configuration and to find the h – parameters from the characteristics.	Apply	K3
CO4	Ability to understand properties of photoelectric devices	Analyze	K4
.CO5	Ability to measure and record the experimental data, analyze the results, and prepare a formal laboratory report	Identify	K3

Course Title: Digital System Design Lab	Code: EC392
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	credits 1

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Introduction to Digital Electronics Lab- Nomenclature of Digital Ics, Specifications, Study of the Data Sheet, Concept of Vcc and Ground, Verification of the Truth Tables of Logic Gates using TTL ICs. Implementation of the Given Boolean Function using Logic Gates in Both Sop and Pos Forms. Verification of State Tables of Rs, J-k, T and D Flip-Flops using NAND & NOR Gates	Construct	K3
.CO2	Implementation and Verification of Decoder/De-Multiplexer and Encoder using Logic Gates. Implementation of 4x1 Multiplexer using Logic Gates	Understand	K2
.CO3	Design, and Verify the 4-Bit Asynchronous Counter	Categorize	K4
.CO4	Simulation of MOS Inverter with different loads using PSPICE software Simulation of CMOS Inverter for different parameters Kn, Kp as a design variable in suitable	Learn	K3
.CO5	Design of a 4-bit Multiplexer using VHDL\Verilog.	Compare	K5
.CO6	Design of a 3-input NAND gate and its simulation using suitable logic simulator	Understand	K2

Course Title: Data Structure & Algorithm Lab.	Code: ES-CS391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	credits 1

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Stacks and Queues: adding, deleting elements Circular Queue: Adding & deleting elements Merging Problem : Evaluation of expressions operations on Multiple stacks & queues	Understand	K2
.CO2	. Implementation of linked lists: inserting, deleting, and inverting a linked list. Implementation of stacks & queues using linked lists	Design	K6
.CO3	. Polynomial addition, Polynomial multiplication Sparse Matrices : Multiplication, addition.	Analyze	K4
.CO4	Recursive and Nonrecursive traversal of Trees Threaded binary tree traversal. AVL tree implementation	Implement	K3
CO5	Application of Trees. Application of sorting and searching algorithms Hash tables implementation: searching, inserting and deleting, searching & sorting techniques.	Design	K6
.CO6	Threaded binary tree traversal. AVL tree implementation	Implement	K3

Course Title: Environmental Science	Code: MC381
Type of Course: Practical	Course Designation: Sessional
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 0 Marks	Final Exam: 100 Marks
Writer: Course Coordinator	credits 0

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste	Interpret	K2
CO2	ii) Poster making event iv) Cycle rally v) Lectures from experts.	Make use of	K3
.CO3	Plantation ii) Gifting a tree to see its full growth iii) Cleanliness drive	Define	K1
CO4	Drive for segregation of waste v) To live some big environmentalist for a week or so to understand his work	Discover	K4
.CO5	. To work in kitchen garden for mess vii) To know about the different varieties of plants	Explain	K5
CO6	Shutting down the fans and ACs of the campus for an hour or so	Discuss	K6

**SEMESTER – IV
THEORY**

Course Title: Analog Communication	Code: EC401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	. The learner must be able to appreciate the need for modulation and calculate the antenna size for different carrier frequencies. From the functional representation of the modulated carrier wave, the learner must be able to identify the type of modulation, calculate the side-band frequencies, identify the modulating and carrier frequencies, decide the type of generation method to be adopted. Solve problems.	Define	K1
CO2	. After understanding the basic concepts the learner must be able to compare between the different demodulation methods, design an envelope detector, calculate the IF and image frequencies for the superheterodyne receivers given the carrier and modulating frequencies, calculate the oscillator frequency.	Demonstrate	K2
CO3	: From the functional representation of the modulated carrier wave, the learner must be able to identify the type of modulation, calculate the side-band frequencies, identify the modulating and carrier frequencies, decide the type of generation method to be adopted. Solve problems	Solve	K3
.CO4	Appreciate the importance of Multiplexing, find out their application areas. The learner must be able to calculate the Noise temperature & SNR for different systems,	Explain	K2
CO5	compare between the performance of the different modulation methods by comparing their SNR. Also Understand the statistical analysis of Communication System	Classify	K4

Course Title: Analog circuits	Code: EC402
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Understand the characteristics of diodes and transistors	Understand	K2
.CO2	Design and analyze various rectifier and amplifier circuits	Discuss	K6
CO3	Design sinusoidal and non-sinusoidal oscillators	Illustrate	K2
CO4	Develop The Instruction level parallelism	Develop	K3
.CO5	Understand the functioning of OP-AMP and design OP-AMP based circuits	Analyze	K4

Course Title: Microprocessor & Microcontroller	Code: EC403
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Do assembly language programming	Write	K6
CO2	Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc	Design	K6
.CO3	Develop systems using different microcontrollers	Determine	K5
.CO4	Understand RSIC processors and design ARM microcontroller based systems.	Design	K6

Course Title: Design and Analysis of Algorithms	Code: ES-CS401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Analyse the complexities of different algorithms.	Analyze	K4
CO2	Develop the algorithm techniques (example Divide & Conquer, Dynamic Programming etc) to solve different mathematical models.	Develop	K3
.CO3	Illustrate the techniques of Greedy paradigm, Branch and Bound, Backtracking etc and compare and contrast them.	Illustrate	K2
.CO4	Discuss the types of Minimal spanning tree and traversal algorithm with their applications.	Discuss	K6
CO5	Understand the variations among tractable and intractable problems to introduce polynomial and non-polynomial reduction.	Understand	K2
.CO6	Explain the randomized algorithms and approximation algorithms to illustrate their applications.	Explain	K5

Mapping of COs with POs and PSOs (Course Articulation Matrix):

Course Title: Biology	Code: BS-B401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 2L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Describe with examples the biological observations lead to major discoveries	Describe	K1
CO2	Explain the classification of kingdom and building blocks of life, classification at cellular, energy and excretory level, habitat, study of model organisms, explain techniques of biophysics to study biological phenomena, cancer diagnosis and treatment.	Explain	K2
CO3	Identify DNA as genetic material in the molecular basis of information transfer	Identify	K3
CO4	Analyze biological processes at the reductionistic level.	Analyze	K4
.CO5	Apply thermodynamic principles to biological systems.	Apply	K3
CO6	Identify microorganism	Identify	K3

Course Title: Numerical Methods (BS)	Code: BS-M401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 1L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	. Approximation in numerical computation: Truncation and rounding errors, Fixed and floating-point arithmetic, Propagation of errors.	Resolve	K3
.CO2	Interpolation: Newton forward/backward interpolation, Lagrange's and Newton's divided difference Interpolation. Numerical integration: Trapezoidal rule, Simpson's 1/3 rule, Expression for corresponding error terms	Solve	K3
CO3	Numerical solution of a system of linear equations: Gauss elimination method, Matrix inversion, LU Factorization method, Gauss-Seidel iterative method	Conceive	K2
CO4	Numerical solution of Algebraic equation: Bisection method, Regula-Falsi method, Newton-Raphson method	Acquire	K1
CO5	Numerical solution of ordinary differential equation: Euler's method, Runge-Kutta methods, PredictorCorrector methods and Finite Difference	Determine	K5

SEMESTER – IV PRACTICAL

Course Title: Analog Communication Lab	Code: EC491
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Measurement of modulation index of an AM signal. 2. Measurement of output power with varying modulation index an AM signal(for both DSB- &.	Discuss	K6
CO2	Measurement of distortion of the demodulated output with varying modulation index of an AM signal (for both DSB-SC & SSB). 4. Measurement of power of different frequency components of a frequency modulated signal & the measurement of the bandwidth	Understand	K2
CO3	Design and set up a PLL using VCO & to measure the lock frequency & Design and set up a FM demodulator using PLL	Analyze	K4
CO4	Measurement of SNR of a RF amplifier & Measurement of selectivity, sensitivity, fidelity of a superheterodyne receiver	Illustrate	K2
.CO5	One innovative experiment.	Explain	K5

Course Title: Analog Electronic Circuits Lab	Code: EC492
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Design and test rectifiers, clipping circuits, clamping circuits and voltage regulator	Analyze	K4
CO2	Compute the parameters from the characteristics of JFET and MOSFET devices	Understand	K2
CO3	Design, test and evaluate BJT amplifiers in CE configuration	Examine	K4
CO4	Design and test JFET/MOSFET amplifiers	Discuss	K6
CO5	Design and test a power amplifier	Develop	K3
CO6	: Design and test various types of oscillators	Explain	K2

Course Title: Numerical Methods Lab (BS)	Code: BS-M491
Type Of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 40Marks	Final Exam: 60Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Assignments on numerical integration using Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule. 3. Assignments on numerical solution of a system of linear equations using Gauss elimination and Gauss-Seidel iterations.	Identify	K1
CO2	Assignments on numerical solution of Algebraic Equation by Regular-falsi and Newton Raphson methods. 5. Assignments on ordinary differential equation: Euler's and Runga-Kutta methods	Distinguish	K4
CO3	Introduction to Software Packages: Matlab / Scilab / Labview / Mathematica.	Choose	K3

Course Title: Microprocessor & Microcontroller Lab	Code: EC493
Type Of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 40Marks	Final Exam: 60Marks
Writer: Course Coordinator	credits 1

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Familiarization with 8085 & 8051 simulator on PC. 2. Study of prewritten programs using basic instruction set (data transfer, Load/Store, Arithmetic, Logical) on the KIT & Assignments based on above	Identify	K1
CO2	Program using subroutine calls and IN/OUT instructions using 8255 PPI on the trainer kit e.g. subroutine for delay, reading switch state and glowing LEDs accordingly & Study of timing diagram of an instruction on oscilloscope.	Distinguish	K4
CO3	Interfacing of 8255: Keyboard and Multi-digit Display with multiplexing using 8255 & Study of 8051 Micro controller kit and writing programs as mentioned in S/L3. Write programs	Choose	K3
CO4	Serial communication between two trainer kits	Judge	K5

Course Title: Soft Skill Development Lab	Code: HS – HU 481
Type Of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 40Marks	Final Exam: 60Marks
Writer: Course Coordinator	credits 1

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Students will be able to communicate in English confidently	Identify	K1
CO2	Students will be able to communicate appropriately in professional and social situations..	Distinguish	K4
CO3	Students will be able to improve team working ,leadership skills and problem solving skills through group activities like GD, case studies, Role play etc.	Choose	K3
CO4	Students will be able to organize and write properly and correctly business correspondence 5. Students will be able to do active listening	Judge	K5

SEMISTER-V

Course Title: Electromagnetic Waves	Code: EC501
Type of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L / week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand characteristics and wave propagation on high frequency transmission lines	Understand	K2
CO2	Carryout impedance transformation on TL	Identify	K3
CO3	Use sections of transmission line sections for realizing circuit elements	Design	K6
CO4	Characterize uniform plane wave	Identify	K3
CO5	Calculate reflection and transmission of waves at media interface	Develop	K3
CO6	Analyze wave propagation on metallic waveguides in modal form & Understand principle of radiation and radiation characteristics of an antenna	Develop	K6

Course Title: Computer Architecture	Code: EC502
Type Of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Demonstrate the concepts of Operating System Services, System calls, structure and types.	Demonstrate	K2
CO2	Discuss processes and threads for multiprogramming and multi-threading.	Discuss	K6
CO3	Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response	Develop	K3
CO4	Explain algorithmic solutions to process synchronization problems for Inter-Process communication	Explain	K5
CO5	Analyse the necessary conditions for Deadlock avoidance and prevention to solve them.	Analyze	K6
CO6	Explain Memory management, Virtual Memory, I/O Hardware, File and Disk Management system.	Explain	K2

Course Title: Digital Communication and Stochastic	Code: EC503
Type of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	understand the concept of Stochastic Process in Communication System	Describe	K1
CO2	represent various signals in different mathematical forms	Explain	K2
CO3	analyze baseband transmission mode of digital data	Analyze	K4
CO4	analyze different carrier modulation techniques considering noise aspects	Discuss	K2

Course Title: Digital Signal Processing	Code: EC504
Type of Course: Theory	Course Designation: Compulsory
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Recall the concepts of Accounting and Recognize different systems used in industrial applications.	Recall	K1
CO2	Discuss on the design of appropriate accounting tool required for real life problems.	Discuss	K1
CO3	Apply and demonstrate the use of Economical concepts.	Apply	K3
CO4	Analyze and Simulate a sequential accounting tool for a system or process appropriate for required accuracy.	Analyze	K4
CO5	Design a sequential economic policy that can work according to the required specifications.	Design	K6
CO6	Justify a specific accounting technique for an specific purpose.	Justify	K5

Course Title: Power Electronics	Code: PE-EC505C
Type of Course: Theory	Course Designation: Elective
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Build and test circuits using power devices such as SCR	Understand & Design	K2
CO2	Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters	Understand & Analyze	K3
CO3	Learn how to analyze these inverters and some basic applications	Understand & Analyze	K2
CO4	Design SMPS..	Design	K3

Course Title: Soft Skill and Interpersonal Communication	Code: OE-EC506A
Type of Course: SESSIONAL	Course Designation: Elective
Semester: 5th	Contact Hours: 3L/week
Continuous Assessment: 0 Marks	Final Exam: 100 Marks
Writer: Course Coordinator	credits 0

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand Basic Structure of the Constitution of India	Understand	K2
CO2	Apply the understanding in Engineering Profession	Apply	K3
CO3	Apply Constitutional Values in Engineering Education	Apply	K3
CO4	Apply Constitutional Provisions in Policy matters of CSE	Apply	K3
CO5	Apply Team Spirit and Constitutional Legislative Provisions for Industrial Design	Apply	K3
CO6	Analyze Constitutional Values of Legislation, Executive & Judiciary in the light of the Professional requirements of Computer Science Engineering	Analyze	K4

SEMESTER – V

PRACTICAL

Course Title: Electromagnetic Waves lab	Code: EC591
Type of Course: Practical	Course Designation: Compulsory
Semester: 5th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	credits 1

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand characteristics and wave propagation on high frequency transmission lines	Understand	K2
CO2	Carryout impedance transformation on TL	Identify	K3
CO3	Use sections of transmission line sections for realizing circuit elements	Design	K6
CO4	Characterize uniform plane wave	Identify	K3
CO5	Calculate reflection and transmission of waves at media interface	Develop	K3
CO6	Analyze wave propagation on metallic waveguides in modal form & Understand principle of radiation and radiation characteristics of an antenna	Develop	K6

Course Title: Digital Communication Laboratory	Code: EC592
Type of Course: Practical	Course Designation: Compulsory
Semester: 5th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	understand the concept of Stochastic Process in Communication System	Understand	K2
CO2	represent various signals in different mathematical forms	Demonstrate	K3
CO3	analyze baseband transmission mode of digital data	Develop	K6
CO4	analyze different carrier modulation techniques considering noise aspects	Determine	K5

Course Title: Digital Signal Processing Laboratory	Code: EC593
Type of Course: Practical	Course Designation: Compulsory
Semester: 5th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Define an object oriented programming language, and associated class libraries and learn how to develop object oriented programs.	Define	K1
CO2	Understand the concepts of class, constructor, data encapsulation, inheritance, overriding and polymorphism to describe large scale software.	Understand	K2
CO3	Develop and debug programs using object oriented principles with wrapper class, arrays.	Develop	K3
CO4	Apply the concept of interfaces- multiple inheritance, extending interfaces.	Apply	K3
CO5	Analyze and use an integrated environment development by creating and accessing packages and multithreaded programming	Analyze	K4
CO6	Develop programs with Graphical User Interfaces capabilities and solve related problems.	Develop	K6

SEMESTER – VI THEORY

Course Title: Control System and Instrumentation	Code: EC601
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Characterize a system and find its steady state behavior	Understand	K1
CO2	Investigate stability of a system using different tests	Identify	K3
CO3	Design various controllers	Describe	K5
CO4	Solve linear, non linear and optimal control problems	Evaluate	K2
CO5	Study with CRO, Wave analyzer, Spectrum analyzer knowing their functional details.	Analyze & Understand	K4

Course Title: Computer Networks	Code: EC602
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Describe the fundamental concepts of computer networking, Data Communications System and learn its components.	Describe	K1
CO2	Explain the concept of function(s) of each layer of the OSI model and learn about TCP/IP.	Explain	K2
CO3	Identify the different types of network topologies, protocols, networking devices and make concepts about their functions within a network.	Identify	K3
CO4	Simplify building the skills of subnetting and routing mechanisms.	Simplify	K4
CO5	Justify the different system component parts of the network	Justify	K5
CO6	Develop an expertise in some specific areas of networking such as the design and learn about maintenance of individual networks	Develop	K6

Course Title: Economics for Engineers	Code: HS-HU 601
Type of Course: Theory	Course Designation: Elective
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand the basic principles of microeconomics and macroeconomics, including supply and demand, market structures, and economic policy.	Define	K1
CO2	Apply economic analysis to engineering decision-making, including cost-benefit analysis, project evaluation, and resource allocation.	Design	K6
CO3	Analyze the impact of economic factors on engineering projects and industries, including pricing, competition, and technological change.	Evaluate	K5
CO4	Evaluate the economic implications of engineering innovations, including the potential for job creation, economic growth, and sustainability.	Identify	K3
CO5	Understand the role of government and public policy in shaping the economy and its impact on engineering practices.	Illustrate	K2
CO6	Develop critical thinking skills to identify and analyze economic issues relevant to engineering, and effectively communicate economic concepts and analysis to both technical and non-technical audiences..	Examine	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

**SEMESTER – VI
PRACTICAL**

Course Title: Computer Networks Lab	Code: EC692
Type of Course: Practical	Course Designation: Compulsory
Semester: 6th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	credits 1

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Describe the Networking cables (CAT5, UTP), Connectors (RJ45, T-connector) and installation of Network Interface Card .	Describe	K1
CO2	Explain the working and difference of various networking devices like Hub, Bridge, Network Switch, Router and Modem.	Explain	K2
CO3	Developed a client server socket programming using TCP and UDP approach in C and Java.	Develop	K3
CO4	Generate techniques Data link Layer Flow control mechanisms like Stop &Wait and Sliding Window using C.	Generate	K4
CO5	Explain how to implement Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check) and error control mechanism like Selective Repeat and GoBack-N algorithm using C.	Explain	K5
CO6	Create the server setup configuration using different process like FTP, DNS, TelNet,NFS and concept of Firewall.	Create	K6

Course Title: Control and Instrumentation Laboratory	Code: EC691
Type of Course: Theory	Course Designation: Elective
Semester: 6th	Contact Hours:
Continuous Assessment: 40	Final Exam: 60 Marks
Writer: Course Coordinator	credits 1

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Students will be able to explain the concepts of feedback control, open-loop control, and closed-loop control.	Explain	K1
CO2	Students will be able to determine the stability, transient response, and steady-state response of control systems.	Analyze	K2
CO3	Students will be able to design and implement controllers using different control techniques such as PID control, cascade control, and feed forward control.	Design and implement	K3
CO4	Students will be able to select appropriate sensors and actuators for a given control system application.	Utilize	K4
CO5	Students will be able to identify and model the dynamics of a given control system.	Perform	K5
CO6	Students will be able to analyze and evaluate the performance of control systems in terms of criteria such as stability, accuracy, and robustness.	Evaluate	K6

Course Title: Mini Project / Electronic Design Workshop	Code: EC681
Type of Course: SESSIONAL	Course Designation: Elective
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment:	Final Exam: 70 Marks
Writer: Course Coordinator	credits 2

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis	Describe	K1
CO2	Design, implement and test the prototype/algorithm in order to solve the conceived problem	Explain	K2
CO3	Write comprehensive report on mini project work.	Analyze	K4

Mapping of COs with POs and PSOs (Course Articulation Matrix):

Course Title: CMOS VLSI Design	Code: PE-EC603C
Type of Course: Theory	Course Designation: Elective
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand the basic elements of numerical methods and error analysis.	Understand	K2
CO2	Understand the theoretical aspects of the use of numerical methods.	Understand	K2
CO3	Apply the concepts of numerical methods to design algorithms for automated processing.	Apply	K3
CO4	Evaluate the limitations, advantages, and disadvantages of different numerical methods.	Evaluate	K5
CO5	Evaluate and Apply appropriate numerical method approach for a given problem.	Evaluate	K5
CO6	Implement numerical methods for solving various engineering problems.	Implement	K3

Course Title: Operating System	Code: OE-EC604B
Type of Course: Theory	Course Designation: Compulsory
Semester: 6th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand the difference between different types of modern operating systems, virtual machines and their structure of implementation and applications.	Define	K1
CO2	Understand the difference between process & thread, issues of scheduling of user-level processes / threads and their issues & use of locks, semaphores, monitors for synchronizing multiprogramming with multithreaded systems and implement them in multithreaded programs	Explain	K2
CO3	Understand the concepts of deadlock in operating systems and how they can be managed / avoided and implement them in multiprogramming system	Identify	K3
CO4	Understand the design and management concepts along with issues and challenges of main memory, virtual memory and file system	Examine	K4
CO5	Understand the types of I/O management, disk scheduling, protection and security problems faced by operating systems and how to minimize these problems.	Explain	K2

Course Title: Universal Human Values	Code: MC681
Type of Course: SESSIONAL	Course Designation: Sessional
Semester: 6th	Contact Hours: 2P/week
Continuous Assessment: 00 Marks	Final Exam: 100 Marks
Writer: Course Coordinator	Credits 0

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand the concept of universal human values	Explain	K
CO2	Analyze the importance of universal human values in society	Analyze	K3
CO3	Apply universal human values in personal and professional life	Apply	K4
CO4	Evaluate ethical dilemmas using universal human values as a framework	Evaluate	K5
CO5	Critically reflect on personal values and their alignment with universal human values	Reflect	K6
CO6	Demonstrate empathy and respect for diverse perspectives and cultures	Demonstrate	K4

SEMESTER – VII

THEORY

Course Title: Principles of Management	Code: HS-HU701
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Credit- 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	. Basic concepts of management: Definition - Essence, Functions, Roles, Level. 2. Functions of Management: Planning - Concept, Nature, Types, Analysis, Management by objectives; Organisation Structure - Concept, Structure, Principles	Explain	K2
CO2	. Management and Society - Concept, External Environment, CSR, Corporate Governance, Ethical Standards.	Analyze	K4
CO3	. People Management - Overview, Job design, Recruitment & Selection, Training & Development, Stress Management. 5. Managerial Competencies - Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurshi	Analyze	K4
CO4	Leadership: Concept, Nature, Styles. 7. Decision making: Concept, Nature, Process, Tools & techniques.	Explain	K2
CO5	Customer Management - Market Planning & Research, Marketing Mix, Advertising & Brand Management. 10. Operations & Technology Management - Production & Operations Management, Logistics & Supply Chain Management, TQM, Kaizen & Six Sigma, MIS	Evaluate	K5

Course Title: Microwave Theory and Technique	Code: PE-EC701A
Type of Course: Theory	Course Designation: Elective
Semester: 7 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand various microwave system components their properties.	Describe	K1
CO2	Appreciate that during analysis/ synthesis of microwave systems, the different mathematical treatment is required compared to general circuit analysis. Logic.	Explain	K2

Course Title: Embedded System	Code: PE-EC703A
Type of Course: Theory	Course Designation: Elective
Semester: 7 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	System, Brief introduction to Embedded software in system, Design Process in Embedded	Discuss	K6
.CO2	Serial and Parallel communication Ports, Timer and Counting devices, Watchdog timers, real time clock, Serial bus Communication Protocols- I2C, CAN, and Parallel Communication Protocol	Understand	K2
.CO3	Processor Architectures-ARM, Processor and Memory organization, Parallelism in instruction level, Processor and memory selection	Illustrate	K2
.CO4	language-C, Processor directives, functions and macros and other programming elements, Embedded C++ concept	Analyze	K4
.CO5	Basic Design rule using RTOS, Task scheduling using Priority based scheduling, cyclic scheduling and round robin scheduling.	Develop	K3
.CO6	Asynchronous serial port, SPI mode, I2C mode, Interfacing with LCD, ADC, sensors, stepper motor, key board,	Explain	K5

Course Title: Web Technology	Code: OE-EC704A
Type of Course: Theory	Course Designation: Elective
Semester: 7th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	design good web pages using different tags, tables, forms, frames and style sheets supported by HTML.	Describe	K1
CO2	. implement, compile, test and run Java programs, comprising more than one class, to address a particular software problem	Identify	K3
CO3	. demonstrate the ability to employ various types of selection statements and iteration statements in a Java program.	Evaluate	K5
.CO4	. be able to leverage the object-oriented features of Java language using abstract class and interface	Understand	K2
.CO5	be able to handle errors in the program using exception handling techniques of Java	Analyze	K4
CO6	design applets as per the requirements with event handling facility.	Explain	K2

Course Title: Digital Image and Video Processing	Code: PE-EC702B
Type of Course: Theory	Course Designation: Compulsory
Semester: 7 th	Contact Hours: 12P/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Mathematically represent the various types of images and analyze them.	Identify	K3
CO2	Process these images for the enhancement of certain properties or for optimized use of the resource	Understand	K2
CO3	Develop algorithms for image compression and coding	Understand	K2

Course Title: Project Stage I	Code: EC782
Type of Course: SESSIONAL	Course Designation: Compulsory
Semester: 7 th	Contact Hours:
Continuous Assessment: 0	Final Exam: 100
Writer: Course Coordinator	credits 4

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	. Survey and study of published literature on the assigned topic;	Examine	K3
CO2	Working out a preliminary Approach to the Problem relating to the assigned topic	Describe	K1
CO3	Conducting preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility;	Compare	K4
CO4	Final Seminar, as oral Presentation before a departmental committee	Evaluate	K5
CO5	Describe Special institutions for entrepreneurial development and assistance in India	Describe	K1
CO6	Explain project Identification	Explain	K6

SEMESTER – VIII THEORY

Course Title: Antennas and Propagation	Code: PE-EC801A
Type of Course: Theory	Course Designation: Elective
Semester: 8 th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	Understand the properties and various types of antennas.	Describe	K1
CO2	Analyze the properties of different types of antennas and their design.	Evaluate	K5
CO3	Operate antenna design software tools and come up with the design of the antenna of required specifications. key	Illustrate	K2

Course Title: Internet of Things	Code: OE-EC803A
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	Understand the vision of IoT from a global context.	Understand	K2
CO2	Determine the Market perspective of IoT.	Determine	K5
.CO3	Use of Devices, Gateways and Data Management in IoT.	Use of	K3
CO4	Analysed the use of IoT in Industrial and Commercial Building Automation and Real World Design Constraints.	Analysed	K4
.CO5	Understand the architecture of smart sensor.	Understand	K2
CO6	Build the interfacing among IoT components.	Build	K5

Course Title: Mixed Signal Design	Code: PE-EC802A
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
.CO1	. Understand the practical situations where mixed signal analysis is required	Understand	K2
.CO2	Analyze and handle the inter-conversions between signals	Analyze	K4
.CO3	Design systems involving mixed signals.	Design	K6

Course Title Organizational Behavior	Code: OE-EC804C
Type of Course: Theory	Course Designation: Elective
Semester: 8th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	credits 3

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	know about organisational structure, organizational behavior and personality development.	Analyze	K4
CO2	. learn about motivational techniques and skill required to work in a group and the process of group decision making.	Develop	K3
CO3	. know various leadership styles and the role of leader in achievement of organisational objectives	Illustrate	K2

Course Title Project Stage II	Code: EC881
Type of Course: Theory	Course Designation: Elective
Semester: 8 th	Contact Hours:
Continuous Assessment: 0	Final Exam: 100
Writer: Course Coordinator	credits 7.5

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
CO1	. In depth study of the topic assigned in the light of the Report prepared under EC P1; 2. Review and finalization of the Approach to the Problem relating to the assigned top	Describe	K1
CO2	. Preparing an Action Plan models and E-strategies for conducting the investigation, including team work; 4. Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed	Explain	K2
CO3	Preparing a paper for Conference presentation/Publication in Journals, if possible;	Understand	K2
CO4	. Final Seminar Presentation before a Departmental Committee.	Analyze	K4