

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

SEMESTER III

| SL NO | COURSE CODE | COURSE NAME | CO No. | CO DESCRIPTION |
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| 1 | MAT 201 | PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS | 1 | Understand the concept and the solution of partial differential equation. |
| | | | 2 | Analyse and solve one dimensional wave equation and heat equation. |
| | | | 3 | Understand complex functions, its continuity differentiability with the use of Cauchy-Riemann equations. |
| | | | 4 | Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function. |
| | | | 5 | Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals. |
| 2 | EET201 | CIRCUITS AND NETWORKS | 1 | Apply circuit theorems to simplify and solve complex DC and AC electric networks. |
| | | | 2 | Analyse dynamic DC and AC circuits and develop the complete response to excitations. |
| | | | 3 | Solve dynamic circuits by applying transformation to s domain |
| | | | 4 | Analyse three-phase networks in Y and Δ configurations. |
| | | | 5 | Solve series /parallel resonant circuits. |
| | | | 6 | Develop the representation of two-port networks using network parameters and analyse. |
| 3 | EET203 | MEASUREMENTS AND INSTRUMENTATION | 1 | Identify and analyse the factors affecting performance of measuring system |
| | | | 2 | Choose appropriate instruments for the measurement of voltage, current in ac and dc measurements. |
| | | | 3 | Explain the operating principle of power and energy measurement |
| | | | 4 | Outline the principles of operation of Magnetic measurement systems |
| | | | 5 | Describe the operating principle of DC and AC bridges, transducers based systems |
| | | | 6 | Understand the operating principles of basic building blocks of digital systems, recording and display units |

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| 4 | EET205 | ANALOG ELECTRONICS | 1 | Design biasing scheme for transistor circuits. |
| | | | 2 | Model BJT and FET amplifier circuits. |
| | | | 3 | Identify a power amplifier with appropriate specifications for electronic circuit applications |
| | | | 4 | Describe the operation of oscillator circuits using BJT. |
| | | | 5 | Explain the basic concepts of Operational amplifier (OPAMP) |
| | | | 6 | Design and develop various OPAMP application circuits. |
| 5 | HUT 200 | PROFESSIONAL ETHICS | 1 | Understand the core values that shape the ethical behaviour of a professional. |
| | | | 2 | Adopt a good character and follow an ethical life. |
| | | | 3 | Explain the role and responsibility in technological development by keeping personal ethics and legal ethics. |
| | | | 4 | Solve moral and ethical problems through exploration and assessment by established experiments. |
| | | | 5 | Apply the knowledge of human values and social values to contemporary ethical values and global issues. |
| 6 | MCN201 | SUSTAINABLE ENGINEERING | 1 | Understand the relevance and the concept of sustainability and the global initiatives in this direction |
| | | | 2 | Explain the different types of environmental pollution problems and their sustainable solutions |
| | | | 3 | Discuss the environmental regulations and standards |
| | | | 4 | Outline the concepts related to conventional and non conventional energy |
| | | | 5 | Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles |

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| 7 | EEL201 | CIRCUITS AND MEASUREMENTS LAB | 1 | Analyse voltage current relations of RLC circuits |
| | | | 2 | Verify DC network theorems by setting up various electric circuits |
| | | | 3 | Measure power in a single and three phase circuits by various methods |
| | | | 4 | Calibrate various meters used in electrical systems |
| | | | 5 | Determine magnetic characteristics of different electrical devices |
| | | | 6 | Analyse the characteristics of various types of transducer systems |
| | | | 7 | Determine electrical parameters using various bridges |
| | | | 8 | Analyse the performance of various electronic devices for an instrumentation systems and, to develop the team management and documentation capabilities. |
| 8 | EEL203 | ANALOG ELECTRONICS LAB | 1 | Use the various electronic instruments and for conducting experiments. |
| | | | 2 | Design and develop various electronic circuits using diodes and Zener diodes. |
| | | | 3 | Design and implement amplifier and oscillator circuits using BJT and JFET. |
| | | | 4 | Design and implement basic circuits using IC (OPAMP and 555 timers). |
| | | | 5 | Simulate electronic circuits using any circuit simulation software. |
| | | | 6 | Use PCB layout software for circuit design |

SEMESTER IV

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| 1 | MAT 204 | PROBABILITY, RANDOM PROCESS AND NUMERICAL METHODS | 1 | Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena. |
| | | | 2 | Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena. |
| | | | 3 | Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate. |
| | | | 4 | Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques |
| | | | 5 | Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations. |

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| 2 | EET202 | DC MACHINES AND TRANSFORMERS | 1 | Acquire knowledge about constructional details of DC machines |
| | | | 2 | Describe the performance characteristics of DC generators |
| | | | 3 | Describe the principle of operation of DC motors and select appropriate motor types for different applications |
| | | | 4 | Acquire knowledge in testing of DC machines to assess its performance |
| | | | 5 | Describe the constructional details and modes of operation of single phase and three phase transformers |
| | | | 6 | Analyse the performance of transformers under various conditions |
| 3 | EET204 | ELECTROMAGNETIC THEORY | 1 | Apply vector analysis and coordinate systems to solve static electric and magnetic field problems. |
| | | | 2 | Apply Gauss Law, Coulomb's law and Poisson's equation to determine electrostatic field parameters |
| | | | 3 | Determine magnetic fields from current distributions by applying Biot-Savart's law and Amperes Circuital law. |
| | | | 4 | Apply Maxwell Equations for the solution of time varying fields |
| | | | 5 | Analyse electromagnetic wave propagation in different media. |
| 4 | EET206 | DIGITAL ELECTRONICS | 1 | Identify various number systems, binary codes and formulate digital functions using Boolean algebra. |
| | | | 2 | Design and implement combinational logic circuits. |
| | | | 3 | Design and implement sequential logic circuits. |
| | | | 4 | Compare the operation of various analog to digital and digital to analog conversion circuits. |
| | | | 5 | Explain the basic concepts of programmable logic devices and VHDL |

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| 5 | EST 200 | DESIGN AND ENGINEERING | 1 | Explain the different concepts and principles involved in design engineering. |
| | | | 2 | Apply design thinking while learning and practicing engineering. |
| | | | 3 | Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering. |
| 6 | MCN202 | CONSTITUTION OF INDIA | 1 | Explain the background of the present constitution of India and features. |
| | | | 2 | Utilize the fundamental rights and duties. |
| | | | 3 | Understand the working of the union executive, parliament and judiciary. |
| | | | 4 | Understand the working of the state executive, legislature and judiciary. |
| | | | 5 | Utilize the special provisions and statutory institutions. |
| | | | 6 | Show national and patriotic spirit as responsible citizens of the country |
| 7 | EEL202 | ELECTRICAL MACHINES LAB 1 | 1 | Analyse the performance of DC motors and DC generators by performing load test. |
| | | | 2 | Sketch the Open Circuit Characteristics of a self excited DC shunt generator and check conditions of voltage build up by performing suitable experiment. |
| | | | 3 | Develop equivalent circuit and predetermine their regulation and efficiency by performing OC & SC tests on transformer. |
| | | | 4 | Analyse the efficiency and regulation of the transformer by performing load test. |
| | | | 5 | Analyse the efficiency of a DC machine when working as motor and generator by conducting suitable test. |
| | | | 6 | Examine the efficiency by performing Sumpner's test on two similar transformers. |
| 8 | EEL204 | DIGITAL ELECTRONICS LAB | 1 | Formulate digital functions using Boolean Algebra and verify experimentally. |
| | | | 2 | Design and implement combinational logic circuits. |
| | | | 3 | Design and implement sequential logic circuits. |
| | | | 4 | Design and fabricate a digital circuit using the knowledge acquired from the laboratory. |

SEMESTER V

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| 1 | EET301 | POWER SYSTEMS I | 1 | Identify the power generating system appropriate for a given area. |
| | | | 2 | Evaluate the electrical performance of any transmission line. |
| | | | 3 | Compute various physical characteristics of underground and overhead transmission systems. |
| | | | 4 | Select appropriate switchgear for protection schemes. |
| | | | 5 | Design a simple electrical distribution system as per the standards. |
| 2 | EET303 | MICROPROCESSORS AND MICROCONTROLLERS | 1 | Describe the architecture and timing diagram of 8085 microprocessor. |
| | | | 2 | Develop assembly language programs in 8085 microprocessor. |
| | | | 3 | Identify the different ways of interfacing memory and I/O with 8085 microprocessor. |
| | | | 4 | Understand the architecture of 8051 microcontroller and embedded systems. |
| | | | 5 | Develop assembly level and embedded C programs in 8051 microcontroller. |
| 3 | EET305 | SIGNALS AND SYSTEMS | 1 | Explain the basic operations on signals and systems. |
| | | | 2 | Apply Fourier Series and Fourier Transform concepts for continuous time signals. |
| | | | 3 | Analyse the continuous time systems with Laplace Transform. |
| | | | 4 | Analyse the discrete time system using Z Transform. |
| | | | 5 | Apply Fourier Series and Fourier Transform concepts for Discrete time domain. |
| | | | 6 | Describe the concept of stability of continuous time systems and sampled data systems. |

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| 4 | EET307 | SYNCHRONOUS AND INDUCTION MACHINES | 1 | Analyse the performance of different types of alternators. |
| | | | 2 | Analyse the performance of a synchronous motor. |
| | | | 3 | Analyse the performance of different types of induction motors. |
| | | | 4 | Describe operating principle of induction machine as generator. |
| | | | 5 | Explain the types of single phase induction motors and their working principle. |
| 5 | HUT310 | MANAGEMENT FOR ENGINEERS | 1 | Explain the characteristics of management in the contemporary context |
| | | | 2 | Describe the functions of management |
| | | | 3 | Demonstrate ability in decision making process and productivity analysis |
| | | | 4 | Illustrate project management technique and develop a project schedule |
| | | | 5 | Summarize the functional areas of management |
| | | | 6 | Comprehend the concept of entrepreneurship and create business plans |
| 6 | MCN301 | DISASTER MANAGEMENT | 1 | Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle |
| | | | 2 | Distinguish between different hazard types and vulnerability types and do vulnerability assessment |
| | | | 3 | Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk |
| | | | 4 | Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community |
| | | | 5 | Identify factors that determine the nature of disaster response and discuss the various disaster response actions |
| | | | 6 | Explain the various legislations and best practices for disaster management and risk reduction at national and international level |
| 7 | EEL331 | MICROPROCESSORS AND MICROCONTROLLERS LAB | 1 | Develop and execute assembly language programs for solving arithmetic and logical problems using microprocessor / microcontroller. |
| | | | 2 | Design and Implement systems with interfacing circuits for various applications. |
| | | | 3 | Execute projects as a team using microprocessor/microcontroller for real life applications. |

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| 8 | EEL333 | ELECTRICAL MACHINES LAB II | 1 | Analyse the performance of single phase and three phase induction motors by conducting suitable tests. |
| | | | 2 | Analyse the performance of three phase synchronous machine from V and inverted V curves. |
| | | | 3 | Analyse the performance of a three phase alternator by conducting suitable tests. |

SEMESTER VI

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| 1 | EET302 | LINEAR CONTROL SYSTEMS | 1 | Describe the role of various control blocks and components in feedback systems. |
| | | | 2 | Analyse the time domain responses of the linear systems. |
| | | | 3 | Apply Root locus technique to assess the performance of linear systems. |
| | | | 4 | Analyse the stability of the given LTI systems. |
| | | | 5 | Analyse the frequency domain response of the given LTI systems. |
| | | | 6 | Design compensators using time domain and frequency domain techniques. |
| 2 | EET304 | POWER SYSTEMS II | 1 | Apply the per unit scheme for any power system network and compute the fault levels. |
| | | | 2 | Analyse the voltage profile of any given power system network using iterative methods. |
| | | | 3 | Analyse the steady state and transient stability of power system networks. |
| | | | 4 | Model the control scheme of power systems. |
| | | | 5 | Schedule optimal generation scheme. |
| 3 | EET306 | POWER ELECTRONICS | 1 | Explain the operation of modern power semiconductor devices and its characteristics. |
| | | | 2 | Analyse the working of controlled rectifiers. |
| | | | 3 | Explain the working of AC voltage controllers, inverters and PWM techniques. |
| | | | 4 | Compare the performance of different dc-dc converters. |
| | | | 5 | Describe basic drive schemes for ac and dc motors. |

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| 4 | EET322 | RENEWABLE ENERGY SYSTEMS | 1 | Describe the environmental aspects of renewable energy resources |
| | | | 2 | Explain the operation of various renewable energy systems |
| | | | 3 | Design solar PV systems |
| | | | 4 | Explain different emerging energy conversion technologies and storage |
| 5 | HUT 300 | INDUSTRIAL ECONOMICS & FOREIGN TRADE | 1 | Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. |
| | | | 2 | Take appropriate decisions regarding volume of output and to evaluate the social cost of production. |
| | | | 3 | Determine the functional requirement of a firm under various competitive conditions. |
| | | | 4 | Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. |
| | | | 5 | Determine the impact of changes in global economic policies on the business opportunities of a firm. |
| 6 | EET308 | COMPREHENSIVE COURSE WORK | 1 | Apply the knowledge of circuit theorems to solve the problems in electrical networks |
| | | | 2 | Evaluate the performance of DC machines and Transformers under different loading conditions |
| | | | 3 | Identify appropriate digital components to realise any combinational or sequential logic. |
| | | | 4 | Apply the knowledge of Power generation, transmission and distribution to select appropriate components for power system operation. |
| | | | 5 | Apply appropriate mathematical concepts to analyse continuous time and discrete time signals and systems |
| 7 | EEL332 | POWER SYSTEMS LAB | 1 | Develop mathematical models and conduct steady state and transient analysis of power system networks using standard software. |
| | | | 2 | Develop a frequency domain model of power system networks and conduct the stability analysis. |
| | | | 3 | Conduct appropriate tests for any power system component as per standards. |
| | | | 4 | Conduct site inspection and evaluate performance ratio of solar power plant. |

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| 8 | EEL334 | POWER ELECTRONICS LAB | 1 | Determine the characteristics of SCR and design triggering circuits for SCR based circuits. |
| | | | 2 | Design, set up and analyse single phase AC voltage controllers. |
| | | | 3 | Design, set up and test suitable gate drives for MOSFET/IGBT. |
| | | | 4 | Design, set up and test basic inverter topologies. |
| | | | 5 | Design and set up dc-dc converters. |
| | | | 6 | Develop simulation models of dc-dc converters, rectifiers and inverters using modern simulation tools. |

SEMESTER VII

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| 1 | EET401 | ADVANCED CONTROL SYSTEMS | 1 | Develop the state variable representation of physical systems. |
| | | | 2 | Analyse the performance of linear and nonlinear systems using state variable approach. |
| | | | 3 | Design state feedback controller for a given system. |
| | | | 4 | Explain the characteristics of nonlinear systems. |
| | | | 5 | Apply the tools like describing function approach or phase plane approach for assessing the performance of nonlinear systems |
| | | | 6 | Apply Lyapunov method for the stability analysis of physical systems. |

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| 2 | EET 463 | ILLUMINATION TECHNOLOGY | 1 | Explain the fundamental concepts of natural and artificial lighting schemes |
| | | | 2 | Design efficient indoor lighting systems |
| | | | 3 | Design efficient outdoor lighting systems |
| | | | 4 | Describe aesthetic and emergency lighting systems |

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| 3 | MCN 401 | INDUSTRIAL SAFETY ENGINEERING | 1 | Describe the theories of accident causation and preventive measures of industrial accidents. |
| | | | 2 | Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. |
| | | | 3 | Explain different issues in construction industries. |
| | | | 4 | Describe various hazards associated with different machines and mechanical material handling. |
| | | | 5 | Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. |
| 4 | CET415 | ENVIRONMENTAL IMPACT ASSESSMENT | 1 | Explain the need for minimizing the environmental impacts of developmental activities |
| | | | 2 | Outline environmental legislation & clearance procedure in the country |
| | | | 3 | Apply various methodologies for assessing the environmental impacts of any developmental activity |
| | | | 4 | Prepare an environmental impact assessment report |
| | | | 5 | Conduct an environmental audit |
| 5 | EEL 411 | CONTROL SYSTEM LAB | 1 | Demonstrate the knowledge of simulation tools for control system design. |
| | | | 2 | Develop the mathematical model of a given physical system by conducting appropriate experiments. |
| | | | 3 | Analyse the performance and stability of physical systems using classical and advanced control approaches. |
| | | | 4 | Design controllers for physical systems to meet the desired specifications. |
| 6 | EEQ413 | SEMINAR | 1 | Identify academic documents from the literature which are related to her/his areas of interest |
| | | | 2 | Read and apprehend an academic document from the literature which is related to her/ his areas of interest |
| | | | 3 | Prepare a presentation about an academic document |
| | | | 4 | Give a presentation about an academic document |
| | | | 5 | Prepare a technical report |

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| 7 | EED415 | PROJECT PHASE I | 1 | Model and solve real world problems by applying knowledge across domains |
| | | | 2 | Develop products, processes or technologies for sustainable and socially relevant applications |
| | | | 3 | Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks |
| | | | 4 | Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms |
| | | | 5 | Identify technology/research gaps and propose innovative/creative solutions |
| | | | 6 | Organize and communicate technical and scientific findings effectively in written and oral forms |

SEMESTER VIII

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| 1 | EET402 | ELECTRICAL SYSTEM DESIGN AND ESTIMATION | 1 | Explain the rules and regulations in the design of components for medium and high voltage installations. |
| | | | 2 | Design lighting schemes for indoor and outdoor applications. |
| | | | 3 | Design low/medium voltage domestic and industrial electrical installations. |
| | | | 4 | Design, testing and commissioning of 11 kV transformer substation. |
| | | | 5 | Design electrical installations in high rise buildings. |
| 2 | EET404 | COMPREHENSIVE COURSE VIVA | 1 | Competent in placement tests and other competitive examinations. |
| 3 | EED416 | PROJECT PHASE II | 1 | Model and solve real world problems by applying knowledge across domains |
| | | | 2 | Develop products, processes or technologies for sustainable and socially relevant applications |
| | | | 3 | Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks |
| | | | 4 | Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms |
| | | | 5 | Identify technology/research gaps and propose innovative/creative solutions |
| | | | 6 | Organize and communicate technical and scientific findings effectively in written and oral forms |

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| 4 | EET 434 | SMART GRID TECHNOLOGY | 1 | Explain the basic concept of distributed energy resources, micro-grid and smart grid |
| | | | 2 | Choose appropriate Information and Communication Technology (ICT) in smart grid |
| | | | 3 | Select infrastructure and technologies for consumer domain of smart grid |
| | | | 4 | Select infrastructure and technologies for smart substation and distribution automation |
| | | | 5 | Formulate cloud computing infrastructure for smart grid considering cyber security |
| | | | 6 | Categorize power quality issues and appraise it in smart grid context |
| 5 | EET 436 | POWER QUALITY | 1 | Identify the sources and effects of power quality problems. |
| | | | 2 | Apply Fourier concepts for harmonic analysis. |
| | | | 3 | Explain the important aspects of power quality monitoring. |
| | | | 4 | Examine power quality mitigation techniques. |
| | | | 5 | Discuss power quality issues in grid connected renewable energy systems. |
| 6 | EET 418 | ELECTRIC AND HYBRID VEHICLE | 1 | Explain the basic concepts of Conventional, Electric, Hybrid EV and Autonomous Vehicles |
| | | | 2 | Describe different configurations of electric and hybrid electric drive |
| | | | 3 | Discuss the propulsion unit for electric and hybrid vehicles |
| | | | 4 | Compare various energy storage and EV charging systems |
| | | | 5 | Select drive systems and various communication protocols for EV |