

## **ELECTRICAL ENGINEERING**

### **PROGRAM OUTCOME OF ELECTRICAL ENGINEERING PROGRAMME**

- PO1: Ability to apply the knowledge of mathematics, science and engineering principles for modeling, analyzing and solving electrical and electronics engineering problems.
- PO2 : Ability to identify, formulate and analyze real-life electrical and electronics engineering problems.
- PO3 : Ability to design and develop solutions for real-life electrical and electronics engineering problems.
- PO4 : Ability to design and develop sophisticated equipment and experimental systems for carrying out detailed investigation to multifaceted electrical and electronics engineering problems.
- PO5 : Ability to develop and utilize modern tools for modelling, analyzing and solving electrical and electronics engineering problems.
- PO6 : Dedication to work as an electrical or electronics engineer who is capable of identifying solutions to various local and global problems faced by the society.
- PO7: Ability to design and develop modern systems for the upkeep of pollution free environment.
- PO8: Willingness and ability to upkeep professional ethics and social values.
- PO9: Willingness and ability to think independently, take initiative and lead a team of engineers or researchers.
- PO10: Ability to express ideas clearly and communicate orally as well as in writing with others.
- PO11: Willingness and ability to maintain lifelong learning process by way of participating in various professional activities.
- PO12: Willingness and ability to take up administrative responsibilities involving both project and financial management confidently.

## **COURSE OUTCOMES OF ELECTRICAL ENGINEERING PROGRAMME**

### AEE 102\202 Basic Electrical Engineering

- CO1: Analysis of Resistive Circuits and Solution of resistive circuits with independent sources
- CO2: Two Terminal Element Relationships for inductors and capacitors and analysis of magnetic circuits.
- CO3: Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits.
- CO4: Awareness of general structure of power systems.

### AEE 151/251 Electrical Engineering Lab

- CO1: Experimentally verify the basic circuit theorems
- CO2: Measure power and power factor in ac circuits
- CO3: Design and experiment potential divider circuits.
- CO4: Understand 3 phase balanced and unbalanced, star and delta connected supply and load and to measure power in 3 phase circuits

### EEE 302 Basic System Analysis

- CO1: Acquire knowledge about the interconnection of elements in a system, classification of signals and basic operations on signals.
- CO2: Acquire knowledge about the time domain analysis of first order systems and representation of total response in various formats.
- CO3: Acquire knowledge about the standard time domain specifications of second order systems and the time domain analysis of higher order systems
- CO4: Acquire knowledge about the application of Fourier series, Fourier transform and Laplace transform in signal representation and analysis of linear time invariant systems.

### EEE-303 Electrical Measurement & Measuring Instruments

- CO1: to impart them the knowledge required for them, in understanding the working of various instruments and equipments used for the measurement of various electrical engineering parameters like voltage, current, power, phase etc in industry as well as in power generation, transmission and distribution sectors.
- CO2: to make students capable of analyzing and solving the varieties of problems and issues coming up in the vast field of electrical measurements.
- CO3: To enable the students to think in terms of innovative ideas to improve the existing technology in the field of measurements in terms of accuracy, cost, durability and user friendliness.

#### EEE-402 Network Analysis and Synthesis

CO1: Design low pass, high pass, band pass and band elimination filter networks

CO2: Analyze the frequency response of circuits and to obtain the correlation between time domain and frequency domain response specifications.

CO3: Obtain steady state solutions for non-sinusoidal inputs using fourier series and to analyze the effect of harmonics in circuits.

CO4: Understand the features of two port networks and to obtain their equivalent circuits.

#### EEE 301 Electromechanical Energy Conversion-I

CO1: Acquire knowledge about the constructional details and principle of operation of dc machines.

CO2: Acquire knowledge about the working of dc machines as generators and motors.

CO3: Acquire knowledge about testing and applications of dc machines.

CO4: Acquire knowledge about the constructional details, principle of operation, testing and applications of transformers.

#### EEC 409 Analog & Digital Electronics

CO1: Acquire basic knowledge on the working of various semi-conductor devices.

CO2: Develop design competence in signal and power amplifiers using BJT and FET.

CO3: Acquire knowledge on basic digital electronic gates.

CO4: Acquire knowledge on combinational and sequential circuits.

#### EEE-403 Electrical & Electronics Engineering Materials

CO1: to provide students with a thorough understanding of the electrical properties and characteristics of various materials, used in the electrical appliances , devices , instruments and in the applications associated with generation, transmission and distribution of electric power.

CO2: to provide students with a moderate level understanding of the physics behind the electrical engineering materials.

CO3: An understanding of the electrical engineering material science essential for them to work in different industries and also motivate them to do innovative research while going for higher studies and also to work in R & D with scientific enthusiasm.

#### EEE-401 Electromechanical Energy Conversion-II

CO1: Acquire knowledge about the constructional details and principle of operation of alternators.

CO2: Acquire knowledge about the working of synchronous machines as generators and motors.

- CO3: Acquire knowledge about testing and applications of synchronous machines.
- CO4: Acquire knowledge about the constructional details and principle of operation of three phase and single phase induction motors.
- CO5: Acquire knowledge about the starting and speed control of induction motors.

#### EEE-501 Elements Of Power System

- CO1: Awareness of general structure of power systems.
- CO2: To make students capable of analysis of mechanical and electrical design aspects of transmission system.
- CO3: Enable the students to do analysis of different types of distribution systems and its design.

#### EEE 502 Power Electronics

- CO1: To understand the basics of Power Electronics.
- CO2: To learn the details of power semiconductor switches (Construction, Characteristics and operation).
- CO3: To understand the working of various types of converters.
- CO4: To learn how to analyse the converters and design the components of them, under various load types.

#### EEE-503 Control System

- CO1: Obtain models of dynamic systems in transfer function and state space forms.
- CO2: Analyze the system response and stability in both time-domain and frequency domain.
- CO3: Learn the features of different types of compensators and to design compensators using time-domain and frequency domain specifications.
- CO4: Analyze the system response and stability of systems represented in state space form and to design compensators for systems modeled in state space form.

#### EEE-504 Microprocessor & Its Applications

- CO1: To understand the working of a microprocessor.
- CO2: To learn to program a processor using assembly language.
- CO3: To learn configuring and using different peripherals in a digital system.
- CO4: To generate an executable file and use it.

#### EEC-508 Fundamentals of E.M. Theory

- CO1: Knowledge for the calculation of electric and magnetic field due to various charge and current distributions.
- CO2: Acquire concepts to design various devices which are working based on the forces generated by electric and magnetic fields.
- CO3: Knowledge of the fundamental Maxwell's equations and the design of various electrical machines based on this.
- CO4: Knowledge of propagation of electromagnetic energy through transmission lines and the design of propagation medium based on the requirements.

### EEE-601 Power System Analysis

- CO1: Exposure to the modeling of individual power system components like transmission lines and generators.
- CO2: Enable the students to do load flow and short circuit calculations.
- CO3: To make students capable of analysis of power system stability, security and reliability.
- CO4: Enable the students to do analysis of economic dispatch of thermal generators, load sharing and governor control.

### EEE-602 Switchgear & Protection

- CO1: Acquire the knowledge of various abnormal conditions that could occur in power system.
- CO2: Ability to design various protective devices in power system for protecting equipment and personnel.
- CO3: Knowledge of various types of existing circuit breakers, their design and constructional details.
- CO4: Knowledge of various conventional relays, their design and latest developments.

### EEE-603 Special Electric Machine

- CO1: To understand and apply the fundamentals of systematical components for the analysis of AC servo motor leading the design of its equivalent circuit and evaluation of its performance.
- CO2: To learn about construction features, method of operation, characteristics and application of stepper motor.
- CO3: Acquire the knowledge of fundamentals, construction details and classification of universal motors and synchronous motor like reluctance motors, hysteresis motors.
- CO4: Acquire the knowledge of fundamentals, construction details and classification of linear machines.

### EEE-701 Electric Drives

- CO1: Develop capability to choose a suitable DC Motor and Power Electronic Converter package from a description of drive requirement – involving load estimation, load cycle considerations, thermal aspects and motor-converter matching.
- CO2: To learn the working principle and design details of frequency controlled converters used in induction motor drives.
- CO3: Acquire detailed knowledge on AC-DC Converters and DC-DC Converters and their modeling for steady-state and transient conditions.
- CO4: To understand the working of various phase controlled converters used in AC Drives.

### EEE-702 Power Station Practice

- CO1: Basic knowledge of Different types of Power Plants, site selection criteria of each one of them.
- CO2: Understanding of Thermal Power Plant Operation, turbine governing, different types of high pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems.
- CO3: Basic knowledge of Different types of Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor.
- CO4: Understanding of Power Plant Economics, Energy Storage including compressed air energy and pumped hydro.

### EEE-031 POWER SYSTEM OPERATION AND CONTROL

- CO1: An understanding of operational constraints (equipment and stability), control objectives and their implementation, under normal and abnormal states of a power system.
- CO2: To enable the students to analyze Economic dispatch of thermal units and methods of solution, Unit commitment- Solution methods.
- CO3: To impart the knowledge of automatic generation control and automatic voltage regulation.
- CO4: An understanding of interchange of power and energy- Economy interchange between interconnected utilities.

### EEE-801 Electrical Instrumentation And Process Control

- CO1: Understand the different methods for measurement of various electrical quantities.
- CO2: Familiarize the dynamics of instrument systems.
- CO3: Learn various methods for measurement of non-electrical quantities like temperature, Pressure, Force, Torque, Density, Liquid level, Viscosity, Flow, Displacement etc.
- CO4: Familiarize various passive and active transducers.

### EEE-802 Utilization Of Electrical Energy And Traction

- CO1: To impart the knowledge of Electric Traction, Electric heating, Electric welding and Illumination.
- CO2: Enable the students to design of interior and exterior lighting systems- illumination levels for various purposes light fittings- factory lighting- flood lighting-street lighting.
- CO3: To make students capable of analyzing and solving the varieties of problems and issues in electric power utilization.
- CO4: To impart the knowledge of air conditioning and refrigeration.

### EEE-042 POWER QUALITY

- CO1: To introduce to students the term and definition of power quality disturbances, and their causes, detrimental effects and solutions.
- CO2: Understand the causes of power quality problems and relate them to equipment.
- CO3: To prepare students to know the power quality monitoring method, equipments and develop the ability to analyze the measured data.

## Program Specific Outcomes of Electrical Engineering programme

The PSOs of electrical engineering programme supported by the curriculum are given below.

The students will be able to

**PSO1:** apply principles of engineering, electronics and computer science; physics, chemistry, environmental science, mathematics (including differential equations, discrete mathematics, linear algebra and complex variables) and laboratory skills for building, testing, operation and maintenance of high currents electrical systems, such as, electrical machines, power and energy systems.

**PSO2:** model, analyse, design, and realize physical systems, components or processes related to high current electrical engineering systems.

**PSO3:** work professionally in power systems engineering, control systems engineering and software industries.