Jagadambha College of Engineering and Technology Yavatmal

Department of Electrical Engineering(UG)

Year: Second Year	Semester: Third
Course Name: Mathematics III	**Course Code: CO23EE01**
CO23EE01.1	Understand ordinary differential equation.
CO23EE01.2	Learn about Laplace transformation and its application.
CO23EE01.3	Understand PDE's of n^{th} order with constant coefficient.
CO23EE01.4	Learn about Numerical Methods.
CO23EE01.5	Understand the concept of Complex Variable.
CO23EE01.6	Students understand the basic of vector calculus comprising of gradients divergent and line, surface, volume integral.

Course Name:Network Analysis	Course Code: CO23EE02
CO23EE02.1	Apply the knowledge of source transformation and Kirchhoff's Voltage Law on electrical networks.
CO23EE02.2	Apply various networks theorem for analysis of electrical circuits.
CO23EE02.3	Apply the knowledge of resonance for series and parallel RLC circuit and calculation of various electrical quantities for 3 phase circuits.
CO23EE02.4	Evaluate the initial conditions using knowledge of Laplace transformation and analysis of various waveforms.
CO23EE02.5	To study sinusoidal steady state analysis and Fourier Series
CO23EE02.6	To Study Two port network

Course Name:Energy Resources and Generation	Course Code: CO23EE03
CO23EE03.1	Students will be able to study the arrangement, construction and working of thermal and hydro power plant.
CO23EE03.2	Students will be able to study the arrangement, construction and working of nuclear and diesel power plant.
CO23EE03.3	Students will be able to study of solar energy and its measurement and their constants for power generation in different technologies.
CO23EE03.4	Students will be able to understand the principles of ocean and tidal energy resources.
CO23EE03.5	Students will be able to understand the principles of electrical generation by fuel cells and wind energy.
CO23EE03.6	Students will be able to learn different technique of conversion of biomass. Biogas, geothermal energy and MHD power generation.

Course Name: Electronics Devices & Circuits	Course Code: CO23EE04
CO23EE04.1	Students will be able to learn study and verify the working of diode, rectifiers and their applications.
CO23EE04.2	Students will be able to study and verify the working of transistors and different biasing methods.
CO23EE04.3	Students will be able to study and analyse the different types of amplifier circuits.
CO23EE04.4	Students will be able to study and verify the working of power amplifiers and oscillators.
CO23EE04.5	Students will be able to study and verify the working of different types of diodes and Photo transistor.
CO23EE04.6	Students will be able to study and verify the working of JFET, MOSFETs and UJT.

Course Name:Electrical Measurements and Instrumentation	Course Code: CO23EE05
CO23EE05.1	Study and Understand the measurement of different electrical parameters (RLC) using different AC & DC bridges.
CO23EE05.2	Detailed study of different electrical measuring instrument along with their construction and working.
CO23EE05.3	Measurement of electrical Power and Energy and the use of current and potential transformer.
CO23EE05.4	Study the Generalized instrumentation system with the help of a block diagram.
CO23EE05.5	Study of Transducers and their use for measurement of Torque, Frequency, Velocity, Acceleration etc.
CO23EE05.6	Temperature, Pressure and Flow measurement and the basic ideas to understand them.
Year: Second Year	**Semester:Fourth**
Course Name:Electrical Machines - I	**Course Code: CO24EE01**
CO24EE01.1	Principle, Construction, EMF & Torque Equations, Armature winding, reaction and commutation along with its improvement methods for a DC Machine.
CO24EE01.2	Study of DC shunts Series and Compound Generators along with their types, characteristics and applications.
CO24EE01.3	Principle, Types, Voltage Build up, Performance characteristics, Starting and Speed control methods, Losses, Efficiency and Torque evaluation in DC Motors.
CO24EE01.4	Heat run test, losses, parallel operation, equivalent circuit, Autotransformer- construction, working, merits, demerits and application.
CO24EE01.5	Principle, construction, working, types, connection, parallel operation of 3-phase transformers, power transformer, distribution transformers.
CO24EE01.6	Conversion of 3-phase to single phase, two phases, six phases, twelve phase. 3 winding and tap changing transformer.

Course Name: Electromagnetic Theory	Course Code: CO24EE02
CO24EE02.1	Apply vector calculus in orthogonal coordinate system.
CO24EE02.2	Analyze behaviour of static electric fields in standard configurations.
CO24EE02.3	Analyze behaviour of dynamic electric fields in standard configurations.
CO24EE02.4	Analyze behaviour of static magnetic fields in standard configurations
CO24EE02.5	Analyze behaviour of dynamic magnetic fields in standard configurations
CO24EE02.6	Describe and analyze Maxwell equations and electromagnetic wave propagation in free space

Course Name: Analog and Digital Circuits	Course Code: CO24EE03
CO24EE03.1	Students will be able to learn and study Monolithic IC Technology, Operational Amplifier.
CO24EE03.2	Students will be able to study and verify the working of linear and nonlinear applications of operational amplifier.
CO24EE03.3	Students will be able to study the other linear ICs that is IC 723, IC 555, IC 78** and 79** series.
CO24EE03.4	Students will be able to study the basic logic circuits.
CO24EE03.5	Students will be able to study the combinational digital circuits.
CO24EE03.6	Students will be able to study the Sequential Circuits and Systems.

Course Name:Mathematics-IV	Course Code: CO24EE04
CO24EE04.1	Comprehend knowledge of complex analysis in terms of complex variables, harmonic functions and conformal mapping.
CO24EE04.2	Understand the Taylor's and Laurent's Series and able to evaluate real integrals by residues.
CO24EE04.3	Identify and solve certain forms of partial difference equations as applied to discrete systems.
CO24EE04.4	Calculate the solution of differential equation using Bessel's and Legendre's functions.
CO24EE04.5	Apply the ideas of probability including distribution to examine elementary parametric and non-parametric statistical test.
CO24EE04.6	Compute and interpret the results of Bivariate Regression and Correlation Analysis and able to perform a multiple regression using computer software.

Course Name:Numerical Method and Computer Programming	Course Code: CO24EE05
CO24EE05.1	To understand the basic concepts of Numerical methods and compare different methods with their implementations.
CO24EE05.2	To understand method of finding solutions of Simultaneous Algebraic equations.
CO24EE05.3	To study the operations of various methods of Interpolation.
CO24EE05.4	To study Differentiation and Integration and practical use of them.
CO24EE05.5	To analysis differential equations with different method.
CO24EE05.6	To update knowledge from understanding the basic concepts of Object Oriented Programming

Year: Third Year	Semester:Fifth
Course Name:Control System-I	Course Code: CO35EE01
CO35EE01.1	Students will be able to learn the basics of various types of control systems and automatic control systems.
CO35EE01.2	Students will be able to learn Electrical or Electro-mechanical components and Pneumatic control devices.
CO35EE01.3	Students will be able to perform a time domain analysis of control system, error analysis and approximate methods for higher order system.
CO35EE01.4	Students will be able to learn the concept of stability, poles and zeros using Routh Hurwitz Criteria and Root Locus.
CO35EE01.5	Students will be able to perform the concept of stability, relative stability by Bode Plot, Polar plot in time domain and frequency domain.
CO35EE01.6	Students will be able to perform the concept of stability, relative stability by Bode Plot, Nyquist Plot in frequency domain.

Course Name:Microprocessor & Microcontroller	Course Code: CO35EE02
CO35EE02.1	To understand architectural difference between Microprocessor and Microcontroller.
CO35EE02.2	To develop Assembly Language Programming concepts of Microprocessor & Microcontroller.
CO35EE02.3	To Interface different peripheral devices with Microprocessor and Microcontroller like PPI, PICUSART.
CO35EE02.4	To Interface different peripheral devices with Microprocessor and Microcontroller like programmable interval timer, floppy disc controller, CRT controller, DMA controller.
CO35EE02.5	To study the microprocessors applications.
CO35EE02.6	TO introduction with microcontroller 8051.

Course Name:Electrical Machine-II	Course Code: CO35EE03
CO35EE03.1	Students will be able to learn the basics of transformer and induction motor and application regarding representation using piece wise linearization and least square error method.
CO35EE03.2	Students will be able to formulate the mathematical modelling of transformer design.

CO35EE03.3	Students will be able to learn the fundamentals of electrical circuits and thermal circuits of cooling method.
CO35EE03.4	Students will be able to learn the basics of induction motor stator design.
CO35EE03.5	Students will be able to learn the concept of air-gap length design, MMF calculations, magnetizing components, etc.
CO35EE03.6	Students will be able to learn the calculation of core loss from design data, winding resistance and leakage reactance from designed data also parameters effect on performance.

Course Name:Signals & Systems	Course Code: CO35EE04
CO35EE04.1	Be able to describe signals mathematically and understand how to perform mathematical operations on signals.
CO35EE04.2	Be able to compute the Fourier series or Fourier transform
CO35EE04.3	Be able to compute the output of an LTI system given the input and the impulse response
CO35EE04.4	Be able to understand Sampling process.
CO35EE04.5	Be able to analyse DT systems & their realization using Z-transforms.
CO35EE04.6	Be able to understand Discrete-time systems and LTI systems,able to compute Fast Fourier Transform.

Course Name:Consumer Electronics	Course Code: CO35FEXT05
CO35FEXT05.1	To sketch and describe operating principles of different types of audio system.
CO35FEXT05.2	To learn various components of composite video signal and differentiate between hue, brightness, saturation, luminescence and chrominance.
CO35FEXT05.3	To acquaint with various domestic appliances devices like Washing machine, Digital Camera system, Microwave ovens with sketches of block diagram.
CO35FEXT05.4	To understand the mechanism of recording and reproduction.
CO35FEXT05.5	To acquire knowledge of various power supplies for household appliance.
CO35FEXT05.6	To study the structure of calculators and electronic gadgets.

Course Name: Communication Skills	Course Code: CO35EE06
CO35EE06.1	To understand the comprehension over an unseen passage with the study of different functions of words as well as structure of grammatical sentences.
CO35EE06.2	To understand the basics of communication and its principles.
CO35EE06.3	To understand specific formats for written communication for official uses and other uses of Non-verbal communication.

Year: Third Year	Semester:Sixth
Course Name:Electrical Power-I	Course Code: CO36EE01
CO36EE01.1	Students will be able to learn the basics of various fundamentals of electrical power generation, transmission & distribution.
CO36EE01.2	Students will be able to learn transmission line parameters, their calculations also the effects on transmission lines & its effects on the communication system.
CO36EE01.3	Students will be able to learn electrical characteristics of transmission line such as types of transmission lines, various effects on transmission & per unit representation of power system.
CO36EE01.4	Students will be able to learn load flow studies and its equation, Comparison of various methods like GS & NR.
CO36EE01.5	Students will be able to learn Mechanical design along with the types of insulators also the knowledge of voltage distribution across the string and introduction to HV, LV and EHV.
CO36EE01.6	Students will be able to learn information regarding conductors and insulation, different types of underground cable parameters.

Course Name:Optimization Techniques	Course Code: CO36EE02
CO36EE02.1	Students will be able to learn the applications of optimization, optimization problems and its techniques.
CO36EE02.2	Students will be able to learn linear programming through theorems, graphical methods and solution of system using various methods.
CO36EE02.3	Students will be able to learn advanced linear programming through duality theorem, dual simplex method and transportation problems.
CO36EE02.4	Students will be able to learn nonlinear programming through unimodal function, fibonanacci search method and golden section method, non-constraints optimization.
CO36EE02.5	Students will be able to learn CPM and PERT introduction through network representation of project and crashing of project.
CO36EE02.6	Students will be able to learn dynamic programming through multi stage decision processes, sub optimization and various solution methods

Course Name:Power Electronics	Course Code: CO36EE03
CO36EE03.1	Students will be able to learn the detail study of Silicon Controlled Rectifier and basics of power semiconductor devices.
CO36EE03.2	Students will be able to learn the series and parallel operation of SCR.
CO36EE03.3	Students will be able to learn the single phase and three phase Half wave and Full wave rectifiers.
CO36EE03.4	Students will be able to learn the different types of Inverter circuits.
CO36EE03.5	Students will be able to learn the different types of Chopper circuits and Cyclo-converters.
CO36EE03.6	Students will be able to perform the speed control of DC motor by using different power semiconductor devices and their applications.

Course Name:Computer Aided Machine Design	Course Code: CO36EE04
CO36EE04.1	Students will be able to learn the basics of transformer and induction motor and application regarding representation using piece wise linearization and least square error method.
CO36EE04.2	Students will be able to formulate the mathematical modelling of transformer design.
CO36EE04.3	Students will be able to learn the fundamentals of electrical circuits and thermal circuits of cooling method.
CO36EE04.4	Students will be able to learn the basics of induction motor stator design.
CO36EE04.5	Students will be able to learn the concept of air-gap length design, mmf calculations, magnetizing components, etc.

CO36EE04.6	Students will be able to learn the calculation of core loss from design data, winding resistance and leakage reactance from designed data also parameters effect on performance.

Course Name: Electrical Energy Utilization	Course Code: CO36EE05
CO36EE05.1	Students will be able to maintain electric drives used in an industries.
CO36EE05.2	Students will be able to identify a heating and cooling of motor and calculations of duties.
CO36EE05.3	Students will be able to study characteristics, braking, starting of DC and induction motor.
CO36EE05.4	Students will be able to figure-out the different schemes of traction and its energy consumption calculation.
CO36EE05.5	Students will be able to design a suitable scheme of speed control for the traction systems and its main components.
CO36EE05.6	Students will be able to understand basics of Illumination and design of lighting schemes, industrial heating and welding.

Course Name: Electronic Test Instruments: Analog and Digital	Course Code: CO36FEXT06
CO36FEXT06.1	Understand the basic techniques of electronic testing and measuring equipment.
CO36FEXT06.2	Identify electronic instruments, their use and errors associated with the instruments.
CO36FEXT06.3	Explain the use of electronic instruments for testing and measurement in various applications.
CO36FEXT06.4	Identify electronic instruments and their use as parameters measurement.
CO36FEXT06.5	To study spectrum and network analysers.
CO36FEXT06.6	To study logic analysers.

Year: Fourth year	Semester:Seventh
Course Name:Control System-II	Course Code: CO47EE01
CO47EE01.1	Understand the basic knowledge of compensation in time and frequency domain, Students will be able to Compensated Performance Analysis of Lead, Lag and Lag-lead Compensators in time & frequency domain.
CO47EE01.2	Students will be able to solve differential equation, How to draw signal flow graph and difference of the SISO and MIMO System.
CO47EE01.3	Students will be able to Understand Controllability &observability of discrete time systems.
CO47EE01.4	Student will be able to learn the various method of finding the z- transform and brief knowledge of open and close loop transfer function.
CO47EE01.5	Students will be able to Analyze non-linear and work with digital system and their further research. Analysis of non-linear control system for various non-linearity's.
CO47EE01.6	Students will be able to Analyze linearization. Phase plane method phase plane trajectory.

Course Name:Power System Operation and Control	Course Code: CO47EE02
CO47EE02.1	To understand concept of Economic operation of power system and importance of LFC control.
CO47EE02.2	To understand concept of thermal and power plants operation in meeting the load demand optimally.
CO47EE02.3	To understand concept of Economic Load Dispatch, Load Frequency Control and reactive power control.
CO47EE02.4	To understand concept of interchange of power and energy- Economy interchange between interconnected utilities.
CO47EE02.5	To understand concept of single area load frequency control and two area load frequency control.
CO47EE02.6	To understand concept of Steady-State Instabilities, Power system stabilizer

Course Name:Electrical Power -II	Course Code: CO47EE03
CO47EE03.1	Student shall able to understand the basics of power system.
CO47EE03.2	Student shall able to Analyze and solve problems on symmetrical & unsymmetrical fault, stability.
CO47EE03.3	Student shall able to Understand economy of operation and get familiar with types of grounding.
CO47EE03.4	Student shall able to understand the concepts of High Voltage DC Transmission.
CO47EE03.5	Student shall able to understand the concepts of Flexible AC Transmission System.
CO47EE03.6	Student shall able to understand and analyze the economic aspects of both conventional transmission and FACTS.

Course Name:Switchgear & Protection	Course Code: CO47EE04
CO47EE04.1	To understand concept of Theory & application of main components used in power system protection.
CO47EE04.2	To understand concept of Protection systems used for electric machines, transformers, bus bars, transmission lines.
CO47EE04.3	To understand concept of Theory, construction, and applications of main types of circuit breakers.
CO47EE04.4	To understand concept of Design the protection systems needed for each main part of a power system & Construction and Principal of relays.
CO47EE04.5	To understand concept of Theory and construction of static relay with application.
CO47EE04.6	To understand the Power System Elements Protection Transformers, Motors, Generators and Buses and types of relay.

Course Name:Computer Methods in Power System Analysis	Course Code: CO47EE05
CO47EE05.1	Students will be able to learn the representation of power systems for computerized analysis.
CO47EE05.2	Students will be able to learn the topology of electric power systems.

CO47EE05.3	Students will be able to study the formation of bus impedances and admittances matrices by algorithm and also three phase network elements.
CO47EE05.4	Students will be able to learn the short circuit networks.
CO47EE05.5	Students will be able to study the formation of load flow problem.
CO47EE05.6	Students will be able to study the stability of power system.

Year: Fourth year	Semester: Eighth
Course Name: Power System Stability	**Course Code: CO48EE01**
CO48EE01.1	Explain the various power system instabilities and dynamics in power systems.
CO48EE01.2	Apply and explain different methods for analyzing power system stability.
CO48EE01.3	Create mathematical models for dynamic and stability analysis of power systems.
CO48EE01.4	Explain different power system controls, and their impact on the system stability.
CO48EE01.5	Demonstrate how the transient stability of a power system can be analyzed by using equal area criterion.
CO48EE01.6	Analyze electromechanical modes in power systems.

Course Name:High Voltage Engineering	Course Code: CO48EE02
CO48EE02.1	The students get the knowledge about breakdown mechanism in gaseous insulation along with related theories Understand Breakdown mechanism in gaseous medium.
CO48EE02.2	The students get the knowledge about breakdown mechanism in solid and liquid insulation along with related theories understands Breakdown mechanism in solid and liquid medium.
CO48EE02.3	The students got the knowledge about lightning and switching overvoltage phenomenon in power system and their protection.
CO48EE02.4	The students got the knowledge about different generation techniques of high voltage and current for testing purpose. Understand generation of high voltage and current by different methods.
CO48EE02.5	The students got the knowledge about different measurement mechanism of high voltage for testing purpose. Understand measurement of high voltage and current by different methods in laboratories.
CO48EE02.6	The students got the knowledge about non-destructive and high voltage testing of Electrical equipment's, Do non-destructive and high voltage testing of electrical apparatus by different techniques.

Course Name:Digital Signal Processing	Course Code: CO48EE03
CO48EE03.1	To illustrate discrete time sequence, frequency domain, description of signals, convolution & until sample response.
CO48EE03.2	To interpret the use of Fourier transform of discrete time signals &it's different algorithm for signal processing.
CO48EE03.3	To understand the sampling of signals, conversion of signals, quantization & coding, interpolation with delay.
CO48EE03.4	To review realization of digital filter, understands different types of filters & windows
CO48EE03.5	To review realization of analog filter & its types.
CO48EE03.6	To understand DSP Processor and its applications.

Course Name:Electric Drives and Control	Course Code: CO48EE04
CO48EE04.1	Students will be able to study introduction to Electrical Drives.
CO48EE04.2	To study the Starting and Braking of Electrical Drives.
CO48EE04.3	Students will be able to understand the DC drive control,PLL, microcomputer control.
CO48EE04.4	Students will be able to study AC drive control.
CO48EE04.5	Students will be able to study Vector controlled drive.
CO48EE04.6	To gain an insight in the working of drives used in traction, industrial application, machine tool applications.