

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

Ananthagiri (V&M), Kodad, Suryapet (Dist), Telangana, India.



B.TECH

ELECTRICAL AND ELECTRONICS ENGINEERING

R22 Regulation

COURSE OUTCOMES

COURSE OUTCOMES (CO)

I YEAR I SEMESTER

(MA101BS) MATRICES AND CALCULUS

After learning the contents of this course the student must be able to

- CO 1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- CO 2: Find the Eigen values and Eigen vectors
Reduce the quadratic form to canonical form using orthogonal transformations.
- CO 3: Solve the applications on the mean value theorems.
Evaluate the improper integrals using Beta and Gamma functions
- CO 4: Find the extreme values of functions of two variables with/ without constraints.
- CO 5: Evaluate the multiple integrals and apply the concept to find areas, volumes

(AP102BS) APPLIED PHYSICS

At the end of the course the student will be able to:

- CO 1: Understand various optical phenomena of light
- CO 2: Apply basic the principles of quantum mechanics to classify solids based on band theory.
- CO 3: Identify the role of semiconductor devices in science and engineering Applications.
- CO 4: Understand the features and applications of Nano materials in various fields.
- CO 5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

(CD103ES) C PROGRAMMING AND DATA STRUCTURES

- CO 1: Illustrate basic concepts of Computer and C programming.
- CO 2: Apply the concepts of looping, branching, arrays and modular approach for a given problem.
- CO 3: Ability to using pointers and strings.
- CO 4: Ability to work with Structures and learn to apply various file handling techniques.
- CO 5: Understand basic Data structures and searching and sorting techniques.

(EE105ES) ELECTRICAL CIRCUIT ANALYSIS –I

After learning the contents of this paper the student must be able to

- CO 1: Understand network analysis, techniques using mesh and node analysis.
- CO 2: Evaluate steady state and transient behaviour of single phase circuits.
- CO 3: Analyze electric circuits using network theorems.
- CO 4: Evaluate steady state and transient behaviour of three phase circuits.
- CO 5: Analyze electric circuits using network theorems and concepts of coupled circuits.

(ME105ES) ENGINEERING WORKSHOP

- CO 1: Study and practice on machine tools and their operations.
- CO 2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, and foundry, house wiring and welding.
- CO 3: Identify and apply suitable tools for different trades of engineering processes including drilling, material removing, measuring, and chiseling.
- CO 4: Build right attitude, team working, precision and safety at work place.
- CO 5: Apply basic electrical engineering knowledge and various Manufacturing processes.

(EE106ES) ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

After learning the contents of this paper the student must be able to

- CO 1: Verify the Kirchhoff's and ohm's laws.
- CO 2: Verify the basic Electrical circuit's parameters with DC excitation.
- CO 3: Verify the basic Electrical circuit's parameters with AC excitation.
- CO 4: Analyze the phenomenon of series and parallel resonance.
- CO 5: Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods

(AP107BS) APPLIED PHYSICS LABORATORY

The students will be able to:

- CO 1: Know the determination of the Planck's constant using Photo electric effect
- CO 2: Appreciate quantum physics in semiconductor devices and optoelectronics.
- CO 3: Gain the knowledge of various semiconductor devices like PN junction diode, Zener diode, BJT, LED, solar Cell
- CO 4: Understand the properties and principles of laser and optical fiber.
- CO 5: Carried out data analysis.

(CD109ES) C PROGRAMMING AND DATA STRUCTURES LABORATORY

- CO 1: Enhance debugging skills and exercise conditional and iterative statements to Write C programs.
- CO 2: Modularize the code with functions so that they can be reused
- CO 3: Solve problems using arrays, strings, structures.
- CO 4: Implement stacks, queues using arrays, linked lists.
- CO 5: Implement various searching and sorting techniques.

(ES110MC) ENVIRONMENTAL SCIENCE

After the completion of the course, the student will be able to understand

- CO 1: The multidisciplinary nature of environment, essence of environment.
- CO 2: About the natural resources utilization and their conservation.
- CO 3: The importance of Biodiversity and its Conservation.
- CO 4: About the causes and effects of environmental pollution and its management as well as environmental issues.
- CO 5: About the environmental wastes management rules, regulations and EIA for the protection of environment and to achieve sustainable development.

I YEAR II SEMESTER

(MA201BS) ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

After learning the contents of this paper the student must be able to

- CO 1: Identify whether the given differential equation of first order is exact or not
- CO 2: Solve higher differential equation and apply the concept of differential equation to real world problems.
- CO 3: Use the Laplace transforms techniques for solving ODE's.
- CO 4: Find Divergence, curl, directional derivatives and identify solenoid and irrotational
- CO 5: Evaluate the line, surface and volume integrals and converting them from one to another

(CH202BS) ENGINEERING CHEMISTRY

The students will be able to

- CO 1: Understand the basic properties of water and its usage in domestic and industrial purposes.
- CO 2: Acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
- CO 3: Learn the fundamentals and general properties of polymers and other engineering materials.
- CO 4: Apply the knowledge of atomic, molecular and electronic changes related to conductivity.
- CO 5: Apply the knowledge of engineering materials in daily life.

(EG203ES) COMPUTER AIDED ENGINEERING GRAPHICS

- CO 1: Apply computer aided drafting tools to create 2D and 3D objects.
- CO 2: Visualize the different aspects of Points, Lines and Planes.
- CO 3: Acquire knowledge on projections of solids.
- CO 4: Draw the Sectional views of solids and plan the drawing for development of surfaces.
- CO 5: Understand the isometric views and projections. Exposure to computer-aided geometric design and creating working drawings.

(EN204HS) ENGLISH FOR SKILL ENHANCEMENT

Students will be able to

- CO 1: Understand the importance of vocabulary and sentence structures.
- CO 2: Choose appropriate vocabulary and sentence structures for oral and written communication.
- CO 3: Demonstrate understanding of the rules of functional grammar.
- CO 4: Develop comprehension skills from known and unknown passages through effective reading strategies.
- CO 5: Construct paragraphs, letters, essays, abstracts, précis and reports in various contexts thereby improving proficiency in writing modules of English.

(EE205ES) ELECTRICAL CIRCUIT ANALYSIS –II

After learning the contents of this paper the student must be able to

- CO 1: Observe the response of various R, L and C circuits for different excitations.
- CO 2: Examine the behavior of circuits using Laplace transforms and transfer function of single port network.
- CO 3: Obtain two port network parameters and applications and design of various filters.
- CO 4: Examine the behaviour of circuits using Fourier transforms and integral.
- CO 5: Classify and design various types of filters.

(CH206BS) ENGINEERING CHEMISTRY LABORATORY

The experiments will make the student gain skills on:

- CO 1: Determination of rate of corrosion of mild steel in various conditions.
- CO 2: To perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
- CO 3: To prepare polymers like Thiokol rubber and Bakelite.
- CO 4: Estimation of Saponification value, Viscosity and surface tension of lubricant oils.
- CO 5: Estimation of hardness of water, Chloride content of water sample.

(CA207ES) APPLIED PYTHON PROGRAMMING LABORATORY

Upon completing this course, the students will be

- CO 1: Able to install python and its modules.
- CO 2: Able to build basic programs using fundamental programming constructs.
- CO 3: Able to code programs using functions and files.
- CO 4: Write and execute python codes for different applications.
- CO 5: Capable to implement on hardware boards.

(EN208HS) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

Students will be able to:

- CO 1: Reproduce speech sounds and improve language
- CO 2: Develop accent and pronunciation in various situations
- CO 3: Understand variants in pronunciation by differentiating between British and American accents
- CO 4: Identify the diverse purposes of listening and speaking
- CO 5: Exhibit critical thinking, problem-solving and decision-making skills through Group Discussions and Interviews.

(EE209ES) ELECTRICAL CIRCUIT ANALYSIS LABORATORY

After learning the contents of this paper the student must be able to

- CO 1: Analyze complex DC and AC linear circuits
- CO 2: Measure the three phase Active and Reactive power of electrical network.
- CO 3: Draw the locus diagrams of electrical circuits with R,L &C parameters.
- CO 4: Analyze the performance of two port network parameters.
- CO 5: Analyze the time response of first order RL, RC and RLC circuits.

(HS210MC) CONSTITUTION OF INDIA

Course Outcomes:

- CO 1: Knowledge of historical perspective and salient features of Indian constitution
- CO 2: Aware of the fundamental rights of Indian citizens.
- CO 3: Know the directive principles and fundamental duties of government and citizens
- CO 4: Knowledge of the Quasi-federal and parliamentary structure of Indian constitution
- CO 5: Knowledge of the constitution amendment powers and Emergency Provisions of Indian constitution

II YEAR I SEMESTER

(MA301BS) NUMERICAL METHODS AND COMPLEX VARIABLES

After learning the contents of this paper the student must be able to

- CO 1: Express any periodic function in terms of sine and cosine
- CO 2: Find the root of a given polynomial and transcendental equations and Estimate the value for the given data using interpolation
- CO 3: Find the numerical solutions for a given first order ODE's
- CO 4: Analyze the complex function with reference to their analyticity.
- CO 5: Complex integration using Cauchy's integral, residue theorems, Taylor's and Laurent's series expansions in complex function.

(EE302PC) POWER SYSTEM - I

After going through this course the students will be able to understand

- CO 1: How the electrical power will be generated through conventional and non-conventional sources.
- CO 2: Concepts of economical aspects of power generation and different types of tariffs.
- CO 3: Calculation of Overhead line parameters and importance of over head insulators.
- CO 4: Layout of substations, their Equipments functioning.
- CO 5: Concepts of AC & DC distribution systems.

(AE303PC) ANALOG ELECTRONIC CIRCUITS

At the end of this course, students will be able to

- CO 1: Know the characteristics, utilization of various components.
- CO 2: Understand the biasing techniques
- CO 3: Design and analyze various rectifiers, small signal amplifier circuits.
- CO 4: Design sinusoidal and non-sinusoidal oscillators.
- CO 5: Designs OP-AMP based circuits with linear integrated circuits.

(EE304PC) ELECTRICAL MACHINES – I

After learning the contents of this paper the student must be able to

- CO 1: Construction of DC machine, different types of DC generators.
- CO 2: The principle of DC motor, electrical characteristics
- CO 3: The testing and industrial applications of DC motor.
- CO 4: The principle of single phase transformers.
- CO 5: The operation and testing of single phase and three phase transformers.

(EE305PC) ELECTROMAGNETIC FIELDS

After going through this course the student will be able to understand

- CO 1: Ability to apply vector mathematics and physics to calculate parameters electromagnetic problems.
- CO 2: Properties and behavior of conductors, dielectrics & Capacitance.
- CO 3: Magneto statics and Physical laws of electro magnetism and Force in magnetic fields.
- CO 4: Analyze time varying fields in point form and Integral form.
- CO 5: Understand the Propagation of EM Waves.

(EE306PC) ELECTRICAL MACHINES LABORATORY – I

After learning the contents of this paper the student must be able to

- CO 1: Interpret the constructional details of the DC machine.
- CO 2: Test the performance of the DC generator.
- CO 3: Analyze the performance of the DC generator.
- CO 4: Test and analyze the performance of the DC motor.
- CO 5: Evaluate the performance of different Transformers using different testing methods.

(AE307PC) ANALOG ELECTRONIC CIRCUITS LABORATORY

At the end of this course, students will demonstrate the ability to

- CO 1: Know the characteristics, utilization of various components.
- CO 2: Understand the biasing techniques
- CO 3: Design and analyze various rectifiers, small signal amplifier circuits.
- CO 4: Design sinusoidal and non-sinusoidal oscillators.
- CO 5: Design OP-AMP based circuits with linear integrated circuits.

(EE308PC) ELECTRICAL SIMULATION TOOLS LABORATORY

After learning the contents of this paper the student must be able to

- CO 1: Develop knowledge of software packages to model and program electrical and electronics systems.
- CO 2: Model different electrical systems and analyze the results.
- CO 3: Model different electronic systems and analyze the results.
- CO 4: Analyze the performance of electric machines and circuits.
- CO 5: Articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results.

(HS309MC) GENDER SENSITIZATION

Course Outcomes: After learning the contents of this paper the student must be able to

- CO 1: Students will have developed a better understanding of important issues related to gender in contemporary India.
- CO 2: Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- CO 3: Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- CO 4: Men and women students and professionals will be better equipped to work and live together as equals.
- CO 5: Through providing accounts of studies and movements as well as the new laws that

provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

II YEAR II SEMESTER

(ME401ES) SOLID MECHANICS & HYDRAULIC MACHINES

After learning the contents of this paper the student must be able to

- CO 1: Solve problems dealing with forces, beam and cable problems and understand distributed force systems.
- CO 2: Solve friction problems and determine moments of Inertia and centroid of practical shapes.
- CO 3: Solve problems and determine momentum on bodies.
- CO 4: Apply knowledge of mechanics in addressing problems in hydraulic machinery.
- CO 5: Apply knowledge on principles that will be utilized in Hydropower development and for other practical usages.

(EE402PC) MEASUREMENTS AND INSTRUMENTATION

After going through this course, the student can be able to

- CO 1: Understand the working of different types of ammeter and voltmeter, their construction, operation, errors and compensation.
- CO 2: Analyze the instrument transformers, errors and understanding the construction and operation of DC & AC potentiometer.
- CO 3: Develop detailed knowledge on LPF&UPF wattmeter and their extension, working of energy meters and power factor meter.
- CO 4: Acquire the knowledge on measuring of R,L,C parameters.
- CO 5: Understanding and analyzing the digital meter, CRO and transducer

(EE403PC) ELECTRICAL MACHINES – II

After learning the contents of this paper the student must be able to

- CO 1: Detailed working, torque equation and equivalent circuit of three phase induction motor.
- CO 2: Performance, speed control methods and industrial applications of three phase induction motor.
- CO 3: Working of synchronous generator, voltage regulation and its phasor representation.
- CO 4: Parallel operation of synchronous generator and performance of synchronous motor.
- CO 5: Performance and working of single phase motors.

(EE404PC) DIGITAL ELECTRONICS

After learning the contents of this paper the student must be able to

- CO 1: Understand the working of logic families and logic gates.
- CO 2: Design and implement Combinational and Sequential logic circuits.
- CO 3: Implement the conversion between converters.
- CO 4: Design logical circuits using different flip flops.
- CO 5: To learn about Semiconductor Memories and Programmable Logic Devices.

(EE405PC) POWER SYSTEMS-II

After learning the contents of this paper the student must be able to

- CO 1: Analyze transmission line performance.
- CO 2: Apply load compensation techniques to control reactive power.
- CO 3: Understand the application of per unit quantities in power systems and analyze of travelling waves.
- CO 4: Design over voltage protection, insulation coordination.
- CO 5: Determine the fault currents for symmetrical and unbalanced faults.

(EE406PC) DIGITAL ELECTRONICS LABORATORY

After learning the contents of this paper the student must be able to

- CO 1: Understand the working of digital circuits.
- CO 2: Design and implement logic families and logic gates.
- CO 3: Design and implement Combinational logic circuits.
- CO 4: Design and implement Sequential logic circuits.
- CO 5: Analyze different types of semiconductor memories.

(EE407PC) MEASUREMENTS AND INSTRUMENTATION LABORATORY

Upon completion of study of the course, students should be able to

- CO 1: Calibrate and test single phase energy meter and calibrate LPF wattmeter.
- CO 2: Apply the suitable method for measurement of inductance and capacitance.
- CO 3: Measure 3- Φ active power and reactive power.
- CO 4: Test dielectric strength of oil and calibrate LVDT.
- CO 5: Test the instrument transformers.

(EE408PC) ELECTRICAL MACHINES LABORATORY – II

After learning the contents of this paper the student must be able to

- CO 1: Test and analyze the performance of transformer.
- CO 2: Test and analyze the performance of induction motor.
- CO 3: Test the performance of alternator.
- CO 4: Analyze the performance of alternator.
- CO 5: Test and analyze the performance of synchronous motor.

(HS410MC) HUMAN VALUES AND PROFESSIONAL ETHICS

- CO 1: Learns about dilemmas and moral issues and be able to apply these concepts to solve various professional problems
- CO 2: Acquires and understanding of the basic concepts of Professional ethics and human values & also gain the practical implication of ethical theories.
- CO 3: Knows the duties and responsibilities towards the society being in engineering profession.
- CO 4: Students gain the practical implication of evacuation from risk and maintaining confidentiality.
- CO 5:** Meets the global challenges and develop the skills to sustaining in competitive environment.