

MGU

B.Tech Electrical & Electronics Engineering

Course Outcomes

EN010 101 Engineering Mathematics I

1. Have a fundamental understanding of matrices and their special forms, their Eigen values and Eigen vectors; reduction of to canonical form
2. Understand the application of derivatives with multi-variables and the determination of higher order derivatives
3. Assimilate the concepts of double and triple integration and visualize the concept of volume in 3-dimensional space
4. Perceive the concept of linear differential equation of the second order and modeling a differential equation from diverse practical applications
5. Analyze a function, find its Laplace transform and its inverse and to solve differential equations using the transform

EN010 102 Engineering Physics

1. Understand the fundamentals of science and engineering
2. Comprehend the principles behind various engineering applications
3. Ingrain the principles of fiber optics and its applications to engineering and technology

EN010 103 Engineering Chemistry & Environmental Studies

1. Adopt a scientific approach to gain acquaintance with the applications of chemistry in the field of technology
2. Be aware about the major environmental issues for sustainable development

EN010 104 Engineering Mechanics

1. Use the concepts of basic Engineering mechanics concepts in analyzing static structures and identify an appropriate structural system to study a

- given problem and isolate it from its environment, model the problem using compatible free-body diagrams and workable equilibrium equations
2. Identify and model various types of loading and support conditions that act on structural systems
 3. Understand the essence of centers of gravity (mass)/centroids and Moments of Inertia
 4. Apply equations for straight line motion to solve problems with variable acceleration
 5. Analyze dynamic problems using work energy and impulse momentum techniques

EN010 105 Engineering Graphics

1. Prepare and understand drawings and will be familiar with the various curves used in Engineering and their applications
2. Understand and use the principles of orthographic projections
3. Visualize three dimensional objects and to design new products by studying the projections of solids
4. Assimilate solid sections along with the internal details of objects, machine parts, etc
5. Possess good knowledge of isometric and perspective projections which will be helpful in representing the objects in three dimensions

EN010 106 Basic Civil Engineering

1. Possess a working knowledge of the types, manufacturing processes and market rates of construction materials available in the market
2. Understand the different parts of buildings and appropriate construction practices in order to analyze construction work
3. Acquire essential knowledge of different foundations used in practice and their structural significance
4. Appreciate surveying concepts and surveying results like maps, remote sensing, GPS, GIS etc

5. Familiarization with the basics of transportation engineering, sanitary engineering, building regulations and modern concepts of building construction from the social and environmental point of view

EN010 107 Basic Mechanical Engineering

1. Conversant with basic concepts and laws of heat transfer
2. Grasp of IC Engine principles, performance of Refrigeration & Air conditioning units
3. Familiarization with Energy Sources and Power Generation
4. Understand the theory of different types of turbines and their operation
5. Familiarization with various manufacturing processes

EN010 108 Basic Electrical Engineering

1. Solve electrical networks mathematically
2. Obtain elementary knowledge of electromagnetism
3. Distinguish between DC and AC circuits and analyze them
4. Imbibe elementary knowledge of Electric machines
5. Apply different energy conservation measures and create social awareness on home energy management

EN010 109 Basic Electronics Engineering & Information Technology

1. Understand the methods to analyze and characterize basic Electronic circuits and components like transistors, Diodes, Op-Amps etc
2. Understand various frequency bands, analog modulation techniques, principles related to the operation and concepts of satellite and mobile communication
3. Knowledge of electronic measuring instruments, transducers and consumer electronics
4. Understand the basics of digital computer components, different computer

network programming, Internet and IP addressing

EN010 110: Mechanical Workshop

1. Thorough grasp of the functioning of basic mechanical instruments and Workshop activities
2. Understand applications of hand tools and power tools
3. Conversant with marking and measurement in carpentry, fitting, smithy, and foundry
4. Appreciate arc and gas welding techniques

EN010 111: Electrical and Civil Workshop

1. Enable the student to have the practical skills for electrical wiring and basic awareness of safety measures
2. Assimilate fundamental knowledge in the use of components to set up Wiring circuits by soldering and testing them
3. Imbibe practical skills in use of instruments employed in Civil Engg. practice
4. Possess a working knowledge of current building materials, masonry, plumbing and surveying

EN010 301 Engineering Mathematics II

1. Awareness of standard methods and basic numerical techniques for solving problems
2. Ability to compute interpolating polynomials, derivatives and integrals for a particular function from a given data
3. Ability to evaluate line integrals and surface integrals, the use of major theorems in vector calculus (Line Integral, Green's Theorem, Stokes' Theorem, Divergence theorem, etc.)
4. Demonstrated ability in the understanding of basic calculus and ordinary

differential equations

5. Application of Z- transform techniques to solve difference equations

EN010 302: Economics and Communication Skills

1. Understand the structure and functioning of major financial institutions and good perception of the fundamentals of National Income Analysis
2. Analytical ability regarding problems of inflation and BOP with a view to raise control measures
3. Have an understanding of the major issues in International Economics
4. Ability to express themselves fluently and appropriately in social and professional forum
5. Capability of lucid expression of ideas as evidenced in different forms of writing

EE 010 303 Electric Circuit Theory

1. Proficiency in basic analysis of electrical networks using network theorems
2. To perceive the features of AC and DC steady state analysis of simple circuits using time domain equations and Laplace transforms to analyze the transient analysis of RL, RC and RLC series circuits
3. To acquire basic knowledge of computer based analysis of electrical networks
4. Acquire proficiency in coupled circuits and one port networks
5. Gain an in-depth knowledge of three phase systems

EE 010 304: Electrical Measurements & Measuring Instruments

1. Have a understanding of units and standards for electrical measurements
2. Be familiar with the essentials of measuring instruments
3. Working knowledge of the effects and working principles of measuring instruments

4. Be acquainted with construction and operation of measuring instruments
5. To understand errors of measuring instruments and their compensating techniques

EE 010 305: Electronic Circuits

1. Ascertain and determine the theoretical output of basic electronic circuits
2. Develop, design and analyze electronic circuits for practical applications

EE 010 306: Mechanical Technology

1. Understand the basic concepts of Fluid properties, hydraulic machines and pumping machinery
2. To develop an idea about pressure measurements, working and properties of hydraulic machines and various types of pumping machineries

EE 010 307: Electrical Measurements Lab

1. Ability to perform experiments to determine various types of errors in measurements and perform error analysis
2. Familiarity with various measuring instruments used to detect electrical quantities

EE 010 308 Mechanical Laboratory

1. Understand the characteristics of various types of pumps & turbines
2. Understand more about the performance of refrigeration & air conditioning units
3. Analyze the efficiency characteristics of petrol & diesel engine

EN 010 401 Engineering Mathematics III

1. Have a fundamental understanding of Fourier series and their properties
2. Understand Fourier Transform, the convergence issues and properties of Fourier Transform
3. Solve partial differential equations selecting from a variety of techniques
4. Understand basic principles of probability and random variables
5. Ability in the application of relevant Single / Two tailed tests and evaluate a null hypothesis using appropriate models

EE 010 402 D C Machines & Transformers

1. Understand the basic concept of a DC generator
2. Gain knowledge about the characteristics and types of DC Generator
3. Analysis of the operating characteristics of DC motors in detail
4. Analysis of single phase Transformer
5. To gain proficiency in three phase Transformers and the applications

EE 010 403 Linear System Analysis

1. Analysis of different systems and perform their mathematical modelling
2. Develop block diagrams of systems and represent them using signal flow graph
3. Gain knowledge of the effects of parameter variations in open loop and closed loop systems and understand the time domain analysis of systems along with error analysis
4. Acquire knowledge of the concept of stability and the stability analysis techniques with various theorems
5. Understand the network functions for two port network with various parameter sets and their interrelations. Also be able to understand different network connections and some ideal two port devices

EE 101 404 Electro-Magnetic Theory

1. Understand basic concepts and principles of electromagnetic fields
2. Assimilate the practical significance of theory in developing a clear perspective of engineering applications
3. Appreciate the relation between electric and magnetic fields
4. Acquire application knowledge of electromagnetic fields in practice
5. Be conversant with wave motion in Electromagnetic fields

EE 010 405 Digital Systems and Computer Organisation

1. Acquire design knowledge of simple digital circuits to generate control signals for various practical applications
2. Understand the design of asynchronous pulse counters using Flip Flops
3. Design synchronous pulse counters and various types of Shift Registers using Flip Flops
4. Understand the basic working of a microprocessor and its specifications
5. Understand basic interfacing techniques in a computer system

EE 010 406 Computer Programming

1. Acquire the basics of programming using essential blocks of C programming
2. Understand the intricacies of loops and conditional statements
3. Familiarization with the concept of functions and pointers
4. Gain a clear idea of Structures and its use
5. Apply file handling operations in practical applications

EE 010 407 Computer Programming Lab

1. Ability to write, compile and debug programs in C language
2. Formulate problems and implement algorithms in C

EE 010 408 Electronic Circuits Lab

1. Be well versed with basic electronic components and circuits
2. Exposure to a variety of practical electronic circuits to establish theory
3. Ability to use basic circuit building blocks to create advanced circuits

4. Understand component capabilities and limitations to make judicious decisions regarding their best utilization in a specific situation

EN 010 501 Engineering Mathematics IV

1. Understanding of the concept of complex variable and complex integration
2. Assimilation of the concept of numerical solutions of algebraic, transcendental and ordinary differential equations
3. Have a working knowledge of the linear programming problem

EE 010 502 Principles of Management

1. Understand different functional areas of management and to develop appropriate working models
2. Understand the functions and duties of an individual to be performed in an organization

EE 010 503 Signals and Systems

1. Master the concept of signals and system, its classification, Fourier series and its application in circuit theory
2. Gain knowledge of Fourier transform and its properties, inverse Fourier transform, signal transmission and its characteristics, concept of bandwidth
3. Understand the concepts behind the convolution of continuous signals, correlation, power spectral density, energy spectral density, noise detection and its removal
4. Imbibe the basics of sampling, FIR – IIR system, solution of difference equation, discrete time convolution and correlation
5. Understand the concepts of symmetrical 2 port networks, its properties, filters like LPF, HPF, BPF, BRN, k filter and m filter and its properties

EE 010 504 Power Electronics

1. Understand the fundamental principles and applications of power electronics circuits
2. Be conversant with the operating principle of semiconductor power electronic switches and turn-on and turn-off methods
3. Mastery of ac phase control methods to control output power
4. Awareness of various types of power converters
5. Proficiency in the usage of power electronic converters to design inverters and rectifiers

EE 010 505 Linear Integrated Circuits

1. Understand the terminal characteristics of Op-amps and design fundamental circuits based on op-amps
2. Capability to analyse feedback and its effect on the performance of op-amp
3. Acquire knowledge to design and analyse nonlinear circuits
4. Obtain application knowledge of op-amps and IC 555

EE 010 506 Microprocessors and Applications

1. Acquire knowledge of Microprocessors and applications
2. Ability to write programs using 8085 microprocessor
3. Understand the internal architecture and interfacing of different peripheral devices with 8085 Microprocessor
4. Be conversant with programming using 8086 microprocessor

EE 010 507 Electrical Machines Lab I

1. Understand the working of different types of starters in DC machines
2. Be able to plot OCC and determine critical speed of DC machines

3. Ability to conduct brake test, load test and plot different characteristics
4. Understand the concept of efficiency and the short circuit impedance of a three-phase transformer from no-load test, winding resistance, short circuit test, and load test
5. Conduct parallel operation of single phase transformers and calculate losses

EE 010 508 Integrated Circuit Lab

1. Analyze and design various applications of Op-Amp
2. Design and construct waveform generation circuits
3. Design timers analog and digital circuits using op amps
4. Implement combinational logic circuits using digital IC's

EE 010 601 Power Generation and Distribution

1. Be conversant with the operation and working of various power plants
2. Detailed understanding of the economic aspects of power generation
3. Awareness of different configurations of distribution systems
4. Understand the different types of feeder systems
5. Acquire a working knowledge of energy management and energy auditing

EE 010 602 Induction Machines

1. Gain knowledge of the basics of 3 phase induction motors and characteristics
2. Acquaintance with basics of starting methods of three phase squirrel cage induction motor and induction generator
3. Gain knowledge of the working of single phase Induction Motors
4. Be conversant with the working of single and three phase commutator motor
5. Gain knowledge about the concepts of special induction machines

EE 010 603 Control Systems

1. Analyse the system stability through various plots
2. Understand the concept of compensator design
3. Understand the concept of state variable approach and design of systems

EE 010 604 Digital Signal Processing

1. Imbibe the concept of various transformation techniques and application in the field of signal processing
2. Gain knowledge in discrete Fourier transforms and FFT computations
3. Assimilate the concepts behind the design and realization of IIR filters
4. Understand the basics of FIR filter design and its realization
5. Be able to apply the concepts of digital signal processors with inherent errors in diverse signal processing applications

EE 010 605 Micro Controllers and Embedded System

1. Understand 8051 microcontroller programming and interfacing
2. Exposure to advanced PIC 16F877 microcontroller and embedded systems

EE 010 606 L01 High Voltage Engineering

1. Study about the fundamental concepts and theory related to high voltage engineering
2. Will give information about the basic techniques of high voltage AC, DC and impulse generation and measurement
3. Gain knowledge about the testing techniques related to high voltage equipments

EE 010 606 L06 Renewable Energy Resources

1. Gain knowledge of the importance, scope and potential of renewable energy sources
2. Be aware of the applications of non-conventional energy sources

EE010 607 Power Electronics Lab

1. Understand the characteristics of different semiconductor switches used in power electronic systems
2. Ability to analyse, design and apply different power electronic converters, chopper circuits and motor drives

EE 010 608 Microprocessor and Microcontroller Lab

1. Appreciate the need of microprocessors, microcontrollers in the development of various projects
2. Gain mastery over architecture, programming, interfacing details of 8085 microprocessor and 8051 microcontroller
3. Acquire ability to execute different programs for 8085 and 8051 in Assembly Level Language

EE 010 701 Electric Power Transmission

1. Understand the electrical and mechanical design aspects of transmission lines
2. Acquire knowledge of the performance of transmission lines, relevant compensating techniques and power transfer capability
3. Have a working knowledge of different types of substations and grounding methods
4. Acquire an overview of HVDC transmission and FACTS technology

EE 010 702 Synchronous Machines

1. Understand the construction and types of windings used in synchronous generators
2. Identification, formulation and solution of engineering problems in the area of electromechanical energy conversion
3. Acquire knowledge of parallel operation of electric machines operating in generation and motoring mode
4. Appreciate the performance of AC generators under loaded and unloaded condition
5. Imbibe the techniques, skills, and application of modern engineering tools for the control of brushless alternator

EE 010 703 Drives and Control

1. Be aware of the different characteristics of electrical machines used in industry
2. Model electric drives based on energy efficiency
3. Understand the speed control techniques implemented in electric drives using solid state power electronics
4. Appreciate the different closed loop control schemes applied in electric drives

EE 010 704 Modern Control Theory

1. Understand the concepts of control systems, pole placement and observer design methods
2. Gain knowledge of nonlinear systems, types, characteristics and plots
3. Reinforce the concepts of Lyapunov stability analysis of non-linear systems
4. Assimilate the basics of sampling, discrete time systems and stability check
5. Obtain a working knowledge of computer aided control systems, PLC, distributed control systems

EE 010 705 Communication Engineering

1. Understand modulation schemes and provide an insight to analog and digital communication
2. Ability to identify and describe different theoretical terms related to TV transmission and reception
3. Obtain basic detailing of the mechanism used in radar and satellite systems

EE010 706 L03 Power Quality

1. Obtain a perspective of power quality specifications
2. Be aware of the causes and effects of power of low quality
3. Obtain factual information of the various methods of measuring power quality
4. Garner facts about the various devices and methods for improving power quality

EE 010 707 Electrical CAD

1. Gain proficiency in the use of various symbols and notations used in drawings dealing with electrical and electronics engineering
2. Interpretation of drawings, make interferences and work out other technical details
3. Draw the layout of various electrical machines and their windings according to standard practices using AutoCADD software

EE 010 708 Control and Simulation Lab

1. Be able to simulate and design various gate firing circuits
2. Familiarization with MATLAB which will assist them to simulate and analyse different Power Electronic Converters
3. Acquire the ability to study and simulate various Chopper Circuits using MATLAB
4. Study the effects of Lead, Lag and Lag-Lead series compensator on a second order system transient and steady state system response

5. Be acquainted with the effects of locations of poles and zeros in the s-plane on the transients under steady state behaviour

EE 010 709 Seminar

1. Improve the technical presentation skills
2. Write literature review of technical topics
3. Identify and apply well-rehearsed note taking interactive and time management strategies to their academic studies

EE 010 710 Project Work

1. Develop the work practice in students to apply theoretical and practical tools/techniques to solve real-life problems related to industry and current research
2. Identify the modern tools (software/hardware) required for the implementation of projects

EE 010 801 Power System Analysis

1. Acquire knowledge of the mathematical model of a power system and ability to design and specify the ratings of components in a power system
2. Understand advanced mechanisms to address load flow problems
3. Gain comprehensive understanding of the principles of load dispatching
4. Ability to create computational models for analysis of both symmetrical and unsymmetrical conditions in power systems
5. Ability to evaluate the key aspects of a power system and address its performance, cost effectiveness, reliability and stability

EE 010 802 Switch gear & Protection

1. Understand the working principle and functioning of Circuit breakers
2. Obtain a grasp of the working principle of protective relays
3. Imbibe the functioning of protective relays of generators, transformers and feeders

EE 010 803 Electrical System Design

1. Understand the design of DC machines
2. Acquire a thorough design base of the mechanical and electrical aspects of transformers
3. Assimilate the design of synchronous machines and induction machines
4. Obtain a comprehensive idea of electrical wiring layout of residential buildings and factories; accompanied by the preparation of estimates
5. Be well informed about the layout and design of various types of substations and various earthing schemes

EE 010 804 L01 Advanced Power System

1. Be conversant with the engineering and economic involvement in the planning, operation and control of power generation and transmission systems in electric utilities
2. Understand the nuances of unit commitment in power systems
3. Obtain a working knowledge of the characteristics of a wide variety of thermal and hydroelectric power generation systems
4. Understand the subtle concepts of energy exchanges between different power systems
5. Acquire the ability to implement security functions

EE 010 804 L02 Computer Networks

1. Be conversant with the role of Computer networks and their integration in a system

2. Acquire knowledge of hardware and software to make networks more efficient, faster, secure with enhanced transmission over a wider spectrum and ability to interconnect with other networks
3. Be able to differentiate between the various types of networks and selectively apply them to meet the changing and challenging networking needs of organizations
4. Analysis of networks to satisfy security and control constraints, possible errors and control

EE 010 805 G06 Distributed Power Systems

1. Gain an objective understanding of Photovoltaic and fuel cells
2. Obtain a thorough grounding about wind turbines and embedded generation
3. Thorough understanding of different isolated generation
4. Gain a working knowledge of other renewable sources and bio-fuels
5. Acquire proficiency in the areas of power quality issues, operating conflicts and distributed generators on low voltage networks

EE 010 806 Electrical Machines Lab II

1. Be able to conduct tests on different AC electrical machines
2. Be capable to analyze the operation of electric machines under different loading conditions

EE 010 807 Project Work

1. Solve research problems using appropriate techniques, tools and skills
2. Design, analyse and evaluate research works
3. Present project findings effectively and produce technical papers and thesis