

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOMES (REGULATION 2021)

Semester III

Course Code / Course Name: MA3303 / Probability and Complex Functions

CO No.	Course Outcomes (COs)
C201.1	Understand the fundamental concepts of probability with a standard distribution for real-life problems.
C201.2	Apply the basic concepts of one and two dimensional random variables to model engineering problems.
C201.3	Explain the standard techniques of complex variable theory in particular analytic function and its mapping property.
C201.4	Apply the techniques of complex integration and contour integration which can be used in real integrals.
C201.5	Apply the concept of differential equations which are significantly used in engineering problems.

Course Code / Course Name: EE3301 / Electromagnetic Fields

CO No.	Course Outcomes (COs)
C202.1	Apply vector calculus operations in the context of electromagnetic field problems.
C202.2	Understand electric fields, potential distributions, and energy density in free space and dielectrics using electrostatic laws.
C202.3	Evaluate magnetic field quantities and solve magneto static problems using Biot–Savart’s Law and Ampere’s Law.
C202.4	Apply Maxwell’s equations in differential and integral forms to analyze time-varying electromagnetic fields.
C202.5	Analyze the propagation of electromagnetic waves behavior in different materials.

Course Code / Course Name: EE3302 / Digital Logic Circuits

CO No.	Course Outcomes (COs)
C203.1	Understand the Boolean algebra rules and simplification methods to improve the design of digital logic circuits
C203.2	Create diverse combinational digital circuits employing a variety of logic gates.

C203.3	Analyze and design synchronous sequential circuits using standard methods.
C203.4	Analyze asynchronous circuits for stability and hazards; implement designs using programmable logic devices.
C203.5	Design RTL circuits using VHDL, covering combinational and sequential logic; create and test digital systems.

Course Code / Course Name: EC3301 / Electron Devices and Circuits

CO No.	Course Outcomes (COs)
C204.1	Explain the structure and working operation of basic electronic devices.
C204.2	Design and analyze amplifiers.
C204.3	Analyze frequency response of BJT and MOSFET amplifiers
C204.4	Design and analyze feedback amplifiers and oscillator principles.
C204.5	Design and analyze power amplifiers and supply circuits.

Course Code / Course Name: EE3303 / Electrical Machines – I

CO No.	Course Outcomes (COs)
C205.1	Understand the principle of Electromechanical Energy Conversion Process for singly and multiple excited systems.
C205.2	Understand the construction, operation and characteristics of various DC generators.
C205.3	Analyse the performance of DC machine with different tests.
C205.4	Illustrate the equivalent circuit of single phase transformer and predetermine the efficiency and regulation.
C205.5	Enumerate the three phase transformer connections and its advantages.

Course Code / Course Name: CS3353 / C Programming and Data Structures

CO No.	Course Outcomes (COs)
C206.1	Demonstrate proficiency in C programming fundamentals, including data types, variables, expressions, conditional statements, functions, recursion, and arrays.
C206.2	Apply advanced C programming features such as structures, unions, enumerated data types, pointers, file handling, and preprocessor directives to solve complex problems.
C206.3	Implement linear data structures such as lists, stacks, queues, and priority queues in various applications.
C206.4	Design non-linear data structures like binary trees, expression trees, and hashing techniques with appropriate collision resolution methods.
C206.5	Utilize sorting and searching algorithms to efficiently process large data sets, ensuring optimal performance in tasks such as data organization and retrieval.

Course Code / Course Name: EC3311 / Electronic Devices and Circuits Laboratory

CO No.	Course Outcomes (COs)
C207.1	Examine the characteristics of PN, Zener diodes, and BJTs in CE, CC, and CB configurations, as well as JFETs and UJT, through experimentation.
C207.2	Investigate the frequency response characteristics of a Common Emitter amplifier and passive filters experimentally.
C207.3	Evaluate the characteristics of RC phase shift, LC oscillators, and FET-based differential amplifiers in a practical setup.
C207.4	Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally
C207.5	Calculate the frequency and phase angle using CRO experimentally

Course Code / Course Name: EE3311 / Electrical Machines Laboratory – I

CO No.	Course Outcomes (COs)
C208.1	Understand the open circuit and load characteristics of DC generators.
C208.2	Illustrate the performance of DC machine with various Tests.
C208.3	Understand the characteristics of single phase transformers with various Tests.
C208.4	Understand the construction of DC motor starters and three phase Transformer connections.
C208.5	Predetermine the efficiency, regulation and equivalent circuit parameters of transformers.

Course Code / Course Name: CS3362 / C Programming and Data Structures Laboratory

CO No.	Course Outcomes (COs)
C209.1	Utilize various constructs of C programming, such as data types, control structures, functions, and arrays, to design and develop applications for solving real-world or technical problems effectively.
C209.2	Write functions to implement a wide range of operations on linear and nonlinear data structures, such as linked lists, stacks, queues, trees, and graphs, while ensuring efficient handling of data.
C209.3	Apply suitable linear and non-linear data structure operations, such as insertion, deletion, searching, and traversal, to effectively solve complex problems in real world scenarios.
C209.4	Implement appropriate hash functions to ensure efficient data storage and retrieval, focusing on minimizing collisions and optimizing lookup times in large data sets.
C209.5	Execute various sorting and searching algorithms, including Quick Sort, Merge Sort, and Binary Search, to efficiently handle and organize data for specific applications, ensuring optimal performance.

Course Code / Course Name: GE3391 / Professional Development

CO No.	Course Outcomes (COs)
C210.1	Create well-structured and formatted documents using MS Word for academic and technical purposes.
C210.2	Apply advanced formatting tools in MS Word to organize content using tables, styles, headers/footers, and references.

C210.3	Use MS Excel to perform data entry, manipulation, and basic calculations using formulas and functions.
C210.4	Analyze and visualize data in MS Excel using charts, graphs, pivot tables, and conditional formatting for effective decision-making.
C210.5	Design engaging academic presentations using MS PowerPoint by integrating tables, charts, media, and hyperlinks

SEMESTER-IV

Course Code / Course Name: GE3451 / Environmental Sciences and Sustainability

CO No.	Course Outcomes (COs)
C211.1	Understand the functions of the environment, ecosystems, and biodiversity, while emphasizing their conservation and importance for ecological balance.
C211.2	Identify the causes and effects of environmental pollution and natural disasters, and propose preventive measures to address these issues for the betterment of society.
C211.3	Analyze renewable and non-renewable resources and apply sustainable measures to preserve them for future generations through resource optimization.
C211.4	Recognize the different goals of sustainable development and apply them to achieve suitable technological advancements and societal progress.
C211.5	Demonstrate the knowledge of sustainability practices by identifying green materials, understanding energy cycles, and evaluating the role of sustainable urbanization in modern development.

Course Code / Course Name: EE3401 / Transmission and Distribution

CO No.	Course Outcomes (COs)
C212.1	Explain the structure of power systems and compute transmission line parameters for various configurations, considering skin and proximity effects.
C212.2	Analyze transmission line models to evaluate line performance, including the Ferranti effect and corona impact.
C212.3	Perform the mechanical design of transmission lines, grounding systems, and assess the role of insulators in transmission systems.
C212.4	Design underground cables and conduct performance analysis for their effective operation.
C212.5	Evaluate the modelling, performance, and modern advancements in distribution systems

Course Code / Course Name: EE3402 / Linear Integrated Circuits

CO No.	Course Outcomes (COs)
C213.1	Describe the monolithic IC fabrication process and the fabrication of diodes, capacitors, resistors, FETs, and PV cells.
C213.2	Analyze the characteristics and basic applications of operational amplifiers, including inverting/non-inverting amplifiers, summers, differentiators, integrators, and V/I and I/V converters.
C213.3	Discuss the design and applications of op-amp-based circuits, such as instrumentation amplifiers, log/antilog amplifiers, analog multipliers/dividers, active filters, comparators,

	and waveform generators.
C213.4	Explain the principles, functional blocks, characteristics, and applications of IC-based timers, PLLs, and analog multipliers.
C213.5	Explore the applications of ICs in instrumentation amplifiers, voltage regulators, SMPS, and function generators.

Course Code / Course Name: EE3403 / Measurements and Instrumentation

CO No.	Course Outcomes (COs)
C214.1	Demonstrate an understanding of the fundamental principles of measurement in engineering.
C214.2	Explain the structural elements and working principles of various measuring instruments.
C214.3	Analyze the significance and applications of bridge circuits in measurement systems.
C214.4	Explore the characteristics and functionality of various transducers through experiments.
C214.5	Apply concepts of digital and virtual instrumentation in experimental setups.

Course Code / Course Name: EE3404 / Microprocessor and Microcontroller

CO No.	Course Outcomes (COs)
C215.1	Develop assembly language programs for microprocessors and microcontrollers.
C215.2	Design peripheral interfacing with microprocessors and microcontrollers.
C215.3	Analyze the microprocessor-based systems for control and monitoring applications.
C215.4	Design microcontroller-based systems for control and monitoring applications.
C215.5	Understand the advanced architectures in the evolving field of microprocessors.

Course Code / Course Name: EE3405 / Electrical Machines – II

CO No.	Course Outcomes (COs)
C216.1	Explain the construction and working principles of synchronous generators.
C216.2	Describe the construction and working principles of synchronous motors.
C216.3	Understand the construction and working principles of three-phase induction motors.
C216.4	Demonstrate knowledge of the starting methods and speed control techniques for induction motors.
C216.5	Understand the basic principles and operation of single-phase induction motors and special electrical machines.

Course Code / Course Name: EE3411 / Electrical Machines Laboratory – II

CO No.	Course Outcomes (COs)
C217.1	Understand EMF and MMF methods in synchronous machines.
C217.2	Analyze the characteristics of V-curves and inverted V-curves for synchronous machines.
C217.3	Conduct tests on alternators to evaluate performance indices using analytical and graphical methods, highlighting the importance of synchronous machines.

C217.4	Perform tests on single and three-phase induction motors to assess their performance indices using standard methods.
C217.5	Demonstrate knowledge of loss separation techniques in electrical machines.

Course Code / Course Name: EE3412 / Linear and Digital Circuits Laboratory

CO No.	Course Outcomes (COs)
C218.1	Understand and implement Boolean functions in digital circuits.
C218.2	Recognize the significance of code conversion in digital systems.
C208.3	Design circuit using digital ICs such as decoders, multiplexers, and registers.
C218.4	Apply operational amplifiers (Op-Amps) in various applications.
C218.5	Design counters using analog ICs like timers and VCOs, as well as digital ICs like flip-flops and counters.

Course Code / Course Name: EE3413 /Microprocessor and Microcontroller Laboratory

CO No.	Course Outcomes (COs)
C219.1	Develop assembly language programs for microprocessors.
C219.2	Develop assembly language programs for microcontrollers.
C219.3	Design and implement peripheral interfacing with microprocessors and microcontrollers.
C219.4	Analyze microprocessor-based systems for control and monitoring applications.
C219.5	Design and simulate microcontroller-based systems for control and monitoring applications.

SEMESTER V

Course Code / Course Name: EE3501/Power System Analysis

CO No.	Course Outcomes (COs)
C301.1	Explain the need for power system planning and represent various components using single-line diagrams and per unit quantities.
C301.2	Solve power flow problems using Gauss-Seidel and Newton-Raphson methods for different bus types.
C301.3	Analyze symmetrical faults in power systems using bus impedance matrices and compute fault levels.
C301.4	Evaluate unsymmetrical faults in power systems using symmetrical component theory and sequence networks.
C301.5	Apply the swing equation and equal area criterion to assess the stability of power systems under disturbances.

Course Code / Course Name: EE3591/Power Electronics

CO No.	Course Outcomes (COs)
C302.1	Apply knowledge of power semiconductor devices and their dynamic behavior to design and analyze low-power SMPS.

C302.2	Develop the skills to evaluate uncontrolled rectifier circuits and design appropriate filtering techniques.
C302.3	Acquire the capability to analyze multi-pulse converters and assess key performance parameters.
C302.4	Implement various PWM techniques for voltage control and harmonic reduction in inverter circuits.
C302.5	Comprehend the working principles of AC voltage controllers and explore their practical applications.

Course Code / Course Name: EE3503/Control Systems

CO No.	Course Outcomes (COs)
C303.1	Model linear time-invariant systems using differential equations, transfer functions, and block diagrams.
C303.2	Analyze time-domain responses and assess stability using Routh-Hurwitz and root locus techniques.
C303.3	Perform frequency domain analysis using Bode, Polar, and Nyquist plots.
C303.4	Formulate state-space models and analyze controllability and observability.
C303.5	Design PID and compensator-based control systems using time and frequency domain methods.

Course Code / Course Name: EE3001/Utilization and Conservation of Electrical Energy

CO No.	Course Outcomes (COs)
C304.1	Understand the fundamentals of electric drives and analyze the characteristics and control of traction systems and their components.
C304.2	Evaluate indoor and outdoor illumination systems using appropriate lighting sources and techniques.
C304.3	Explain various electric heating and welding methods, their applications, and assess their advantages over conventional methods.
C304.4	Apply energy conservation techniques in industrial and electrical systems, and simulate the effect of power factor improvement using capacitors.
C304.5	Analyze domestic utilization systems such as house wiring, air conditioning, UPS systems, and assess power quality and earthing requirements in different sectors.

Course Code / Course Name: EE3017 /Embedded C Programming

CO No.	Course Outcomes (COs)
C305.1	Describe the basic concepts of C programming and construct simple programs using control structures and arrays.
C305.2	Organize Embedded C code using modular techniques and develop routines to handle real-time constraints.
C305.3	Implement 8051-based applications in C using I/O operations, logic processing, and data conversion techniques.
C305.4	Demonstrate serial communication and apply interrupt-driven programming and timer configuration in 8051.
C305.5	Integrate peripheral devices like ADC, DAC, sensors, LCD, and motors with 8051 using appropriate interfacing techniques.

Course Code / Course Name: CE1331/ PLC Programming

CO No.	Course Outcomes (COs)
C306.1	Understand the fundamentals and significance of industrial automation.
C306.2	Interpret logic and execution flow of automation programs used in process control.
C306.3	Understand SCADA architecture and its associated industrial communication protocols.
C306.4	Describe the various PLC network architectures and communication protocols based on their topology, performance.
C306.5	Apply automation solutions using any of the programming languages defined in the IEC 61131-3 standard.

Course Code / Course Name: MX3084/ Disaster Risk Reduction and Management

CO No.	Course Outcomes (COs)
C307.1	Impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
C307.2	Enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
C307.3	Develop disaster response skills by adopting relevant tools and technology
C307.4	Enhance awareness of institutional processes for Disaster response in the country.
C307.5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity.

Course Code / Course Name: EE3511/ Power Electronics Laboratory

CO No.	Course Outcomes (COs)
C308.1	Determine the characteristics of SCR, IGBT, TRIAC, MOSFET and IGBT
C308.2	Find the transfer characteristics of full converter, semi converter, step up and step down choppers by simulation experimentation.
C308.3	Analyze the voltage waveforms for PWM inverter using various modulation techniques
C308.4	Design and experimentally verify the performance of basic DC/DC converter topologies used for SMPS
C308.5	Understand the performance of AC voltage controllers by simulation and experimentation.

Course Code / Course Name: EE3512/ Control and Instrumentation Laboratory

CO No.	Course Outcomes (COs)
C309.1	Apply analog and numerical simulation techniques to solve and analyze differential equations.
C309.2	Develop mathematical models of physical systems and analyze their behavior across multiple domains.
C309.3	Evaluate the stability and performance of dynamic systems using classical analysis methods.
C309.4	Design and implement compensators and controllers for improving system performance.
C309.5	Analyze discrete-time control systems and design state-space based control strategies.