MEENAKSHI COLLEGE OF ENGINEERING

No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

REGULATION-2021

COURSE OUTCOMES

SEMESTER-1

COURSE NAME: HS3152- PROFESSIONAL ENGLISH I

CO1	Utilize suitable language in professional settings.
CO2	Develop a strong understanding of essential grammatical structures and effectively utilize them in diverse contexts.
CO3	Interact with technical texts to uncover both their apparent and hidden significances, comprehensively exploring not just their technical complexities but also their nuanced interpretations.
CO4	Examine and interpret data presented in tables, charts, and other visual formats.
CO5	Compose definitions, descriptions, narratives, and essays covering a wide range of topics.

COURSE NAME: MA3151- MATRICES AND CALCULUS

CO1	Apply matrix algebra techniques to address real-world problems.
CO2	Apply methods from differential calculus to address a variety of practical problems. .
CO3	Able to employ principles from differential calculus in addressing functions involving multiple variables.
CO4	Utilize a variety of integration techniques to effectively tackle real-world problems.
CO5	Apply concepts of multiple integrals to solve problems involving areas, volumes, and various practical situations.

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COURSE NAME: PH3151- ENGINEERING PHYSICS

CO1	Understand the importance of mechanics.
CO2	Express their knowledge in electromagnetic waves.
CO3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO4	Understand the importance of quantum physics.
CO5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

COURSE NAME: CY3151- ENGINEERING CHEMISTRY

CO1	Interpret the water quality parameters and water treatment techniques.
CO2	Demonstrate the basic principles and preparatory methods of nanomaterials.
CO3	Illustrate the basic concepts and applications of phase rule and composites.
CO4	Facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
CO5	Familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.

COURSE NAME: GE3151-PROBLEM SOLVING AND PYTHON PROGRAMMING

CO1	Develop algorithmic solutions to simple computational problems
CO2	Develop and execute simple Python programs
CO3	Write simple Python programs using conditionals and loops for solving problems
CO4	Decompose a Python program into functions
CO5	Represent compound data using Python lists, tuples, dictionaries etc
	Read and write data from/to files in Python programs

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Chennai-600078

COURSE NAME: GE3152-HERITAGE OF TAMILS

CO1	Discuss the Tamil Language and Literature
CO2	Discuss about the paintings modern Art Sculpture
CO3	Illustrate the folk martial arts
CO4	Understand the Sangam age through Tamil Literature
CO5	Discuss the contribution of Tamil Literature in Indian Civilization

COURSE NAME: GE3171-PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

CO1	Develop algorithmic solutions to simple computational problems
CO2	Develop and execute simple Python programs
CO3	Implement programs in Python using conditionals and loops for solving problems
CO4	Deploy functions to decompose a Python program
CO5	Process compound data using Python data structures
	Utilize Python packages in developing software applications

COURSE NAME: BS3171-PHYSICS LABORATORY

CO1	Understand the functioning of various physics laboratory equipment.
CO2	Use graphical models to analyze laboratory data.
CO3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO4	Access, process and analyze scientific information.
CO5	Solve problems individually and collaboratively.

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COURSE NAME: BS3171-CHEMISTRY LABORATORY

CO1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO
CO2	To determine the amount of metal ions through volumetric and spectroscopic techniques
CO3	To analyse and determine the composition of alloys
CO4	To learn simple method of synthesis of nanoparticles
CO5	To quantitatively analyse the impurities in solution by electroanalytical techniques

COURSE NAME: GE3172-ENGLISH LABORATORY

CO1	Engage in active listening to effectively absorb and comprehend a broad spectrum of academic information, ranging from general concepts to more complex topics.
CO2	Listen attentively and understand various perspectives presented in a discussion.
CO3	Communicate fluently and accurately in both formal and informal contexts.
CO4	Describe products and processes clearly and accurately, elucidating their uses and purposes effectively.
CO5	Express opinions adeptly in both formal and informal discussions.

SEMESTER-II

COURSE NAME: HS3252-PROFESSIONAL ENGLISH – II

CO1	Analyze and differentiate between products and ideas in technical texts, highlighting their similarities and differences.
CO2	Identify and document cause-and-effect relationships within events and industrial processes by analyzing technical texts.
CO3	Examine issues thoroughly to develop practical solutions and convey them effectively through written communication.
CO4	Express their ideas and opinions in an organized and coherent manner.
CO5	Compose compelling resumes tailored to the specifics of job searches.

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Chennai-600078

COURSE NAME: MA3251-STATISTICS AND NUMERICAL METHODS

CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems
CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture
CO3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

COURSE NAME : PH3202-PHYSICS FOR ELECTRICAL ENGINEERING

CO1	Know basics of dielectric materials and insulation.
CO2	Gain knowledge on the electrical and magnetic properties of materials and their applications
CO3	Understand clearly of semiconductor physics and functioning of semiconductor devices
CO4	Understand the optical properties of materials and working principles of various optical devices
CO5	Appreciate the importance of nanotechnology and nanodevices.

COURSE NAME : BE3255-BASIC CIVIL AND MECHNICAL ENGINEERING

CO1	To Understanding profession of Civil and Mechanical engineering
CO2	To Summarize the planning of building, infrastructure and working of Machineries
CO3	To Apply the knowledge gained in respective discipline
CO4	ToIllustrate the ideas of Civil and Mechanical Engineering applications
CO5	To Appraise the material, Structures, machines and energy

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME: GE3251- ENGINEERING GRAPHICS

CO1	To Use BIS conventions and specifications for engineering drawing
CO2	To Construct the conic curves, involutes and cycloid
CO3	To Solve practical problems involving projection of lines
CO4	To Draw the orthographic, isometric and perspective projections of simple solids
CO5	To Draw the development of simple solids

COURSE NAME : EE3251- ELECTRIC CIRCUIT ANALYSIS

CO1	To Explain circuit's behavior using circuit laws
CO2	To Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit
CO3	To Compute the transient response of first order and second order systems to step and sinusoidal input
CO4	To Compute power, line/ phase voltage and currents of the given three phase circuit
CO5	To Explain the frequency response of series and parallel RLC circuits
	To Explain the behavior of magnetically coupled circuits

COURSE NAME : GE3252- TAMILS AND TECHNOLOGY

CO1	Learn about weaving and ceramic methods in Sangam period
CO2	Experience about art and sculpture in Sangam period
CO3	Make and use of metals in Sangam period
CO4	Apply the knowledge on water management in Sangam Period
CO5	Implementing the digitization in Tamil

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME : GE3271- ENGINEERING PRACTICES LABORATORY

CO1	To Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work
CO2	To Wire various electrical joints in common household electrical wire work
CO3	To Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work
CO4	To Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB

COURSE NAME : EE3271- ELECTRIC CIRCUITS LABORATORY

CO1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit
CO2	Use simulation and experimental methods to verify the various electrical theorems
CO3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods
CO4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods

COURSE NAME : GE3272- COMMUNICATION LABORATORY

CO1	To Speak effectively in group discussions held in formal/semi formal contexts
CO2	To Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
CO3	To Write emails, letters and effective job applications
CO4	To Write critical reports to convey data and information with clarity and precision
CO5	To Give appropriate instructions and recommendations for safe execution of tasks

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

SEMESTER-III

COURSE NAME : MA3303- PROBABILITY AND COMPLEX FUNCTIONS

CO1	To understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon
CO2	To understand the basic concepts of one and two dimensional random variables and apply in engineering applications
CO3	To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property
CO4	To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
CO5	To acquaint the students with Differential Equations which are significantly used in engineering problems.

COURSE NAME : EE3301- ELECTROMAGNETIC FIELDS

CO1	Visualize and explain Gradient, Divergence, and Curl operations on electromagnetic vector fields and identify the electromagnetic sources and their effects
CO2	Compute and analyse electrostatic fields, electric potential, energy density along with their applications
CO3	Compute and analyse magneto static fields, magnetic flux density, vector potential along with their applications.
CO4	Explain different methods of emf generation and Maxwell's equations
CO5	Explain the concept of electromagnetic waves and characterizing parameters

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME : EE3302- DIGITAL LOGIC CIRCUITS

CO1	Explain various number systems and characteristics of digital logic families
CO2	Apply K-maps and Quine McCluskey methods to simplify the given Boolean expressions
CO3	Explain the implementation of combinational circuit such as multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders
CO4	Design various synchronous and asynchronous circuits using Flip Flops
CO5	Explain asynchronous sequential circuits and programmable logic devices
CO6	Use VHDL for simulating and testing RTL, combinatorial and sequential circuits

COURSE NAME : EC3301- ELECTRON DEVICES AND CIRCUITS

CO1	Explain the structure and operation of PN junction devices
CO2	Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes
CO3	Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT
CO4	Analyze the performance of various configurations of BJT and MOSFET based amplifier
CO5	Explain the characteristics of MOS based cascade and differential amplifier
CO6	Explain the operation of various feedback amplifiers and oscillators

COURSE NAME: EE3303- ELECTRICAL MACHINES - I

CO1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems
CO2	Explain the construction and working principle of DC machines
CO3	Interpret various characteristics of DC machines
CO4	Compute various performance parameters of the machine, by conducting suitable tests.
CO5	Draw the equivalent circuit of transformer and predetermine the efficiency and regulation
CO6	Describe the working principle of auto transformer, three phase transformer

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME: CS3353 C PROGRAMMING AND DATA STRUCTURES

CO1	Develop C programs for any real world/technical application
CO2	Apply advanced features of C in solving problems
CO3	Write functions to implement linear and non–linear data structure operations
CO4	Suggest and use appropriate linear/non–linear data structure operations for solving a problem
CO5	Appropriately use sort and search algorithms for a given application and apply appropriate hash functions result in a collision free scenario for data storage and retrieval

COURSE NAME: EC3311- ELECTRONIC DEVICES AND CIRCUITS LABORATORY

CO1	Analyze the characteristics of PN, Zener diode and BJT in configurations experimentally
CO2	Analyze the characteristics of JFET and UJT experimentally
CO3	Analyze frequency response characteristics of a Common Emitter amplifier experimentally
CO4	Analyze the characteristics of RC phase shift and LC oscillators experimentally
CO5	Analyze the characteristics of rectifier and FET based differential amplifier experimentally
CO6	Calculate the frequency and phase angle using CRO and analyze the frequency response characteristics of passive filters experimentally

COURSE NAME: EE3311- ELECTRICAL MACHINES LABORATORY – I

CO1	Construct the circuit with appropriate connections for the given DC machine/transformer
CO2	Experimentally determine the characteristics of different types of DC machines
CO3	Demonstrate the speed control techniques for a DC motor for industrial applications
CO4	Identify suitable methods for testing of transformer and DC machines
CO5	Predetermine the performance parameters of transformers and DC motor
CO6	Understand DC motor starters and 3-phase transformer connections

MEENAKSHI COLLEGE OF ENGINEERING
No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME : CS3362- C PROGRAMMING AND DATA STRUCTURES LABORATORY

CO1	Use different constructs of C and develop applications
CO2	Write functions to implement linear and non-linear data structure operations
CO3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem
CO4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
CO5	Implement Sorting and searching algorithms for a given application

COURSE NAME: GE3361-PROFESSIONAL DEVELOPMENT

CO1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

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Chennai-600078

SEMESTER-IV

COURSE NAME : GE3451- ENVIRONMENTAL SCIENCES AND SUSTAINABILITY

CO1	To recognize the functions of environment, ecosystems and biodiversity and their conservation
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations
CO4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization

COURSE NAME : EE3401- TRANSMISSION AND DISTRIBUTION

CO1	Understand the structure of power system, computation of transmission line parameters for different configurations
CO2	Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance
CO3	Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system
CO4	Design the underground cables and understand the performance analysis of underground cable
CO5	Understand the modelling, performance analysis and modern trends in distribution system

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME : EE3402- LINEAR INTEGRATED CIRCUITS

CO1	Explain monolithic IC fabrication process
CO2	Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell
CO3	Analyze the characteristics and basic applications of Op-Amp
CO4	Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters
CO5	Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs.
CO6	Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator

COURSE NAME : EE3403- MEASUREMENTS AND INSTRUMENTATION

CO1	Ability to understand the fundamental art of measurement in engineering
CO2	Ability to understand the structural elements of various instruments
CO3	Ability to understand the importance of bridge circuits
CO4	Ability to understand about various transducers and their characteristics by experiments
CO5	Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME : EE3404- MICROPROCESSOR AND MICROCONTROLLER

CO1	Ability to write assembly language program for microprocessor and microcontroller
CO2	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
CO3	Ability to analyze, comprehend, design and simulate microprocessorbased systems used for control and monitoring
CO4	Ability to analyze, comprehend, design and simulate microcontrollerbased systems used for control and monitoring.
CO5	Ability to understand and appreciate advanced architecture evolving microprocessor field

COURSE NAME : EE3405- ELECTRICAL MACHINES - II

CO1	Ability to understand the construction and working principle of Synchronous generator
CO2	Ability to understand the construction and working principle of Synchronous Motor
CO3	Ability to understand the construction and working principle of Three Phase Induction Motor
CO4	Acquire knowledge about the starting and speed control of induction motors
CO5	To gain knowledge about the basic principles and working of Single-phase induction motors and Special Electrical Machines

COURSE NAME : EE3411- ELECTRICAL MACHINES LABORATORY - II

CO1	Ability to understand and analyze EMF and MMF methods
CO2	Ability to analyze the characteristics of V and Inverted V curves
CO3	Acquire hands on experience of conducting various tests on alternators and to understand the importance of Synchronous machines
CO4	Acquire hands on experience of conducting various tests on induction motors and to understand the importance of single and three phase Induction motors
CO5	Ability to acquire knowledge on separation of losses

COURSE NAME : EE3412- LINEAR AND DIGITAL CIRCUITS LABORATORY

CO1	Ability to understand and implement Boolean Functions
CO2	Ability to understand the importance of code conversion
CO3	Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register
CO4	Ability to acquire knowledge on Application of Op-Amp
CO5	Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters

COURSE NAME : EE3413-MICROPROCESSOR AND MICROCONTROLLER LABORATORY

CO1	Ability to write assembly language program for microprocessor
CO2	Ability to write assembly language program for microcontroller
CO3	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
CO4	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring
CO5	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring

SEMESTER-V

COURSE NAME : EE3501- POWER SYSTEM ANALYSIS

CO1	Ability to model the power system under steady state operating condition
CO2	Ability to carry out power flow analysis using
CO3	Ability to infer the significance of short circuit studies in designing circuit breakers.
CO4	Ability to analyze the state of the power system for various unsymmetrical faults
CO5	Ability to analyze the stability of power system using different methods

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME : EE3591- POWER ELECTRONICS

CO1	Understand the operation of semiconductor devices and dynamic characteristics and to design &analyze the low power SMPS
CO2	Analyze the various uncontrolled rectifiers and design suitable filter circuits
CO3	Analyze the operation of the n-pulse converters and evaluate the performance parameters
CO4	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits
CO5	Understand the operation of AC voltage controllers and its applications

COURSE NAME : EE3503- CONTROL SYSTEMS

CO1	Represent simple systems in transfer function and state variable forms
CO2	Analyze simple systems in time domain
CO3	Analyze simple systems in frequency domain
CO4	Infer the stability of systems in time and frequency domain
CO5	Interpret characteristics of the system and find out solution for simple control problems

COURSE NAME : EE3025- ELECTRIC VEHICLE ARCHITECTURE

CO1	Summarize the History and Evolution of EVs, Hybrid and Plug-In Hybrid EVs
CO2	Describe the various EV components
CO3	Describe the concepts related in the Plug-In Hybrid Electric Vehicles
CO4	Analyse the details and Specifications for the various EVs developed
CO5	Describe the hybrid vehicle control strategy

MEENAKSHI COLLEGE OF ENGINEERING

No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME : EE3033- HYBRID ENERGY TECHNOLOGY

CO1	Analyze the impacts of hybrid energy technologies on the environment and demonstrate them to harness electrical powers
CO2	Select a suitable Electrical machine for Wind Energy Conversion Systems and simulate wind energy conversion system
CO3	Design the power converters such as AC-DC, DC-DC, and AC-AC converters for SPV systems
CO4	Analyze the power converters such as AC-DC, DC-DC, and AC-AC converters for Hybrid energy systems
CO5	Interpret the hybrid renewable energy systems

COURSE NAME : EE3018- EMBEDDED PROCESSORS

CO1	Interpret the basics and functionality of processor functional blocks
CO2	Observe the specialty of RISC processor Architecture
CO3	Incorporate the I/O hardware interface of processor with peripherals
CO4	Emphasis the communication features of the processor
CO5	Improved Employability and entrepreneurship capacity due to knowledge up gradation on recent trends in commercial embedded processors

COURSE NAME : EE3512- POWER ELECTRONICS LABORATORY

CO1	Determine the characteristics of SCR, IGBT, TRIAC, MOSFET and IGBT
CO2	Find the transfer characteristics of full converter, semi converter, step up and step down choppers by simulation experimentation
CO3	Analyze the voltage waveforms for PWM inverter using various modulation techniques
CO4	Design and experimentally verify the performance of basic DC/DC converter topologies used for SMPS
CO5	Understand the performance of AC voltage controllers by simulation and experimentation

COURSE NAME : EE3512- CONTROL AND INSTRUMENTATION LABORATORY

CO1	To model and analyze simple physical systems and simulate the performance in analog and digital platform
CO2	To design and implement simple controllers in standard forms
CO3	To design compensators based on time and frequency domain specifications
CO4	To design a complete closed control loop and evaluate its performance for simple physical systems
CO5	To analyze the stability of a physical system in both continuous and discrete domains

SEMESTER-VI

COURSE NAME : EE3602- POWER SYSTEM OPERATION AND CONTROL

CO1	Understand and select proper protective scheme and type of earthing.
CO2	Explain the operating principles of various relays.
CO3	Suggest suitable protective scheme for the protection of various power system apparatus.
CO4	Analyze the importance of static relays and numerical relays in power system protection.
CO5	Summarize the merits and demerits and application areas of various circuit breakers.

COURSE NAME: EE3601-PROTECTION AND SWITCHGEAR

CO1	Understand the day – to – day operation of power system.
CO2	Model and analyse the control actions that are implemented to meet the minute-to minute variation of system real power demand
CO3	Model and analyze the compensators for reactive power control and various devices used for voltage control.
CO4	Prepare day ahead and real time economic generation scheduling.
CO5	Understand the necessity of computer control of power systems.

COURSE NAME : EE3014- POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS

CO1	Examine the available renewable energy sources.
CO2	Demonstrate the working principles of electrical machines and power converters used for wind energy conversion system
CO3	Demonstrate the principles of power converters used for solar PV systems
CO4	Examine the available hybrid renewable energy systems.
CO5	Simulate AC-DC converters, buck/boost converters, AC-AC converters and PWM inverters

COURSE NAME : EE3611- POWER SYSTEM LABORATORY

CO1	To provide a better understanding of modelling of transmission lines in impedance and admittance forms.
CO2	To apply iterative techniques for power flow analysis and to carry out short circuit and stability studies on power system
CO3	To analyze the load - frequency and voltage controls
CO4	To analyze optimal dispatch of generators and perform state estimation
CO5	To understand the operation of relays, characteristics, and applications

SEMESTER-VII

COURSE NAME : EE3020-SMART SYSTEM AUTOMATION

CO1	Understand the concepts of smart system design and its present developments.
CO2	Illustrate different embedded open-source and cost-effective techniques for developing solution for real time applications.
CO3	Acquire knowledge on different platforms and Infrastructure for Smart system design
CO4	Infer about smart appliances and energy management concepts.
CO5	Improve Employability and entrepreneurship capacity due to knowledge upgradation on embedded system technologies.

MEENAKSHI COLLEGE OF ENGINEERING
No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

COURSE NAME: EE3028- DESIGN OF ELECTRIC VEHICLE CHARGING SYSTEM

CO1	To illustrate various charging techniques and to know charging standards and regulations
CO2	To demonstrate the working o DC-DC converters used for charging systems and principles
CO3	To illustrate the advantages of renewable system based charging systems
CO4	To demonstrate the principles of wireless power transfer.
CO5	To analyze the standards for wireless charging
C06	To design and simulate boost converter-based power factor correction.

COURSE NAME: EE3611- POWER SYSTEM LABORATORY

CO1	Model and analyze the performance of the transmission lines.
CO2	Perform power flow, short circuit, and stability analysis for any power system network.
CO3	Understand, design, and analyze the load frequency control mechanism.
CO4	Perform optimal scheduling of generators and compute the state of the power system.
CO5	Understand, analyze, and apply the relays for power system protection.

COURSE NAME: EE3014- Power Electronics for Renewable Energy Systems

CO1	Examine the available renewable energy sources.
CO2	Demonstrate the working principles of electrical machines and power converters used for wind energy conversion system
CO3	Demonstrate the principles of power converters used for solar PV systems
CO4	Examine the available hybrid renewable energy systems.
CO5	Simulate AC-DC converters, buck/boost converters, AC-AC converters and PWM inverters

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Chennai-600078

COURSE NAME: EE3007- SMART GRID

CO1	To be able to understand the importance and objectives of Power System Grid.
CO2	To be able to know and understand the concept of a smart grid;
CO3	To identify and discuss smart metering devices and associated technologies.
CO4	To be able to get an overview of Microgrid and Electric Vehicle Technology
CO5	To be able to have an up-to-date knowledge on the various computing technologies; to understand the role of Big Data and IoT for effective and efficient operation of Smart Grid

COURSE NAME: OCS352- IoT Concepts and Applications

CO1	Explain the concept of IoT
CO2	Understand the communication models and various protocols for IoT.
CO3	Design portable IoT using Arduino/Raspberry Pi /open platform
CO4	Apply data analytics and use cloud offerings related to IoT
CO5	Analyze applications of IoT in real time scenario

COURSE NAME: CME365- Renewable Energy Technologies

CO1	Discuss the Indian and global energy scenario
CO2	Describe the various solar energy technologies and its applications
CO3	Explain the various wind energy technologies
CO4	Explore the various bio-energy technologies
CO5	Discuss the ocean and geothermal technologies

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No-12, Vembuli Amman Koil Street, West K.K Nagar
Chennai-600078

SEMESTER-VII

COURSE NAME: EE3701- High Voltage Engineering

CO1	Explain various overvoltage's and its effects on power systems
CO2	Understand the breakdown phenomena in different medium under uniform and non- uniform fields
CO3	Explain the methodsof generating and measuring High DC, AC, Impulse voltage and currents
CO4	Suggest and Conduct suitable HV testing of Electrical power apparatus as per Standards
CO5	Explain the Industrial Applications of Electrostatic Fields

COURSE NAME: GE3791- Human Values and Ethics

CO1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life
CO2	Practice democratic and scientific values in both their personal and professional life
CO3	Find rational solutions to social problems
CO4	Behave in an ethical manner in society
CO5	Practice critical thinking and the pursuit of truth

COURSE NAME: GE3752- Total Quality Management

CO1	Ability to apply TQM concepts in a selected enterprise
CO2	Ability to apply TQM principles in a selected enterprise
CO3	Ability to understand Six Sigma and apply Traditional tools, New tools, Benchmarking and FMEA.
CO4	Ability to understand Taguchi's Quality Loss Function, Performance Measures and apply QFD, TPM, COQ and BPR
CO5	Ability to apply QMS and EMS in any organization

SEMESTER-VIII

COURSE NAME: EE3811- PROJECT WORK / INTERNSHIP

CO1	Ability to identify, formulate, design, interprete,analyze and provide solutions to complex engineering and societal issues by applying knowledge gained on basics of science and Enginnering.
CO2	Ability to choose, conduct and demonstrate a sound technical knowledge of their selected project topics in the field of power components, protection, highvoltage, electronics, process automation, power electronics and drives instrumentation and control by exploring suitable engineering and IT tools.
CO3	Ability to understand, formulate and propose new learning algorithms to solve engineering and societal problems of moderate complexity through multidisciplinary projectsunderstanding commitment towards sustainable development
CO4	Ability to demonstrate, prepare reports, communicate and work in a team as a member/leader by adhering to ethical responsibilities
CO5	Ability to acknowledge the value of continuing education for oneself and to stay up with technology advancements