



AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi, & Permanently Affiliated to J.N.T.U-GV, Vizianagaram)

NAAC "B++" Accredited Institute

Cherukupally (Village), Near Tagarapuvalasa Bridge, Vizianagaram (Dist) -531162.

www.aietta.ac.in, principal@aietta.ac.in

Department of Electrical and Electronics Engineering

Program: B.Tech- Electrical and Electronics Engineering

Regulation: R20

Course Outcomes

No. of Courses: 77

I-I Sem	Course: Communicative English
CO-1	understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
CO-2	ask and answer general questions on familiar topics and introduce oneself/others
CO-3	employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
CO-4	recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
CO-5	form sentences using proper grammatical structures and correct word forms
I-I Sem	Course: Mathematics-I
CO-1	utilize mean value theorems to real life problems
CO-2	solve the differential equations related to various engineering fields
CO-3	familiarize with functions of several variables which is useful in optimization
CO-4	apply double integration techniques in evaluating areas bounded by region
CO-5	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
I-I Sem	Course: Mathematics-II
CO-1	develop the use of matrix algebra techniques that is needed by engineers for practical applications
CO-2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel
CO-3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms
CO-4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals
CO-5	apply numerical integral techniques to different Engineering problems
I-I Sem	Course: Programming For Problem Solving Using C
CO-1	To write algorithms and to draw flowcharts for solving problems
CO-2	To convert flowcharts/algorithms to C Programs, compile and debug programs
CO-3	To use different operators, data types and write programs that use two-way/ multi-way selection



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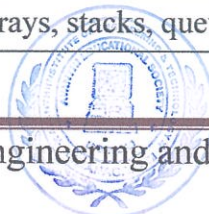
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CO-4	To select the best loop construct for a given problem
CO-5	To design and implement programs to analyze the different pointer applications
I-I Sem	Course: Electrical Engineering Workshop
CO-1	Explain the limitations, tolerances, safety aspects of electrical systems and wiring.
CO-2	Select wires/cables and other accessories used in different types of wiring.
CO-3	Make simple lighting and power circuits.
I-I Sem	Course: Programming For Problem Solving Using C Lab
CO-1	Gains Knowledge on various concepts of a C language.
CO-2	Draw flowcharts and write algorithms.
CO-3	Design and development of C problem solving skills
I-II Sem	Course: Mathematics-III
CO-1	interpret the physical meaning of different operators such as gradient, curl and divergence
CO-2	estimate the work done against a field, circulation and flux using vector calculus
CO-3	<input type="checkbox"/> apply the Laplace transform for solving differential equations
CO-4	<input type="checkbox"/> find or compute the Fourier series of periodic signals
CO-5	know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
I-II Sem	Course: Applied Physics
CO-1	Explain the need of coherent sources and the conditions for sustained interference
CO-2	Understand the basic concepts of LASER light Sources
CO-3	Explain the concept of dual nature of matter
CO-4	Explain the concept of dielectric constant and polarization in dielectric materials
CO-5	Classify the energy bands of semiconductors
I-II Sem	Course: Data Structures Through C
CO-1	Data structures concepts with arrays, stacks, queues.





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CO-2	Linked lists for stacks, queues and for other applications.
CO-3	Traversal methods in the Trees.
CO-4	Various algorithms available for the graphs.
CO-5	Sorting and searching in the data retrieval applications.
I-II Sem	Course: Electrical Circuit Analysis – I
CO-1	Analyze Various electrical networks in presence of active and passive elements
CO-2	Calculate Electrical networks with network topology concepts.
CO-3	Calculate Any magnetic circuit with various dot conventions
CO-4	Calculate Any R, L, C network with sinusoidal excitation
CO-5	Calculate Any R, L, network with variation of any one of the parameters R, L, C. and f.
I-II Sem	Course: Basic Civil And Mechanical Engineering
CO-1	Apply Shear force diagram & Bending moment diagram principles for
CO-2	Cantilever and Simply supported beams.
CO-3	Apply concepts of Rosette analysis for strain measurements.
CO-4	Analyse the characteristics of common building materials.
CO-5	Compare the working characteristics of Internal Combustion engines.
I-II Sem	Course: Basic Civil And Mechanical Engineering Lab
CO-1	Solve to arrive at finding constant speed and variable speed on IC engines and interpret their performance.
CO-2	Estimate energy distribution by conducting heat balance test on IC
CO-3	Explain procedure for standardization of experiments
I-II Sem	Course: Data Structures Through C Lab
CO-1	Be able to design and analyze the time and space efficiency of the data structure.
CO-2	Be capable to identify the appropriate data structure for given problem.
CO-3	Have practical knowledge on the applications of data structures.





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I-II Sem	Course: Constitution Of India
CO-1	Understand historical background of the constitution making and its importance for building a democratic India.
CO-2	Understand the functioning of three wings of the government i.e., executive, Legislative and judiciary.
CO-3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
CO-4	Analyze the decentralization of power between central, state and local self government.
CO-5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
II-I Sem	Course: Mathematics-IV
CO-1	apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic
CO-2	find the differentiation and integration of complex functions used in engineering problems
CO-3	make use of the Cauchy residue theorem to evaluate certain integrals
CO-4	apply discrete and continuous probability distributions
CO-5	design the components of a classical hypothesis test
II-I Sem	Course: Electronic Devices And Circuits
CO-1	Understand the basic concepts of semiconductor physics.
CO-2	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
CO-3	Know the construction, working principle of rectifiers with and without filters with Relevant expressions and necessary comparisons.
CO-4	Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
CO-5	Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
II-I Sem	Course: Electrical Circuit Analysis - II
CO-1	Understand the concepts of balanced and unbalanced three-phase circuits
CO-2	Know the transient behavior of electrical networks with DC excitations
CO-3	Learn the transient behavior of electrical networks with AC excitations
CO-4	Estimate various parameters of a two port network
CO-5	Understand the significance of filters in electrical networks



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II-I Sem	Course: DC Machines and Transformers
	Assimilate the concepts of electromechanical energy conversion
CO-1	Mitigate the ill-effects of armature reaction and improve commutation in dc machines.
CO-2	Understand the torque production mechanism and control the speed of dc motors.
CO-3	Analyze the performance of single phase transformers.
CO-4	Predetermine regulation, losses and efficiency of single phase transformers
CO-5	Parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation
II-I Sem	Course: Electromagnetic Fields
CO-1	Determine electric fields and potentials using Gauss's law or solving Laplace's or Poisson's equations, for various electric charge distributions.
CO-2	Calculate and design capacitance, energy stored in dielectrics.
CO-3	Calculate the magnetic field intensity due to current, the application of Ampere's law and the Maxwell's second and third equations.
CO-4	Determine the magnetic forces and torque produced by currents in magnetic field
CO-5	Determine self and mutual inductances and the energy stored in the magnetic field.
II-I Sem	Course: Electrical Circuits Lab
CO-1	Apply various theorems, determination of self and mutual inductances, two port parameters of a given electric circuits.
CO-2	Draw locus diagrams. Waveforms and phasor diagram for lagging and leading networks.
CO-3	Two port parameters of a given electric circuits
II-I Sem	Course: DC Machines and Transformers Lab
CO-1	Determine and predetermine the performance of DC machines and Transformers.
CO-2	Control the speed of DC motor. □
CO-3	Obtain three phases to two phase transformation. □
II-I Sem	Course: Electronic Devices And Circuits Lab
CO-1	Analyze the characteristics of diodes, transistors and other devices □



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CO-2	Design and implement the rectifier circuits, SCR and UJT in the hardware circuits
CO-3	Design the biasing and amplifiers of BJT and FET amplifiers□
II-I Sem	Course: Skill Oriented Course - Design Of Electrical Circuits Using Engineering Software Tools
CO-1	write the MATLAB programs to simulate the electrical circuit problems
CO-2	simulate various circuits for electrical parameters
CO-3	simulate various wave form for determination of wave form parameters
CO-4	□simulate RLC series and parallel resonance circuits for resonant parameters
CO-5	simulate magnetic circuits for determination of self and mutual inductances
II-I Sem	Course: Professional Ethics & Human Values
CO-1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
CO-2	Identify the multiple ethical interests at stake in a real-world situation or practice
CO-3	Articulate what makes a particular course of action ethically defensible
CO-4	Assess their own ethical values and the social context of problems
CO-5	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of
II-II Sem	Course: Induction and Synchronous Machines
CO-1	Explain the operation and performance of three phase induction motor.
CO-2	Analyze the torque-speed relation, performance of induction motor and induction generator.
CO-3	Explain design procedure for transformers and three phase induction motors
CO-4	Implement the starting of single phase induction motors.
CO-5	Perform winding design and predetermine the regulation of synchronous Generators.
II-II Sem	Course: Python Programming
CO-1	Develop essential programming skills in computer programming concepts like data types, containers
CO-2	Apply the basics of programming in the Python language Solve coding tasks related
CO-3	Conditional execution, loops





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CO-4	Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming
CO-5	Understand the concepts of inheritance and polymorphism for code reusability and extensibility.
II-II Sem	Course: Digital electronics
CO-1	Classify different number systems and apply to generate various codes. □
CO-2	Use the concept of Boolean algebra in minimization of switching functions
CO-3	Design different types of combinational logic circuits
CO-4	Apply knowledge of flip-flops in designing of Registers and counters
CO-5	The operation and design methodology for synchronous sequential circuits and Algorithmic state machines.
II-II Sem	Course: Power Systems-I
CO-1	Identify the different components of thermal power plants.
CO-2	Identify the different components of nuclear Power plants.
CO-3	Distinguish between AC/DC distribution systems and also estimate voltage drops of distribution systems.
CO-4	Identify the different components of air and gas insulated Substations.
CO-5	Identify single core and multi core cables with different insulating materials
II-II Sem	Course: Managerial Economics and Financial Analysis
CO-1	Equipped with the knowledge of estimating the Demand and demand Elasticities for a product. □
CO-2	Knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. □
CO-3	Understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units
CO-4	Prepare Financial Statements and the usage of various Accounting tools for Analysis. □
CO-5	Evaluate various investment project proposals with the help of capital budgeting techniques for decision making. □
II-II Sem	Course: Induction and Synchronous Machines Lab
CO-1	Assess the performance of single phase and three phase induction motors
CO-2	Control the speed of three phase induction motor



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CO-3	Predetermine the regulation of three-phase alternator by various methods
II-II Sem Course: Python Programming Lab	
CO-1	Write, Test and Debug Python Programs
CO-2	Use Conditionals and Loops for Python Programs
CO-3	Use functions and represent Compound data using Lists, Tuples and
II-II Sem Course: Digital electronics Lab	
CO-1	Learn the basics of gates, flip-flops and counters
CO-2	Construct basic combinational circuits and verify their functionalities
CO-3	Apply the design procedures to design basic sequential circuits
III-I Sem Course: Power Systems-II	
CO-1	Understand parameters of various types of transmission lines during different operating conditions.
CO-2	Understand the performance of short and medium transmission lines.
CO-3	Understand travelling waves on transmission lines.
CO-4	Understand various factors related to charged transmission lines.
CO-5	Understand sag/tension of transmission lines and performance of line insulators.
III-I Sem Course: Control Systems	
CO-1	Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
CO-2	Determine time response specifications of second order systems and absolute and relative stability of LTI systems using Routh's stability criterion and root locus method.
CO-3	Analyze the stability of LTI systems using frequency response methods
CO-4	Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode diagrams
CO-5	Represent physical systems as state models and determine the response. Understand the concepts of controllability and observability.
III-I Sem Course: Renewable Energy Sources	
CO-1	Analyze solar radiation data, extra-terrestrial radiation, radiation on earth's surface and solar Energy Storage.



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CO-2	Illustrate the components of wind energy systems
CO-3	Illustrate the working of biomass, digesters and Geothermal plants.
CO-4	Demonstrate the principle of Energy production from OTEC, Tidal and Waves
CO-5	Evaluate the concept and working of Fuel cells & MHD power generation
III-I Sem	Course: Concepts of Optimization Techniques
CO-1	State and formulate the optimization problem without and with constraints, also apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints and arrive at an optimal solution
CO-2	Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.
CO-3	Formulate a mathematical model and apply non-linear programming techniques for unconstrained and constrained case studies.
CO-4	Solve transportation and assignment problem by using Linear programming Simplex method
CO-5	Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
III-I Sem	Course: Power Electronics
CO-1	Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's.
CO-2	Design firing circuits for SCR.
CO-3	Explain the operation of single phase full-wave converters and analyze harmonics in the input current.
CO-4	Explain the operation of three phase full-wave converters.
CO-5	Analyze the operation of different types of DC-DC converters
III-I Sem	Course: Concepts of Control Systems
CO-1	Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
CO-2	Determine time response specifications of second order systems and to determine error constants.
CO-3	Analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
CO-4	Analyze the stability of LTI systems using frequency response methods.
CO-5	Represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability



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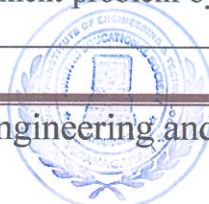
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III-I Sem	Course: Linear IC Applications
CO-1	Describe the Op-Amp and internal Circuitry: 555 Timer, PLL
CO-2	Discuss the Applications of Operational amplifier: 555 Timer, PLL
CO-3	Design the Active filters using Operational Amplifier
CO-4	Use the Op-Amp in A to D & D to A Converters
CO-5	Comprehend & differentiate the working principle of various data converters.
III-I Sem	Course: Utilization of Electrical energy
CO-1	Identify various illumination methods produced by different illuminating sources
CO-2	Identify a suitable motor for electric drives and industrial applications
CO-3	Identify most appropriate heating and welding techniques for suitable applications.
CO-4	Distinguish various traction system and determine the tractive effort and specific energy consumption.
CO-5	Validate the necessity and usage of different energy storage schemes for different applications and comparisons.
III-I Sem	Course: Computer Architecture and Organisation
CO-1	Explain the instruction cycle of a computer
CO-2	Understand various micro operations and register transfer language.
CO-3	Describe parallel processing and pipelining
CO-4	Interface different peripherals with processors
CO-5	Know the advantages of cache and virtual memory.
III-I Sem	Course: Optimization Techniques
CO-1	State and formulate the optimization problem without and with constraints, also apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints and arrive at an optimal solution.
CO-2	Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.
CO-3	Formulate a mathematical model and apply non-linear programming techniques for unconstrained and constrained case studies.
CO-4	Solve transportation and assignment problem by using Linear programming Simplex method





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CO-5	Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
III-I Sem	Course: Object oriented Programming Through JAVA
CO-1	Discuss and understand java programming constructs, Control structures
CO-2	Illustrate and experiment Object Oriented Concepts like classes, objects
CO-3	Apply Object Oriented Constructs such as Inheritance, interfaces, and exception handling
CO-4	Construct applications using multithreading and I/O
CO-5	Develop Dynamic User Interfaces using applets and Event Handling in java
III-I Sem	Course: Power Electronics Lab
CO-1	Analyse characteristics of various power electronic devices and design firing circuits for SCR.
CO-2	Analyse the performance of single-phase dual, three-phase full-wave bridge converters and dual converter with both resistive and inductive loads.
CO-3	Examine the operation of Single-phase AC voltage regulator and Cycloconverter with resistive and inductive loads.
III-I Sem	Course: Control Systems Lab
CO-1	Analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchronous motors.
CO-2	Design P,PI,PD and PID controllers
CO-3	Design lag, lead and lag-lead compensators
III-II Sem	Course:Microprocessors and Microcontrollers
CO-1	Understand the microprocessor capability in general and explore the evaluation of microprocessors.
CO-2	Understand the addressing modes of microprocessors
CO-3	Understand the micro controller capability
CO-4	Program mp and mc
CO-5	Interface mp and mc with other electronic devices
III-II Sem	Course:Electrical Measurements and Instrumentation





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CO-1	Know the construction and working of various types of analog instruments.
CO-2	Describe the construction and working of wattmeter and power factor meters
CO-3	Know the construction and working various bridges for the measurement resistance inductance and capacitance
CO-4	Know the operational concepts of various transducers
CO-5	Know the construction and operation digital meters
III-II Sem	Course: Power System Analysis
CO-1	Draw impedance diagram for a power system network and calculate per unit quantities
CO-2	Apply the load flow solution to a power system using different methods.
CO-3	Form Z bus for a power system networks and analyse the effect of symmetrical faults.
CO-4	Find the sequence components for power system Components and analyse its effects of unsymmetrical faults
CO-5	Analyse the stability concepts of a power system
III-II Sem	Course: Signals and Systems
CO-1	Apply the knowledge of various signals and operations
CO-2	Analyze the spectral characteristics of periodic signals using Fourier Analysis.
CO-3	Classify the systems based on their properties and determine the response of LSI system using convolution.
CO-4	Understand the process of sampling and the effects of under sampling
CO-5	Apply Laplace and z-transforms to analyze signals and Systems (continuous & discrete).
III-II Sem	Course: Electric Drives
CO-1	Explain the fundamentals of electric drive and different electric braking methods
CO-2	Analyze the operation of three-phase converter fed dc motors and four quadrant operations of dc motors using dual converters.
CO-3	Describe the DC-DC converter fed control of dc motors in various quadrants of operation
CO-4	Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters and differentiate the stator side control and rotor side control
CO-5	Learn the concepts of speed control of synchronous motor with different methods



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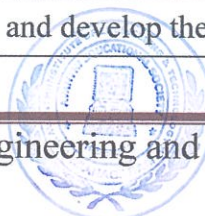
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III-II Sem	Course: Advanced Control Systems
CO-1	Analyse different canonical forms - solution of State equation
CO-2	Design of control system using the pole placement technique is given after introducing the concept of controllability and observability
CO-3	Analyze nonlinear system using describing function technique and phase plane analysis.
CO-4	Examine the stability analysis using Lyapunov method.
CO-5	Illustrate the Minimization of functional using calculus of variation - state and quadratic regulator problems
III-II Sem	Course: Switch Gear and Protection
CO-1	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air - oil - vacuum - SF ₆ gas type.
CO-2	Analyse the working principle and operation of different types of electromagnetic protective relays.
CO-3	Acquire knowledge of protective schemes for generator and transformers for different fault conditions.
CO-4	Classify various types of protective schemes used for feeders and bus bar protection and Types of static relays.
CO-5	Analyse the operation of different types of over voltages protective schemes required for insulation co-ordination and types of neutral grounding
III-II Sem	Course: Big data Analytics
CO-1	Understand how to leverage the insights from big data analytics
CO-2	Analyze data by utilizing various statistical and data mining approaches
CO-3	Perform analytics on real-time streaming data
CO-4	Understand the various NoSql alternative database models
CO-5	Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics
III-II Sem	Course: Battery Management Systems and charging Stations
CO-1	Describe the construction and operation of different batteries for EV applications
CO-2	Describe charging algorithms of different batteries and balancing methods of battery packs
CO-3	Describe the different kinds of infrastructure needed in the charging stations
CO-4	Describe the requirements of battery management and their maintenance
CO-5	Obtain the modelling of batteries and develop their simulation models





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III-II Sem	Course: Fundamentals of Utilization of Electrical Energy
CO-1	Know the concepts of illumination and various illumination methods
CO-2	Know about the resistance - induction and dielectric heating.
CO-3	Learn about the resistance and arc welding and welding equipment
CO-4	Know about the mechanisms - equipment and technology used in the electric traction.
CO-5	Differentiate the importance of various energy storage systems
III-II Sem	Course: Electrical Measurements and Instrumentation Lab
CO-1	Know about the phantom loading.
CO-2	Learn the calibration process
CO-3	Measure the electrical parameters voltage - current - power - energy and electrical characteristics of resistance - inductance and capacitance.
III-II Sem	Course: Microprocessors and Microcontrollers Lab
CO-1	Write assembly language program using 8086 micro based on arithmetic, logical, and shift operations
CO-2	Interface 8086 with I/O and other devices
CO-3	Parallel and serial communication using 8051 & PIC 18 micro controllers
III-II Sem	Course: Power Systems and Simulation Lab
CO-1	Estimate the sequence impedances of 3-phase Transformer and Alternators
CO-2	Evaluate the performance of transmission lines
CO-3	Analyse and simulate power flow methods in power systems
IV-I Sem	Course: Digital signal Processing
CO-1	Know the concepts of Digital signal processing - frequency domain representation & z transform.
CO-2	Compute discrete Fourier transform and fast Fourier transforms for different sequences.
CO-3	Design IIR filters through analog filter approximation and basic structure of IIR filters
CO-4	Design FIR filters with window techniques and basic structure of FIR filters
CO-5	Learn the concepts of Multirate Signal Processing.



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www.aietta.ac.in, principal@aietta.ac.in

IV-I Sem	Course: Renewable and Distributed Energy Technologies
CO-1	Illustrate basic concepts of renewable and distributed sources
CO-2	Demonstrate the components of wind energy conversion systems.
CO-3	Model PV systems and analyse MPPT Techniques
CO-4	Illustrate the concept of Energy Production from Hydro - Tidal and Geothermal
CO-5	Distinguish between standalone and grid connected DG systems and design hybrid renewable energy systems.
IV-I Sem	Course: Flexible Alternating Current Transmission Systems
CO-1	Know the concepts of facts controller and power flow control in transmission line
CO-2	Demonstrate operation and control of voltage source converter and know the concepts current source converter.
CO-3	Analyse compensation by using different compensators to improve stability and reduce power oscillations in the transmission lines.
CO-4	Know the concepts methods of compensations using series compensators
CO-5	Analyse operation of Unified Power Flow Controller (UPFC) and Interline power flow controller (IPFC).
IV-I Sem	Course: Power system Deregulation
CO-1	Know the essential and operation of deregulated electricity market systems
CO-2	Learn about the different structure model.
CO-3	Analyze various types of electricity market operational and control issues using new mathematical models.
CO-4	Analyse LMP's wheeling transactions and congestion management
CO-5	Analyze impact of ancillary services.
IV-I Sem	Course: Database Management systems
CO-1	Illustrate the concept of databases, database management systems, database languages, database structures and their work
CO-2	Apply ER modeling and Relational modeling for designing simple databases
CO-3	Summarize the concepts related to relational model and SQL and Write database queries using relational algebra and structured query language.
CO-4	Design and develop databases from the real world by applying the concepts of Normalization
CO-5	Outline the issues associated with Transaction Management and Recovery, Tree Structured Indexing



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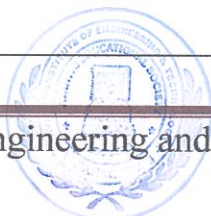
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IV-I Sem	Course: Hybrid Electric Vehicles
CO-1	Know the concept of electric vehicles and hybrid electric vehicles
CO-2	Familiar with different configuration of hybrid electric vehicles
CO-3	Choose an effective motor for EV and HEV application
CO-4	Understand the power converters used in hybrid electric vehicles
CO-5	Know different batteries and other energy storage systems
IV-I Sem	Course: High voltage Engineering
CO-1	Recognise the dielectric properties of gaseous materials used in HV equipment
CO-2	Differentiate the break down phenomenon in liquid and solid dielectric materials.
CO-3	Acquaint with the techniques of generation of high AC and DC voltages
CO-4	Acquaint with the techniques of generation of high Impulse voltages and currents
CO-5	Getting the knowledge of measurement of high AC - DC - Impulse voltages and currents
IV-I Sem	Course: Programmable Logic Controllers and Applications
CO-1	Illustrate I/O modules of PLC systems and ladder diagrams
CO-2	Demonstrate various types registers and programming instructions.
CO-3	Examine various types of PLC functions and its applications
CO-4	Assess different data handling functions and its applications.
CO-5	Describe the analog operations and PID modules
IV-I Sem	Course: Cloud computing with AWS
CO-1	Understand and analyze the architecture of Cloud
CO-2	Identify and apply deployment and management options of AWS Cloud Architecture
CO-3	Design architectures to decouple infrastructure and reduce interdependencies
CO-4	Analyze various cloud programming models and apply them to solve problems on the cloud.
CO-5	Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.





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IV-I Sem	Course: Deep Learning Techniques
CO-1	Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning
CO-2	Discuss the Neural Network training, various random models.
CO-3	Explain the Techniques of Keras, TensorFlow, Theano and CNTK
CO-4	Classify the Concepts of CNN and RNN
CO-5	Implement Interactive Applications of Deep Learning
IV-I Sem	Course: Power System Operation and Control
CO-1	Compute optimal load scheduling of Generators
CO-2	Formulate hydrothermal scheduling and unit commitment problem..
CO-3	Analyse effect of Load Frequency Control for single area systems
CO-4	Analyse effect of Load Frequency Control for two area systems
CO-5	Describe the effect of reactive power control for transmission lines
IV-I Sem	Course: Switched Mode Power Conversion
CO-1	Design and analyse the operation of non-isolated switch mode converters
CO-2	Analyze the operation of isolated switch mode converters.
CO-3	Illustrate the operation of resonant converters
CO-4	Analyse the control schemes of converters and design transformer and inductor.
CO-5	Model the converters and design controller for closed loop operation
IV-I Sem	Course: AI Applications of Electrical engineering
CO-1	Analyse different models of artificial neuron & Use learning methods of ANN.
CO-2	Evaluate different paradigms of ANN.
CO-3	Classify between classical and fuzzy sets
CO-4	Illustrate different modules of Fuzzy logic controller.
CO-5	Apply Neural Networks and fuzzy logic for real-time applications
IV-I Sem	Course: Data Science
CO-1	Acquire the knowledge and expertise to become a proficient data scientist



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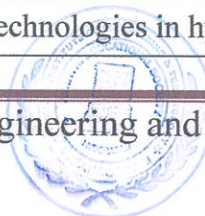
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CO-2	Demonstrate an understanding of statistics and machine learning concepts that are vital for data science
CO-3	Explain how data is collected, managed and stored for data science
CO-4	Interpret the key concepts in data science, including their real-world applications and the toolkit used by data scientists
CO-5	Illustrate data collection and management scripts using MongoDB
IV-II Sem	Course: Fundamentals of Electric Vehicles
CO-1	Illustrate different types of electric vehicles.
CO-2	Select suitable power converters for EV applications
CO-3	Design HEV configuration for a specific application
CO-4	Choose an effective method for EV and HEV applications
CO-5	Analyse a battery management system for EV and HEV.
IV-II Sem	Course: Concepts of Internet of Things
CO-1	Review Internet of Things (IoT).
CO-2	Demonstrate various business models relevant to IoT
CO-3	Construct designs for web connectivity
CO-4	Organize sources of data acquisition related to IoT, integrate to enterprise systems
CO-5	Describe IoT with Cloud technologies.
IV-II Sem	Course: Concepts of Power System Engineering
CO-1	Know the concepts of power generation by various types of power plants.
CO-2	Learn about transmission line concepts and distribution systems schemes.
CO-3	Learn about protection equipments and grounding methods of power system
CO-4	Know the economic aspects of electrical energy and their importance.
CO-5	Know the importance of power factor improvement and voltage control in power systems.
IV-II Sem	Course: Concepts of Smart Grid Technologies
CO-1	Know the concepts of smart grids and analyse the smart grid policies and developments in smart grids.
CO-2	Develop concepts of smart grid technologies in hybrid electrical vehicles etc.





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CO-3	Know the concepts of smart substations - feeder automation - Battery Energy storage systems etc
CO-4	Analyse micro grids and distributed generation systems
CO-5	Analyse the effect of power quality in smart grid and to understand latest developments in ICT for smart grid.
IV Sem -II	Project
CO-1	Formulate., and apply mathematical, science and engineering principles to solve real time engineering problems
CO-2	Test the existing data, communicate and conduct research on complex problems using modern tools
CO-3	Validate the obtained results on contemporary issues related to society and environment
CO-4	Determine effectively the engineering principles used in their project individually and as a team as per the norms of engineering practice
CO-5	Structure future work to promote life long learning in the context of technological adaptation.




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