CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (Autonomous)

Department of Electrical and Electronics Engineering

1. VISION & MISSION OF THE INSTITUTE:

Vision: To be center of excellence in technical education and research

Mission: To address the emerging needs through quality technical education and advanced research.

2. VISION & MISSION OF THE DEPARTMENT:

Department Vision:

To achieve Academic and Professional Excellence in Teaching and Research in the frontier areas of Electrical and Electronics Engineering Vis-a -Vis serve as a Valuable Resource for Industry and Society.

Department Mission:

Empowering the Faculty and Student Rendezvous to Nurture Interest for Conceptual Keystone, Applied Multidisciplinary Research, Inspiring Leadership, and Efficacious Entrepreneurship culture, Impeccable Innovation in frontier areas to be synergetic with Environmental, Societal and Technological Developments of the National and International community for Universal Intimacy.

M1: Emphasis on providing Strong Theoretical Foundation & Engineering Leadership Eminence, infusion of Creativity and Management skill while maintaining Ethics and Moral for Sustainable Development. (Individual development).

M2: Enable the Faculty and Student Interactions to trigger interest for Applied Multidisciplinary Research and Entrepreneurship Culture resulting in Significant Advancement of the field of Specialization with Involvement of Industries and Collaborative Educational Networks. (Sense of Ownership, Networking, and Eco system development).

M3: Extend the Conducive Neighbourhoods for Innovation in frontier areas to keep pace with Environmental, Societal and Technological Developments of the National and International Community to Serve Humanity. (Service to Society, Atmanirbhar Bharat).

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PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

- PEO1- Graduates will ennoble in offering Design solutions for Complex Engineering Problems using appropriate modern Software tools, with the specified need of the Industry and Protagonist in transforming the Society into a Knowledge Society.
- PEO2- Graduates will elevate Engineering Leadership and will be recognized as Experts working in in Government, Consulting firms, International organizations with their Creativity in Design of Experiments, Analysis and Interpretation of Data and Synthesis of Information.
- PEO 3- Graduates will exalt in their Professional career by Persistence in Team work, Ethical behavior, Proactive involvement, and Effective Communication.
- PEO 4- Graduate will excel by becoming Researches , Professors and Entrepreneurs who will create and Disseminate new knowledge in the frontier areas of Engineering , Technology and Management.

4. PROGRAM SPECIFIC OUTCOMES (PSOS):

PSO 1: Evaluate complex Engineering Problems to meet the distinct need of Industry & Society, by utilizing knowledge of Mathematics, Science, Emerging Technologies such as AI, Block chain & IT tools.

PSO 2: Exhibit Latent talent in understanding the Engineering and Administration standards at work place as a team leader to manage Projects in the Multi-Disciplinary Environments.

PSO 3: Establish Engineering Expertise in Power system, Machines and Drives Systems and also Pursue Research in the Frontier areas such as Embedded systems, Renewable Energy, EMobility and Smart grid.

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PO - PROGRAM OUTCOMES:

1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

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effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in mul□disciplinary environments.

12. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change

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Course outcomes statements BE-EEE

		R22 - Course		Course outcomes statements
S.NO	SEM	Code	Name	
1	1st/I	22EEC01	Basic Electrical Engineering	1. Understand the concepts of Kirchhoff's laws and their application various theorems to get solution of simple dc circuits.
				2. Predict the steady state response of RLC circuits with AC single phase/three phase supply.
				3. Infer the basics of single phase transformer
				4. Describe the construction, working principle of DC machine and 3-phase Induction motor.
				5. Acquire the knowledge of electrical wires, cables, earthing, Electrical safety precautions to be followed in electrical installations and electric shock and its safety and energy calculations
2	1st/I	22EEC02	Basic Electrical Engineering Lab	1. Comprehend the circuit analysis techniques using various circuital laws and theorems.
				2. Analyse the parameters of the given coil and measurement of power and energy in AC circuits
				3. Determine the turns ratio/performance parameters of singlephase transformer.
				4. Infer the characteristics of DC shunt motor different tests.
				5. Illustrate different parts and their function of electrical Components, equipment and machines.

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S.NO	Year/ SEM	Code	Name	Course outcomes statements
1	2/III	22MTC09	Applied Mathematics	Find Laplace, Inverse Laplace and solution of engineering problems.
				Find the solution of Difference Equation.
				Calculate the Euler's coefficients for Fourier series expansion of a function.
				Understand the methods to find solution of linear and non-linear PDE and solution of wave equation.
				Analyze the coefficient of correlation, regression and fitting of the data by various methods.
2	2/III	22CSC29	C and Data Structures	Analyze the basic concepts of C Programming language.
				Design applications in C, using functions, arrays, pointers and structures.
				Apply the concepts of Stacks and Queues in solving the problems.
				Explore various operations on Linked lists.
				Demonstrate various tree traversals and graph traversal techniques.
3	2/III	22EEC03	Electrical Circuit Analysis	Calculate the response of RLC networks with sinusoidal input at steady state & resonance conditions and to analyze three-phase circuits with different loads
				Apply various network analysis techniques to find the responses in the circuits with dependent and independent sources.
				Determine time constant, steady state and transient responses of RL, RC, RLC networks with initial conditions of network elements.
				Evaluate the response of electrical circuits with Laplace transformation using initial & final value theorems and to obtain the pole-zero diagrams using network functions.
				Find the impedance, admittance, ABCD, h and g-parameters of given two-port network and interconnected two-port networks.
4	2/III	22EEC04	Electromagnetic Fields	Understand the basic concepts of vector calculus, various coordinate systems and apply them appropriately for solving electromagnetic field problems.
				Obtain the physical quantities like field intensity, flux density and potential due to various types of charge distributions in electric and magnetic fields using fundamental laws.

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				Differentiate between conduction & convections currents, and describe the behaviour of static electric & magnetic fields in different media, boundary conditions and acquire the knowledge about energy storing elements
				Illustrate Maxwell's equations and their application to time-harmonic fields, wave propagation in different media and Poynting's power-balance theorem.
				Recognize what is EMI & EMC, sources & effects of Electromagnetic Interferences in inter and intra systems and various methods to control EMI
5	2/III	22EEC05	Electrical Measurements and Instrumentation	Identify to suitable Instrument to measure a given Electrical Parameter.
				Analyze the working Principle by using suitable Torque equations for DC and AC Instruments.
				Design Bridge Circuits for measuring Passive Electrical Parameters.
				Distinguish between Electrical and Magnetic Measurements and their Instruments.
				Select an Electrical Transducer for a given physical quantity Measurement.
6	2/III	22EEC06	Analog Electronic Circuits	Comprehend the V-I characteristics of Diode and its applications
				Understand the V-I characteristics of BJT & MOSFET and to analyze the significance of operating point in the biasing techniques of BJT & MOSFET
				Apply the knowledge of differential amplifiers to understand the basic characteristics of Operational Amplifiers (Op-Amps) and their significance
				Design and analyze linear application circuits of Op-Amp like amplifiers, Integrator, differentiator, filters, and regulators.
				Design and analyze non-linear application circuits of Op-Amps and design stable and monostable modes of 555 timer circuit.
7	2/III	22CEM01	Environmental Science	Identify the natural resources and realize the importance of water, food, forest, mineral, energy, land resources and effects of over utilization.
				Understand the concept of ecosystems and realize the importance of interlinking food chains.
				Contribute for the conservation of bio-diversity.
				Suggest suitable remedial measure for the problems of environmental pollution and contribute for the framing of legislation for protection of environment.

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				Follow the environmental ethics and contribute to the mitigation and management of environmental disasters.
8	2/III	22EEC07	Electrical Circuits and Measurements Lab	Obtain and plot the frequency response and locus diagrams of RLC circuits.
				Verify various circuit theorems.
				Determine various two-port network parameters.
				Validate DC and AC bridges for measuring unknown electrical parameters and demonstrate the principles of magnetic measurements.
				Demonstrate the measurement of non-electrical quantity with an appropriate transducer, Study the operation of megger, CT & PT and to calibrate energy meter.
9	2/III	22EEC08	Analog Electronic Circuits Lab	Demonstrate the working principle of PN junction diode, transistor and MOSFET from their V-I characteristics.
				Realize half wave and Full wave rectifiers for C filter combinations.
				Analyze the significance of choosing a DC operating point for a transistor/MOSFET and to analyze the frequency response of CE amplifier.
				Design of linear and non-applications of Op-Amps
				Design a 555 Timer in A stable mode to produce pulses for Pulse Width Modulation (PWM) Schemes.
10	2/III	22CSC30	C and Data Structures Lab	Understand and trace the execution of programs written in C language
				Apply the concepts of looping and decision-making statements for a given problem.
				Solve problems using functions, arrays, structures and pointers.
				Implementation various operations on stack, queue, tree and graph.
				Apply the knowledge of data structure in problem solving
11	2/IV	22EEC09	Electrical Machines-I	Comprehend the nomenclature and principles related to the concepts of energy balance and various excited systems
				Elucidate the principle of operation , characteristics and parallel operation of DC Generators
				Analyze the starting methods , speed control and testing methods under different conditions of a given DC motor
				Explain the principle of operation, performance ,testing methods and parallel operation aspects of 1-ph transformer
				Explore the performance and other aspects of various 3-ph transformer

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12	2/IV	22EEC10	Power Systems I	Discuss the construction and operation of conventional and non-conventional sources of energy along with financial management.
				Determine the line parameters such as inductance and capacitance for different configurations of transmission line.
				Calculate the sag and tension for given transmission line under different weather conditions.
				Discuss the operation of underground cables, insulators and calculate the capacitance of cables and string efficiency of insulators.
				Discuss the different tariff structures, types of costs and general aspects of distribution systems.
13	2/IV	22EEC11	Control Systems	Demonstrate the characteristics of DC, AC Servo motors and Synchro Pair.
				Analyze the performance parameters of a given second order plant in the time domain.
				Analyze the performance of different compensators through its frequency response.
				Design P, PI, PID and ON/OFF controller of a given system and to distinguish the merits and demerits of these controllers.
				Demonstrate the effect of damping on the plant using the DC position control system.
14	2/IV	22EEC12	Digital Electronics	Understand the fundamental concepts and techniques used in logical operations.
				Analyze and design various combination circuits using k Maps and Q-M method.
				Design and implement Sequential logic circuits like counters shift register sand sequence generators
				Understand the process of Analog to Digital conversion and Digital to Analog conversion.
				Implement PLD's to solve the given logical problems.
15	2/IV	22EEC13	Signals and Systems	Understand the classification & properties of signals & systems.
				Analyze the behavior of LTI systems in continuous and discrete time domain.
				Representation of continuous & discrete time signals in complex frequency domain
				Apply Laplace & Z-transforms to analyze the continuous & discrete signals
				Analyze the concept of sampling theorem and Know about the process of reconstruction.

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16	2/IV	22EEM01	Universal Human Values-II	Become familiar about themselves, and their surroundings (family, society, nature).
				Develop empathy and respect for diversity by gaining an appreciation for different cultures, perspectives, and identities
				Exhibit responsible and ethical behavior by adhering to principles of integrity, honesty, compassion, and justice.
				Recognize their role as global citizens.
				Exhibit a sense of social responsibility.
17	2/IV	22EEC14	Electrical Machines-I Lab	Understand how to perform experiments to measure and analyze the performance of different types of electrical machines.
				Realize the performance parameters through experimentation.
				Understand the Practical aspects of electrical machines and control
				Obtain the performance characteristics of the given Machine
				Interpret the experimental data and drawing conclusions.
18	2/IV	22EEC15	Control Systems Lab	Obtain mathematical models and transfer functions for any electromechanical LTI system.
				Determine the Transfer function of an LTI system using block diagram & signal flow graph approach.
				Analyze the given first and second order systems based on their performance parameters & PID controllers.
				Analyze the absolute and relative stabilities of an LTI system using time and frequency domain techniques and demonstrate the design of compensators.
				Develop the state space models for various LTI systems and check their Controllability and Observability.
19	2/IV	22EEC16	Digital Electronics Lab	Demonstrate the truth table of various expressions and combinational circuits using logic gates.
				Design, test and implement various combinational circuits such as adders, sub tractors, comparators.
				Apply knowledge of logic gates to design complex logic circuits like multiplexers and demultiplexers.
				Design, test and implement various sequential circuits using flip-flops
				Design various logic circuits using shift registers.
20	3/V	20EEC17	Electrical Machines-II	Acquire the knowledge of Constructional and operational features of ac machines.
				Understand the various starting methods and speed control of ac machines.

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				Explain the concepts of ac machines.
				Describe the applications of ac machines.
				Analyze the performance characteristics of ac machines.
21	3/V	20EEC18	Power Systems -II	Analyse the performance of different types of transmission lines and evaluate the corona effect on transmission lines
				Understand the application of per unit quantities in power systems
				Classify different types of faults and apply symmetrical components to solve the power system problem when subjected to different fault conditions
				Describe the causes of over voltages and analyse reflection and refraction coefficients of overhead lines and cables
				Apply Gauss Seidel method and Newton-Raphs on method to find power flows and voltages of the given power system.
22	3/V	20EEC19	Microcontrollers and Applications	Understand the internal architecture of 8051 Microcontroller
				Do Assembly Language Programming using 8051 Microcontroller
				Interface Application devicesto 8051 Microcontroller and Communication Protocols
				Understand the internal architecture of ARM controller
				Programming using ARM controller LPC 2148
23	3/V	20EEC20	Control Systems	Understand different mathematical models for any electro mechanical LTI systems.
				Determine the Transfer function of an LTI system using block diagram & signal flow graph approach.
				Analyze the given first and second order systems based on their performance parameters &PID controllers
				Analyze absolute and relative stability of an LTI system using time and frequency domain techniques.
				To understand the concepts of compensators and be able to draw its frequency response
24	3/V	20EEE11	Electrical Distribution Systems	Solve the problems on load factor, loss factor, coincidence factor and discuss the characteristic so floads along with load growth
				Illustrate the substation bus schemes and determine the rating, voltage drop of substations
				Describe types and characteristics of primary and secondary distribution system and find voltage drop and power losses.

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				Find voltage drop and power loss of three-phase & non-three phase lines and analyze the distribution costs and voltage control methods in the distribution system
				Calculate there active power requirements of the distribution system and summarize the functions and communications used in distribution automation
25	3/V	20EEE13	Simulation Techniques in Electrical Engineering	Understand the basics of MATLAB programming
				Apply matrix mathematics and functions for solution of linear and nonlinear equations
				Understand the use of plots for visualization of the numerical solution. Develop and run them-files
				Analyse the basic electrical and networks applications in MATLAB environment
				Analyse the computational Intelligence Techniques in MATLAB environment
26	3/V	20EEE24	Renewable Energy Technologies	Know the benefits of different renewable energy sources
				Understand the generation of Wind Power
				Model the generator, turbine and converter suitable for a specific wind-generation topology.
				Understand the Solar PV generation and grid interconnection technologies
				Understand and apply the remedies for network integration issues
27	3/V	20EEE26	Basic VLSI Design	To design logic circuits using pMOS and nMOS technologies
				To design cMOS logic circuits.
				To simulate logical circuits using HDL programming
				To understand different modeling strategies
				To understand FPGA design strategies.
28	3/V	20ADO01	Introduction to Python Programming	Explore data operations on list, tuple and dictionary in python.
				Understand deployment of models on different datasets.
				Apply supervised, unsupervised, resembling and NLP models on different datasets.
				Perform data analysis using python packages
				Build and evaluate the models using python programming
29	3/V	20ITO01	Object Oriented Programming Using JAVA	To understand fundamentals of object-oriented programming paradigm.
				To apply knowledge of string handling, interfaces, packages and inner classes.
				To implement Exception handling mechanisms and Multithreading.

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				To demonstrate knowledge on collection framework, stream classes.
				To develop web applications using Servlets and JSP.
30	3/V	20EEC21	Control Systems Lab	Demonstrate the characteristics of DC, AC Servo motors and Synchro Pair.
				Analyze the performance parameters of a given second order plant in time domain.
				Analyze the performance of different compensators through its frequencyresponse.
				Design P, PI, PID and ON/OFF controller of a given system and to distinguish the merits and demerits of these controllers.
				Analyze the characteristics of magnetic amplifier for series and parallel connections.
				Demonstrate the effect of damping on the plant using D.C. position control system.
31	3/V	20EEC22	Electrical Machines- II Lab	Make the connections for any given AC machine based on applications
				Design the meter ratings for various applications of induction and synchronous machines
				Control the speed of the induction motor by different methods
				Determine the efficiency and regulation of the given alternator using various methods.
				Test the induction motor for their no-load and load characteristics.
32	3/V	20EEC23	Microcontr ollers and Application s Lab	Develop the Programs of 8051 and ARM using their respective Instruction Set.
				Understand the usage of various Debugging Tools available to Program different Microcontrollers.
				Build code for 8051 and ARM7 to interface various Input/Output Modules.
				Analyze the hardware and software interaction and integration
				Design and develop 8051 and ARM based Embedded systems for Various Applications.
33	3/V	20EGC03	Employabili ty Skills	Become effective communicators, participate in group discussions with confidence and be able to make presentations in a professional context.
				Write resumes, prepare and face interviews confidently.
				Be assertive and set short term and long term goals, learn to mange time effectively and deal with stress.

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				Make the transition smoothly from campus to work, use media with etiquette and understand the academic ethics.
				Enrich their vocabulary, frame accurate sentences and comprehend passages confidently.
34	3/VI	20EEC24	Power System Protection	Understand basic terminology of relays and types of over current protection of power system.
				Distinguish the type of distance protection with principle & their application to three phase transmission lines.
				Choose suitable differential scheme for the protection of various equipment in electrical power system.
				Describe the principle of operation, and able to calculate the ratings of circuit breakers.
				Familiarize with different protection methods against over-voltages.
				Identify various elements of numerical relays, their functions and different techniques used in their design.
35	3/VI	20EEC25	Power System Operation and Control	Demonstrate the Economic operation of power system without and with Losses
				Illustrate the concept of Unit Commitment
				Analyze the Load Frequency Control for single and two area systems
				Examine the rotor angle stability of a power system under any disturbance.
				Identify and Explain the Voltage Stability problems.
36	3/VI	20EEC26	Electrical Drives	Acquire the knowledge about classification, choice, dynamics and stability of Electric Drives.
				Analyse 1-Φ & 3-Φ converters fed DC motors.
				Understand the operational variance between single and multi-quadrant operation of various Electric Drives
				Analyse chopper fed DC motors.
				Comprehend the speed control of a converter fed induction motor drives and synchronous motor drives.
37	3/VI	20EEC27	IoT for Electrical Engineering	Understand the basic principles and terminologies of computer networking, network security, WSN, M2M, CPS, sensors and actuators.
				Describe various data types in IoT applications, connectivity protocols in IoT, communication protocols in IoT.
				Understand basic concepts of Arduino UNO and Design smart system applications using Arduino UNO.
				Apply Python programming for Problem solving and application development.

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				Understand the working of RaspberryPi and develop IoT applications.
38	3/VI	20EGM01	Indian Constitution & Fundamental Principles	Understand the making of the Indian Constitution and its features.
				Identify the difference among Right To equality, Right To freedom and Right to Liberty.
				Analyze the structuring of the Indian Union and differentiate the powers between Union and States.
				Distinguish between the functioning of Lok Sabha and Rajya Sabha while appreciating the importance of Judiciary.
				Differentiate between the functions underlying Municipalities, Panchayats and Co-operative Societies.
39	3/VI	20EEE33	Utilization of Electrical Energy (PE-3)	Acquire knowledge about electric heating concepts for a given application
				Understand principles of welding concepts for a given application
				Familiar with principles of illumination concepts
				Identify the necessity of illumination and luminaries for specified requirement
				Select proper traction system and its corresponding drive for industrial applications
40	3/VI	20EEE34	Power Quality Engineering (PE-3)	Illustrate the basic concepts of power quality issues and power quality monitoring, standards and measuring instruments.
				Determine the voltage sag magnitude in radial, Non-radial and Meshed systems
				Analyze voltage sags effect on three-phase AC- Adjustable speed drive (ASD), DC- Adjustable speed drive (ASD) for industrial applications.
				Identify the sources of harmonics and its mitigation techniques in industrial systems.
				Discuss the protection devices for transient over voltages and solutions for Wiring and Grounding problems
41	3/VI	20 EEC28	Power Systems Lab	Calculate ABCD constants of transmission lines and evaluate regulation and efficiency.
				Examine relay setting and compensation techniques for safe operating of power system.
				Identity sequence parameters of transformer and alternator and discuss its importance.
				Calculate the time constant, perform Fault Analysis of an Alternator and Identify Fault location of an Underground Cable.

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				Determine the dielectric strength of transformer oil and calculate the efficiency of string insulators of a transmission line.
42	3/VI	20 EEC29	Electrical Simulation Lab	Analyze the DC and AC circuits
				Demonstrate the time and frequency response of the system
				Perform Load flow studies and economic load dispatch
				Conduct Load frequency control and transient stability studies
				Realize the Electrical operations using ANNs and Heuristic Techniques.
43	3/VI	20 EEC30	Electrical Drives Lab	Analyze the control strategies to modify the output parameters of dc and ac drives.
				Develop, testing and experimental procedures by applying basic knowledge in electrical and electronics.
				Demonstrate the principle of energy efficient motors by load matching.
				Interpret the performance of a given drive by suitable experimentation.
				Investigate the performance of a given drive by using suitable simulation software.
44	3/VI	20 EEC31	IoT Lab	Understand use of Arduino / RaspberryPi board circuit
				Implement interfacing of various sensors with Arduino /Raspberry Pi
				Demonstrate the abilityto transmit data wirelessly between different devices
				Show an ability to upload/download sensor data on cloud and server
				Analyze basic protocols in wireless sensor network
45	4/VII	20MBC01	Engineering Economics & Accountancy	Apply fundamental knowledge of Managerial Economics concepts and tools
				Analyze various aspects of Demand Analysis, Supply and Demand Forecasting.
				Understand Production and Cost relationships to make best use of resources available.
				Apply Accountancy Concepts and Conventions and preparation of Final Accounts.
				Evaluate Capital and Capital Budgeting decision based on any technique.
46	4/VII	20 EE C32	Project – Part-1	List the various approaches to the selected problem
				Interpret theadvantages and disadvantages of various approaches.

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				Apply the selected approach for simulating/ modeling /designing the problem.
				Analyse and write a report on the results of the simulation / modeling of the problem selected.
				Justify and present the results of the simulation / modeling/ design before the departmental 9committee.
47	4/VII	20EGM04	Gender Sensitization	U1nderstand the difference between “Sex” and “Gender” and be able to explain socially constructed theories of identity.
				Recognize shifting definitions of “Man” and “Women” in relation to evolving notions of “Masculinity” and “Femininity”.
				Appreciate women’s contributions to society historically, culturally and politically.
				Analyze the contemporary system of privilege and oppressions, with special attention to the ways gender intersects with race, class, sexuality, ethnicity, ability, religion, and nationality.
				Demonstrate an understanding of personal life, the workplace, the community and active civic engagement through classroom learning.
48	4/VII	20EEE43	AI Techniques in Electrical Engineering	Understand the concepts of ANNs, Fuzzy logic and machine learning Techniques
				Remember the difference between knowledge based systems and algorithmic based systems.
				Understand the basics of machine learning concepts.
				Apply fuzzy logic controller and machine learning algorithms for real-world problems.
				. Analyze critically the techniques presented and apply them to electrical Engineering problems.
49	4/VII	20CSO02	Introduction to Web Technology	Understand the technologies required for developing web application.
				Identify and choose XHTML tags, CSS and java scripts to develop well-structured and easily maintained web pages.
				Design and Develop interactive and innovative web pages using various platforms/technologies like XHTML, CSS, XML, JAVASCRIPT.
				Create and deploy web applications in web server by using server-side programming concepts like PHP
				Build a data driven web site using Databases.
				Evaluate different web applications to implement optimal solutions for real time problems

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50	4/VII	20CEO02	Disaster Risk Reduction and Management	Identify and understand the concepts of hazards, causes and impacts of disasters.
				Develop a critical capacity to evaluate the principles and practices of disaster risk reduction and management
				Develop a deep awareness of disaster resilience, risk mitigation, and recovery policies as they arise from natural hazards around the globe
				Apply knowledge about existing global frame work sand existing agreements and role of community in successful Disaster Risk Reduction
				Evaluate DM study including data search, analysis and presentation as a case study.
51	4/VIII	20EEE55	Electric Hybrid Vehicles (EHV)	Be familiar to the models of describing Electric and hybrid vehicles and their performance.
				Calculation of tractive effort required for EHV and EV with different vehicle parameters and optimization of powertrain.
				Design optimization of Electric power train and implementation of charging technology.
				Analyze the different possible ways of energy storage and battery selection.
				Illustrate the principle of Hybrid Electric Vehicle, Battery Electric Vehicle and Plug-in EHV and able to prepare. a business plans.
52	4/VIII	20EEE56	Embedded System Design (ESD)	Understand the fundamentals of the embedded systems
				Analyze the hardware and software components of the embedded systems.
				Design interfacing ofthe systems with other processing systems.
				Evaluate the performance of an embedded system using debugging tools.
				Apply embedded design approach for various applications.
53	4/VIII	20CS009	Fundamentals of DBMS (FDBMS)	Classify the difference between FMS and DBMS; describe the roles of different users and the structure of the DBMS. Design the database logically using ER modeling
				Outline the schema of the relational database and key constraints. Develop queries using DDL, DML and DCL of SQL.
				Identify the inference rules for functional dependencies and apply the principles of normal forms to decompose the relations in a database.

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				Summarize the concepts of dense, sparse, ISAM and B+ tree indexing and get familiar with states and properties of transactions.
				Interpret the locking, time stamp, graph and validation-based protocols for concurrency control. 6. Summarize log-based recovery techniques to increase the robustness of the database, identify to resolve the deadlocks in the transactions.
54	4/VIII	20CH002	Industrial Pollution Control (IPC)Control (IPC)	Differentiate the types of wastes generated in an industry, their effects on living and non-living things
				Understand the effect of climate changes, atmospheric dispersion of air pollutants, and operating principle
				Understand working principles of particulate control devices
				Quantify wastewater and Assess treatment technologies for wastewater
				Select treatment methodologies for hazardous and E-waste
55	4/VIII	20EEC33	Technical Seminar	Collect, Organize, Analyze and Consolidate information about emerging technologies from the literature.
				Exhibit effective communication skills, stage courage and confidence.
				Demonstrate intra-personal skills.
				Explain new innovations / inventions in the relevant field.
				Prepare and experience in writing the Seminar Report in a prescribed format.
56	4/VIII	20EEC34	Project Part-2	Recall the details of the approach for the selected problem.
				Interpret the approach to the problem relating to the assigned topic.
				Determine the action plan to conduct investigation.
				Analyze and present the model/simulation / design as needed.
				Evaluate, present and report the results of the analysis and justify the same.

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