CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (Autonomous)
Gandipet, Hyderabad -75
Department Of Electrical and Electronics Engineering
Course Outcomes Statements for ME(PS & PE)-R20

SNo	Code	Course Name	Course Outcomes Statements
1.	20EEC101	Real Time Applications for Power Systems	Understand the study of optimal power flows
			Acquire knowledge of state estimation required for the real-time operation of power system
			Describe the importance of contingency analysis at planning stage for secured operation of power system; and simulating the contingency studies with different methods
			Discuss the power system security and challenges in secured operation of power system in real-time environment.
			Explain various methods and models available in power system load forecasting
2.	20EEC102	Power Electronic Converters	Give a systematic approach for transient and steady state analysis of all power electronic converters with passive and active loads.
			Know and carry out transient and steady state analysis of different power converters of different types of loads and switching sequences
			Analyze power electronic devices
			Analyze and design DC-DC and DC-AC converters
			Analyze and design AC regulator and Cyclo converter
3.	20MEC103	Research Methodology and IPR	Define research problem, review and asses the quality of literature from various sources
			Improve the style and format of writing a report for technical paper/ Journal report, understand and develop various research designs
			Collect the data by various methods: observation, interview, questionnaires
			Analyze problem by statistical techniques: ANOVA, F-test, Chi-square
			Understand apply for patent and copyrights
4.	20EEC103	Power Systems Lab	Learn the measurement of sequence reactance of synchronous machine and 3-phase transformer
			Knowledge about the relay characteristics
			Acquire Knowledge to estimate efficiency, regulation and ABCD constants of 3-phase transmission line
			Learn about various types of faults
			Validate the I–V and P-V characteristics of a PV module
5.	20EEC104	Power Electronics Simulation Lab	Acquire the knowledge of using simulation tools for power electronic converters modelling.
			Analyze the performance of phase -controlled converters by simulation
			Demonstrate the effects of different topologies and voltage control techniques in inverters.
			Simulate different dc-dc converter circuits
			Investigate with ac-ac conversion and reactive power compensation calculations

SNo	Code	Course Name	Course Outcomes Statements
6	20EEC105	Power System Dynamics	Distinguish various stabilities issues in the power system
			Understand the modeling of synchronous machine
			Describe the role of Excitation, PSS and Prime Movers in improving the power system performance during disturbances
			Analyze the small-signal stability of the power system
			Infer the concepts of LFOs and SSR in detail
7.	20EEC106	Advanced Power Electronic Circuits	Demonstrate the knowledge of DC isolated and non-isolated regulators
			Demonstrate the knowledge of load and switch resonant converters
			Demonstrate the knowledge resonant inverters
			Model and design DC-DC converters for renewable energy conversion
			Apply the knowledge of dc-dc converters used in dc drives and renewable energy applications
9.	20EEC107	Power Electronics Lab	Demonstrate the effects of different loads on the performance of various phase-controlled converters and choppers
			Understand the various topologies and control techniques used in inverters
			Acquire the conversion principles of AC-AC converters
			Analyze different power electronic based speed control techniques of electric dr
			Utilize matrix converter for different power conversions and analyze resonant converters.
10.	20EEC108	Power Systems Simulation Lab	Validate the adaptability of economic load dispatch and load flow for a given situation by simulation results.
			Acquire the knowledge about formation of Impedance and Admittance Matrices
			Acquire the knowledge to analyze the Symmetrical and un-symmetrical fault currents
			Acquire the knowledge to simulate various types of transmission models
			Acquire the knowledge about Symmetrical and Unsymmetrical components for a given system.
11.	20EEC109	Mini Project with Seminar	Organise the literature review to identify and formulate the engineering problem
			Design engineering solutions to simple problems utilizing modern tools and methods
			Demonstrate a sound technical knowledge of their selected mini project topic
			Communicate with engineers and the community to have the conscious of surroundings
			Adapt the skills and attitudes of a Professional Engineer
12.	20EEC110	Industrial Project /Dissertation Phase I	State research questions related to main problem and identify the Research methods
			Identify literature for review
			Integrate theory and practice
			Apply knowledge and understanding in relation to the agreed area of study.
			Communicate in written form by integrating, analysing and applying key texts and practices

SNo	Code	Course Name	Course Outcomes Statements
13.	20EEC111	Industrial Project /Dissertation Phase II	Contribute to Research and Development work
			Apply a holistic view to critically, independently and creatively to identify, formulate and deal with complex issues
			Evaluate critically different engineering/Technological solutions
			Integrate knowledge critically and systematically
			Develop the ethical aspects of Research work.
14.	20EEE101	Electrical Power Distribution System	Acquire knowledge of sub-transmission, Distribution substations
			Understand Distribution voltage regulation
			Discuss the Distribution automation and its application in practice
			Explain the concept of optimization in distribution automation
			Demonstrate the need and functioning of SCADA system
15.	20EEE102	Mathematical Methods for Power Engineering	Recognize and identify the nature of the mathematical problems that are commonly encountered in power engineering
			Knowledge about vector spaces, linear transformation, Eigen values and eigenvectors of linear operators
			To learn about linear programming problems and understanding the Simplex method for solving linear programming problems in various fields of science and technology
			Acquire knowledge about nonlinear programming and various techniques used for solving constrained and unconstrained nonlinear programming problems
			Understanding the concept of random variables, functions of random variable and their probability distribution
16.	20EEE103	Restructured Power Systems	understand the operation of power system in de-regulated and competitive environment
			Discuss operation and planning policies, in deregulated environment.
			Describe the transmission pricing methodologies
			Distinguish different ancillary services provided by the ISO
			Explain open access same-time information system.
17.	20EEE104	Power Semi Conductor devices & Modelling	Understand, the attributes of an ideal switch and its selection for a Specific Power electronic application
			Analyze the static and switching characteristics of different current controlled semiconductor devices
			Analyze the static and switching characteristics of different voltage controlled semiconductor devices and also to differentiate various voltage controlled devices

SNo	Code	Course Name	Course Outcomes Statements
18.	20EEE105	Electric Drive Systems	Model the Electric Drive System
			Design modulation strategies of power electronics converters, for drives application
			Design appropriate current/voltage regulators for electric drives
			Select and implement the drives for Industrial Process
			Implement various variable speed drives in Electrical Energy Conversion System
19.	20EEE106	HVDC	Explain state of the art HVDC technology
			Demonstrate the knowledge of HVDC converter operation and methods of control
			Demonstrate the knowledge of HVDC converter characteristics and control methods
			Demonstrate the knowledge of the protection methods and AC-DC system interactions.
			Demonstrate the knowledge of multi-terminal DC systems.
20.	20EEE107	Renewable Energy System	Acquire the knowledge on design of solar PV systems
			Implement the concepts of wind power generation
			Demonstrate the suitability of non-conventional energy for grid connection
			Understand the working of distributed generation system in autonomous/grid connected modes
			Understand the working of distributed generation system in autonomous/grid connected modes
21.	20EEE108	Artificial Intelligence Techniques for Power Systems	Understand the various Artificial Intelligent and Meta-heuristic Techniques
			Classify the techniques according to their method of approach
			Select the suitable technique for the given power system problem
			Implement suitable Intelligent technique for the given power system problem
			Execute any power system planning and operation using Artificial Intelligent Techniques

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22.	20EEE109	Digital Protection of Power System	Recognize the need and architecture of digital relays
			Comprehend the application of mathematics in power system protection
			Describe the importance of every element of digital relay
			Distinguish various mathematical algorithms used for the estimation of power system parameters
			Explain various algorithms used for the digital protection of power system.
23.	20EEE110	Power Quality	Acquire the knowledge of theoretical concepts and standards of Power Quality issues and its measurement
			Acquire knowledge in identifying sources of harmonics
			Acquire the knowledge to analyze voltage sag in distribution systems
			Acquire the knowledge Harmonic Filtering Techniques
			Acquire the knowledge in Solutions to power factor correction, Wiring and Grounding Problems
24.	20EEE111	FACTS and Custom power devices	Distinguish the performance of Transmission line with and without FACTS Devices
			Compare the SVC and STATCOM
			Understand the operation and control of various Static Series Compensators
			Understand the operation and control of Unified Power Flow Controller
25.	20EEE112	Switch mode & Resonant Converters	Identify different power electronic circuits for designing converters
			Design various types of SMPS for electrical applications.
			Design control methods for SMPS
			Analyze the stability using Bode plots for the converters
			Select different components used in SMPS hardware
26.	20EEE113	Energy Auditing & Management	Acquire the background required for engineers to meet the role of energy managers
			Gain the skills and techniques required to implement energy management
			Demonstrate energy conservation aspects
			Apply the energy conservation techniques to industrial loads
			Perform basic energy audit in an organization
27.	20EEE114	Smart Grids	Appreciate the difference between smart grid & conventional grid.
			Acquire knowledge of smart devices such as PMU, IED etc
			Apply smart metering concepts to industrial and commercial installations
			Formulate solutions in the areas of smart substations, distributed generation and wide area measurements.

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28.	20EEE115	High Voltage Engineering	Acquire knowledge about high voltage generation techniques
			Acquaint with the different methods of generating high voltage AC/DC and impulse voltages and currents
			Acquire the knowledge of measurement techniques for high voltage AC/DC and impulse voltages and currents
			Acquire knowledge about planning and layout of HV labs
			Attain methods of shielding, grounding and other safety precautions of HV labs
29.	20EEE116	Electric and Hybrid Vehicles	Be familiar to the models of describing hybrid vehicles and their performance
			Model the electric vehicles with different acceleration and range
			Design various configuration and control strategies for electric drives.
			Analyze the different possible ways of energy storage.
			Design of a Hybrid Electric Vehicle, Battery Electric Vehicle
30.	20CSO 101	Business Analytics	To understand the basic concepts of business analytics
			Identify the application of business analytics and use tools to analyze business data
			Become familiar with various metrics, measures used in business analytics
			Illustrate various descriptive, predictive and prescriptive methods and techniques
			Model the business data using various business analytical methods and techniques
31.	20MEO101	Industrial Safety	Causes for industrial accidents and preventive steps to be taken
			Fundamental concepts of Maintenance Engineering. About wear and corrosion along with preventive steps to be taken. The basic concepts and importance of fault tracing.
			The steps involved in carrying out periodic and preventive maintenance of various equipments used in industry
32.	20MEO 102	Introduction to Optimization Techniques	Formulate a managerial decision problem into a mathematical model
			Apply transportation problems in manufacturing industries
			Build and solve assignment models
			Apply project management techniques like CPM and PERT to plan and execute project successfully
			Apply sequencing concepts in industry applications

SNo	Code	Course Name	Course Outcomes Statements
33.	20MEO 103	Composite Materials	Classify and characterize the composite materials
			Describe types of reinforcements and their properties
			Understand different fabrication methods of metal matrix composites
			Understand different fabrication methods of polymer matrix composites
			Decide the failure of composite materials
34.	20CEO 101	Cost Management of Engineering Projects	Acquire in-depth knowledge about the concepts of project management and understand the principles of project management
			Determine the critical path of a typical project using CPM and PERT techniques
			Prepare a work break down plan and perform linear scheduling using various methods
			Solve problems of resource scheduling and leveling using network diagrams
			Learn the concepts of budgetary control and apply quantitative techniques for optimizing project cost
35.	20EEO 101	Waste to Energy	Understand the concept of conservation of waste
			Identify the different forms of wastage
			Chose the best way for conservation to produce energy from waste
			Explore the ways and means of combustion of biomass
			Develop a healthy environment for the mankind
36.	20EG A 101	English for Research Paper Writing	Interpret the nuances of research paper writing.
			Differentiate the research paper format and citation of sources
			To review the research papers and articles in a scientific manner
			Avoid plagiarism and be able to develop their writing skills in presenting the research work
			Create a research paper and acquire the knowledge of how and where to publish their original research papers
37.	20EGA 102	Indian Constitution and Fundamental Rights	Understand the making of the Indian Constitution and its features
			Understand the Rights of equality, the Right of freedom and the Right to constitutional remedies
			Have an insight into various Organs of Governance - composition and functions
			Understand powers and functions of Municipalities, Panchayats and Co-operative Societies
			Understand Electoral Process, special provisions

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38.	20EGA 103	Stress Management by Yoga	To understand yoga and its benefits
			Enhance Physical strength and flexibility
			Learn to relax and focus
			Relieve physical and mental tension through asanas
			Improve work performance and efficiency
39.	20EGA 104	Personality Development through Life Enlightenment Skills	Develop their personality and achieve their highest goal of life.
			Lead the nation and mankind to peace and prosperity
			To practice emotional self regulation
			Develop a positive approach to work and duties.
			Develop a versatile personality
40.	20ECA 101	Value Education	Gain necessary Knowledge for self-development
			Learn the importance of Human values and their application in day to day professional life
			Appreciate the need and importance of interpersonal skills for successful career and social life
			Emphasize the role of personal and social responsibility of an individual for all-round growth
			Develop a perspective based on spiritual outlook and respect women, other religious practices, equality, non-violence and universal brotherhood
41.	20CEA 101	Disaster Mitigation and Management	Ability to analyse and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at different levels
			Ability to understand and choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan
			Ability to understand various mechanisms and consequences of human induced disasters for the participatory role of engineers in disaster management
			To understand the impact on various elements affected by the disaster and to suggest and apply appropriate measures for the same
			Develop an awareness of the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans and ability to understand various participatory approaches/strategies and their application in disaster management
42.	20ITA 101	. Pedagogy Studies	Illustrate the pedagogical practices followed by teachers in developing countries both in formal and informal classrooms.
			Examine the effectiveness of pedagogical practices
			Understand the concept, characteristics and types of educational research and perspectives of research
			Describe the role of classroom practices, curriculum and barriers to learning
			Understand Research gaps and learn the future directions
43.	20EEA 101	Sanskrit for Technical Knowledge	Develop passion towards Sanskrit language
			Decipher the latent engineering principles from Sanskrit literature
			Correlates the technological concepts with the ancient Sanskrit history
			Develop knowledge for the technological progress
			Explore the avenue for research in engineering with aid of Sanskrit

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Department of Electrical and Electronics Engineering
CourseOutcomesStatements for ME(PSPE)-R19

S.No	Code	Course Name	Course Outcomes Statements
1.	19EEC101	Power System Analysis	Calculate voltage phasors at all buses, using various methods of load flow
			Calculate fault currents in each phase
			Rank various contingencies according to their severity
			Estimate closeness to voltage collapse and calculate PV curves using continuation power flow
			Distinguish between conventional load-flow and state estimation in real-time applications
2.	19EEC102	Power Electronic Converters	Give a systematic approach for transient and steady state analysis of all power electronic converters with passive and active loads.
			Know and carry out transient and steady state analysis of different power converters of different types of loads and switching sequences.
			Analyze power electronic device
			Analyze and design dc-dc and dc-ac converters.
			Analyze and design AC regulator and cyclo converter
3.	19EEC103	Power Systems Lab	Learn the measurement of sequence reactance of synchronous machine and 3-phase transformer
			Knowledge about the relay characteristics
			Acquire Knowledge to estimate efficiency, regulation and ABCD constants of 3-phase transmission line
			Learn about various types of faults
			Validate the I–V and P-V characteristics of a PV module
4.	19EEC104	Power Electronics Simulation Lab	Familiar with the usage of software for analysis of power electronic converters.
			Analyze the performance of converters by simulation
			Demonstrate the effects of different loads on various converters and inverters by experimentation
			Simulate different dc chopper circuits
			Acquaint with the different speed control techniques of ac and dc drives.
5.	19EEC105	Power System Dynamics	Acquire knowledge to model the synchronous machine to carry out system studies
			Acquire knowledge to evaluate performance of power system from steady state stability, transient stability and voltage stability point of view
			Acquire knowledge to model PS controllers such as: excitation system, Turbine-Governor, FACTS controllers for stability studies
			Acquire knowledge to mitigate low frequency oscillations in power systems; improving system damping through supplementary excitation control (PSS)
			Acquire knowledge to analyze SSR oscillations occurring in series compensated network through damping controls and its importance in power transfer and stability of the system

SNo	Code	Course Name	Course Outcomes Statements
6.	19EEC106	Advanced Power Electronic Circuits	Demonstrate the knowledge of DC isolated and non-isolated regulators
			Demonstrate the knowledge of load and switch resonant converters
			Demonstrate the knowledge resonant inverters
			Model and design DC-DC converters for renewable energy conversion.
			Apply the knowledge of dc-dc converters used in dc drives and renewable energy applications
7.	19EEC107	Power Electronics Lab	Distinguish the characteristics of different controlled switches and their applications.
			Demonstrate the effects of different loads on the performance of various phase controlled converters and choppers
			Understand the various control techniques used in inverters.
			Acquire the conversion principles of DC-DC and AC-AC converters
			Observe different speed control techniques of electric drives.
8.	19EEC108	Power Systems Simulation Lab	Validate the adaptability of economic load dispatch and load flow for a given situation by simulation results.
			Acquire the knowledge about formation of Impedance and Admittance Matrices
			Acquire the knowledge to analyze the Symmetrical and un-symmetrical fault currents
			Acquire the knowledge to simulate various types of transmission models
9.	19EEE101	Electrical Power Distribution System	Acquire knowledge of power distribution management system
			Know Distribution automation and its application in practice
			Acquire the knowledge of SCADA system
			Acquire knowledge of optimization aspects of distribution system.
			Acquire knowledge of urban, rural distribution systems and application of capacitors in distribution systems

SNo	Code	Course Name	Course Outcomes Statements
10.	19EEE102	Mathematical Methods for Power Engineering	Recognize and identify the nature of the mathematical problems that are commonly encountered in power engineering
			Knowledge about vector spaces, linear transformation, Eigen values and eigenvectors of linear operators
			To learn about linear programming problems and understanding the Simplex method for solving linear programming problems in various fields of science and technology
			Acquire knowledge about nonlinear programming and various techniques used for solving constrained and unconstrained nonlinear programming problems
			Understanding the concept of random variables, functions of random variable and their probability distribution
11.	19EEE103	Restructured Power Systems	Have knowledge in analyzing the operation of power system in de-regulated and competitive environment
			Acquire knowledge in operation and planning policies, in deregulated environment.
			Have knowledge of transmission pricing methodologies.
			Know the different ancillary services provided by the ISO
			Acquire the knowledge of open access same time information system.
12.	19EEE104	Power Semi Conductor devices & Modelling	Select the suitable device for the Specific Power electronic application.
			Design current controlled semiconductors device and their parameters.
			Design voltage controlled semiconductors device and their parameters.
			Design of protection circuits.
			Design of firing circuits for different power electronic devices.
13.	19EEE105	Electric Drive Systems	Model the Electric Drive System
			Design modulation strategies of power electronics converters, for drives application
			Design appropriate current/voltage regulators for electric drive.
			Select and implement the drives for Industrial Process
			Implement various variable speed drives in Electrical Energy Conversion System
14.	19EEE106	HVDC	Explain state of the art HVDC technology
			Demonstrate the knowledge of HVDC converter operation and methods of control
			Demonstrate the knowledge of HVDC converter characteristics and control methods
			Demonstrate the knowledge of the protection methods and AC-DC system interactions
			Demonstrate the knowledge of multi-terminal DC systems.
15.	19EEE107	Renewable Energy System	Acquire the knowledge on design of solar PV systems
			Implement the concepts of wind power generation
			Demonstrate the suitability of non-conventional energy for grid connection
			Understand the working of distributed generation system in autonomous/grid connected modes.
			Analyze economic aspects of power generation and its power quality issues.

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16.	19EEE108	Artificial Intelligence Techniques	Apply the concepts of biological and artificial neural networks
			Acquire the knowledge of fuzzy systems
			Acquire the knowledge of GA
			Demonstrate the concepts of ANFIS
			Integrate the intelligent system approaches relevant to Power systems
17.	19EEE109	Digital Protection of Power Systems	Recognize the need and architecture of digital relays
			Comprehend the application of mathematics in power system protection
			Acquainted with the basic blocks and their role in digital protection
			Attain the knowledge of sinusoidal wave based algorithms
			Know Walsh functions and least square techniques and their usage in protection
18.	19EEE110	Power Quality	Acquire the knowledge of theoretical concepts and standards of Power Quality issues and its measurement
			Acquire knowledge in identifying sources of harmonics
			Acquire the knowledge to analyze voltage sag in distribution systems
			Acquire the knowledge Harmonic Filtering Techniques
			Acquire the knowledge in Solutions to power factor correction, Wiring and Grounding Problems
19.	19EEE111	FACTS and Custom power devices	Select the appropriate compensating technique/ device/controller based on the needs of inter connected power transmission systems.
			Demonstrate the knowledge of shunt compensators (i.e. SVC, STATCOM) for the end of line voltage support and transient stability problem
			Analyze the operation and control of GCSC, TCSC, TSSC, TCVR, TCPAR and SSSC.
			Demonstrate the knowledge of operation and control of UPFC
			Identify the power quality problems and demonstrate the knowledge of various types of filters and UPQC
20.	19EEE112	Switch mode & Resonant Converters	Identify different power electronic circuits for designing converters.
			Design various types of SMPS for electrical applications .
			Design control methods for SMPS
			Analyze the stability using Bode plots for the converters.
			Select different components used in SMPS hardware.
21.	19EEE113	Energy Auditing & Management	Acquire the background required for engineers to meet the role of energy managers
			Acquire the background required for engineers to meet the role of energy manager
			Demonstrate energy conservation aspects
			Apply the energy conservation techniques to industrial loads
			Perform basic energy audit in an organization
22.	19EEE114	Smart Grids	Appreciate the difference between smart grid & conventional grid.
			Acquire knowledge of smart devices such as PMU, IED etc
			Apply smart metering concepts to industrial and commercial installations.
			Formulate solutions in the areas of smart substations, distributed generation and wide area measurements.
			Acquire knowledge of micro grid and modern communication technologies

SNo	Code	Course Name	Course Outcomes Statements
23.	19EEE115	High Voltage Engineering	Acquire knowledge about high voltage generation techniques
			Acquaint with the different methods of generating high voltage AC/DC and impulse voltages and currents
			Acquire the knowledge of measurement techniques for high voltage AC/DC and impulse voltages and currents
			Acquire knowledge about planning and layout of HV labs.
			Attain methods of shielding, grounding and other safety precautions of HV labs
24.	19EEE116	Electric and Hybrid Vehicles	Be familiar to the models of describing hybrid vehicles and their performance.
			Model the electric vehicles with different acceleration and range
			Design various configuration and control strategies for electric drives
			Analyze the different possible ways of energy storage.
			Design of a Hybrid Electric Vehicle, Battery Electric Vehicle
25.	19CSO101	Business Analytics	To understand the basic concepts of business analytics
			Identify the application of business analytics and use tools to analyze business data
			Become familiar with various metrics, measures used in business analytics
			Illustrate various descriptive, predictive and prescriptive methods and techniques
			Model the business data using various business analytical methods and techniques
26.	19MEO101	Industrial Safety	Identify the causes for industrial accidents and suggest preventive measures
			Identify the basic tools and requirements of different maintenance procedures.
			Apply different techniques to reduce and prevent Wear and corrosion in Industry.
			Identify different types of faults present in various equipment like machine tools, IC Engines, boilers etc.
			Apply periodic and preventive maintenance techniques as required for industrial equipments like motors, pumps and air compressors and machine tools etc
27	16MEO 102	Introduction to Optimization Techniques Industrial Safety	Formulate a managerial decision problem into a mathematical model
			Apply transportation problems in manufacturing industries
			Build and solve assignment models
			Apply project management techniques like CPM and PERT to plan and execute project successfully
			Apply sequencing concepts in industry applications
28.	19MEO103	Composite Materials	Classify and characterize the composite materials.
			Describe types of reinforcements and their properties.
			Understand different fabrication methods of metal matrix composites.
			Understand different fabrication methods of polymer matrix composites.
			Decide the failure of composite materials.

SNo	Code	Course Name	Course Outcomes Statements
29.	19CEO 101	Cost Management of Engineering Projects	Acquire in-depth knowledge about the concepts of project management and understand the principles of project management.
			Determine the critical path of a typical project using CPM and PERT techniques.
			Prepare a work break down plan and perform linear scheduling using various methods
			Prepare a work break down plan and perform linear scheduling using various methods
			Learn the concepts of budgetary control and apply quantitative techniques for optimizing project cost.
30.	19EEO101	Waste to Energy	Understand the concept of conservation of waste
			Identify the different forms of wastage
			Choose the best way for conservation to produce energy from waste
			Explore the ways and means of combustion of biomass
			Develop a healthy environment for the mankind

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Department of Electrical and Electronics Engineering
Course Outcomes Statements for ME(PSPE)-R16

S No	Code	Course Name	Course Outcomes Statements
1.	16EEC101	Power Semi-Conductor Devices and Circuits	Demonstrate the knowledge of switching characteristics of various power semiconductor devices
			Design dc-dc buck ,boost, buck-boost and Cuk converters
			Demonstrate the knowledge of various PWM techniques used in dc-ac single and three phase inverters
			Analyze various types of resonant converters
			Comprehend various dc-dc converters (with isolation) used in SMPS and also able to demonstrate electrical power supply the protection schemes
2.	16EEC102	Distribution System Planning and Automation	Able to know different planning models in the distribution system planning
			Will have knowledge of role and functioning of sub-transmission and distribution sub-stations
			Capable of doing the primary feeder and secondary feeder voltage drop and power loss calculations
			Competent to calculate the reactive power requirements of distribution system
			Acquire knowledge of different aspects of Distribution automation
			Capable of finding load flow results of distribution system using ladder iterative technique.
3.	16EEC103	Advanced Computer Methods in Power Systems	Will have knowledge to draw network graphs, formulate bus incidence matrices form the graphs
			Able to form and manipulate bus admittance and impedance matrices, based on an understanding of incidence and primitive network, so as to reflect changes in network
			Able to form and manipulate bus admittance and impedance matrices, based on an understanding of incidence and primitive network, so as to reflect changes in network
			Will formulate power flow equations and become adept to solving these equations by applying Gauss-seidel and Newton-Raphson methods.
			Will have knowledge to calculate short circuit calculations for different types of faults
			Will develop algorithms and write programs for power flow solutions by iterative techniques.
4.	16EEC104	Power System Stability	Acquire knowledge to model the syn. m/c to carryout system studies.
			Acquire knowledge to evaluate performance of power system form steady state stability, transient stability and voltage stability point of view.
			Acquire to knowledge to model PS controllers such as excitation system, Turbine-Governor FACTS controller for stability studies
			Acquire knowledge to mitigate low freq Oscillation in power system; improving system damping through supplementary excitation control
			Acquire knowledge to analyze SSR Oscillation occurring in series compensated network through damping controls and its importance in power transfer and stability of the system

SNo	Code	Course Name	Course Outcomes Statements
5.	16EEC105	Advanced Electric Drives	Identify and consider the requirement of power converters for a given application
			Illustrate the digital methods of DC motor speed control techniques.
			Show how the changes effect in different speed control schemes of Induction motor.
			Analyse the performance of Synchronous motor with and without sinusoidal supply
			Recognize and formulate problems encountered by special motor drives for a particular application.
6.	16EEC106	Flexible AC Transmission Systems	Select the appropriate FACTS device/controller based on the needs of inter connected power transmission systems.
			Select various converter topologies used in FACTS for harmonic reduction
			Demonstrate the knowledge of shunt compensators(i.e SVC,STATCOM) for the end of line voltage support and transient stability problems
			Analyze the operation and control of GCSC, TCSC and SSSC.
			Describe the principles, operation and control of UPFC and also demonstrate the knowledge of UPFC for P and Q control
7.	16EEC107	Power Systems Lab	Validate the adaptability of economic load dispatch and load flow for a given situation by simulation results.
			Design a controller for FACTS application by simulation
			Demonstrate the effects of different sequence reactances of a synchronous machine by experimentation Acquainted with the characteristics of different relays by experimentation
			Acquainted with the characteristics of different relays by experimentation
8.	16EEC108	Power Electronics Lab	Analyze the performance of converters and inverters by simulation results
			Design a control circuit with different orientations of devices by simulation
			Demonstrate the effects of different loads on various converters and inverters by experimentation.
			Acquainted with the different speed control techniques of IM
			Know how to use the simulation software to design and fabricate different power electronic circuits.
9.	16EEC109	Seminar-I	Acquire knowledge in systematic way of carrying out literate survey and select the topic for seminar.
			Acquire knowledge in preparing detailed summary and to gain in -depth knowledge on the chosen topic.
			Acquire knowledge in preparing summary highlights in the direction in which work has progressed and the gaps.
			Acquire knowledge in preparing summary highlights in the direction in which work has progressed and the gaps.
			Acquire knowledge in communication skills and clarity in expression.

SNo	Code	Course Name	Course Outcomes Statements
10.	16EEC110	Seminar-II	Acquire knowledge in systematic way of carrying out literate survey and select the topic for seminar.
			Acquire knowledge in preparing detailed summary and to gain in-depth knowledge on the chosen topic.
			Acquire knowledge in preparing summary highlights in the direction in which work has progressed and the gaps.
			Acquire knowledge to fill gaps in highlighting the method of solution.
			Acquire knowledge in communication skills and clarity in expression.
11.	16EEC112	Project Seminar	Develop the skills of analyzing a problem, solving it by different approaches, building interactions with the other organizations.
			Develop the skills of presenting a concept, independent learning and addressing the societal issues, economical outlay.
12.	16EEC113	Project Work & Dissertation	Acquire knowledge in conducting systematic way the literature Survey by referring to reputed journals/ textbooks etc.
			Acquire knowledge in segregating /Classifying the literature survey paper: Design, Analysis, experimental etc
			Able to prepare a detailed summary of the paper as per the classification and choose the area and topic fitting in to the classification such as simulation studies, experimentation, preparing prototype etc.
			Acquire knowledge to conduct simulation studies/ experimental studies and tabulate the results and compare the performance and choose the design parameter to improve the performance etc.
			Acquire knowledge in writing the project work report in different chapters: Introduction, back ground, description, problem formulation, Analysis, Discussion, results and suggestions for further studies and conclusions.
13.	16EEE101	Machine Modeling and Analysis	Model mathematically all types of DC machine using state variable form
			Obtain stability conditions of all types of DC machines using their characteristic equation deriving from transfer function of the machine.
			Transform variables from one reference frame to another reference frame.
			Model 3Q symmetrical induction machines using reference frame theory under study state condition
			Analyze the 3Q symmetrical induction motor dynamic performance during transient condition.
			Model 3Q synchronous machines using transformation of reference frames by Park's transformation under steady state and analyze dynamic performance during transient conditions

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14.	16EEE102	Modern Control Theory	Acquire knowledge to represent the system in state space form and analyze controllability and observability aspects
			Have knowledge in problem formulation of non-linear systems and to analyze its performance.
			Acquire knowledge in defining the stability of a non-linear system using Lyapunov stability method.
			Acquire knowledge in formulating an optimal control problem and finding its solution using mathematical modeling
			Acquire knowledge pertaining to Adaptive control systems and applications.
15.	16EEE103	Advanced Power System Protection	Comprehend the basic components of static relays and their characteristics
			Understand the operating principles of different distance relays.
			Acquaint with the characteristics & application of different protection schemes for AC generators / motors.
			Acquaint with the characteristics & application of different protection schemes for AC generators / motors.
			Know various types of pilot protection schemes, their adaptability and basic principle of travelling wave relays.
16.	16EEE104	Real Time Applications in Power Systems	Acquire knowledge in real-time computer control of power system and functional aspects of energy control centre and management system.
			Acquire knowledge to distinguish the difference between load-flow studies and state estimation and role of SE in energy control centre.
			Acquire knowledge in studying the importance of contingency analysis at planning stage for secured operation of power system; and simulating the contingency studies with different methods.
			Acquire knowledge in studying the importance of security analysis and challenges in secured operation of power system in real-time environment
			Acquire knowledge to study the operation of power system in de-regulated environment and grasp the salient features of Electricity Act 2003 and Indian Electricity Grid Code.
17.	16EEE105	Deregulation of Power Systems	Have knowledge in analyzing the operation of power system in de-regulated and competitive environment
			Acquire knowledge in operation and planning policies, in deregulated environment.
			Have knowledge of transmission pricing methodologies.
			Know the different ancillary services provided by the ISO
			Acquire the knowledge of open access same time information system.
			Acquire the concepts of available transfer capability and methodologies to calculate ATC
18.	16EEE106	Soft Computing Techniques to Power Systems	Understand the concepts of ANN
			Acquire knowledge of Fuzzy systems.
			Able to understand fundaments and different selection mechanisms in genetic algorithm
			Acquire knowledge of PSO and its variations.
			Capable of applying ANN, Fuzzy, GA, PSO techniques to power system problems
			Distinguish between wind and wave energy systems.
			Design suitable OTEC plant and geothermal plant for the available source of heat.

SNo	Code	Course Name	Course Outcomes Statements
19.	16EEE107	Renewable Energy Sources	Know the importance of RES for India and know the factors which influence RES selection
			Design solar thermal applications
			Model solar PV system.
			Design WEC system according to the available environmental condition.
			Distinguish between wind and wave energy systems.
			Design suitable OTEC plant and geothermal plant for the available source of heat.
20.	16EEE108	Reliability Modeling in Power Systems	Have the knowledge of principles of reliability applied to power systems
			Acquire the knowledge to carryout evaluation procedures of generator capacity reserves.
			Illustrate the evaluation of operating reserve of a system.
			Acquire knowledge to formulate mathematical models for reliability evaluation of Generation, Transmission.
			Compare and contrast various techniques of evaluation with regard to distribution systems.
21.	16EEE109	Power Quality Engineering	Have the knowledge of theoretical concepts and standards of Power Quality and issues in industrial systems
			Have the knowledge to calculate and analyze voltage sag in distribution systems
			Acquire knowledge in identifying sources of harmonic.
			Acquire the knowledge in mitigation of harmonics in industrial and commercial loads systems
			Acquire the knowledge in measurement of PQ problems.
22.	16EEE110	Energy Management	Acquire knowledge of Energy management principles and the evolution of EC Act 2001 & 2003.
			Familiar with energy audit instruments and Energy Audit case studies
			Identify the need of Demand side management in the Energy conservation aspect.
			Compare and contrast the Energy efficient systems in various sectors.
			Recognize the role of technology in Energy management perspective.
23.	16EEE111	Advanced Microprocessor Systems	Have knowledge of Architecture features and function of 8086, 80386, 80486, Pentium, Motorola 68000 microprocessors.
			Have knowledge of features of MIPS, AMD
			Acquire basic knowledge on 68020, 68030 and 68040 Microprocessors
			Acquire knowledge of functional features of RISC, Dec Alpha AXP and Sun SPARC
			To get basic knowledge on Pentium , Pentium pro Pentium II Pentium III features of Pentium series microprocessors
24.	16EEE112	Digital Control Systems	Acquire knowledge on Z-transforms and their importance in finding Pulse Transfer Function.
			Acquire knowledge on developing a discrete time system in state space form and also to analyze stability, controllability, observability aspects
			Acquire knowledge to design discrete time control systems through conventional methods using compensators and PID controllers
			Have knowledge of pole placement and design of state feedback controllers
			Acquire knowledge of Adaptive controls and State Estimation through Kalman filter.

S.No	Code	Course Name	Course Outcomes Statements
25.	16EEE113	HVDC Transmission	Acquire knowledge about HVDC converter operation and methods of control
			Acquire knowledge about methods of HVDC converter control
			Acquire knowledge about the protection methods in HVDC system
			Acquire knowledge about the protection methods in HVDC system
			Acquire knowledge about multi-terminal DC systems
26.	16EEE114	Research Methodology & Professional Ethics	Acquire knowledge in distinguishing the difference in types of research and formulate area of research in a systematic manner.
			Acquire knowledge to prepare research design, outline important concepts, following relevant standards and codes, and their importance in analysis.
			Acquire knowledge in preparing research project proposal outlining the objectives, deliverables, and beneficiary's financial requirements in preparing the report.
			Acquire the knowledge of report writing, technical paper writing and Journal paper writing.
			Acquire the knowledge of Intellectual property rights, citation etc.
			Acquire the concepts of MOU and MOA.
27.	16EG104	Soft skills lab	Be effective communicators and participate in group discussions and case studies with confidence. Also 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. Also learn to manage time effectively and deal with stress.
			Make the transition smoothly from campus to corporate. Also use media with etiquette and know what academic ethics are.
			Correct and complete sentences, have a good vocabulary and comprehend passages confidently

Member, BoS   **Chairman, BoS, EEE**