ESWAR COLLEGE OF ENGINEERING
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KESANUPALLI (V), NARASARAOPETA-522549, AP
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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
Course Outcomes

Year/Sem: II B.Tech I SEM　　　　　　　　　　**A.Y:2021-2022**

II YEAR- I SEM

COURSE NAME: MATHEMATICS– IV	
COURSE CODE: : EE2101	
EE2101.1	Apply cauchy-riemann equations to complex functions in order to determine whether a given continuous function is analytic (l3).
EE2101.2	Find the differentiation and integration of complex functions used in engineering problems (l5).
EE2101.3	Make use of the cauchy residue theorem to evaluate certain integrals (l3).
EE2101.4	Apply discrete and continuous probability distributions (l3).
EE2101.5	Design the components of a classical hypothesis test (l6).
EE2101.6	Infer the statistical inferential methods based on small and large sampling tests (l4) .

COURSE NAME: : ELECTRONIC DEVICES AND CIRCUITS	
COURSE CODE: EE2102	
:EE2102.1	Understand the basic concepts of semiconductor physics.
EE2102.2	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.
EE2102.3	Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
EE2102.4	Understand the construction, principle of operation of transistors, bjt and fet with their v-i characteristics in different configurations.
EE2102.5	Know the need of transistor biasing, various biasing techniques for bjt and fet and stabilization concepts with necessary expressions.
EE2102.6	Perform the analysis of small signal low frequency transistor amplifier circuits using bjt and fet in different configurations.

COURSE NAME: ELECTRICAL CIRCUIT ANALYSIS – II	
COURSE CODE: EE2103	
EE2103.1	Understand the concepts of balanced and three-phase circuits.
EE2103.2	Know the transient behavior of electrical networks with dc excitations.
EE2103.3	Learn the transient behavior of electrical networks with ac excitations.
EE2103.4	Estimate various parameters of a two port network.
EE2103.5	Understand the significance of filters in electrical networks.
EE2103.6	Understand the concepts of unbalanced three-phase circuits.

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COURSE NAME: DC MACHINES AND TRANSFORMERS	
COURSE CODE: EE2104	
EE2104.1	Assimilate the concepts of electromechanical energy conversion.
EE2104.2	Mitigate the ill-effects of armature reaction and improve commutation in dc machines.
EE2104.3	Understand the torque production mechanism and control the speed of dc motors.
EE2104.4	Analyze the performance of single phase transformers.
EE2104.5	Predetermine regulation, losses and efficiency of single phase transformers.
EE2104.6	Parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.

COURSE NAME: ELECTRO MAGNETIC FIELDS	
COURSE CODE: EE2105	
EE2105.1	Compute electric fields and potentials using gauss law or solve laplace's or poisson's equations for various electric charge distributions.
EE2105.2	Calculate the capacitance and energy stored in dielectrics.
EE2105.3	Calculate the magnetic field intensity due to current carrying conductor and understanding the application of ampere's law, maxwell's second and third law.
EE2105.4	Estimate self and mutual inductances and the energy stored in the magnetic field.
EE2105.5	Understand the concepts of displacement current and poynting theorem and poynting vector.
EE2105.6	Solve laplace's or poisson's equations for various electric charge distributions.

COURSE NAME: ELECTRICAL CIRCUITS LAB	
COURSE CODE: EE21L1	
EE21L1.1	Apply various theorems.
EE21L1.2	Determination of self and mutual inductances.
EE21L1.3	Two port parameters of a given electric circuits.
EE21L1.4	Draw locus diagrams.
EE21L1.5	Draw waveforms and phasor diagrams for leading networks.
EE21L1.6	Draw waveforms and phasor diagrams for lagging.

COURSE NAME: DC MACHINES AND TRANSFORMERS LAB	
COURSE CODE: EE21L2	
EE21L2.1	Determine and predetermine the performance of dc machines.
EE21L2.2	Determine and predetermine the performance of transformers.
EE21L2.3	Control the speed of dc motor.
EE21L2.4	Obtain three phase to two phase transformation
EE21L2.5	To predetermine the efficiency and regulation of transformers and assess their performance.
EE21L2.6	To plot the magnetizing characteristics of dc shunt generator and understand the mechanism of self-excitation.

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COURSE NAME: ELECTRONIC DEVICES AND CIRCUITS LAB	
COURSE CODE: EE21L3	
EE21L3.1	Analyze the characteristics of diodes, transistors and other devices.
EE21L3.2	Design and implement the rectifier circuits, scr and ujt in the hardware circuits.
EE21L3.3	Design and implement the scr.
EE21L3.4	Design and implement the ujt in the hardware.
EE21L3.5	Design the biasing and amplifiers of bjt and fet amplifiers.
EE21L3.6	Measure electrical quantities using cro in the experimentation.

II YEAR- II SEM

COURSE NAME: PYTHON PROGRAMMING	
COURSE CODE: EE2201	
EE2201.1	Develop essential programming skills in computer programming concepts like data types.
EE2201.2	Apply the basics of programming in the python language.
EE2201.3	Solve coding tasks related conditional execution, loops.
EE2201.4	Solve coding tasks related to the fundamental notions used in object- oriented programming.
EE2201.5	Solve coding tasks related to the fundamental techniques used in object- oriented programming.
EE2201.6	Develop essential programming skills in computer programming concepts like containers.

COURSE NAME: DIGITAL ELECTRONICS	
COURSE CODE: EE2202	
EE2202.1	Classify different number systems and apply to generate various codes.
EE2202.2	Use the concept of boolean algebra in minimization of switching functions.
EE2202.3	Design different types of combinational logic circuits.
EE2202.4	Apply knowledge of flip-flops in designing of registers and counters
EE2202.5	The operation and design methodology for synchronous.
EE2202.6	Sequential circuits and algorithmic state machines.

COURSE NAME: POWER SYSTEMS - I	
COURSE CODE: EE2203	
EE2203.1	Identify the different components of thermal power plants.
EE2203.2	Identify the different components of nuclear power plants.
EE2203.3	Identify the different components of air insulated substations.
EE2203.4	Identify the different components of gas insulated substations.
EE2203.5	Identify single core and three core cables with different insulating materials.
EE2203.6	Analyse the different economic factors of power generation and tariffs.

COURSE NAME: INDUCTION AND SYNCHRONOUS MACHINES	
COURSE CODE :EE2204	
EE2204.1	Explain the operation and performance of three phase induction motor.
EE2204.2	Analyze the torque-speed relation, performance of induction motor and induction generator.
EE2204.3	Implement the starting of single phase induction motors.
EE2204.4	Develop winding design and predetermine the regulation of synchronous generators.
EE2204.5	Explain hunting phenomenon, implement methods of staring and correction of power factor.
EE2204.6	Explain hunting phenomenon, implement methods of staring and correction of power factor with synchronous motor.

COURSE NAME: MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS	
COURSE CODE: EE2205	
EE2205.1	The learner is equipped with the knowledge of estimating the demand and demand elasticities for a product.
EE2205.2	The knowledge of understanding of the input-output-cost relationships and estimation of the least cost combination of inputs.
EE2205.3	The pupil is also ready to understand the nature of different markets and price output determination under various market conditions.
EE2205.4	The pupil is also ready to understand the nature of different markets and price output determination under to have the knowledge of different business units.
EE2205.5	The learner is able to prepare financial statements and the usage of various accounting tools for analysis.
EE2205.6	The learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

COURSE NAME: PYTHON PROGRAMMING LAB	
COURSE CODE: EE22L1	
EE22L1.1	Write, test and debug python programs
EE22L1.2	Use conditionals for python programs
EE22L1.3	Use loops for python programs
EE22L1.4	Use functions and represent compound data using lists.
EE22L1.5	Use functions and represent compound data using tuples.
EE22L1.5	Dictionaries use various applications using python.

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COURSE NAME: INDUCTION AND SYNCHRONOUS MACHINES LAB	
COURSE CODE: EE22L2	
EE22L2.1	Assess the performance of single phase and three phase induction motors.
EE22L2.2	Control the speed of three phase induction motor.
EE22L2.3	Predetermine the regulation of three–phase alternator by various methods.
EE22L2.4	Find the xd/xq ratio of alternator and asses the performance of three–phase synchronous motor.
EE22L2.5	Determine the performance of single phase ac series motor.
EE22L2.6	Control the speed of two phase induction motor

COURSE NAME: DIGITAL ELECTRONICS LAB	
COURSE CODE: EE22L3	
EE22L3.1	Learn the basics of gates, filp-flops and counters.
EE22L3.2	Construct basic combinational circuits and verify their functionalities.
EE22L3.3	Apply the design procedures to design basic sequential circuits.
EE22L3.4	To understand the basic digital circuits and to verify their operation.
EE22L3.5	Apply boolean laws to simplify the digital circuits.
EE22L3.6	Apply the design

III YEAR- I SEM

COURSE NAME: POWER SYSTEMS–II	
COURSE CODE: EE3101	
EE3101.1	Understand parameters of various types of transmission lines during different operating conditions.
EE3101.2	Understand the performance of short and medium transmission lines.
EE3101.3	Understand travelling waves on transmission lines.
EE3101.4	Understand various factors related to charged transmission lines.
EE3101.5	Understand sag of transmission lines and performance of line insulators.
EE3101.6	Understand tension of transmission lines and performance of line insulators.

COURSE NAME: POWER ELECTRONICS	
COURSE CODE: EE3102	
EE3102.1	Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of scr's.
EE3102.2	Design firing circuits for scr.
EE3102.3	Explain the operation of single phase full–wave converters and analyze harmonics in the input current.
EE3102.4	Explain the operation of three phase full–wave converters.
EE3102.5	Analyze the operation of different types of dc-dc converters.
EE3102.6	Explain the operation of inverters and application of pwm techniques for voltage control and harmonic mitigation.
COURSE NAME: LINEAR IC APPLICATIONS	
COURSE CODE: EE3103	
EE3103.1	Design circuits using operational amplifiers for various applications.

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EE3103.2	Analyze and design amplifiers and active filters using op-amp.
EE3103.3	Diagnose and trouble-shoot linear electronic circuits.
EE3103.4	Understand the gain-bandwidth concept and frequency.
EE3103.5	Understand the response of the amplifier configurations.
EE3103.6	Understand thoroughly the operational amplifiers with linear integrated circuits.

COURSE NAME: DIGITAL SIGNAL PROCESSING	
COURSE CODE: EE3104	
EE3104.1	Understand the concept of signal processing.
EE3104.2	Understand the concept of transforms.
EE3104.3	Appraise the fat fourier algorithm.
EE3104.4	Design fir filter.
EE3104.5	Design iir filter.
EE3104.6	Appreciate the concepts of multirate signal processing.

COURSE NAME: MICROPROCESSORS AND MICROCONTROLLERS	
COURSE CODE: EE3105.	
EE3105.1	Understand the microprocessor capability in general and explore the evaluation of microprocessors.
EE3105.2	Understand the addressing modes of microprocessors .
EE3105.3	Understand the microcontroller capability.
EE3105.4	Program microprocessors and microcontrollers.
EE3105.5	Interface microprocessors and microcontrollers with other electronic devices.
EE3105.6	Develop cyber physical systems.

COURSE NAME: ELECTRICAL MACHINES – II LABORATORY	
COURSE CODE: EE31L1	
EE31L1.1	Analyze the performance and working magnetic amplifier, d.c and a.c. servo motors and synchros.
EE31L1.2	Design p,pi,pd and pid controllers .
EE31L1.3	Design lag, lead and lag–lead compensators.
EE31L1.4	Control the temperature using pid controller.
EE31L1.5	Control the performance of d.c and a.c servo motor.
EE31L1.6	Determine the transfer function of d.c motor.

COURSE NAME: ELECTRICAL MEASUREMENTS & INSTRUMENTATION LABORATORY	
COURSE CODE: EE31L2	
EE31L2.1	Measure the electrical power, energy and electrical characteristics of resistance, inductance and capacitance.
EE31L2.2	Measure the electrical parameters voltage, current, power, energy inductance and capacitance.

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EE31L2.3	Known the characteristics of transducers.
EE31L2.4	Measure the calibration of dc and ac potentiometers.
EE31L2.5	Measure the strains, frequency and phase difference.
EE31L2.6	Measurement of strain.

COURSE NAME: CONTROL SYSTEMS LABORATORY	
COURSE CODE: EE31L3.	
EE31L3.1	Analyze the performance and working magnetic amplifier, d.c and a.c. servo motors and synchros.
EE31L3.2	Design p,pi,pd and pid controllers.
EE31L3.3	Design lag, lead and lag–lead compensators.
EE31L3.4	Control the temperature using pid controller.
EE31L3.5	Determine the transfer function of d.c motor.
EE31L3.6	Control the performance of d.c and a.c servo motor.

III YEAR- II SEM

COURSE NAME: ELECTRIC DRIVES	
COURSE CODE: EE3201	
EE3201.1	Explain the fundamentals of electric drive and different electric braking methods.
EE3201.2	Analyze the operation of three phase converter fed dc motors and four quadrant operations of dc motors using dual converters.
EE3201.3	Describe the converter control of dc motors in various quadrants of operation.
EE3201.4	Know the concept of speed control of induction motor by using ac voltage controllers.
EE3201.5	Know the concept of speed control of induction motor by using voltage source inverters.
EE3201.6	Differentiate the stator side control and rotor side control of three phase induction motor, explain the speed control mechanism of synchronous motors.

COURSE NAME: POWER SYSTEM ANALYSIS	
COURSE CODE: EE3202	
EE3202.1	Draw impedance diagram for a power system network and to understand per unit quantities.
EE3202.2	Form a ybus and zbus for a power system networks.
EE3202.3	Understand the load flow solution of a power system using different methods.
EE3202.4	Find the fault currents for all types faults to provide data for the design of protective devices.
EE3202.5	Find the sequence components of currents for unbalanced power system network.
EE3202.6	Analyze the steady state, transient and dynamic stability concepts of a power system.

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COURSE NAME: DATA STRUCTURES	
COURSE CODE: EE3203	
EE3203.1	Data structures concepts with arrays, stacks, queues.
EE3203.2	Linked lists for stacks, queues and for other applications.
EE3203.3	Traversal methods in the trees.
EE3203.4	Various algorithms available for the graphs.
EE3203.5	Searching in the data ret retrival applications.
EE3203.6	Sorting in the data ret retrival applications.

COURSE NAME: DIGITAL CONTROL SYSTEMS	
COURSE CODE: EE3204	
EE3204.1	Learn the advantages of discrete time control systems and the "know how" of various associated accessories.
EE3204.2	Understand z–transformations and their role in the mathematical analysis of different systems(like laplace transforms in analog systems).
EE3204.3	Learn the stability criterion for digital systems adopted for testing the same are explained.
EE3204.4	Learn the stability criterion methods adopted for testing the same are explained.
EE3204.5	Understand the conventional methods of design are also introduced.
EE3204.6	Understand the state space methods of design are also introduced.

COURSE NAME: ENERGY AUDIT AND CONSERVATION AND MANAGEMENT	
COURSE CODE: EE3205.	
EE3205.1	Analyze solar radiation data, extraterrestrial radiation, and radiation on earth's surface .
EE3205.2	Design solar photo voltaic systems.
EE3205.3	Develop maximum power point techniques in wind energy systems.
EE3205.4	Explain wind energy conversion systems, wind generators, power generation.
EE3205.5	Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.
EE3205.6	Develop maximum power point techniques in solar pv energy systems.

COURSE NAME: POWER ELECTRONICS LABORATORY	
COURSE CODE: EE32L1	
EE32L1.1	Study the characteristics of various power electronic devices.
EE32L1.2	Analyze of single–phase converters with both resistive and inductive loads.
EE32L1.3	Understand the operation of single phase ac voltage regulator with resistive and loads.
EE32L1.4	Analyze and performance of three–phase full–wave bridge converters with both resistive and inductive loads.
EE32L1.5	Understand the operation of single phase ac voltage regulator with and inductive loads.
EE32L1.6	Understand the working of buck converter, boost converter, single–phase square wave inverter and pwm inverter.

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COURSE NAME: MICRO PROCESSORS AND MICRO CONTROLLERS LAB	
COURSE CODE: EE32L2.	
EE32L2.1	Write assembly language program using 8086 micro based on arithmetic, shift operations.
EE32L2.2	Write assembly language program using 8086 micro based on arithmetic, logical operations.
EE32L2.3	Write assembly language program using 8086 micro based on logical, and shift operations.
EE32L2.4	Interface 8086 with i/o and other devices.
EE32L2.5	Do parallel communication using 8051 & pic 18 micro controllers.
EE32L2.6	Do serial communication using 8051 & pic 18 micro controllers.

IV YEAR-I SEM

COURSE NAME: UTILIZATION OF ELECTRICAL	
COURSE CODE: EE4101.	
EE4101.1	Able to identify a suitable motor for electric drives and industrial applications.
EE4101.2	Able to identify most appropriate heating or welding techniques for suitable applications.
EE4101.3	Able to understand various level of illuminosity produced by different illuminating sources.
EE4101.4	Able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.
EE4101.5	Able to determine the speed/time characteristics of different types of traction motors.
EE4101.6	Able to estimate energy consumption levels at various modes of operation.

COURSE NAME: LINEAR IC APPLICATIONS	
COURSE CODE: EE4102	
EE4102.1	Design circuits using operational amplifiers for various applications.
EE4102.2	Analyze active filters using op-amp.
EE4102.3	Diagnose and trouble-shoot linear electronic circuits
EE4102.4	Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
EE4102.5	Analyze and design amplifiers.
EE4102.6	Design operational amplifiers.

COURSE NAME: POWER SYSTEM OPERATION AND CONTROL	
COURSE CODE: EE4103.	
EE4103.1	Able to compute optimal scheduling of generators
EE4103.2	Able to understand hydrothermal scheduling
EE4103.3	Understand the unit commitment problem
EE4103.4	Able to understand importance of the frequency

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| EE4103.5 | Understand importance of pid controllers in single area and two area systems. |
| EE4103.6 | Will understand reactive power control and compensation for transmission line. |

COURSE NAME: SWITCHGEAR AND PROTECTION	
COURSE CODE: EE4104.	
EE4104.1	Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, sf6 gas type.
EE4104.2	Ability to understand the working principle and operation of different types of electromagnetic protective relays.
EE4104.3	Students acquire knowledge of faults and protective schemes for high power generator and transformers
EE4104.4	Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.
EE4104.5	Able to understand different types of static relays and their applications.
EE4104.6	Able to understand different types of over voltages and protective schemes required For insulation co–ordination.

COURSE NAME: Instrumentation	
COURSE CODE: EE4105	
EE4105.1	Able to represent various types of signals .
EE4105.2	Acquire proper knowledge to use various types of Transducers.
EE4105.3	Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc.
EE4105.4	Acquire proper knowledge and working principle of various types of digital voltmeters
EE4105.5	Able to measure various parameter like phase and frequency of a signal with the help of CRO.
EE4105.6	Acquire proper knowledge and able to handle various types of signal analyzers.

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COURSE NAME: SPECIAL ELECTRICAL MACHINES	
COURSE CODE: EE4106	
EE4106.1	Acquire proper knowledge to use various types of transducers
EE4106.2	Able to represent various types of signals
EE4106.3	Acquire proper knowledge and working principle of various types of Voltmeters.
EE4106.4	Able to monitor and measure various parameters such as strain, velocity, temperature.
EE4106.5	Acquire proper knowledge and able to handle various types of signal analyzers.
EE4106.6	Acquire proper knowledge and working principle of various types of digital Voltmeters.

COURSE NAME: ELECTRICAL SIMULATION LAB	
COURSE CODE: EE41L1	
EE41L1.1	Able to simulate integrator circuit, differentiator circuit, boost converter, buck converter, full convertor and pwm inverter.
EE41L1.2	Able to simulate transmission line by incorporating line, load and transformer models.
EE41L1.3	Able to perform transient analysis of rlc circuit and single machine connected to Infinite bus(smib).
EE41L1.4	Able to simulate integrator circuit, differentiator circuit.
EE41L1.5	Able to simulate transmission line by incorporating line.
EE41L1.6	Able to perform transient analysis of rlc circuit.

COURSE NAME: POWER SYSTEMS LAB	
COURSE CODE: EE41L2.	
EE41L2.1	State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.
EE41L2.2	Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.
EE41L2.3	Formulate a mathematical model and apply linear programming technique by using simplex method. Also extend the concept of dual simplex method for optimal solutions.
EE41L2.4	Apply gradient and non-gradient methods to nonlinear optimization problems and useinterior or exterior penalty functions for the constraints to derive the optimal solutions.
EE41L2.5	Able to apply genetic algorithms for simple electrical problems.
EE41L2.6	Able to solve practical problems using pso.

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IV YEAR-II SEM

COURSE NAME: DIGITAL CONTROL SYSTEMS	
COURSE CODE: EE4201	
EE4201.1	The students learn the advantages of discrete time control systems and the "know how" of various associated accessories.
EE4201.2	The learner understand z–transformations and their role in the mathematical analysis of different systems(like laplace transforms in analog systems).
EE4201.3	The stability criterion for digital systems and methods adopted for testing the same are explained.
EE4201.4	Finally, the conventional and state space methods of design are also introduced.
EE4201.5	Mathematical analysis of different systems.
EE4201.6	Stability criterion for digital systems and methods.

COURSE NAME: H.V.D.C. TRANSMISSION	
COURSE CODE: EE4102	
EE4102.1	Learn different types of hvdc levels and basic concepts.
EE4102.2	Know the operation of converters.
EE4102.3	Acquire control concept of reactive power control and ac/dc loadflow.
EE4102.4	Understand converter faults, protection and harmonic effects.
EE4102.5	Design low pass and high pass filters.
EE4102.6	Understand converter faults, protection.

COURSE NAME: ELECTRICAL DISTRIBUTION SYSTEMS	
COURSE CODE: EE4103	
EE4103.1	Able to understand various factors of distribution system.
EE4103.2	Able to design the substation and feeders.
EE4103.3	Able to determine the voltage drop and power loss
EE4103.4	Able to understand the protection and its coordination
EE4103.5	Able to understand the effect of compensation forp.f improvement
EE4103.6	Able to understand the effect of voltage control

COURSE NAME: FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEM	
COURSE CODE: EE4104	
EE4104.1	Will understand importance of power system deregulation and restructuring.
EE4104.2	Able to compute available transfer capability.
EE4104.3	Will understand transmission congestion management.
EE4104.4	Able to compute electricity pricing in deregulated environment
EE4104.5	Will be able to understand power system operation in deregulated environment.
EE4104.6	Will understand importance of ancillary services