



## Department of Electrical and Electronics Engineering

### R15 COURSE OUTCOMES

#### II EEE I Semester

| <b>A13012</b> | <b>MATHEMATICS-IV</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C211.1        | Acquire the knowledge of Special functions.  |
| C211.2        | Work with the functions of complex variables and evaluation of complex differentiation.      |
| C211.3        | Acquire the knowledge of complex power series and integration.                               |
| C211.4        | Work with contour integration and evaluation of real definite integrals                      |
| C211.5        | Acquire the knowledge of evaluating of conformal mapping and bilinear transformations.       |

| <b>A13401</b> | <b>ELECTRONIC DEVICES &amp; CIRCUITS</b>  |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to        |
| C212.1        | Understand different types of diodes, operation and their characteristics.                          |
| C212.2        | Apply the concepts of semiconductors for circuits like rectifiers, filters.                         |
| C212.3        | Analyze the operation and characteristics of BJT and FET.   |
| C212.4        | Examine the DC bias circuitry of BJT and FET, design biasing circuits using diodes and transistors. |
| C212.5        | Assess the transistor application circuits like amplifier.  |



## Department of Electrical and Electronics Engineering

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| <b>A13204</b> | <b>NETWORK THEORY</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to              |
| C213.1        | Understand the concepts of three phase circuits for both balanced and unbalanced loads                    |
| C213.2        | Apply transient response analysis on RLC circuits with initial conditions for both DC and AC excitations. |
| C213.3        | Analyze network functions – pole-zero plots – and obtain time response from pole-zero plots.              |
| C213.4        | Evaluate impedance, admittance, and transmission and hybrid parameters for two port networks.             |
| C213.5        | Design low pass, high pass, band pass and band stop prototype filters.                                    |

|               |  |
|---------------|--|
| <b>A13205</b> | <b>ELECTRO MAGNETIC FIELDS</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                   |
| C214.1        | Understand the concepts of electric field, magnetic field electric potential.                                  |
| C214.2        | Explain the Properties and behavior of conductors, dielectrics, capacitance in electric fields.                |
| C214.3        | Apply Biot Savart's law and Ampere circuital law for evaluating magnetic field intensity and current density.  |
| C214.4        | Examine Lorentz force equation to electromagnetic systems for the transfer of power and development of torque. |
| C214.5        | Evaluate inductance in electric fields and apply Maxwell equations for time varying fields.                    |



## Department of Electrical and Electronics Engineering

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| <b>A13206</b> | <b>ELECTRICAL MACHINES- I</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C215.1        | Identify different parts of D.C machine and their working.                                   |
| C215.2        | Analyze D.C. machines on load and no load.   |
| C215.3        | Understand Principle of operation of a D.C Motor and Torque equation                         |
| C215.4        | Categorise speed control methods of DC Motors  |
| C215.5        | Analyze Various losses, different test in D.C Machines and Calculations of their efficiency. |

|               |  |
|---------------|--|
| <b>A13011</b> | <b>ENVIRONMENTAL SCIENCE</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C216.1        | Understand the importance of ecological balance for sustainable development.                 |
| C216.2        | Understand the impacts of developmental activities and mitigation measures.                  |
| C216.3        | Understand the variety of living organisms and the need to conserve them.                    |
| C216.4        | Sensitization on the ill effects of development and possible solutions to prevent it.        |
| C216.5        | Understand the environmental policies and regulations.                                       |



## Department of Electrical and Electronics Engineering

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| <b>A13281</b> | <b>BASIC SIMULATION TOOLS LAB</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to       |
| C217.1        | Understand the basic commands & operators of MATLAB & PSPICE                                       |
| C217.2        | Develop the program for matrix multiplication & inversion in MATLAB                                |
| C217.3        | Analyze the series RL,RC & RLC circuits using Simulink for DC & DC excitation using MATLAB .       |
| C217.4        | Design DC network and single phase half wave & full wave rectifier using PSPICE.                   |
| C217.5        | Analyze the transient response of series RL, RC, RLC circuits for DC & AC excitation using PSPICE. |

|               |   |
|---------------|---|
| <b>A13282</b> | <b>ELECTRICAL CIRCUITS LAB</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to  |
| C218.1        | Design circuit and conduct experiments for verification of electrical theorems such as Thevenin's, Norton's theorem, Superposition theorem etc.     |
| C218.2        | Find Resonance in series and parallel R, L, C Circuits& locus concepts practically.   |
| C218.3        | Examine Self inductance, Mutual inductance and Coefficient of coupling and Analyze RMS, Average Value, Form Factor and Peak Factor of Complex wave. |
| C218.4        | Determine two port parameters practically.  |
| C218.5        | Measure Active power & Reactive power for star and delta connected balanced loads.  |



## Department of Electrical and Electronics Engineering

II EEE II Semester

| <b>14407</b> | <b>ELECTRONIC CIRCUITS</b>  |
|--------------|---|
|              | After the completion of this course, a student must demonstrate the knowledge and ability to  |
| C221.1       | Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.  |
| C221.2       | Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances. |
| C221.3       | Design and realize different classes of Power Amplifiers useable for audio and Radio applications.  |
| C221.4       | Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.              |
| c221.5       | Design and realize different classes of tuned amplifiers useable for audio and Radio applications.  |

| <b>A14408</b> | <b>SWITCHING THEORY &amp; LOGIC DESIGN</b>   |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C222.1        | Manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.                     |
| C222.2        | Manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.                      |
| C222.3        | Design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.       |
| C222.4        | Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits. |
| C222.5        | To develop the state diagrams with the knowledge of Mealy and Moore circuits and algorithmic state machines for binary multipliers.                      |



## Department of Electrical and Electronics Engineering

|               |   |
|---------------|---|
| <b>A14311</b> | <b>FLUID MECHANICS AND HYDRAULIC MACHINES</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to  |
| C223.1        | Understand the basic mechanics of fluid statics.  |
| C223.2        | Understand the principles of flow and energy momentum equations.  |
| C223.3        | Analyze the losses in pipe flow, boundary layer, separation of flows, forces on different vanes and quantify the flow of fluid in flow measurement instruments. |
| C223.4        | Understand the working of hydraulic machinery and analyze their characteristic curves.  |
| C223.5        | Appreciate the working principles of pumps and their applications.  |

|               |  |
|---------------|--|
| <b>A14208</b> | <b>ELECTRICAL MACHINES – II</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                   |
| C224.1        | Understand the construction and working operations of single phase transformers                                |
| C224.2        | Distinguish different types of three phase transformers and able to obtain the load sharing of transformers    |
| C224.3        | Analyze the performance of induction motors and effect of harmonics.   |
| C224.4        | Compare the operation of induction motor using different speed control methods and analyze the circle diagram. |
| C224.5        | Infer the performance of single phase induction motors   |



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|               |   |
|---------------|---|
| <b>A14209</b> | <b>POWER SYSTEMS-I</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to  |
| C225.1        | Explain about electric power generation, selection of power plants, layout and working of steam power stations, gas and nuclear power stations. |
| C225.2        | Classify DC and AC Distribution system, voltage drop calculations etc.  |
| C225.3        | Sketch Substation layouts, different types of substations (Indoor& outdoor), like GI substations and design aspects of substation.              |
| C225.4        | Analyze power factor and voltage control.   |
| C225.5        | Infer load curve, plant usage and various types of tariff   |

|               |  |
|---------------|--|
| <b>A14210</b> | <b>CONTROL SYSTEMS</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C226.1        | Understand the basic concepts of control system and develop the mathematical model of simple electrical and mechanical systems.                                      |
| C226.2        | Apply the transient response of first and second order systems through time domain specifications.   |
| C226.3        | Sketch root locus technique to know the conditional stability of the system.   |
| C226.4        | Calculate the relative stability of the systems with the help of frequency domain indices and design compensators to meet the desired specifications of the systems. |
| C226.5        | Analyze systems using modern control theory through state space analysis.  |



## Department of Electrical and Electronics Engineering

|               |  |
|---------------|--|
| <b>A14283</b> | <b>ELECTRICAL MACHINES – I LAB</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C227.1        | Identify losses, Output and efficiency of dc motors  |
| C227.2        | Identify losses, Output and efficiency of dc generators                                      |
| C227.3        | Apply speed control methods on DC motors.  |
| C227.4        | Analyze the magnetization characteristics of DC shunt generator to determine its parameters. |
| C227.5        | Infer the efficiencies of D.C Series Machines.   |

|               |   |
|---------------|---|
| <b>A14484</b> | <b>ELECTRONIC DEVICES AND CIRCUITS LAB</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                                      |
| C228.1        | Understand internal physical behavior of PN junction diode, resistor and capacitor  |
| C228.2        | Interpret the breakdown mechanisms in semiconductors so as to construct Zener voltage regulator used in regulated power supplies. |
| C228.3        | Analyze various rectifiers and filter circuits used in regulated power supplies.  |
| C228.4        | Contrast the operation and characteristics of Bipolar Junction Transistor, which can be used in the design of amplifiers          |
| C228.5        | Analyze the characteristics of FET And UJT  |





## Department of Electrical and Electronics Engineering

### III EEE I Semester

|               |  |
|---------------|--|
| <b>A15017</b> | <b>MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTS</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C311.1        | Analyze the scope of managerial economics.   |
| C311.2        | Apply managerial tools and techniques to attain optimal decisions.                           |
| C311.3        | Analyze how production function is carried out to achieve maximum output.                    |
| C311.4        | Analyze changing business environment in post liberalization scenario.                       |
| C311.5        | Evaluate and interpret the financial statements to make informed decisions.                  |

|               |  |
|---------------|--|
| <b>A15212</b> | <b>POWER ELECTRONICS</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C312.1        | Understand various power electronic devices and their commutation procedure.                 |
| C312.2        | Illustrate the operation of various phase-controlled converters.                             |
| C312.3        | examine the operation of AC-AC Converters  |
| C312.4        | categorize the operation of various DC-DC converters   |
| C312.5        | analyze the operation of DC-AC converters  |



## Department of Electrical and Electronics Engineering

|               |   |
|---------------|---|
| <b>A15213</b> | <b>POWER SYSTEMS – II</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                                |
| C313.1        | Understand and discuss the methods of finding transmission line parameters & modeling of lines and their performance.       |
| C313.2        | Apply performance criteria to models of short, medium and long lines, Discuss the models in terms of A, B, C, D parameters. |
| C313.3        | Examine the transient phenomenon on transmission lines  |
| C313.4        | Analyze mechanical design, overview of line supports, insulators, sag & Tension calculations, Corona & Radio Interference.  |
| C313.5        | Design cables, capacitance of single core & 3 core belted cables, IR values and voltage stress.                             |

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| <b>A15214</b> | <b>ELECTRICAL MACHINES-III</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to  |
| C314.1        | Understand the construction and principle of operation of synchronous machine. Armature reaction , load characteristics, harmonics in generating emf etc. |
| C314.2        | Solve regulation of synchronous generator using various methods.  |
| C314.3        | Apply the concept of Parallel operation, load sharing, change of excitation & prime-mover input to alternators  |
| C314.4        | Analyse the principle of operation of synchronous motor and working principle of a synchronous condenser in the system, power circle.                     |
| C214.5        | Categorize different special machines and their performances.   |



## Department of Electrical and Electronics Engineering

### OPEN ELECTIVES

| <b>A15218</b> | <b>NON-CONVENTIONAL ENERGY SOURCES</b>  |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to              |
| C315.1        | Realize the importance of renewable energy sources for energy planning.                                   |
| C315.2        | Understand the value of solar energy potential and exploit the solar energy for real world applications.  |
| C315.3        | Restate the potential of wind energy, types of wind mills, performance characteristics and Betz criteria. |
| C315.4        | Analyze the potential of both tidal and ocean thermal energies and learn the extraction methods.          |
| C315.5        | Identify the potential of Geothermal, Bio-mass energies and learn relevant extraction methods.            |

| <b>A15219</b> | <b>ENERGY MANAGEMENT</b>   |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C316.1        | understand the process of planning, initiating energy management program, promoting, monitoring energy conservation methods in any system.       |
| C316.2        | evaluate energy potential by conducting a systematic search of energy saving opportunities in different energy conservation schemes.             |
| C316.3        | exploit the energy saving opportunities in an industry through efficient lighting management and power factor control of the electrical gadgets. |
| C316.4        | Examine the qualities and functions of Energy manager and language of energy manager.  |
| C316.5        | Analyze economics through various evaluation methods such as depreciation, time value of money, risk and replacement analysis.                   |



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| <b>A15215</b> | <b>HIGH VOLTAGE ENGINEERING</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                   |
| C316.1        | Understand the concepts of stress Electric Stress, Surge Voltages and their distribution.                      |
| C316.2        | examine breakdown phenomenon in gases, liquids and solid dielectric media.                                     |
| C316.3        | Apply the concepts of generation of high voltages and currents in power systems                                |
| C316.4        | Examine the causes of over voltages in power systems concepts of insulation coordination, and DC measurements. |
| C316.5        | Assess high voltage testing techniques of power apparatus  |

| <b>A15285</b> | <b>ELECTRICAL MACHINES – II LAB</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C317.1        | understand the basic working principle of a transformer; obtain the equivalent circuit parameters, estimate efficiency & regulation at various loads of 1- $\Phi$ transformers.                      |
| C317.2        | Apply load sharing concepts of transformers & conversion of 3- $\Phi$ to 2- $\Phi$ supply for transformers   |
| C317.3        | examine the equivalent circuit parameters of a single phase induction motor, determine the performance characteristics and efficiency by direct and indirect methods of three phase induction motor. |
| C317.4        | analyze the regulation of an alternator by various methods at different power factors.   |
| C317.5        | Investigate synchronous motor performance curves at various power factors and field currents.  |



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| <b>A15286</b> | <b>CONTROL SYSTEMS AND SIMULATION LAB</b>  |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to         |
| C327.1        | Examine the time response of second order systems, Synchronos, and truth tables verification by PLC. |
| C327.2        | Find the transfer function of AC servomotor and DC servomotor practically.                           |
| C327.3        | Identify the transfer function of DC motor, DC generator practically.                                |
| C327.4        | Analyze magnetic amplifier characteristics.  |
| C327.5        | Examine stability analysis through bode, Nyquist and root locus plots using MATLAB                   |



## Department of Electrical and Electronics Engineering

III EEE II Semester

| <b>A16421</b> | <b>IC APPLICATIONS</b>   |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C321.1        | Ability to elucidate the characteristics of ideal and practical operational amplifier.   |
| C321.2        | Apply knowledge of mathematics to analyze operational amplifier in inverting and non-inverting configuration modes and develop the applications of IC 741.   |
| C321.3        | Examine and infer the functionality of 555 timer and 565 PLL Integrated circuits and interpret the concepts and features of Analog to Digital and Digital to Analog converter in Integrated circuits form. |
| C321.4        | Evaluate the various Combinational and sequential logic using 74XX Digital Integrated circuits.  |
| C321.5        |  |

| <b>A16221</b> | <b>ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS</b>   |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to         |
| C322.1        | Discuss about different types of measuring instruments and error compensations.                      |
| C322.2        | Understand the operation of DC Crompton potentiometer, compare the CT and PT with phasor diagram.    |
| C322.3        | Apply the concepts of power and energy measurement by using wattmeter and energy meter.              |
| C322.4        | Outline the concept of DC and AC bridges for the measurement of resistance, inductance & capacitance |
| C322.5        | Analyze the concepts of transducers and cathode ray oscilloscopes.                                   |



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|               |   |
|---------------|---|
| <b>A16222</b> | <b>POWER SEMICONDUCTOR DRIVES</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to  |
| C323.1        | Understand the concepts of the dynamics of electric drives, such as speed torque characteristics etc. Able to review speed control of different types of DC drives using single phase and three phase controlled converter. |
| C323.2        | Analyze four quadrant operations with controlled converter speed control of DC drives.  |
| C323.3        | Examine four quadrant operations with Chopper speed control of DC drives.   |
| C323.4        | Assess speed control of induction motor using stator voltage and stator frequency variations.   |
| C323.5        | Assess speed control of synchronous motor, using voltage source inverter/current source inverter, Cyclo converter, PWM, VFI.  |

|               |  |
|---------------|--|
| <b>A16223</b> | <b>SWITCHGEAR AND PROTECTION</b>   |
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                   |
| C324.1        | Describe working of circuit breaker and various types of circuit breakers.                                     |
| C324.2        | Outline different circuit breakers and their application in power systems.                                     |
| C324.3        | Use the principle of operation of over current, directional, differential and distance relays in relay design. |
| C324.4        | Analyze the protection of alternators, transformers, bus-bars.   |
| C324.5        | Assess the concept of neutral grounding and protection from surge.   |



## Department of Electrical and Electronics Engineering

| <b>A16227</b> | <b>ENERGY AUDITING AND CONSERVATION</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C325.1        | Realize the need for energy auditing and conservation. Get awareness on types of energy audit; represent energy flows and energy consumption in tabular and graphical methods. |
| C325.2        | Understand energy saving opportunities in energy efficient motors and power factor improvement methods.  |
| C325.3        | Exploit energy auditing and conservation opportunities with respect to energy efficient buildings.   |
| C325.4        | Analyze economic viability with respect to real world problems using depreciation methods.   |
| C325.5        | Prioritize energy conservation opportunities in boilers, heat pumps, cooling systems, compressors and fans.  |

| <b>A16228</b> | <b>PRINCIPLES OF ELECTRIC POWER UTILIZATION</b>   |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                |
| C326.1        | Understand terms and concepts of illumination   |
| C326.2        | Apply the concepts of different electric lamps and good lighting Practices for artificial lighting systems. |
| C326.3        | Analyze the methods of electric heating and welding   |
| C326.4        | Categorize the concepts of different electric traction systems and existing traction system in India.       |
| C326.5        | Investigate the mechanics of train movement   |





## Department of Electrical and Electronics Engineering

| <b>A16224</b> | <b>RENEWABLE ENERGY SOURCES</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                                 |
| C327.1        | Understand the concept of solar energy, analysis and applications solar energy.  |
| C327.2        | Examine the Environmental impact of solar power, solar plate collectors, and solar energy storage                            |
| C327.3        | Outline the basic principles of wind, bio-mass and their use for IC engines.   |
| C327.4        | Discuss the principles of geo-thermal, OTEC energy sources.  |
| C327.5        | Analyze the methods of direct energy conversions, energy storage and Environmental effects of energy and conversion systems. |

| <b>A16287</b> | <b>POWER ELECTRONICS &amp; SIMULATION LAB</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C328.1        | Examine the characteristics of SCR, MOSFET, & IGBT, and analyze triggering circuits          |
| C328.2        | Analyze input and output waveforms of AC-DC converters.                                      |
| C328.3        | Identify input and output waveforms of AC-AC converters                                      |
| C328.4        | Identify input and output waveforms of DC-DC Converters                                      |
| C328.5        | Design converters and inverters using p-spice.   |



## Department of Electrical and Electronics Engineering

| <b>A16090</b> | <b>ADVANCED COMMUNICATION SKILLS LAB</b>   |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C329.1        | Listen to the speakers attentively, accurately and precisely to understand and respond appropriately in different contexts.  |
| C329.2        | Analyze and communicate intelligently while speaking with professionalism and enact different roles; engage themselves in preparing, organizing and delivering speeches, presentations etc.                |
| C329.3        | Demonstrate command over English vocabulary and develop the ability to read intelligently and imaginatively for comprehending different contexts.  |
| C329.4        | Master the mechanics of writing & practice it as a process and communicate the ideas relevantly and coherently.  |
| C329.5        | Gain employability skills; develop leadership qualities and problem solving skills to apply them for careers at advanced levels in a wide range of English and enrich themselves to meet industrial needs. |

| <b>MP-I</b> | <b>INDUSTRY ORIENTED MINI PROJECT</b>                      |
|-------------|--|
|             | <b>A student will be able to</b>                           |
| C330.1      | Understand various requirements and procedures of industry |
| C330.2      | Make links across different core areas of knowledge.       |
| C330.3      | Generate, develop and evaluate ideas.                      |
| C330.4      | Effectively work as a team.                                |
| C330.5      | Enhance verbal and writing skills.                         |



## Department of Electrical and Electronics Engineering

IV EEE I Semester

| <b>A17231</b> | <b>COMPUTER METHODS IN POWER SYSTEMS</b>   |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C411.1        | Compute Y-bus and Z-bus matrices   |
| C411.2        | Apply the concepts of load flow studies in power systems.                                    |
| C411.3        | Analyze faults using for unit system   |
| C411.4        | Examine steady state stability of power system.  |
| C411.5        | Investigate transient stability of power system.   |

| <b>A17233</b> | <b>ELECTRICAL DISTRIBUTION SYSTEMS</b>  |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                  |
| C412.1        | Distinguish between transmission and distribution systems, classification of loads and their characteristics. |
| C412.2        | Understand design considerations of distribution feeders and sub-stations                                     |
| C412.3        | Compute voltage drop and power loss in feeders.   |
| C412.4        | Apply concepts of protection and coordination to distribution systems   |
| C412.5        | Examine the power factor improvement and voltage control  |



## Department of Electrical and Electronics Engineering

| <b>A17230</b> | <b>POWER SYSTEM OPERATION &amp; CONTROL</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to |
| C413.1        | Understand the economic operation of power systems.  |
| C413.2        | compute optimal loading of generators for the demand.  |
| C413.3        | Analyze modeling of turbines and automatic controllers.                                      |
| C413.4        | Apply the knowledge of single area and two area load frequency control.                      |
| C413.5        | Examine reactive power control and compensating equipments.                                  |

| <b>A17232</b> | <b>OPTIMIZATION METHODS</b>   |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to      |
| C414.1        | Understand the need of optimization of engineering systems and classical optimization techniques. |
| C414.2        | Restate optimization methods for electrical and electronics engineering problems.                 |
| C414.3        | Apply unconstrained optimization and transportation problem.                                      |
| C414.4        | Examine the concept of constrained nonlinear programming.   |
| C414.5        | Investigate the concept of dynamic programming.   |



## Department of Electrical and Electronics Engineering

| <b>A17238</b> | <b>ELECTRIC VEHICLES AND HYBRID VEHICLES</b>  |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to        |
| C415.1        | Understand the components of electric vehicles and fundamentals of electric vehicles.               |
| C415.2        | Apply the basic concepts of batteries in the design of electric vehicles                            |
| C415.3        | Differentiate the characteristics of various electric motors which can be used in electric vehicles |
| C415.4        | Analyze the transmission of the drive system and the components of transmission.                    |
| C415.5        | Design the basic parameters of Electric and hybrid vehicles.  |

| <b>A17239</b> | <b>ENERGY STORAGE SYSTEMS</b>  |
|---------------|--|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to     |
| C416.1        | Understand Electrical Energy Storage Technologies.   |
| C416.2        | Outline the needs for electric energy storage  |
| C416.3        | Analyze the characteristics and features of energy from various sources.                         |
| C416.4        | Classify various types of energy storage and various devices used for the purpose.               |
| C416.5        | Apply the same concepts to real time solutions like electric vehicles, smart Grid and SCADA etc. |



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| <b>A17288</b> | <b>ELECTRICAL MEASUREMENTS LAB</b>  |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                  |
| C417.1        | Calibrate voltmeters, ammeters, single phase energy meter.  |
| C417.2        | Analyze true and actual values of potentiometer & Power factor meter.   |
| C417.3        | verify dielectric property of oil insulation, Analyze the measuring parameters of Anderson & Schering bridge. |
| C417.4        | Test displacement, force, strain, inductance, capacitance & resistance using concepts of electricity.         |
| C417.5        | Examine the output of turns ratio and ratio error of CT.  |

| <b>A17493</b> | <b>MICROPROCESSOR AND INTERFACING LAB</b>   |
|---------------|---|
| C418.1        | After the completion of this course, a student must demonstrate the knowledge and ability to  |
| C418.2        | Understand and implement the basic programs of microprocessor (8086).                         |
| C418.3        | analyze and interpret the interfacing concept of microprocessor (8086) with other Processors. |
| C418.4        | illustrate and show the different programs using Microcontroller (8051)                       |
| C418.5        | implement and verify the interfacing concepts with 8051 microcontroller.                      |



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### IV EEE II Semester

| <b>A18240</b> | <b>UTILIZATION OF ELECTRICAL ENERGY</b>   |
|---------------|---|
|               | After the completion of this course, a student must demonstrate the knowledge and ability to                          |
| C421.1        | Understand illumination methods & solutions for illumination.   |
| C421.2        | Apply principles of electrical heating & welding and acquire skills to solve problems.                                |
| C421.3        | Categorize electrical drives, their characteristics & applications.   |
| C421.4        | Analyze features of electric traction movement.   |
| C421.5        | Investigate the effects of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion. |

| <b>A18241</b> | <b>FUNDAMENTALS OF HVDC AND FACTS DEVICES</b>  |
|---------------|--|
| C422.1        | After the completion of this course, a student must demonstrate the knowledge and ability to   |
| C422.2        | Understand the concepts of DC transmission   |
| C422.3        | Analyze converters and their control and analyze Harmonics, Filters and Reactive Power Control |
| C422.4        | Apply the basic principles of different types of facts controllers and their characteristics.  |
| C422.5        | Categorize types of shunt compensation.  |
| C422.6        | Investigate the usage of series compensation.  |



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|               |   |
|---------------|---|
| <b>A18244</b> | <b>EHVAC TRANSMISSION</b>   |
| C423.1        | After the completion of this course, a student must demonstrate the knowledge and ability to      |
| C423.2        | Understand the necessity, merits and demerits of EHVAC transmission lines and mechanical aspects. |
| C423.3        | Use the concepts of voltage gradient & effects of corona.   |
| C423.4        | Apply the measurement of electrostatic fields and their effects on human & animals.               |
| C423.5        | Analyze the lightning stroke mechanism and lightning protection techniques.                       |
| C423.6        | Categorize the voltage control methods and techniques for compensation.                           |

|           |  |
|-----------|--|
| <b>TS</b> | <b>TECHNICAL SEMINAR</b>   |
|           | <b>A student will be able to</b>   |
| C424.1    | Choose suitable up to date topic of his choice by doing survey of literature           |
| C424.2    | Make an in depth study of the topic and analyze the subject                            |
| C424.3    | Scrutinize the subject creating newness in its application with scope for future work. |
| C424.4    | Prepare the seminar report and present it in a befitting manner.                       |





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| <b>CVV</b> | <b>COMPREHENSIVE VIVA-VOCE</b>  |
|------------|---|
|            | <b>A student will be able to</b>  |
| C425.1     | Relate the technical knowledge of core courses of electrical and electronics engineering programme. |
| C425.2     | Apply the knowledge from courses learnt in the curriculum to the relevant industry.                 |
| C425.3     | Examine his confidence to face real interviews in their career.                                     |
| C425.4     | Apply the knowledge from courses learnt in the curriculum to the relevant industry.                 |

| <b>MP-II</b> | <b>MAJOR PROJECT</b>  |
|--------------|---|
|              | <b>A student will be able to</b>                                |
| C426.1       | Make links across different core areas of knowledge.            |
| C426.2       | Generate, develop and evaluate ideas for the benefit of society |
| C426.3       | Effectively work as a team.                                     |
| C426.4       | Enhance verbal and writing skills.                              |