Regulation – 2017

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

PROGRAMME OUTCOMES (POs):

Program outcome (POs) **Electrical and Electronics Engineering Graduates will be able to:**	
PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science and basic engineering fundamentals to the solution of complex engineering problems in the major areas of Electrical and Electronics Engineering.
PO 2	**Problem analysis**: Identify, formulate, review research literature and analyze complex Electrical and Electronics engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for the complex Electrical and Electronics engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Electrical and Electronics engineering practice.
PO 7	**Environment and sustainability**:

	Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the professional Electrical and Electronics engineering Practice.
PO 9	**Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

Program Specific Outcomes (PSOs)	
PSO 1	Provide optimal solution in the field of power sector.
PSO 2	Apply suitable electronic controllers for power conversion, control and automation.
PSO 3	Make use of appropriate technique and modern tools to analyze and evaluate the performance of electrical machines and electronic circuits.

COURSE OUTCOMES

HS8151-Communicative English

After completion of the course, Students are able to,

1. Read articles of a general kind in magazines and newspapers.
2. Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
3. Comprehend conversations and short talks delivered in English
4. Use electronic media.
5. Write short essays of a general kind and personal letters and emails in English.

MA8151- Engineering Mathematics – I

After completion of the course, Students are able to,

1. Use both the limit definition and rules of differentiation to differentiate functions.
2. Apply differentiation to solve maxima and minima problems.

3. Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
4. Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
5. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.

PH8151-Engineering Physics

After completion of the course, Students are able to,

1. Gain knowledge on the basics of properties of matter and its applications,
2. Acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
3. Adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
4. Knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes,
5. Understand the basics of crystals, their structures and different crystal growth techniques

CY8151 - Engineering Chemistry

After completion of the course, Students are able to,

1. Gain knowledge on the engineering materials
2. Gain knowledge on the fuels, energy sources and
3. Gain knowledge on the water treatment techniques
4. Understand the concept of engineering processes
5. Understand the applications for further learning.

GE8151 - Problem Solving and Python Programming

After completion of the course, Students are able to,

1. Develop algorithmic solutions to simple computational problems
2. Read, write, execute by hand simple Python programs.
3. Structure simple Python programs for solving problems.
4. Decompose a Python program into functions.
5. Represent compound data using Python lists, tuples, and dictionaries.

GE8152 - Engineering Graphics

After completion of the course, Students are able to,

1. Familiarize with the fundamentals and standards of Engineering graphics
2. Perform freehand sketching of basic geometrical constructions and multiple views of objects.
3. Project orthographic projections of lines and plane surfaces.
4. Draw projections, solids, and development of surfaces.
5. Visualize and to project isometric and perspective sections of simple solids.

GE8161- Problem Solving and Python Programming Laboratory

After completion of the course, Students are able to,

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Read and write data from/to files in Python.

BS8161 - Physics and Chemistry Laboratory

After completion of the course, Students are able to,

1. Apply principles of elasticity, engineering applications.

2. Optics engineering applications.
3. Thermal properties for engineering applications.
4. Understand the engineering properties of the various materials
5. Operate the different types conductivity meter to find the conductance of solution.

II Semester

HS8251 - Technical English

After completion of the course, Students are able to,

1. Express their opinions clearly, convincingly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
2. Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
3. Tell different genres of texts infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
4. Understand different spoken excerpts critically and infer unspoken and implied meanings.
5. Express their language skills at academic as well as workplace.

MA8251-Engineering Mathematics – II

After completion of the course, Students are able to,

1. Solve the problems related to vector calculus.
2. Analyze ordinary differential equations in model engineering problems.
3. Develop Laplace transform technique in linear ODE of second order with constant coefficients.
4. Analyze the fundamental analytic functions.
5. Explain the standard technique of complex variable theory.

PH8253 - Physics for Electronics Engineering

At the end of the course, the students will able to

1. gain knowledge on classical and quantum electron theories, and energy band structures,
2. acquire knowledge on basics of semiconductor physics and its applications in various devices,
3. get knowledge on magnetic and dielectric properties of materials,
4. have the necessary understanding on the functioning of optical materials for optoelectronics,
5. understand the basics of quantum structures and their applications in spintronics and carbon electronics.

BE8252 - Basic Civil and Mechanical Engineering

On successful completion of this course, the student will be able to

1. Appreciate the Civil and Mechanical Engineering components of Projects.
2. Explain the usage of construction material and proper selection of construction materials.
3. Measure distances and area by surveying.
4. Identify the components used in power plant cycle.
5. Demonstrate working principles of petrol and diesel engine and also elaborate the components of refrigeration and Air conditioning cycle.

EE8251 - Circuit Theory

On successful completion of this course, the student will be able to

1. To introduce electric circuits and its analysis
2. To impart knowledge on solving circuit equations using network theorems
3. To introduce the phenomenon of resonance in coupled circuits.
4. To educate on obtaining the transient response of circuits.
5. To introduce Phasor diagrams and analysis of three phase circuits

GE8291-Environmental Science and Engineering

After completion of the course, Students are able to,

1. Acquired knowledge to solve environmental problems.
2. Understood relationship between biotic and abiotic components.
3. Knew the role of human beings in maintaining a clean environment and the values of biodiversity.
4. Able to understand topography and geographic distribution of organism.
5. Conscious about conserving the natural resources and creating pollution free environment.

GE8261 - Engineering Practices Laboratory

After completion of the course, Students are able to,

1. Fabricate carpentry components and pipe connections including plumbing works.
2. Use welding equipments to join the structures.
3. Carry out the basic machining operations
4. Make the models using sheet metal works
5. Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings.

EE8261 - Electric Circuits Laboratory

After completion of the course, Students are able to,

1. To simulate various electric circuits using Pspice/ Matlab/e-Sim / Scilab
2. To gain practical experience on electric circuits and verification of theorems.
3. Understand and apply circuit theorems and concepts in engineering applications.
4. Design and Simulate electric circuits like RL, RC and RLC
5. Design and Simulate series and parallel resonant circuits.

II – YEAR

MA8353- Transforms and PartialDifferential Equations

After completion of the course, Students are able to,

1. Understand how to solve the given standard partial differential equations.
2. Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
3. Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equation.
4. Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
5. Use the effective mathematical tools for the solutions of partial differential equations byusing Z transform techniques for discrete time systems.

EE8351- Digital Logic Circuits

After completion of the course, Students are able to,

1. Ability to study various number systems and simplify the logical expressions using Boolean functions
2. Ability to design combinational and sequential Circuits.
3. Ability to design various synchronous and asynchronous circuits.
4. Ability to introduce asynchronous sequential circuits and PLDs
5. Ability to introduce digital simulation for development of application oriented logic circuits and Ability to simulate using software package.

EE8391 - Electromagnetic Theory

After completion of the course, Students are able to,

1. Understand the basic mathematical concepts related to electromagnetic vector fields
2. Acquire the knowledge Electrostatic fields, electrical potential, energy density and their applications

3. Get the exposure towards Magneto static fields, magnetic flux density, vector potential and its applications.
4. Gain the knowledge on Different methods of emf generation and Maxwell's equations
5. Learn about Electromagnetic waves and characterizing parameters.

EE8301- Electrical Machines - I

After completion of the course, Students are able to,

1. Students will be able to summarize the concepts of magnetic circuits and properties of magnetic materials.
2. Students will be able to analyze the performance, testing and parallel operation of transformers.
3. Students will be able to describe the concepts of electro mechanical energy conversion
4. Students will be able to discuss the principle, characteristics, starting methods and speed control of DC motors.
5. Students will be able Investigate and test the performance of DC machines.

EC8353 - Electron Devices and Circuits

After completion of the course, Students are able to,

1. To understand the structure and working operation of basic electronic devices.
2. Able to identify and differentiate both active and passive elements
3. Analyze the characteristics of different electronic devices such as diodes and transistors
4. Choose and adapt the required components to construct an amplifier circuit.
5. Employ the acquired knowledge in design and analysis of oscillators

ME8792 - Power Plant Engineering

After completion of the course, Students are able to,

1. Illustrate the layout, accessories and safety measures of Thermal power plant.
2. Describe the working of power generation based on the Diesel, and Gas power plants.
3. Compare the various reactors based nuclear power plants and its operations.
4. Derive an idea of how renewable energy sources can be utilized to generate electric Power.
5. Solve energy and economic related issues in power sectors.

EC8311- Electronics Laboratory

After completion of the course, Students are able to,

1. Illustrate the structure and characteristics of basic electronic devices
2. Modeling of amplifiers and oscillators using basic electronic devices
3. Demonstrate oscillators using basic electronic devices.
4. Design applications using the basic electronic devices
5. Differentiate Electronic devices

EE8311- Electrical Machines Laboratory – I

After completion of the course, Students are able to,

1. Draw the open circuit and load characteristics of different types of generators and transformers.
2. Test on various types of motors and transformers for various loading conditions.
3. Control the speed of DC shunt motor.
4. Work on the losses of single phase transformer.
5. Demonstrate the starters and 3-phase transformers connections.

MA8491 - Numerical Methods

After completion of the course, Students are able to,

1. Understand the basic concepts and techniques of solving algebraic and transcendental equations.
2. Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
3. Apply the numerical techniques of differentiation and integration for engineering problems.
4. Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
5. Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

EE8401- Electrical Machines - II

After completion of the course, Students are able to,

1. Students will be able to summarize the concepts of magnetic circuits and properties of magnetic materials.
2. Students will be able to Analyze the performance, testing and parallel operation of transformers.
3. Students will be able to describe the concepts of electro mechanical energy

conversion.

4. Students will be able toDiscuss the principle, characteristics, starting methods and speed control of DC motors.
5. Students will be able Investigate and test the performance of DC machines.

EE8402 - Transmission and Distribution

After completion of the course, Students are able to,

1. Students are able to know the operation of different distribution schemes.
2. Students are able to compute transmission line parameters.
3. Students are capable to develop the equivalent circuits and estimate voltage regulation and efficiency of transmission lines.
4. Students have the ability to analyze the voltage distribution on insulators and cables.
5. Students are able to design lines and explain grounding.

EE8403 - Measurements and Instrumentation

After completion of the course, Students are able to,

1. Students have understood the basic functional elements of instrumentation
2. Ability to model and analyze electrical apparatus and their application to power system.
3. Students have acquired the knowledge to compare the various methods of Measurement.
4. Students are able to identify the various storage and display devices.
5. Students have got exposure towards various transducers and data acquisition system

EE8451- Linear Integrated Circuits andApplications

After completion of the course, Students are able to,

1. Describe IC fabrication Technology.
2. Draw the characteristics and small signal analysis of Op-amp Ics.
3. Apply the concept of Operational amplifier to various applications.
4. Summarize the characteristics of special and application ICs.
5. Analyze linear electronic circuits.

IC8451- Control Systems

After completion of the course, Students are able to,

1. Use transfer function models for analysis physical systems and recall the control system components.
2. Compute time response and steady state error analysis
3. To Construct various plots and analyze system stability.
4. Design compensators.
5. Relate physical systems as state variable model and describe analysis.

EE8411 - Electrical Machines Laboratory - II

After completion of the course, Students are able to,

1. Find the regulation, impedances of three phase alternator using appropriate methods.
2. Draw the load characteristics of single phase and three phase induction motor.
3. Demonstrate the no load and blocked rotor test on induction motors.

4. Draw the V and Inverted V curves for three phase synchronous motor.
5. Demonstrate the types of starter in induction motors.

EE8461 - Linear and Digital Integrated CircuitsLaboratory

After completion of the course, Students are able to,

1. Demonstrate the Boolean Functions, Adder/ Subtractor circuits.
2. Design and demonstrate the Combinational (Code converters & Shift registers).
3. Design and demonstrate the Sequential Circuits (Counters).
4. Demonstrate the applications of Op-Amp (inverting and non-inverting amplifier, Adder, comparator, Integrator and Differentiator).
5. Show the functions of NE/SE 555 timer (Astable and Monostable), 565(VCO and PLC) and 566(V/I).

EE8412 - Technical Seminar

After completion of the course, Students are able to,

1. Explain the advanced technological developments using various teaching aids.
2. Prepare technical reports.
3. Express the technical skill during Placement interviews.
4. Show an attitude of learning consistently/continuously.
5. Compare technological developments.

III – YEAR

EE8501- Power System Analysis

After completion of the course, Students are able to,

1. Construct a model for power system.
2. Analyze per unit value and draw the single line diagram.
3. Apply numerical methods to solve the power flow problem.
4. Model and analyze the system under balanced and unbalanced faulted conditions.
5. Analyze transient stability of power system.

EE8551-Microprocessors and Microcontrollers

After completion of the course, Students are able to,

1. Describe the basic building block diagram of 8085 processor and 8051 Micro controller.
2. Recognize the addressing modes & instruction set of 8085 & 8051.
3. Solve simple ALP program on 8085 processor and 8051 Micro controller.
4. Interpret the peripheral interfacing of 8085 and 8051.
5. Apply the concepts of micro controller in real time application.

EE8552 - Power Electronics

After completion of the course, Students are able to,

1. Describe the operational characteristics of different types of power switching devices and design protection circuit for the same. (U&A)
2. Describethe basic concepts and derive the performance parameters of single phase and three phase controlled rectifier.
3. Explain the operation, control strategy and commutation circuit of different types of DC-DC Converter.
4. Analyze 1-phase and 3-phase inverter circuit and various harmonic control techniques.
5. Explain the operation of 1-phase and 3-phase AC –AC voltage controller with power factor control and cyclo-converter.

EE8591 - Digital Signal Processing

After completion of the course, Students are able to,

1. Explain signals and systems & their mathematical representation.
2. Analyze the discrete time system.
3. understand Transformations Techniques and their computation
4. Design of FIR & IIR Filter by applying window and frequency sampling techniques effects
5. Draw the programmable digital signal processor & quantization.

CS8392 - Object Oriented Programming

After completion of the course, Students are able to,

1. To understand Object Oriented Programming concepts and basic characteristics of Java
2. To know the principles of packages, inheritance and interfaces
3. To define exceptions and use I/O streams
4. To develop a java application with threads and generics classes
5. To design and build simple Graphical User Interfaces

OMD551- Basics of Biomedical Instrumentation

After completion of the course, Students are able to,

1. To study about the different bio potential and its propagation
2. To understand the different types of electrodes and its placement for various recording
3. To study the design of bio amplifier for various physiological recording
4. To learn the different measurement techniques for non-physiological parameters.
5. To familiarize the different biochemical measurements.

EE8511 - Control and Instrumentation Laboratory

After completion of the course, Students are able to,

1. Design a lead lag compensator and bridges.
2. Derive the model and analyse the system.
3. Simulate control systems using MATLAB.
4. Compute the power and energy.
5. Practice on signal conditioning circuits and transducers.

HS8581 – Professional Communication

After completion of the course, Students are able to,

1. Enhance the Employability and Career Skills of students
2. Orient the students towards grooming as a professional
3. Make them Employability Graduates
4. Develop their confidence and help them attend interviews successfully.

CS8383 - Object Oriented Programming Laboratory

After completion of the course, Students are able to,

1. Make use of objects, functions and Constructor to solve simple problems.
2. Apply the compile time, runtime polymorphism and file handling concepts using C++ programs.
3. Develop the simple JAVA application.
4. Experiment with concepts like packages, interfaces in JAVA.
5. Utilize the threading and exception handling concepts of JAVA

EE8601 - Solid State Drives

After completion of the course, Students are able to,

1. Describe steady state operation and transient dynamics of a motor load system.
2. Apply and analyze the operation of DC drive.
3. Design AC motor speed control drives using voltage and flux control method in closed loop.
4. Analyze and design closed loop controllers for AC and DC drives.
5. Discuss the operation and performance of AC motor drives.

EE8602 - Protection and Switchgear

After completion of the course, Students are able to,

1. Illustrate the causes of abnormal conditions of the apparatus and system.
2. Compare and discuss the characteristics and functions of relays.
3. Describe the apparatus protection.
4. Explain static relays and numerical protection.
5. Summarize the functions of Circuit breaker.

EE8691 - Embedded Systems

After completion of the course, Students are able to,

1. Summarize the basic building blocks of embedded system.
2. Illustrate different interfacing system bus and networking.
3. Draw the diagrams models for Embedded Firmware development

Environment.

4. Analyze the concepts of RTOS.
5. Interpret various embedded development strategies.

EE8002 - Design of Electrical Apparatus

After completion of the course, Students are able to,

1. Derive main idea about major considerations of electrical machine design.
2. Design armature and field systems for D.C. machines.
3. Design core, yoke, windings and cooling systems of transformers.
4. Design stator and rotor of induction machines.
5. Design the rotor of synchronous machines.

EE8005 - Special Electrical Machines

After completion of the course, Students are able to,

1. Explain Construction, principle of operation and performance of synchronous reluctance motors.
2. Describe the Construction, principle of operation, control and performance of stepping motors.
3. Compare synchronous reluctance and switched reluctance motors.
4. Discuss the Construction, principle of operation, control and performance of permanent magnet brushless D.C. motors.
5. Differentiate permanent magnet brushless D.C. motors and permanent magnet synchronous motors.

EE8661 - Power Electronics and Drives Laboratory

After completion of the course, Students are able to,

1. Generate triggering Pulses using R, RC and UJT circuits.
2. Derive the characteristics curves of power thyristor and transistors.
3. Demonstrate controlled rectifiers, PWM inverters and Step down and step up DC-DC converter.
4. Work on AC voltage controllers and SMPC.
5. Simulate Power Electronics circuits using MATLAB/PSPICE

EE8681 - Microprocessors and Microcontrollers Laboratory

After completion of the course, Students are able to,

1. Develop program on simple arithmetic operations in 8085 microprocessor and 8051 micro controller.
2. Demonstrate the programming with control instructions in 8085 micro processor.
3. Demonstrate the interfacing devices with 8085 microprocessor.
4. Apply computing platform and software for engineering problems.
5. Develop a mini project with microprocessors and microcontrollers.

EE8611 - Mini Project

After completion of the course, Students are able to,

1. Review all subjects in core area.
2. To develop their own innovative prototype of ideas.
3. Analyze the practical problems and justify the solution by a new methodology.
4. Prepare an effective report on complex engineering problems.
5. Endeavour to get technological upgrade of knowledge.

EE8701 - High Voltage Engineering

After completion of the course, Students are able to,

1. Interpret various types of over voltages in power system and protection methods
2. Explain about generation of over voltages in laboratories.
3. Discuss measurement of over voltages.
4. Illustrate nature of breakdown mechanism in solid, liquid and gaseous dielectrics.
5. Describe the testing of power apparatus and insulation coordination

EE8702 - Power System Operation and Control

After completion of the course, Students are able to,

1. Interpret the techniques of forecasting and plant level and system level Control.
2. To model power-frequency dynamics and to design power-frequency controller.
3. To model reactive power-voltage interaction and the control actions against varying system load.
4. Solve unit commitment and economic dispatch problems for the economic operation of power system.
5. Illustrate SCADA and EMS functions for the control of power systems.

EE8703 - Renewable Energy Systems

After completion of the course, Students are able to,

1. Awareness about renewable Energy Sources and technologies.
2. Adequate inputs on a variety of issues in harnessing renewable Energy.
3. To know about solar PV and Thermal systems

4. To make awareness about the generation of energy from bio mass resources
5. Recognize current and possible future role of renewable energy sources

GE8071- Disaster Management

After completion of the course, Students are able to,

1. To provide students an exposure to disasters, their significance and types.
2. To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
3. To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
4. To enhance awareness of institutional processes in the country
5. To develop rudimentary ability to respond to their surroundings with Potential disaster response in areas where they live, with due sensitivity

EE8010- Power Systems Transients

After completion of the course, Students are able to,

1. Describe the generation of switching transients and their control using circuit – theoretical concept.
2. Illustrate the mechanism of lighting strokes and the production of lighting surges.
3. Differentiate the propagation, reflection and refraction of travelling waves.
4. Explain the impact of voltage transients caused by faults, circuit breaker action, load rejection on integrated power system.
5. Apply EMTP for computation of transients.

EE8711 - Power System Simulation Laboratory

After completion of the course, Students are able to,

1. Construct the modelling of transmission lines.
2. Analyse the performance of power system parameters using MATLAB coding.
3. Solve the power flow problems using MATLAB coding.
4. Demonstrate the stability and fault analysis of power system using MATLAB coding.
5. Understand the power system protection.

EE8712 - Renewable Energy Systems Laboratory

After completion of the course, Students are able to,

1. To train the students in Renewable Energy Sources and technologies.
2. To provide adequate inputs on a variety of issues in harnessing Renewable Energy.
3. To recognize current and possible future role of Renewable energy sources.
4. To understand the behaviour of intelligent control on Hybrid systems
5. To know about performance measures in renewable energy systems

EE8017 - High Voltage Direct Current Transmission

After completion of the course, Students are able to,

1. Plan the DC power transmission and make the comparison with AC power transmission.
2. Understand about HVDC converters.
3. Analyse the HVDC system control.
4. Understand the Harmonics and design of filters.
5. Measure the Power flow in HVDC system under steady state.

GE8076 - Professional Ethics in Engineering

After completion of the course, Students are able to,

1. Apply ethics in society.
2. Analyze the ethical issues related to engineering.
3. Tell the responsibilities and rights in the society.
4. Demonstrate Engineering ethics
5. Express Moral and Social values

EE8811- Project Work

After completion of the course, Students are able to,

1. Review all subjects in core area.
2. Derive solution for complex engineering problems.
3. Analyze the practical problems and justify the solution by a new methodology.
4. Prepare an effective report on complex engineering problems.
5. Endeavour to get technological upgrade of knowledge.

M.E. POWER SYSTEMS ENGINEERING

PROGRAMME SPECIFIC OUTCOMES (PSOs):

Program Specific Outcomes (PSOs)	
PSO 1	Investigate, design and implement to Electrical machines, control system, measurement, instrumentation, power systems and power electronics for satisfying industry needs.
PSO 2	Bring into play of up to date tools and appropriate solutions for the real time problems for promoting energy preservation and sustainability.
PSO 3	Acquire the capacity to grip new opportunities of budding technologies, leadership and teamwork opportunities, all affording sustainable engineering career in Electrical and Electronics related fields.
PSO 4	Demonstrate the knowledge and hands on competence appropriate to the goals of the program in the applications of circuit analysis and design, analog and digital electronics, computer programming, embedded systems and associated software to the building, testing, operation and maintenance of electrical, electronics and power system network.

COURSE OUTCOMES

MA5155 - Applied Mathematics for Electrical Engineers

After completing this course, students should demonstrate competency in the following skills:

1. Apply various methods in matrix theory to solve system of linear equations.
2. Maximizing and minimizing the functional that occur in electrical engineering discipline.
3. Computation of probability and moments, standard distributions of discrete and continuous random variables and functions of a random variable.
4. Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems.
5. Fourier series analysis and its uses in representing the power signals.

PS5101 - Advanced Power System Analysis

After completion of the course, Students are able to,

1. To introduce different techniques of dealing with sparse matrix for large scale power systems.
2. To impart in-depth knowledge on different methods of power flow solutions.
3. To perform optimal power flow solutions in detail.
4. To perform short circuit fault analysis and understand the consequence of different type of faults.
5. To Illustrate different numeric al integration methods and factors influencing transient stability

PS5102 - Power System Operation and Control

1. Learners will be able to understand system load variations and get an overview of
   power system operations.
2. Learners will be exposed to power system state estimation.
3. Learners will attain knowledge about hydrothermal scheduling.
4. Learners will understand the significance of unit commitment and different solution methods.
5. Learners will understand the need for state estimation in real time operation

PS5103 - Analysis and Computation of Electromagnetic Transients in Power Systems

1. Learners will be able to understand the various types of transients and its analysis in power system.
2. Learners will be able to learn about modeling and computational aspects transients computation
3. Learners will be able to know about Lightning, Switching and Temporary Overvoltages.
4. Learners will be able to model over head lines, cables and transformers.
5. Learners will be able to analyze power system transients.

IN5152 - System Theory

1. Ability to represent the time-invariant systems in state space form as well as analyze,
   whether the system is stabilizable, controllable, observable and detectable.
2. Ability to design state feedback controller and state observers
3. Ability to classify singular points and construct phase trajectory using delta and isocline methods.
4. Use the techniques such as describing function, Lyapunov Stability, Popov's Stability
   Criterion and Circle Criterion to assess the stability of certain class of non-linear system.
5. Ability to describe non-linear behaviors such as Limit cycles, input multiplicity and output multiplicity, Bifurcation and Chaos.

PX5152 - Analysis and Design of Power Converters

After completion of the course, Students are able to,

1. To determine the operation and characteristics of controlled rectifiers.
2. To apply switching techniques and basic topologies of DC-DC switching regulators.
3. To introduce the design of power converter components.
4. To provide an in depth knowledge about resonant converters.
5. To comprehend the concepts of AC-AC power converters and their applications.

PS5111 - Power System Simulation Lab

After completion of the course, Students are able to,

1. Analyze the power flow using Newton-Raphson method and Fast decoupled method.
2. Perform contingency analysis & economic dispatch
3. Set Digital Over Current Relay and Coordinate Relay
4. To have hands on experience on various system studies and different techniques used for system planning using Software packages
5. To perform the dynamic analysis of power system

PS5201 - Power System Dynamics

1. Learners will be able to understand on dynamic modelling of synchronous machine.
2. Learners will be able to understand the modeling of excitation and speed governing system for stability analysis.
3. Learners will attain knowledge about stability of dynamic systems.
4. Learners will understand the significance about small signal stability analysis with controllers.
5. Learners will understand the enhancement of small signal stability.

PS5202 - HVDC and FACTS

After completion of the course, Students are able to,

1. To emphasis the need for FACTS controllers.
2. To learn the characteristics, applications and modeling of series and shunt FACTS controllers.
3. To analyze the interaction of different FACTS controller and perform control coordination
4. To impart knowledge on operation, modelling and control of HVDC link.
5. To perform steady state analysis of AC/DC system.

PS5203 - Advanced Power System Protection

1. Learners will be able to understand the various schemes available in Transformer protection
2. Learners will have knowledge on Overcurrent protection.
3. Learners will attain knowledge about Distance and Carrier protection in transmission lines.
4. Learners will understand the concepts of Generator protection.
5. Learners will attain basic knowledge on substation automation.

PS5204 - Restructured Power System

1. Learners will have knowledge on restructuring of power industry
2. Learners will understand basics of congestion management
3. Learners will attain knowledge about locational margin prices and financial transmission rights
4. Learners will understand the significance ancillary services and pricing of transmission
   Network
5. Learners will have knowledge on the various power sectors in India

PS5092 - Solar and Energy Storage Systems

1. Students will develop more understanding on solar energy storage systems
2. Students will develop basic knowledge on standalone PV system
3. Students will understand the issues in grid connected PV systems
4. Students will study about the modeling of different energy storage systems and their Performances
5. Students will attain more on different applications of solar energy

IN5091 - Soft Computing Techniques

After completion of the course, Students are able to,

1. To expose the concepts of feed forward neural networks.
2. To provide adequate knowledge about feed back neural networks.
3. To teach about the concept of fuzziness involved in various systems.
4. To expose the ideas about genetic algorithm
5. To provide adequate knowledge about of FLC and NN toolbox

PS5211 - Advanced Power System Simulation Laboratory

After completion of the course, Students are able to,

1. To analyze the effect of FACTS controllers by performing steady state analysis.
2. To have hands on experience on different wind energy conversion technologies
3. To learn of variable speed wind energy conversion system- DFIG
4. To learn of variable speed wind energy conversion system- PMSG
5. To compute the harmonic indices generated by a rectifier feeding a R-L load

PS5212- Technical Seminar

After completion of the course, Students are able to,

1. Explain the advanced technological developments using various teaching aids.
2. Prepare technical reports.
3. Express the technical skill during Placement interviews.
4. Show an attitude of learning consistently/continuously .
5. Compare technological developments.

PS5072 - Energy Management and Auditing

1. Students will develop the ability to learn about the need for energy management and auditing process
2. Learners will learn about basic concepts of economic analysis and load management.
3. Students will understand the energy management on various electrical equipments.
4. Students will have knowledge on the concepts of metering and factors influencing cost function
5. Students will be able to learn about the concept of lighting systems, light sources and various forms of cogeneration

PX5071 - Wind Energy Conversion Systems

After completion of the course, Students are able to,

1. Acquire knowledge on the basic concepts of Wind energy conversion system.
2. Understand the mathematical modeling and control of the Wind turbine
3. Develop more understanding on the design of Fixed speed system
4. Study about the need of Variable speed system and its modeling.
5. Able to learn about Grid integration issues and current practices of wind interconnections with power system.

PS5073 - Electric Vehicles and Power Management

After completion of the course, Students are able to,

1. To understand the concept of electrical vehicles and its operations
2. To understand the need for energy storage in hybrid vehicles
3. To provide knowledge about various possible energy storage technologies that can be used in electric vehicles
4. To know about control of DC and AC Drives
5. Learners will understand the operation of Electric vehicles and various energy storage technologies for electrical vehicles

PS5311 - Project Work Phase I

After completion of the course, Students are able to,

1. Review all subjects in core area.
2. develop their own innovative prototype of ideas.
3. Analyze the practical problems and justify the solution by a new methodology.
4. Prepare an effective report on complex engineering problems.
5. Endeavour to get technological upgrade of knowledge.

PS5411 - Project Work Phase II

After completion of the course, Students are able to,

1. Review all subjects in core area.
2. Derive solution for complex engineering problems.
3. Analyze the practical problems and justify the solution by a new methodology.
4. Prepare an effective report on complex engineering problems.
5. Endeavour to get technological upgrade of knowledge.