

## **B.E. (ELECTRICAL AND ELECTRONICS ENGINEERING)**

### **FIRST SEMESTER**

#### **ETBS101 PHYSICS**

##### **Course Outcomes:**

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

1. Analyze the various types of damping force.
2. Develop the wave equation for longitudinal and transverse wave motion.
3. Compare the different properties of light
4. Realize the importance of list phenomena in interference and diffraction.
5. State the principle and working of various laser system.

#### **ETBS102 MATHEMATICS – I**

##### **Course Outcomes:**

At the end of this course, students will able to

1. Solve improper integrals using Beta and Gamma functions.
2. Evaluate the extreme values for functions of two variables.
3. Analyze the convergence of infinite series.
4. Understand vector differentiation and recognize saddle points.
5. Solve eigen values and eigen vectors of a real matrix and Orthogonal transformation of a matrix.

#### **ETES103 BASIC ELECTRICAL ENGINEERING**

##### **Course Outcomes:**

1. Describe and analyze the behavior of various DC circuits.
2. Recall the different terminologies associated with AC circuits to analyze their response.
3. Illustrate the construction and working principle of single and three-phase transformers.
4. Classify the different types of Electrical Machines and explain their construction and working principle.
5. Familiarize with various protective devices and safety measures in electrical installations.

#### **ETBP104 PHYSICS LABORATORY**

##### **Course Outcomes:**

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

1. Acquired the knowledge of torsional properties of metals wire.
2. Generalized the dispersion of light through the prism.
3. Calculate the wavelength of monochromatic and polychromatic source of light.
4. Analyze diffraction patterns can be formed by light passing through a series of finelines.
5. Estimate the size and shape of given unknown fine powder using laser gratings.

#### **ETSP105 ELECTRICAL ENGINEERING LABORATORY**

##### **Course Outcomes:**

1. Identify common electrical components and their ratings.
2. Familiarize with the usage of common electrical measuring instruments.
3. Examine the responses of AC circuits
4. Analyze the basic characteristics of transformers and electrical machines
5. Demonstrate the working of power electronic converters.

#### **ETSP106 ENGINEERING WORKSHOP / MANUFACTURING PRACTICES**

##### **Course Outcomes:**

Upon completion of this course, the students will be able to:

1. Utilize drawing instruments effectively and present engineering drawings and sketches
2. Construct basic and intermediate geometries.
3. Understand the concept of orthographic, isometric projections of points, lines and regular solids, component drawing, building drawing.
4. Acquire visualization skills to develop new products.
5. Develop their technical communication skills and promote life-long learning.

## **SECOND SEMESTER**

### **ETHS201 ENGLISH**

Course Outcomes:

1. Get an exposure of vocabulary and gain a good glossary.
2. Get knowledge regarding use of Grammar in speech and writing.
3. Acquire a knowledge of remembering, understanding, applying, analyzing, evaluating & Creating.
4. Determine how to articulate their ideas effectively to a variety of listeners.
5. Acquire ability to speak and write effectively in English.

### **ETBS202 CHEMISTRY**

Course Outcomes:

At the end of the course the student will be able to

1. Develop innovative methods in soft water production for industrial uses and Adsorption analysis.
2. Describe the concept of electrochemistry and its applications; corrosion and its controlling Methods.
3. Demonstrate the properties of fuels and applications of energy storage devices.
4. Evaluate the synthetic method of various polymers and the applications of Nanochemistry.
5. Describe the principles of UV, IR techniques and properties of Refractories and Lubricants.

### **ETES203 PROGRAMMING FOR PROBLEM SOLVING**

Course Outcomes:

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

1. Formulate algorithms, draw flowcharts and write pseudocode for solving arithmetic and logical problems.
2. Develop C programs using branching and looping statements.
3. Implement searching and sorting algorithms and analyze the order of complexities.
4. Define and call simple functions by value and by reference and also to write recursive functions.
5. Utilize structures, pointers and files in C programming.

### **ETBS204 MATHEMATICS – II**

Course Outcomes:

At the end of this course, students will able to

1. Solve double and triple integrals in finding area and volumes.
2. Solve first order ordinary differential equations
3. Solve Second order linear differential equations with constant coefficients.
4. Construct analytic function and analyze conformal mappings.
5. Evaluate the complex integrals and contour integration.

### **ETHP205 COMMUNICATION SKILLS AND LANGUAGE LABORATORY**

Course Outcomes:

1. Student will heighten their awareness of correct usage of English Grammar in writing and speaking.

2. Acquire speaking ability in English both in terms of fluency and comprehensibility.
3. Enhance competence in the four modes of literacy; Writing, Speaking, Reading and Listening.
4. Ensure student to improve their accuracy and fluency in producing and understanding spoken and written English
5. Exposure of the grammatical forms of English and the use of these forms in specific communicative contexts.

#### ETBP206 CHEMISTRY LABORATORY

Course outcomes:

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

1. Determine the physical properties like surface tension and viscosity.
2. Determine rate of reactions and soapnification of oil.
3. Calculate the quantity of adsorbate adsorbed by charcoal.
4. Determine the impurity from Pharmaceutical products and hardness of water.
5. Determine exact concentration of acid and bases present in the industrial wastes.

#### ETSP207 COMPUTER PROGRAMMING LABORATORY

Course Outcomes:

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

1. Analyze program requirements and develop programs using conditional and looping statements.
2. Write programs for handling arrays and strings.
3. Create C programs with user defined functions and recursive function calls.
4. Utilize pointers and structures for dynamic memory allocation in C programming.
5. Develop C programs for handling files.

#### ETES208 ENGINEERING GRAPHICS AND DRAFTING

Course Outcomes:

Upon completion of this course, the students will be able to

1. Summarize the various conventional and latest manufacturing processes
2. Gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.
3. Acquire the ability to fabricate models of their own.
4. Develop skill to make simple fitting joints.
5. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.

### **THIRD SEMESTER**

#### ETBS301 ENGINEERING MATHEMATICS – III

Course Outcomes:

At the end of this course, students will able to

1. Acquire basic understanding of the most common partial differential equations.
2. Understand the concepts of Fourier series.
3. Ability to solve boundary value problems.
4. Able to investigate signals problems using Fourier transform
5. Familiarize Z-transform that play important roles in many discrete engineering problems.

#### ETES302 ENVIRONMENTAL STUDIES

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the importance of environment.

2. Analyze the importance of environment in engineering.
3. Apply their own ideas and demonstrate advanced technologies that will be useful to protect environment.
4. Employ awareness among the society about environmental problems and natural disasters.
5. Practice according to the present and future environmental issues.

#### ETES303 ENGINEERING MECHANICS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the forces and its related laws of mechanics in static and dynamic conditions.
2. Analyze the forces and its motions on particles, rigid bodies and structures.
3. Solve the moment of inertia of any section and masses for the structural members.
4. Study about Dynamics of particles.
5. Understand the elements of rigid body dynamics.

#### ETES304 FLUID MECHANICS AND HYDRAULICS MACHINERY

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Apply the basic knowledge of fluid mechanics in finding fluid properties, performance parameters of hydraulic turbines and pumps.
2. Understand various dynamics of fluid flow.
3. Use fluid dynamics for study of flow through pipes and flow in open channels.
4. Present hydraulic design for the construction of efficient hydraulic turbines and pumps.
5. Get through knowledge of different kinds of pumps.

#### EEPC305 ELECTRICAL CIRCUIT ANALYSIS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Apply network theorems for the analysis of electrical circuits
2. Analyze the transient and steady-state response of electrical circuits
3. Understand the sinusoidal steady-state analysis
4. Apply Laplace transforms for deriving the transfer function representation
5. Understand the relationship of the variables in two port networks.

#### EEPC306 ANALOG ELECTRONICS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the basics of PN junction from an application perspective
2. Analyze the operation of BJT circuits
3. Apply the operation of MOSFET to obtain its equivalent circuits
4. Analyze the operation of differential, multistage and operational amplifiers
5. Apply the theory of op-amps to derive practical applications.

#### EESP307 HYDRAULICS LABORATORY

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Determine the properties of fluids, pressure and their measurements.
2. Measure flow in pipes and determine frictional losses.
3. Compute forces on immersed plane and curved plates applying continuity equation and energy equation in solving problems on flow through conduits.
4. Develop Characteristics of pumps and turbines.

5. Develop Characteristics of turbines.

#### EECP308 ELECTRICAL CIRCUITS LAB

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Basic Knowledge about theorems.
2. Analyze RL, RC and RLC series circuits.
3. Analyze RL, RC and RLC parallel circuits.
4. Understand different wave shaping circuits.
5. Ability to design resonance circuit.

#### EECP309 ANALOG ELECTRONICS LAB

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Learn the application and characteristics of basic electronic devices.
2. Understand the characteristics of transistors.
3. Design and analyze various rectifier and amplifier circuits.
4. Understand the functioning of OP-AMP and design OP-AMP based circuits
5. Understand the circuit connections and testing points.

### **FOURTH SEMESTER**

#### EEBS401 PROBABILITY, RANDOM PROCESS AND NUMERICAL METHODS

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Acquire skills in handling situations involving random experiments.
2. Familiarize the concept of random processes.
3. Understand the basic concepts of theory of sampling to any collection of individuals of their attributes can be numerically specified.
4. Solve problems algebraic transcendental equations and numerical integration.
5. Obtain numerical solution of ordinary and partial differential equations.

#### EEES402 DATA STRUCTURES AND C++ PROGRAMMING

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the linear data structures such as arrays, linked lists, stacks and queues.
2. Understand then on linear data structures like sorting, searching, insertion and deletion of data.
3. Understand the basic concepts of object-oriented programming language.
4. Obtain knowledge about objects and classes.
5. Gain knowledge about various types of inheritance and operator overloading.

#### EEPC403 ELECTRICAL MACHINES

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the construction, working principles & operations of all types of machines.
2. Predict the performance of electrical machines from their equivalent circuit models.
3. Select suitable machine to meet specific application requirement.
4. Validate the theoretical concepts by conducting experiments in practical sessions.
5. Study the different testing techniques available to assess the performance of machine.

#### EEPC404 DIGITAL ELECTRONICS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand working of logic families and logic gates.
2. Design and implement Combinational and Sequential logic circuits.
3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
4. Apply PLDs to implement the given logical problem.
5. Design digital circuits for consumer application

#### EEPC405 ELECTRICAL MEASUREMENTS & INSTRUMENTS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand basic principle of measuring instruments.
2. Understand the concept of measurement of power and energy in single and three phase circuits.
3. Gain Knowledge on the measurement of resistance and impedance.
4. Acquire knowledge of display instruments, amplifier measurements and CRO
5. Distinguish recorders, transducers, data acquisition systems and display devices, frequency and period measurements.

#### EEPC406 ELECTROMAGNETIC FIELDS

##### Course Outcomes:

At the end of the course, students will demonstrate the ability to

1. Understand the application of vector calculus for analyzing electromagnetism.
2. Analyze electrostatic fields due to different charge distributions, electric potential and energy density.
3. Familiarize about various capacitor geometries, solutions of Poisson's and Laplace's equations.
4. Understand basic concepts of static magnetic field, scalar and vector magnetic potentials.
5. Understand Maxwell's equations, wave propagation, magnetic circuits and magnetic boundary conditions.

#### EEPC407 ELECTRICAL MACHINES LAB

##### Course Outcomes:

At the end of the course, students will demonstrate the ability

1. Understand the construction, working principles & operations of DC machines and transformers, Induction motors and Synchronous machines.
2. Predict the performance of electrical machines from their equivalent circuit models.
3. Validate the theoretical concepts by conducting experiments in practical sessions.
4. Distinguish the various categories of electrical machines.
5. Study the different testing techniques available to assess the performance of machine.

#### EEPC408 DIGITAL ELECTRONICS LAB

##### Course Outcomes:

At the end of the course, students will demonstrate the ability to

1. Understand the basic code conversion and Karnaugh mapping technique
2. Acquire the operating theory of combinational and sequential circuits.
3. Explore the use of digital logic in integrated circuit applications.
4. Acquire the design capability of digital circuits
5. Design various counters.

#### EECP409 ELECTRICAL MEASUREMENTS LAB

##### Course Outcomes:

At the end of the course, students will demonstrate the ability to

1. Measure various electrical parameters using bridges.
2. Understand the methods involved in magnetic measurements
3. Acquire knowledge in calibrating various Energy Meters for different load conditions.
4. Investigate ABCD constants in transmission lines, detection of cable fault and RLC transients.
5. Explore the impact of real and reactive powers for constant power factor loading.

#### FIFTH SEMESTER

#### EEPC501 MICROPROCESSOR AND MICROCONTROLLER

##### Course Outcomes:

At the end of this course, students will acquire the ability to

1. Understand the fundamental of microprocessors.
2. Explore the architecture of various microcontrollers.
3. Develop assembly language programs for the processors.
4. Incorporate the memory and peripheral devices.
5. Extend the development of the microprocessor based automation system.

#### EEPC502 POWER ELECTRONICS

##### Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand the details of switching devices
2. Analyze use of thyristors in different types of rectifier circuits
3. Analyze the operation of DC-DC buck and boost converters
4. Apply the different modulation techniques to the operation of single-phase voltage source inverters
5. Analyze the operation of three phase voltage source inverters

#### EEPC503 CONTROL SYSTEMS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the modeling of linear-time-invariant systems using transfer function and feedback control systems.
2. Gain knowledge about time response analysis and the use of Root – loci to determine stability of systems.
3. Understand the concept of frequency response analysis
4. Design simple feedback controllers.
5. Acquire knowledge about state variable analysis.

#### EEPC504 POWER SYSTEMS-I

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the concepts of power systems
2. Determine the line parameters and analyze the performance of transmission lines
3. Acquire knowledge of mechanical characteristics of transmission lines
4. Analyze the concepts of distribution systems
5. Understand concept of insulation

#### EECP507 MICROPROCESSOR AND MICROCONTROLLER LAB

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the architecture and operations of microprocessors and microcontrollers.
2. Write programs for performing real world a task.
3. Validate the theoretical concepts by performing experiments in practical sessions.
4. Distinguish the various categories of programmable devices.
5. Study the different interfacing techniques available for 8085 and 8051.

#### EECP508 POWER ELECTRONICS LAB

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Develop schemes for generation of firing pulses suitable for the power switches in converter circuits.
2. Formulate procedures for testing the operation of power converters.
3. Evaluate the performance of power converter circuits.
4. Experience the platform for simulation of power electronic circuits.
5. Acquire knowledge on characteristics of switching devices.

#### EECP509 CONTROL SYSTEMS LAB

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the methods involved in the position and speed control of DC machine
2. Calibrate and investigate the importance of PID Controllers for analog and temperature control systems.
3. Design and develop various Compensation Schemes for a given plant.
4. Acquire knowledge about the impact of step and continuous command on the Stepper Motor for various modes.
5. Investigate on the output performance of the linear and nonlinear analog and digital control system.

### **SIXTH SEMESTER**

#### EEPC601 POWER SYSTEMS – II

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand and analyze power system.
2. Form power system matrices.
3. Model power system components.
4. Apply load flow analysis to an Electrical power network and interpret the results of the analysis.
5. Analyze a network under symmetrical and unsymmetrical fault conditions and interpret the results.

#### EEPC602 EMBEDDED SYSTEMS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the architecture and its programming aspects.
2. Distinguish between the general computing system and embedded system.
3. Design real time embedded systems using the concept of RTOS.
4. Acquire knowledge about architecture, registers, instruction set of arm processor.
5. Know about operating system function, resource and task management function.



#### EECP607 POWER SYSTEMS LAB

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Familiarize with analyzing the load flow problems.
2. Analyze load frequency problem.
3. Perform short circuit studies.
4. Perform transient stability studies.
5. Perform economic load dispatch.

#### EECP608 EMBEDDED SYSTEMS LAB

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the architecture and operations of MICROCHIP microcontrollers.
2. Write programs in Embedded C for performing a task.
3. Validate the theoretical concepts by performing experiments in practical sessions.
4. Distinguish the various categories of programmable devices.
5. Acquire knowledge about different interfacing capabilities of 89C51, PIC and ARM7.

### **SEVENTH SEMESTER**

#### ETHS701 ENGINEERING ETHICS

##### Course Outcomes:

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

1. Understand and build the relationship between the Engineer and the Society.
2. Describe the importance of Developing ethical codes in engineering practice.
3. Develop the knowledge on the legal, moral and ethical aspects in Engineering.
4. Construct the moral and ethical dimensions in engineering.
5. Improve the Knowledge about Multinational Corporation.

#### EEPC702 INDUSTRIAL ELECTRICAL SYSTEMS

##### Course Outcomes:

At the end of this course, students will able to

1. Familiarize with different electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD.
2. Understand various components of industrial electrical systems.
3. Analyze and select the proper size of various electrical system components.
4. Acquire knowledge about various industrial automation system.
5. Train and get exposed with the design of illumination system.

#### EEPC706 ELECTRICAL ESTIMATION AND DRAWING LAB

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand basic tools of CADD.
2. Estimate of the materials required.
3. Draw various electrical components.
4. Acquire the designing of wiring system.
5. Understand the design of lighting schemes.

#### ETIT707 SEMINAR/ INDUSTRIAL TRAINING

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Face the audience and to interact with the audience with confidence.
2. Tackle any problem during group discussion in the corporate interviews.
3. Face the challenges in the field with confidence.
4. Manage the situation that arises during the execution of works related to Electrical and Electronics Engineering
5. Develop the ability of writing technical papers for Conferences and Journals.

#### **EIGHTH SEMESTER**

#### EEPV803 PROJECT WORK AND VIVA-VOCE

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Take up any challenging practical problems and find solution by formulating proper methodology on completion of the project work.
2. Carry out any experimental works.
3. Understand the modeling, analysis and design.
4. Prepare research papers for Conferences and journals
5. Acquire confidence to face any type of audience

#### **PROFESSIONAL ELECTIVES**

#### EEPESCN ELECTRICAL MACHINE DESIGN

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the various factors which influence the design of electrical machines and select proper material for the design.
2. Design a transformer and estimate its performance characteristics.
3. Relate the output power of an induction motor with its main dimensions and design squirrel cage and slip ring induction motors.
4. Obtain the optimal design of a synchronous machine as per the requirements and constraints specified.
5. Apply software tools to do design calculations.

#### EEPESCN ELECTRICAL ENERGY CONSERVATION AND AUDITING

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Gain knowledge on the current energy scenario and the importance of energy conservation.
2. Comprehend the various forms of energy.
3. Familiarize the concepts of energy efficiency of electrical systems and energy management.
4. Acquire awareness of the methods adopted for improving energy efficiency in various electrical systems.
5. Understand the basic concepts and implementation schemes of energy audit and energy management.

#### EEPESCN ELECTRICAL DRIVES

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the basics of electric drives

2. Analyze the operation of phase-controlled dc drives.
3. Apply the theory of self commutated switches to the operation of chopper fed drives.
4. Analyze the speed control mechanisms for induction motor drives.
5. Understand the operation of synchronous motor and special machine drives.

#### EEPESCN ELECTRICAL AND HYBRID VEHICLES

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the models to describe hybrid vehicles and their performance.
2. Identify the different possible strategies in hybridization of EV.
3. Know the various topologies of electric drive and its control.
4. Familiarize the different strategies related to energy storage systems.
5. Gain knowledge about different energy management strategies adopted for EV.

#### EEPESCN WIND AND SOLAR ENERGY SYSTEMS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Comprehend the energy scenario and the consequent growth of the power generation from renewable energy sources.
2. Gain knowledge about the basic physics of wind and solar power generation.
3. Familiarize the power electronic interfaces for wind and solar generation.
4. Understand the concept of solar photovoltaic power generation.
5. Acquire awareness about the issues related to the grid-integration of solar and wind energy systems.

#### EEPESCN DIGITAL SIGNAL PROCESSING

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Represent signals mathematically in continuous and discrete-time, and in the frequency domain.
2. Analyze discrete-time systems using z-transform.
3. Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms.
4. Design digital filters for various applications.
5. Apply digital signal processing for the analysis of real-life signals.

#### EEPESCN CONTROL SYSTEMS DESIGN

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Study various design specifications.
2. Design classical control system in time domain
3. Design classical control system in frequency domain.
4. Analyze the controllers to satisfy the desired design specifications using simple controller structures (P, PI, PID, compensators).
5. Understand controllers using state-space approach.

#### EEPESCN COMPUTER ARCHITECTURE

##### Course Outcomes:

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

1. Understand the architecture and functions of the computer system.
2. discuss the features of various I/O interfaces and select the required I/O for a particular objective.
3. Understand the concepts of microprocessors, their principles and practices.
4. Analyze the task and develop the assembly language program using 8086 instruction set.

5. Differentiate processor architectures like VLIW, DSP, SOC and their suitability for the desired application.

#### EEPESCN POWER SYSTEM PROTECTION

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Study the different components of a protection system.
2. Understand the operation of circuit breakers.
3. Analyze the protection schemes for different power system components.
4. Impart basic principles of digital protection.
5. Understand system protection schemes and the use of wide-area measurements.

#### EEPESCN HIGH VOLTAGE TRANSMISSION SYSTEMS

Course Outcomes:

1. Understand the factors governing the choice of HVAC and HVDC for overhead and underground transmission system.
2. Learn about bundled conductors and corona loss.
3. Analyze the problem of EHVAC transmission at power frequency and compensation.
4. Learn the DC transmission system in case of harmonics and as well as multi-terminal DC transmission system.
5. Impart the knowledge of over voltage problem cables and insulating materials.

#### EEPESCN COMPUTER AIDED POWER SYSTEM ANALYSIS

Course Outcomes:

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

1. understand the economic operation of power system operation.
2. Enhance skills to develop the policies for optimal load flow using various methodologies.
3. Design Unit Commitment under various strategies.
4. Gain knowledge in load-frequency control and in designing various types of Controllers.
5. Learn the analysis of the transient stability for power system using various techniques

#### EEPESCN COMMUNICATION ENGINEERING

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Provide idea about modulation and demodulation techniques employed in communication systems.
2. Understand angle modulation technique in communication system
3. Understand pulse modulation technique and its conversion
4. Explain the concepts of pulse modulation systems and multiple access techniques used in communication field applications.
5. Understand the various broadband communication systems and recent advancements in communication systems.

#### EEPESCN VLSI DESIGN

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Provide comprehensive idea about the techniques of chip design using programmable devices.
2. Analyze VLSI systems, VHDL and MOS circuit realization of the various building blocks that is common to any microprocessor or digital VLSI circuit.
3. Design and analyze of analog circuit

4. Design and analyze digital circuits like multipliers, adders and understand the architecture and programming technologies of FPGA.
5. Model a simple digital system using VHDL

#### EEPECSN MICRO ELECTRO MECHANICAL SYSTEMS

Course Outcomes:

1. Understand the concept of scaling laws that are used extensively in the design of micro devices and systems.
2. Analyze the basic principles and applications of micro-fabrication processes, such as photolithography, ion implantation, diffusion, oxidation, CVD, PVD, and etching.
3. Impart knowledge about thin film process and etchants used for isotropic and anisotropic etching.
4. Analyze semiconductor materials for common micro components and devices.
5. Understand the types of bonding process and the techniques used for MEMS

#### OPEN ELECTIVES

##### EEOESCN ELECTRICAL SAFETY ENGINEERING

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Get an insight on Electrical safety, IE act and IE rules
2. Acquire knowledge about prevention of electrical shocks
3. Familiarize with various first aid measures
4. Recommend electrical safety measures in hazardous areas
5. Understand the significance of safety management

##### EEOESCN GENERATION OF ELECTRICAL ENERGY

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Know different types of power plants, their functions and issues related to them.
2. Understand the significance of Hydro Energy and its economical benefits.
3. Understand the principle of operation and performance of various nuclear reactors and their impact on environment.
4. Understand the importance of renewable energy sources as an alternative to energy crisis.
5. Learn the basics of Tariff structure for energy production.

##### EEOESCN ELECTRICAL MATERIALS

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the concept of conducting materials.
2. Realize the properties of semiconducting, magnetic, dielectric and optical materials.
3. Realize the properties of magnetic and dielectric materials
4. Know the importance of optical materials in electrical engineering field.
5. Introduce new engineering materials in electrical engineering.

##### EEOESCN SOFT COMPUTING TOOLS FOR ELECTRICAL ENGINEERING

Course Outcomes:

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

1. Analyze and select a suitable technique for the particular problem domain.
2. Recognize the merits and demerits of applying a particular ANN model for a particular problem.
3. Design and apply fuzzy Logic based reasoning to handle uncertainty in engineering problems.
4. Apply Neuro-controller, Fuzzy Logic Controller for non-linear controlling applications.

5. Solve combinatorial optimization problems using genetic algorithm.

#### **EEOESCN BIOMEDICAL ENGINEERING**

##### **Course Outcomes:**

At the end of this course, students will demonstrate the ability to

1. Explain the anatomy and physiology of various subsystems of human body.
2. Provide idea about different types of physiological transducers used in medical engineering which can be used to acquire biological signals from the human body
3. Gain knowledge about acquiring biological signal and the safety features to be incorporated
4. Understand the principles of cardiovascular, respiratory and therapeutic assisting devices used in bio-medical field.
5. Describe the recent trends used in medical imaging.

#### **EEOESCN UTILIZATION OF ELECTRICAL ENERGY**

##### **Course Outcomes:**

At the end of this course the students will be able to

1. Know about different type of electric drives and systems employed in electric traction.
2. Understand the various lamps and design illumination schemes.
3. Acquire the knowledge of existing methods used for heating and welding.
4. Familiarize the concepts and theory of refrigeration and air conditioning.
5. Analyze the various energy saving methods.

#### **HONOUR ELECTIVES**

##### **EEHESCN POWER SYSTEM DYNAMICS AND CONTROL**

###### **Course Outcomes:**

At the end of this course, students will demonstrate the ability to

1. Understand basic power system operation
2. Understand the problem of power system stability and its impact on the system.
3. Analyze linear dynamical systems and use of numerical integration methods.
4. Model different power system components for the study of stability.
5. Understand the methods to improve stability.

##### **EEHESCN RESTRUCTURED POWER SYSTEMS**

###### **Course Outcomes:**

At the end of this course, students will demonstrate the ability to

1. Understand the difference between traditional and restructured power systems
2. Understand about various entities involved in power markets.
3. Familiarize with transmission open access and electricity pricing
4. Understand various ancillary services management
5. Understand the power system analysis under market environment

##### **EEHESCN FLEXIBLE AC TRANSMISSION SYSTEMS**

###### **Course Outcomes:**

At the end of this course, students will able to

1. Conceptualize the different methods adopted in power system control and Learn the classification of compensators along with its application
2. Learn the characteristics, modeling and operating schemes of different types of shunt and series switched reactive power generating devices.
3. Familiarize with all types of compensators and know their significance.

4. Equip with basic procedure of FACTS controller design and get exposed with emerging facts controllers
5. Build an enhanced knowledge of how to realize control strategies to ensure a smooth transfer of power with improved performance indices.

#### EEHESCN POWER QUALITY STUDIES

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Familiarize with the basic concepts of power quality standards and issues
2. Understand and analyze single phase and three phase system with various types of loads
3. Gain knowledge with the use of various load compensating methods compute the concept of improving the power quality to sensitive load by various mitigating methods.
4. Identify the schemes for load compensation using DSTATCON
5. Acquire awareness about DVR and the impact of Unified power quality conditioner for power quality issues.

#### EEHESCN HIGH VOLTAGE ENGINEERING

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. To understand the breakdown mechanism gaseous insulating materials.
2. To analyze the processes lead to breakdown of solid and liquid insulating materials.
3. To gain knowledge about high voltage and current generation equipment.
4. To explain how Lightning and Switching Over-voltages arises in the system
5. To analyze the suitable H.V tests required for particular equipment as per the standards.

#### EEHESCN DIGITAL CONTROL SYSTEMS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Obtain knowledge on discrete representation of continuous systems.
2. Understand the usage of Z and inverse Z transform in discrete-time systems.
3. Gain knowledge about stability of discrete time systems.
4. Acquire knowledge about state space approach for discrete time systems.
5. Design discrete controllers and discrete compensators.

#### **MINOR ELECTIVES**

#### EEMISCN ANALOG ELECTRONICS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the characteristics of transistors.
2. Design and analyses various rectifier and amplifier circuits.
3. Design sinusoidal and non-sinusoidal oscillators.
4. Understand the functioning of OP-AMP and design OP-AMP based circuits.
5. Understand the structure and I.V characteristics of MOSFET & BJT.

#### EEMISCN DIGITAL ELECTRONICS

##### Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the working of logic families and logic gates.
2. Design and implement Combinational logic circuits.
3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.

4. Apply PLDs to implement the given logical problem.
5. Design and implement sequential logic circuits.

#### EEMISCN CONTROL SYSTEMS

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the modeling of linear-time-invariant systems using transfer function and state- space representations.
2. Understand the concept of stability and its assessment for linear-time invariant systems.
3. Design simple feedback controllers.
4. Design simple feedback controllers.
5. Acquire knowledge about state variable analysis.

#### EEMISCN INDUSTRIAL ELECTRICAL SYSTEMS

Course Outcomes:

At the end of this course, students will able to

1. Familiarize with different electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD.
2. Understand various components of industrial electrical systems.
3. Analyze and select the proper size of various electrical system components.
4. Acquire knowledge about various industrial automation system.
5. Train and get exposed with the design of illumination system.

### **M.E. POWER SYSTEM**

#### EEPSPC11 POWER SYSTEM ANALYSIS

COURSE OUTCOMES:

Students will be able to

1. Acquire knowledge about the modelling of power system components.
2. Introduce the sparsity techniques in power system analysis.
3. Develop computer program for various power flow studies.
4. Attain knowledge about the abnormal operation of power system under balanced and unbalanced conditions.
5. Understand the computational procedure for obtaining the swing curve.

#### EEPSPC12 POWER SYSTEM DYNAMICS

COURSE OUTCOMES:

Students will be able to

1. Understand about various approaches in modelling of power system components and analyze for the dynamic operation of the power system
2. Adopt machine controllers for various machine models
3. Obtain improved skills with the detailed study of various IEEE type excitation systems for improved power system operation, stability, control and protection.
4. Ensure enhanced capability in adopting efficient engineering aspects for real power - frequency and reactive power – voltage controls of electrical energy generation and utilization.
5. Have clear understanding of managerial functions like planning, organizing, controlling various power system utilities.



#### EEPSMC15 RESEARCH METHODOLOGY AND IPR

##### COURSE OUTCOMES:

Students will be able to:

1. Understand research problem formulation.
2. Analyze research related information and Follow research ethics
3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
4. Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

#### EEPSCP16 POWER SYSTEM ANALYSIS LAB

##### COURSE OUTCOMES:

Students will be able to:

1. Know concepts in problem solving
2. Develop programming in C++ language
3. Analyze simulation results and create effective documentation
4. Exhibit professional behavior and competence
5. Acquire expertise in usage of modern software tools

#### EEPSCP17 POWER SYSTEM SIMULATION LAB

##### COURSE OUTCOMES:

Students will be able to:

1. Know concepts in problem solving
2. Develop programming in C++ language
3. Analyze simulation results and effective documentation
4. Exhibit professional behavior and competence
5. Acquire expertise in usage of modern software tools

#### EEPSPC21 POWER SYSTEM PROTECTION

##### COURSE OUTCOMES:

Students will be able to:

1. Obtain fundamental knowledge about various protection schemes including over current protection.
2. Become proficient in incorporating transformer protection schemes.
3. Gain familiarity in several protection schemes for transmission lines.
4. Acquire knowledge in designing various kinds of Generator and Motor Protection
5. Familiarize with the substation automation.

#### EEPSPC22 POWER SYSTEM STABILITY

##### COURSE OUTCOMES:

Students will be able to

1. Familiarize with the different types of stability in power systems.
2. Understand the significance about small signal stability analysis and its enhancement.
3. Gain knowledge on Transient stability analysis
4. Know the significance of voltage stability analysis.
5. Investigate the various methods to enhance transient stability.

#### EEPSCP26 ARTIFICIAL INTELLIGENCE APPLICATIONS TO POWER SYSTEMS LAB

##### COURSE OUTCOMES:

Students will be able to:

1. Know concepts in problem solving using AI techniques
2. Develop programming in MATLAB
3. Analyze simulation results and effective documentation
4. Exhibit professional behavior and competence
5. Acquire expertise in usage of modern software tools

#### EEPSTS27 INDUSTRIAL TRAINING AND SEMINAR /MINI PROJECT

##### COURSE OUTCOMES:

Students will be able to:

1. Face the challenges in the field with confidence.
2. Benefit by the training with managing the situation that arises during the execution of works related to Power Systems.
3. Get the training to face the audience and to interact with the audience with confidence.
4. Tackle any problem during group discussion in the corporate interviews.
5. Gain practical knowledge in carrying out Power Systems field related works.

#### EEPSTH33 THESIS PHASE-I & VIVA-VOCE

##### COURSE OUTCOMES:

Students will be able to:

1. Review quality of Literature survey and Novelty in the problem
2. Assess clarity of Problem definition and Feasibility of problem solution
3. Validate the relevance to the specialization
4. Acquire Knowledge on the clarity of objective and scope
5. Improve the quality of Written and Oral Presentation

#### EEPSTH41 THESIS PHASE-II & VIVA-VOCE

##### COURSE OUTCOMES:

Students will be able to:

1. Identify the real world power system problems
2. Analyze, design and implement solution methodologies
3. Apply modern engineering tools for solution
4. Write technical reports following professional ethics
5. Develop effective communication skills to present and defend their research work to a panel of experts.

### **PROGRAM ELECTIVES**

#### EEPSPEXX STATE ESTIMATION AND SECURITY ASSESSMENT OF POWER SYSTEMS

##### COURSE OUTCOMES:

Students will be able to

1. Understand the conceptual aspects in power system state estimation.
2. Demonstrate various state estimation methods.
3. Acquire proficiency to perform observability analysis.
4. Conduct distribution state estimation.
5. Realize the security assessment and enhancement strategies.

#### EEPSPEXX SMART GRID

##### COURSE OUTCOMES:

1. Acquire knowledge on the concept of smart grids.
2. Implement Load flow and contingency methods for smart grid.
3. Identify stability assessment tools for smart grid.
4. Gain knowledge on smart metering infrastructure.
5. Realize the application of FACTS and energy storage devices in smart grid.

#### EPSPEXX EXTRA HIGH VOLTAGE AC

##### COURSE OUTCOMES:

Students will be able to

1. Understand the basic comparison of HVAC and HVDC for overhead and underground transmission system.
2. Derive the surface voltage gradient of single, double, and more than three conductor bundles and expression for a charge voltage diagram for evaluation of the power loss.
3. Analyze the DC transmission system in case of harmonics and discuss about the multi terminal DC transmission system.
4. Gain Knowledge about the design factors about lines and cables.
5. Learn about testing, overvoltage and design of EHV system.

#### EEPSPEXX WIND AND SOLAR SYSTEMS

##### COURSE OUTCOMES:

Students will be able to

1. Understand the basic concept of wind energy conversion system.
2. Impart knowledge on wind electric generators in power systems.
3. Develop skill to control the wind generated electrical energy.
4. Learn the basics of solar energy and its prospects.
5. Understand the basic knowledge of photo voltaic system.

#### EEPSPEXX ELECTRIC POWER DISTRIBUTION SYSTEM

##### COURSE OUTCOMES:

Students will be able to

1. Gain Knowledge of power distribution system
2. Acquire knowledge on Distribution automation and its application in practice
3. Learn SCADA system
4. Know the optimal placement of switching devices
5. Apply AI techniques to power systems.

#### EPSPEXX POWER SYSTEM OPERATION AND CONTROL

##### COURSE OUTCOMES:

Students will be able to

1. Gain knowledge on economic load dispatch.
2. Solve optimal power flow problems using various solution methods.
3. Get exposed to hydro thermal scheduling.
4. Understand the significance of Unit Commitment
5. Focus on control aspects in power systems.

#### EEPSPEXX ENERGY MANAGEMENT AND ENERGY AUDIT

##### COURSE OUTCOMES:

Students will be able to

1. Understand and acquire fundamental knowledge in the field of energy and on both the conventional and non-conventional energy technologies.

2. Acquire the capability and skills needed for the energy monitoring, auditing and management of Energy.
3. Understand the need for energy audit, types and Instruments for energy audit.
4. Exhibit proficiency in Report writing and presentation of energy audit.
5. Perform energy economics calculations.

#### EEPSPEXX ELECTRIC AND HYBRID VEHICLES

##### COURSE OUTCOMES:

Students will be able to:

1. Acquire knowledge about fundamental concepts, principles, analysis and design of hybrid and electric vehicles.
2. Learn about electric drives in vehicles /traction.
3. Familiarize with the different electrical components used in hybrid and electric vehicles.
4. Understand the models to describe hybrid vehicles and their performance.
5. Understand the different strategies related to energy storage systems.

#### EEPSPEXX RESTRUCTURED POWER SYSTEMS

##### COURSE OUTCOMES:

Students will be able to:

1. Understand the difference between traditional and restructured power systems
2. Acquire knowledge about various congestion management methods.
3. Familiarize with electricity pricing and transmission open access.
4. Gain knowledge about significant ancillary services.
5. Learn about the reform initiatives undertaken in Indian power sector.

#### EEPSPEXX SCADA SYSTEM AND APPLICATIONS

##### COURSE OUTCOMES:

Students will be able to:

1. Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications.
2. Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system.
3. Familiarize with single unified standard architecture IEC 61850.
4. Learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.
5. Understand about SCADA applications in transmission and distribution sector, industries etc.,

#### EEPSPEXX POWER QUALITY

##### COURSE OUTCOMES:

Students will be able to:

1. Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonics on system equipment and loads
2. Develop analytical modeling skills needed for modeling and analysis of harmonics in networks and components
3. Introduce the active power factor correction based on static VAR compensators and its control techniques
4. Implement the series and shunt active power filtering techniques for harmonics.
5. Find solutions to grounding and wiring problems

## EEPSPEXX APPLICATION OF AI TECHNIQUES TO POWER SYSTEMS

### COURSE OUTCOMES:

Students will be able to:

1. Understand the concept, architecture and algorithm of each AI technique
2. Familiarize with the application of various artificial neural networks.
3. Acquire knowledge about fuzzy logic systems.
4. Implement genetic algorithm for various power system optimization problems.
5. Acquaint with various swarm optimization methods.

## EEPSPEXX POWER SYSTEM TRANSIENTS

### COURSE OUTCOMES:

Students will be able to:

1. Acquire the basic knowledge about occurrence of various types of power system transients and their mathematical formulation
2. Compute various parameter for the power system design due to lightning impacts.
3. Coordinate the insulation of various equipment in power system lightning
4. Model the power system for transient analysis considering switching HVDC line
5. Understand the need for Insulation co-ordination:

## EPSPEXX FACTS AND CUSTOM POWER DEVICES

### COURSE OUTCOMES:

Students will be able to:

1. Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems.
2. Learn various Static VAR Compensation Schemes like Thyristor/GTO Controlled Reactive Power Systems, PWM Inverter based Reactive Power Systems.
3. Develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems.
4. Equip with basic procedure of FACTS controller Design.
5. Gain knowledge on IEEE standards on power quality.

## EEPSPEXX INDUSTRIAL LOAD MODELING AND CONTROL

### COURSE OUTCOMES:

Students will be able to:

1. Learn the basic concepts of demand side management in the electrical energy scenario
2. Study the various cost imposed with electricity pricing models
3. Familiarize understand the impacts and need for reactive power management in industries.
4. Design various types of load models and analyze its impact
5. Gain knowledge about the captive power generation units.

## EEPSPEXX SYSTEMS THEORY

### COURSE OUTCOMES:

Students will be able to:

1. Learn the basic design concepts with examples.
2. Gain an enhanced knowledge about state space analysis.
3. Attain knowledge about time varying and time invariant feedback concepts.
4. Acquire conceptual knowledge about stability analysis.
5. Familiarize with modal control concepts.

## EEPSOEXX BUSINESS ANALYTICS

### COURSE OUTCOMES:

Students will be able to

1. Familiarize with the data analytics in Business administration
2. Acquire knowledge for critical thinking in making decisions based on data and deep analytics.
3. Implement organization structure to increase the ability to translate data into clear, action able in sights.
4. Acquaint with risk analysis in Business administration.
5. Demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.

#### EEPSOEXX INDUSTRIAL SAFETY

##### Course Outcomes

Students will be able to:

1. Familiarize with various methods adopted for industrial safety.
2. Acquire knowledge on the basic concepts on various maintenance schemes for industrial safety.
3. Explore several techniques used to control wear and corrotion prevention in industries.
4. Implement fault tracing mechanism adopted in industries for safety.
5. Understand the need of periodic and preventive maintenance in industrial safety

#### EEPSOEXX OPERATIONS RESEARCH

##### COURSE OUTCOMES:

Students will be able to

1. Familiarize with the various optimization techniques
2. Formulate a linear programming problem and carry out sensitivity analysis
3. Acquire knowledge on CPM/PERT
4. Gain knowledge on various types of models and carry out simulation
5. Apply the dynamic programming to solve problems of discreet and continuous variables.

#### EEPSOEXX COST MANAGEMENT& ENGINEERING PROJECTS

##### COURSE OUTCOMES

Students will be able to:

1. Understand various Strategic Cost Management in Projects
2. Acquire knowledge in developing the optimal methodologies in Engineering Projects
3. Familiarize with Cost Behavior and Profit Planning in Engineering Projects
4. Acquaint with the various schemes of Total Quality Management
5. Develop various methodologies in executing the Engineering Projects using quantitative management techniques

#### EEPSOEXX COMPOSITE MATERIALS

##### COURSE OUTCOMES:

Students will be able to:

1. Obtain fundamental knowledge about various classification and characteristics of Composite materials.
2. Become proficient in reinforcements.
3. Familiarize with manufacturing of polymer matrix composites
4. Gain familiarity in several manufacturing of metal matrix composites.
5. Acquire knowledge in designing composite materials with enhanced failure criteria-strength

#### EEPSOEXX WASTE TO ENERGY

##### Course Outcome:

Students will be able to:

1. Understand the concept of Waste to Energy.
2. Apply the knowledge about the operations of Waste to Energy Plants.

3. Analyse the various aspects of Waste to Energy Management Systems.
4. Apply the knowledge in planning and operations of Waste to Energy plants.
5. Carry out Techno-economic feasibility for Waste to Energy Plants.

### **AUDIT COURSES**

#### **EEPSACXX SANSKRIT FOR TECHNICAL KNOWLEDGE**

##### **COURSE OUTCOMES:**

Students will be able to

1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood.
3. Being a global language, will help to develop logic in students.

#### **EEPSACXX VALUE EDUCATION**

##### **COURSE OUTCOMES**

Students will be able to

1. Acquire Knowledge of self-development.
2. Learn the importance of Human values
3. Develop the overall personality

#### **EEPSACXX CONSTITUTION OF INDIA**

##### **COURSE OUTCOMES:**

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct.
4. Familiarize with Elections through adult suffrage in the Indian Constitution.
5. Discuss the passage of the Hindu Code Bill of 1956.

#### **EEPSACXX PEDAGOGY STUDIES**

##### **COURSE OUTCOMES:**

Students will be able to

1. Understand what pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.
2. Understand what is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners.
3. Learn how can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.

#### **EEPSACXX STRESS MANAGEMENT BY YOGA**

##### **COURSE OUTCOMES:**

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also
2. Improve efficiency

## EEPSACXX PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

### COURSE OUTCOMES:

Students will be able to:

1. Study Shrimad - Bhagwad- Geeta that will help the student in developing his personality and achieve the highest goal in life.
2. Lead the nation and mankind to peace and prosperity
3. Help in developing versatile personality.

## **M.E. Embedded Systems**

### EEESPC11 MICROCONTROLLER BASED SYSTEM DESIGN

#### COURSE OUTCOMES:

1. Understand the fundamentals of microcontroller systems and interface, and have the ability to apply them.
2. Understand the architecture and capabilities of PIC microcontroller.
3. Learn importance of PIC in designing embedded application.
4. Learn use of hardware and software tools.
5. Develop interfacing to real world devices.

### EEESPC12 ADVANCED DIGITAL SYSTEM DESIGN

#### COURSE OUTCOMES:

1. Gather a review of combinational circuit and analysis.
2. Develop the ability to analyze and design synchronous sequential circuits.
3. Equip the capability to design Asynchronous sequential circuits and realize hazard free circuit.
4. Gain knowledge on implementation of sequential circuits using PLDs.
5. Understand the concepts fault diagnosis and testability.

### EEESMC15 RESEARCH METHODOLOGY AND IPR

#### COURSE OUTCOMES:

Students will be able to:

1. Understand research problem formulation.
2. Analyze research related information
3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
4. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

### EEESCP16 MICROCONTROLLER BASED SYSTEM DESIGN LAB

#### COURSE OUTCOMES:

Students will be able to:

1. Explain the architecture and operation of 89C51 and PIC16F877 Microcontrollers
2. Identify and explain the operations of peripherals and memories typically interfaced with these controllers
3. Analyze instruction sets of 89C51 and PIC16F877 Microcontrollers.
4. Gain hands-on experience in doing experiments on 89C51 and PIC16F877 Microcontrollers, by using hardware kits in the laboratory and present the report.



5. Students should understand the hardware/software tradeoffs involved in the design of these Controllers

#### EEESCP17 DSP BASED SYSTEM DESIGN LAB

##### COURSE OUTCOMES:

Upon completion of the course the student will be able to

1. Explain the architecture and operation of various DSP Processors.
2. Identify and explain the operations of peripherals and memories typically interfaced with DSP Processors.
3. Analyze instruction sets of TMS320F2812, TMS320VC5416 and TMS320C6713 Processor.
4. Gain hands-on experience in doing experiments on TMS320F2812, TMS320VC5416 and TMS320C6713 Processor by using hardware kit in the laboratory and present the report.
5. Explain the hardware/software trade-offs involved in the design of DSP Processors.

#### EEESPC21 RISC AND CISC PROCESSORS

##### COURSE OUTCOMES:

1. Delivers insight into various embedded processors of RISC and CISC architecture with improved design strategies.
2. Introduces the recent advanced features in RISC and CISC processors.
3. Gives an idea about the instruction set in ARM processor
4. Explains the programming model in the processors.
5. Develops an overview about the application of the advanced processors.

#### EEESPC22 EMBEDDED CONTROL SYSTEMS DESIGN

##### COURSE OUTCOMES:

1. Understand the basic concept of embedded system such as memory, I/O devices, and bus communication system.
2. Design real time embedded systems using the concepts of RTOS.
3. Explain and design of software for embedded control.
4. Implement the real-time operating system principle.
5. Design simple A/D and D/A interface circuits.

#### EEESCP26 ARM BASED SYSTEM DESIGN LAB

##### COURSE OUTCOMES:

1. Upon completion of the course the student will be able to
2. Explain the architecture and operation of ARM Processors.
3. Identify and explain the operations of peripherals and memories typically interfaced with ARM Processors.
4. Analyze instruction sets of ARM LPC 2148 Processor.
5. Design and do experiments on ARM LPC 2148 Processor by using hardware kit in the laboratory and present the report.

#### EEESTS27 INDUSTRIAL TRAINING AND SEMINAR/MINI PROJECT

##### COURSE OUTCOMES:

1. The students can face the challenges in the field with confidence.
2. The students will be benefited by the training with managing the situation that arises during the execution of works related to Embedded Systems.
3. The students will be getting the training to face the audience and to interact with the audience with confidence.
4. To tackle any problem during group discussion in the corporate interviews.

5. To enable the students capable of preparing reports based on what they have learnt in the industry

#### EMETH33 THESIS PHASE – I AND VIVA VOCE

##### COURSE OUTCOMES:

1. Review quality of Literature survey and Novelty in the problem
2. Assess clarity of Problem definition and Feasibility of problem solution
3. Validate the relevance to the specialization
4. Acquire Knowledge on the clarity of objective and scope
5. Improve the quality of Written and Oral Presentation

#### EVETH41 THESIS PHASE – II AND VIVA VOCE

##### COURSE OUTCOMES:

1. Identify the Embedded system problem
2. Analyze, design and implement solution methodologies
3. Apply modern engineering tools for solution
4. Write technical reports following professional ethics
5. Develop effective communication skills to present and defend their research work to a panel of experts.

#### **PROGRAM ELECTIVES**

##### EEESPEXX ADVANCED DIGITAL SIGNAL PROCESSING

##### COURSE OUTCOMES:

Students should be able to:

1. To understand advanced digital signal processing algorithms
2. To design adaptive filters for a given application
3. To design multi-rate DSP systems.
4. To understand decimation and interpolation of discrete-time signals.
5. To understand advanced digital signal transforms and their algorithms

##### EEESPEXX DISTRIBUTED EMBEDDED COMPUTING

##### COURSE OUTCOMES:

The student will be able to

1. Explain various network hardware and security related issues
2. Explain basic concepts of internet database and webpage design.
3. Explain the distributed database computing using embedded Java.
4. Describe the embedded agent design and operation mechanism.
5. Explain the real time multiprocessor distributed embedded systems

##### EEESPEXX REAL TIME OPERATING SYSTEM

##### COURSE OUTCOMES:

1. Acquire knowledge about Real Time Operating System.
2. Understand the concept of real time programming.
3. Understand the services rendered by an RTOS in a developed application.
4. Discuss about I/O and memory management concepts
5. Provide a concept to design and develop application using RTOS.

#### EEESPEXX VLSI FOR EMBEDDED APPLICATION

##### COURSE OUTCOMES:

1. Obtain the knowledge of basic fundamentals of VLSI design concepts
2. Understand various fabrication process technologies used in VLSI devices.
3. Able to analyze and design CMOS analog IC building blocks like MOS amplifiers,
4. Design multistage differential amplifiers
5. Able to analyze and design CMOS digital IC building blocks

#### EEESPEXX SCADA FOR EMBEDDED APPLICATIONS

##### COURSE OUTCOMES:

1. Understanding the concept of SCADA.
2. Analyse various system components involved in SCADA system.
3. Acquires knowledge about monitoring and control methods in SCADA.
4. Helps to know about communication protocols in SCADA system.
5. Describes about application of SCADA in Embedded system.

#### EEESPEXX EMBEDDED PRODUCT DEVELOPMENT TECHNOLOGY

##### COURSE OUTCOMES:

1. Gives an idea about an approach to concept creativity, selection and testing.
2. Provides an idea for designing a consumer specific product.
3. Gives knowledge up gradation on recent trends in embedded systems design.
4. Describes the economic analysis and the consideration while designing a product.
5. Helps to improve the integration of customer requirements in product design.

#### EEESPEXX DIGITAL INSTRUMENTATION

##### COURSE OUTCOMES:

1. To enhance teaching & research contributions in Embedded System Technology particularly for PC based Instrumentation concepts.
2. An ability to design and conduct experiments as well as to organize, analyze and interpret data on multidisciplinary domains.
3. Be able to identify problems in major issues of Instrument Communication Systems, analyze problems & solve them using the base of Embedded Technology.
4. To provide guidance and to develop inter-process communication techniques based on hardware– software approaches for real time process automations.
5. An ability to effectively communicate technical information in speech, presentation, and in writing.

#### EEESPEXX MEDICAL INSTRUMENTATION SYSTEMS

##### COURSE OUTCOMES:

1. Helps to learn about Biomedical Instruments.
2. Acquires knowledge about Electrodes, Sensors and Transducers for biomedical signal acquisition
3. Gives an idea about ECG, EEG and EMG recording techniques and their instrumentation
4. Helps to know about signal processing and filtering techniques for noise and artifact removal.
5. Describes the modern medical imaging modalities and instruments

#### EEESPEXX MICRO ELECTRO MECHANICAL SYSTEMS

##### COURSE OUTCOMES:

1. Understanding the concept of scaling laws that are used extensively in the design of micro devices and systems.
2. Analyze the basic principles and applications of micro-fabrication processes, such as photolithography, ion implantation, diffusion, oxidation, CVD, PVD, and etching.
3. Provide impart knowledge about thin film process and etchants used for isotropic and anisotropic etching.
4. Analyze semiconductor materials for common micro components and devices.
5. Understanding the types of bonding process and the techniques used for sacrificial process.

#### EEESPEXX DIGITAL IMAGE PROCESSING

##### COURSE OUTCOMES:

1. Explain different transform and various algorithms to evaluate them
2. Implement the design of Digital filters
3. Implement the different coding methods
4. Apply the basic concepts of Image segmentation,
5. Explain image recognitions and the applications

#### EEESPEXX SOFTWARE TECHNOLOGY FOR EMBEDDED SYSTEMS

##### COURSE OUTCOMES:

1. The learning process delivers insight into various programming languages / softwares compatible to embedded process development with improved design & programming skills.
2. Develop advanced programs in Embedded C.
3. Get knowledge in data structure and OOP.
4. Develop programs using scripting languages.
5. Improved Employability and entrepreneurship capacity due to knowledge up gradation on recent trends in embedded systems design.

#### EEESPEXX ROBOTICS AND AUTOMATION

##### COURSE OUTCOMES:

1. Explain the basic concepts of working of robot.
2. Analyze the function of manipulators in the robot.
3. Use robots in different applications.
4. Knowledge of industrial automation by transfer lines and automated assembly lines.
5. Ability to understand the electronic control systems in metal machining and other manufacturing processes.

#### EEESPEXX WIRELESS SENSOR NETWORKS

##### COURSE OUTCOMES:

1. Describe and explain the working of communication protocols and the evolution of 2G/3G networks.
2. Understand the characteristics, architectures and modeling of WSNs.
3. Explain the concepts of multiple access techniques and the working of various clustering algorithms and their usefulness for routing in WSNs.
4. Describe the different security management techniques and security

protocols defined for WSNs.

5. Elucidate the design issues related to the energy and power management techniques for WSNs.

#### EEESPEXX WIRELESS MOBILE COMMUNICATION

##### COURSE OUTCOMES:

1. Fundamental concepts of wireless communication and its standards have been brought out.
2. Cellular concepts and various radio propagation models have been pointed out.
3. Architecture of various mobile radio models have been understood.
4. Various mobile radio modulation techniques have been described.
5. Different access techniques have been learnt.

#### EEESPEXX FPGA BASED EMBEDDED SYSTEM DESIGN COURSE OUTCOMES:

1. Underlying fundamental concepts of VLSI have been brought out.
2. Memory management and input/output technology of various processors have been pointed out.
3. Architecture of various processors have been understood.
4. Softwares for the processors have been learnt.
5. Some basic design examples using VLSI processors have been described.

#### OPEN ELECTIVES

##### EEESOEXX BUSINESS ANALYTICS

##### COURSE OUTCOMES

Students will be able to

1. Familiarize with the data analytics in Business administration
2. Acquire knowledge for critical thinking in making decisions based on data and deep analytics.
3. Implement organization structure to increase the ability to translate data into clear, action able in sights.
4. Acquaint with risk analysis in Business administration.
5. Demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.

##### EEESOEXX INDUSTRIAL SAFETY

##### COURSE OUTCOMES:

Students will be able to:

1. Familiarize with various methods adopted for industrial safety.
2. Acquire knowledge on the basic concepts on various maintenance schemes for industrial safety.
3. Explore several techniques used to control wear and corrosion prevention in industries.
4. Implement fault tracing mechanism adopted in industries for safety.
5. Understand the need of periodic and preventive maintenance in industrial safety

##### EEESOEXX OPERATIONS RESEARCH

##### COURSE OUTCOMES:

Students will be able to

1. Familiarize with the various optimization techniques
2. Formulate a linear programming problem and carry out sensitivity analysis
3. Acquire knowledge on CPM/PERT
4. Gain knowledge on various types of models and carry out simulation
5. Apply the dynamic programming to solve problems of discrete and continuous variables.

#### EEESOEXX COST MANAGEMENT & ENGINEERING PROJECTS

##### COURSE OUTCOMES

Students will be able to:

1. Understand various Strategic Cost Management in Projects
2. Acquire knowledge in developing the optimal methodologies in Engineering Projects
3. Familiarize with Cost Behavior and Profit Planning in Engineering Projects
4. Acquaint with the various schemes of Total Quality Management
5. Develop various methodologies in executing the Engineering Projects using quantitative management techniques

#### EEESOEXX COMPOSITE MATERIALS

##### COURSE OUTCOMES:

Students will be able to:

1. Obtain fundamental knowledge about various classification and characteristics of Composite materials.
2. Become proficient in reinforcements.
3. Familiarize with manufacturing of polymer matrix composites
4. Gain familiarity in several manufacturing of metal matrix composites.
5. Acquire knowledge in designing composite materials with enhanced failure criteria-strength

#### EEESOEXX WASTE TO ENERGY

##### Course Outcome:

Students will be able to:

1. Understand the concept of Waste to Energy.
2. Apply the knowledge about the operations of Waste to Energy Plants.
3. Analyse the various aspects of Waste to Energy Management Systems.
4. Apply the knowledge in planning and operations of Waste to Energy plants.
5. Carry out Techno-economic feasibility for Waste to Energy Plants.

#### **AUDIT COURSES**

#### EEESACXX SANSKRIT FOR TECHNICAL KNOWLEDGE

##### COURSE OUTCOMES:

Students will be able to

1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood.
3. Being a global language, will help to develop logic in students.

#### EEESACXX VALUE EDUCATION

##### COURSE OUTCOMES

Students will be able to

1. Knowledge of self-development.
2. Learn the importance of Human values
3. Developing the overall personality

#### EEESACXX CONSTITUTION OF INDIA

##### COURSE OUTCOMES:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct.
4. Elections through adult suffrage in the Indian Constitution.
5. Discuss the passage of the Hindu Code Bill of 1956.

#### EEESACXX PEDAGOGY STUDIES

##### COURSE OUTCOMES:

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners.
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.

#### EEESACXX STRESS MANAGEMENT BY YOGA

##### COURSE OUTCOMES:

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also
2. Improve efficiency

#### EEESACXX PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

##### COURSE OUTCOMES:

Students will be able to:

1. Study of Shrimad - Bhagwad- Geeta will help the student in developing his personality and achieve the highest goal in life
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
3. Study of Neetishatakam will help in developing versatile personality of students