Narasu's Sarathy
Institute of Technology
Approved by AICTE | Accredited By NAAC | Affiliated to Anna University
Salem Bengaluru Highway NH - 7, Poosaripatty, Kadayampatty Taluk, Salem - 636305.
Admin Office: 93449-72274, Admission Cell: 93449-72275,73977-56003,
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COURSE OUTCOMES (COs)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

(REGULATION 2017)

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Course Code	**HS8151**
Name of the Course	**COMMUNICATIVE ENGLISH**
Year/Semester	I/I
Total Contact Hours	60
Course Outcome	CO1: Read articles of a general kind in magazines and newspapers. CO2: Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. CO3: Comprehend conversations and short talks delivered in English. CO4: Write short essays of a general kind and personal letters andemails in English. CO5: Writing long essays.

Course Code	**MA 8151**
Name of the Course	**ENGINEERING MATHEMATICS – I**
Year/Semester	I/I
Total Contact Hours	60
Course Outcome	CO1:Use both the limit definition and rules of differentiation todifferentiate functions CO2:Apply differentiation to solve maxima and minima problems CO3:Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus, Evaluate integrals using techniques of integration, such as substitution, partial fractions andintegration by parts, Determine convergence/divergence of improper integrals and evaluate convergent improper integrals CO4:Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order andchange of variables CO5:Apply various techniques in solving differential equations

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Course Code	**PH 8151**
Name of the Course	**ENGINEERING PHYSICS**
Year/Semester	I/I
Total Contact Hours	45
Course Outcome	CO1: The students will gain knowledge on the basics of properties of matter and its applications CO2: The students will acquire knowledge on the concepts of waves and optical devices and their applications in fiber optics CO3: The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers CO4: The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes CO5: The students will understand the basics of crystals, their structures and different crystal growth techniques.

Course Code	**CY 8151**
Name of the Course	**ENGINEERING CHEMISTRY**
Year/Semester	I/I
Total Contact Hours	45
Course Outcome	CO1: Summarize the water related problems in boilers and their treatment techniques. CO2: Discuss the types of adsorption, catalysis and the mechanism of enzyme catalysis CO3: Associate phase rule in the alloying and the behavior of one component and two component systems using phase diagram CO4: Explain various types of fuels, their manufacturing processes and calculation of calorific theoretically CO5: Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells

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Course Code	**GE8151**
Name of the Course	**PROBLEM SOLVING AND PYTHON PROGRAMMING**
Year/Semester	I/I
Total Contact Hours	45
Course Outcome	CO1: Develop algorithmic solutions to simple computational problems CO2: Read, write, execute by hand simple Python programs CO3: Structure simple Python programs for solving problems CO4: Decompose a Python program into functions. CO5: Represent compound data using Python lists, tuples, dictionaries

Course Code	**GE8152**
Name of the Course	**ENGINEERING GRAPHICS**
Year/Semester	I/I
Total Contact Hours	90
Course Outcome	CO1: Familiarize with the fundamentals and standards of engineeringgraphics CO2: Perform freehand sketching of basic geometrical constructions and multiple views of objects. CO3: Project orthographic projections of lines and plane surfaces. CO4: Draw projections and solids and development of surfaces. CO5: Visualize and to project isometric and perspective sections of simple solids.

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Course Code	**GE8161**
Name of the Course	**PROBLEM SOLVING AND PYTHON PROGRAMMINGLABORATORY**
Year/Semester	I/I
Total Contact Hours	60
Course Outcome	CO1: Write, test, and debug simple Python programs. CO2: Implement Python programs with conditionals and loops. CO3: Implement Python programs with conditionals and loops. CO4: Use Python lists, tuples, dictionaries for representing compounddata. CO5: Read and write data from/to files in Python. CO6: Develop elliptical orbits in Pygmy

Course Code	**BS8161**
Name of the Course	**PHYSICS AND CHEMISTRY LABORATORY**
Year/Semester	I/I
Total Contact Hours	60
Course Outcome	CO1: Carry out experiments using Air wedge set up to find the thickness of a thin wire and to determine the Young's modulus of the material using non uniform bending CO2:Calculate the wavelength of laser light and predict the particle size and to determine the rigidity modulus of the wire using torsional pendulum CO3: Demonstrate the Lees Disc experiment to determine the thermal Conductivity of a bad conductor. CO4: Calculate the amount of chloride content present in given watersample and to find the strength of given iron solution using potentiometer. CO5: Carryout an experiment using pH meter to calculate strength ofgiven acid. CO6: Compare the strength of acids A & B using conductometer and to estimate two acids in a mixture of acids.

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Course Code	**HS8251**
Name of the Course	**TECHNICAL ENGLISH**
Year/Semester	I/II
Total Contact Hours	60
Course Outcome	CO1: Read technical texts and write area- specific texts effortlessly. CO2: Listen and comprehend lectures and talks in their area specialisation successfully. CO3: Speak appropriately and effectively in varied formal and informal contexts. CO4: Write reports and winning job applications.

Course Code	**MA8251**
Name of the Course	**ENGINEERING MATHEMATICS-II**
Year/Semester	I/II
Total Contact Hours	60
Course Outcome	CO1: Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positivedefinite matrices and similar matrices. CO2: Gradient, divergence and curl of a vector point function and related identities. CO3: Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theoremsand their verification. CO4: Analytic functions, conformal mapping and complex integration. CO5: Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

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Course Code	**PH8253**
Name of the Course	**PHYSICS FOR ELECTRONICS ENGINEERING**
Year/Semester	I/II
Total Contact Hours	45
Course Outcome	CO1:gain knowledge on classical and quantum electron theories, and energy band structures, CO2:acquire knowledge on basics of semiconductor physics and its applications in various devices, CO3:get knowledge on magnetic and dielectric properties of materials, CO4:have the necessary understanding on the functioning of optical materials for optoelectronics, CO5: understand the basics of quantum structures and their applications in spintronics and carbonelectronics.

Course Code	**BE8252**
Name of the Course	**BASIC CIVIL AND MECHANICAL ENGINEERING**
Year/Semester	I/II
Total Contact Hours	60
Course Outcome	CO1: appreciate the Civil and Mechanical Engineering components of Projects. CO2: explain the usage of construction material and proper selection of construction materials. CO3:measure distances and area by surveying CO4: identify the components used in power plant cycle. CO5: demonstrate working principles of petrol and diesel engine. CO6: elaborate the components of refrigeration and Air conditioning cycle.

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Course Code	**EE8251**
Name of the Course	**CIRCUIT THEORY**
Year/Semester	I/II
Total Contact Hours	60
Course Outcome	CO1:Ability to analyses electrical circuits CO2:Ability to apply circuit theorems CO3:Ability to analyze transients

Course Code	**GE8291**
Name of the Course	**ENVIRONMENTAL SCIENCE AND ENGINEERING**
Year/Semester	I/II
Total Contact Hours	45
Course Outcome	CO1: Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. CO2: Public awareness of environmental is at infant stage. CO3:Ignorance and incomplete knowledge has lead to misconceptions CO4:Development and improvement in std. of living has lead to serious environmental disasters

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Course Code	**GE8261**
Name of the Course	**ENGINEERING PRACTICES LABORATORY**
Year/Semester	I/II
Total Contact Hours	60
Course Outcome	CO1: Fabricate carpentry components and pipe connections including plumbing works. CO2: use welding equipment's to join the structures. CO3:Carry out the basic machining operations CO4:Make the models using sheet metal works CO5:Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary andfittings CO6:Carry out basic home electrical works and appliances CO7:Measure the electrical quantities CO8: Elaborate on the components, gates, soldering practices.

Course Code	**EE8261**
Name of the Course	**ELECTRIC CIRCUITS LABORATORY**
Year/Semester	I/II
Total Contact Hours	60
Course Outcome	CO1: Understand and apply circuit theorems and concepts in engineering applications. CO2: Simulate electric circuits.

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Course Code	**MA8353**
Name of the Course	**TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**
Year/Semester	II/III
Total Contact Hours	60
Course Outcome	CO1: To understand the basic properties of Standard Partial Differential Equations. Apply the Fundamental concept of Partial Differential Equations. CO2: To develop Fourier Series for different types of functions. CO3:Find the solutions of the heat equation, wave equation and the Laplace equation subject to boundary conditions CO4: To solve the Problems using Fourier Transforms and its inverse Transforms**.** CO5:Have a knowledge in Z- transform and inverse transform of simple functions, Properties, various related theorems and application to differential equations with constant coefficients. CO6:After successfully completing the course, the student will have a good understanding of the topics and their applications

Course Code	**EE8351**
Name of the Course	**DIGITAL LOGIC CIRCUITS**
Year/Semester	II/III
Total Contact Hours	60
Course Outcome	CO1: Develop a digital logic and apply it to solve real life problems. CO2: Analyze, design and implement combinational logic circuits. CO3: Classify different semiconductor memories. CO4: Analyze, design and implement sequential logic circuits. CO5: Analyze digital system design using PLD. CO6: Simulate and implement combinational and sequential circuits using VHDL systems.

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Course Code	**EE8391**
Name of the Course	**ELECTROMAGNETIC THEORY**
Year/Semester	II/III
Total Contact Hours	60
Course Outcome	CO1: Ability to Illustrate the Sources and effects of electromagnetic fields and discuss about various Coordinate Systems, laws and theorems related to electromagnetic fields. CO2: Able to analyze, find the Electric field produced in free space, dielectrics and apply boundary conditions to find Capacitance, Energy density. C03:Able to analyze the magnetic field intensity (H) and apply Biot–Savant's Law, Ampere's Circuit Law to find H due to straight conductors, circular loop, infinite sheet Of current. C04: Able to illustrate the concept of magnetic flux density (B) – B in free space, conductor and study the characteristics of magnetic materials. CO5:Capable to analyze the magnetic Circuits ,apply Faraday's law solve problems related to Displacement current CO6: To describe and derive the Maxwell's equations and apply it in solving Electromagnetic wave generating equations.

Course Code	**EE8301**
Name of the Course	**ELECTRICAL MACHINES – I**
Year/Semester	II/III
Total Contact Hours	60
Course Outcome	CO1: Obtain the knowledge about the fundamental of Magnetic circuits and Magnetic Materials. CO2:Secure the idea about the various construction details and erection of Transformer CO3:Assured the working principles of electrical machines and classify the various generator and its mathematical models CO4:Establish the working principles of electrical machines and classify the various motor and its speed control techniques CO5:Expertise in testing methods to obtain the performance of DC Machines. CO6:Analyze the real time recent applications of DC Machines and Transformers.

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Course Code	**EC8353**
Name of the Course	**ELECTRON DEVICES AND CIRCUITS**
Year/Semester	II/III
Total Contact Hours	45
Course Outcome	CO1: Understand the construction and modeling of semiconductor diodes and rectifiers. CO2: Discuss the methods of transistors and its characteristics. CO3: Interpret the midband analysis of amplifier circuits with gain and impedance values. CO4: Analyze the frequency response of differential amplifier and tuned circuits. CO5: Examine the methods of feedback and generation of oscillator conditions. CO6: Understand characteristics of electron devices towards its applications.

Course Code	**ME8792**
Name of the Course	**POWER PLANT ENGINEERING**
Year/Semester	II/III
Total Contact Hours	45
Course Outcome	CO1: Draw the layout of modern coal power plant and list the various componentsused in thermal power plant. CO2: Identify the components of diesel and gas turbine power plants and construct the integrated gasifier based combined cycle systems. CO3: Describe the layout of subsystems of various nuclear power plants and express safety measures for nuclear power plants. CO4: Distinguish different hydroelectric power plants and construct various renewable energy power plants such as wind, tidal, PV, solar, thermal, geo thermal, biogas and fuel cell. CO5: Calculate the per unit cost of electrical energy based on Power tariff, load factor, demand factor, diversity factor and plant safety factor. CO6: Draw the layout of modern coal power plant and list the various components used in thermal power plant.

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Course Code	**EC8311**
Name of the Course	**ELECTRONICS LABORATORY**
Year/Semester	II/III
Total Contact Hours	60
Course Outcome	CO1: Analyze various types of diodes and its v-i characteristics. CO2: Construct the various types of transistors and draw its v-i characteristics. CO3: Demonstrate the various types of amplifiers. CO4: Categorize about filter circuits and multivibrators. CO5: Design and analyze the feedback amplifiers and oscillator circuits. CO6: Ability to perform different types of electronic circuits and its characteristics.

Course Code	**EE8311**
Name of the Course	**ELECTRICAL MACHINES LABORATORY – I**
Year/Semester	II/III
Total Contact Hours	60
Course Outcome	CO1:Analyze the characteristics of DC shunt generator DC compound generator and calculate critical resistance and critical speed CO2:Examine load characteristics of DC shunt, series and compound motor and identify its maximum efficiency operating point CO3:Predict the efficiency of DC shunt machine in different methods CO4:Explain the load characteristics of single phase and three phase transformer separate the different losses and to find the efficiency CO5:Predetermine the equivalent circuit parameters of single phase transformer in two different methods and compare the results CO5: Explore the DC starters.

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Course Code	**MA8491**
Name of the Course	**NUMERICAL METHODS**
Year/Semester	II/IV
Total Contact Hours	60
Course Outcome	CO1: Able to solve the system of equations by using different methods and find Eigen values and Eigen vectors of a given matrix by power method. CO2: To make effective use of the interpolation formulas to find the missing data using the given data. CO3:Apply the techniques of solving any algebraic, transcendental equations CO4: Distinguish among the criteria of selection and procedures of various Numerical integration as well as Numerical differentiation rules. CO5: Apply various numerical methods in solving an initial value problem involving an ordinary differential equation. CO6: Estimate the best fit polynomial for the given tabulated data using the methods of Newton's interpolation and Lagrange's interpolation.

Course Code	**EE8401**
Name of the Course	**ELECTRICAL MACHINES – II**
Year/Semester	II/IV
Total Contact Hours	60
Course Outcome	CO1: Draw the constructional details and explain the performance of salient and non –salient type synchronous generators. CO2: Draw and explain the Principle of operation and performance of synchronous motor. CO3: Draw and describe the construction, principle of operation and performance of induction machines. CO4: Describe the starting and speed control of three-phase induction motors. CO5: Explain the construction, principle of operation and performance of single phase induction motors and special machines. CO6: Ability to model and analyze electrical apparatus and their application to power system.

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Course Code	**EE8402**
Name of the Course	**TRANSMISSION AND DISTRIBUTION**
Year/Semester	II/IV
Total Contact Hours	45
Course Outcome	CO1: Identify the basic elements of the electric power system, generation, transmission, distribution and describe the role played by each element. CO2: Compute the losses, efficiency and parameters of the Transmission line. CO3: Analyze the Performance of Transmission Lines. CO4: Solve the voltage distribution in insulator strings, cables and methods to improve the same. CO5: Design overhead lines both Mechanical and electrical aspects using Sag calculation. CO6: Ability to understand and analyze power system operation, stability, control and protection.

Course Code	**EE8403**
Name of the Course	**MEASUREMENTS AND INSTRUMENTATION**
Year/Semester	II/IV
Total Contact Hours	45
Course Outcome	CO1: To introduce the basic functional elements of instrumentation. CO2: To introduce the fundamentals of electrical and electronic instruments. CO3: To construct suitable bridges for measurement of particular parameters. CO4: To introduce various storage and display devices. CO5: To introduce various transducers and the data acquisition systems.

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Course Code	**EE8451**
Name of the Course	**LINEAR INTEGRATED CIRCUITS AND APPLICATIONS**
Year/Semester	II/IV
Total Contact Hours	45
Course Outcome	CO1:Ability to acquire knowledge in IC fabrication procedure CO2:Ability to analyze the characteristics of Op-Amp CO3: To understand the importance of Signal analysis using Op-amp based circuits. CO4: Functional blocks and the applications of special ICs like Timers, PLL circuits,regulator Circuits. CO5:To understand and acquire knowledge on the Applications of Op-amp CO6: Ability to understand and analyze, linear integrated circuits their Fabrication andApplication.

Course Code	**IC8451**
Name of the Course	**CONTROL SYSTEMS**
Year/Semester	II/IV
Total Contact Hours	75
Course Outcome	CO1: Develop electrical models/ mechanical models to design a physical system for a specific operation. CO2: Understand, define different time domain specification parameters and thus can apply that knowledge to conclude dynamic performance of a system. CO3:Use the basic knowledge in obtaining the open loop and closed–loop frequency responses of systems CO4: Able to explain the stability analysis and types of compensators. CO5:To describe the state variable representation of physical systems and the effect of state feedback CO6:Able to explain and use all the control techniques and to determine stability of all systems

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Course Code	**EE8411**
Name of the Course	**ELECTRICAL MACHINES LABORATORY - II**
Year/Semester	II/IV
Total Contact Hours	60
Course Outcome	CO1: Determine the voltage regulation of three phase alternator in different methods and compare the results. CO2: Determine the voltage regulation of salient pole synchronous machine and find negative &zero sequence components. CO3: Explain the V and inverted V characteristics of three phase synchronous machine at different load condition. CO4: Determine and pre determine performance characteristics of three phase induction Motor. CO5: Determine and pre determine performance characteristics of single phase induction Motor. CO6: Ability to model and analyze electrical apparatus and their application to power system.

Course Code	**EE8461**
Name of the Course	**LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY**
Year/Semester	II/IV
Total Contact Hours	60
Course Outcome	CO1:Apply Boolean functions to implement adder, subtractor circuits and convert Excess 3 to BCD, Binary to Gray code and vice versa. CO2:Test Parity generator and checker and Design encoder decoder circuits CO3:Demonstrate 4 bit synchronous, asynchronous counter and Shift registers CO4: Illustrate multiplexer circuit and apply 555 timer in Monostable and Astable operation. CO5: Apply OP-AMP to construct Adder, comparator, differentiator, Integrator and Describe VCO, PLL characteristics. CO6: Ability to understand and analyse, linear and digital electronic circuits.

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Course Code	**EE8412**
Name of the Course	**TECHNICAL SEMINAR**
Year/Semester	II/IV
Total Contact Hours	30
Course Outcome	CO1: Present seminar in the field of Electrical and Electronics Engineering subjects studied. CO2: Solve objective type questions in the field of Electrical and Electronics Engineering. CO3: Communicate effectively, the subjects learned in the form of seminar presentation. CO4: Communicate effectively, the modern trends in the field of Electrical and Electronics Engineering. CO5: Answer effectively during technical interviews.

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Course Code	**EE8501**
Name of the Course	**POWER SYSTEM ANALYSIS**
Year/Semester	III/V
Total Contact Hours	45
Course Outcome	CO1: Discuss Various components of Power System, their characteristics and Modeling. CO2:Draw equivalent single line reactance and impedance diagrams and per unit representation of a power system CO3: Explain significance of load flow problem and apply numerical techniques to obtain Load flow solution. CO4:Interpret the effect of symmetrical fault conditions and select suitable rating for various protective devices in a. power system CO5: Apply symmetrical components and solve unsymmetrical faults.in a power system. CO6: Discuss stability classifications and calculate stability limits using equal area criterion and numerical methods.

Course Code	**EE8551**
Name of the Course	**MICROPROCESSORS AND MICROCONTROLLERS**
Year/Semester	III/V
Total Contact Hours	45
Course Outcome	CO1: Describe the basic Architecture of 8085 Microprocessor and working of all blocks of the processor, IO and memory interfacings with necessary timing diagrams. CO2: Classify the instructions with the help of Addressing modes of 8085 with necessary programs. CO3: Explain the basic Architecture of 8051 Microcontroller with working of various blocks of the controller like Interrupts, Timer, IO ports etc. with necessary timing diagram andcompare the programming concepts with 8085. CO4:Analyze the architecture of various Interfacing Devices like 8255 PPI, 8259 PIC, 8251USART, 8279, 8253 CO5: Analyze the architecture of various Interfacing Devices like ADC and DAC and Programming of all the Interfacing IC's. CO6:Apply the knowledge of programming concepts of 8051 Microcontroller for various applications like keyboard display interface, servo motor etc.,

EEE-COURSE OUTCOME

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Course Code	**EE8552**
Name of the Course	**POWER ELECTRONICS**
Year/Semester	III/V
Total Contact Hours	45
Course Outcome	CO1: Explain the significance of switching devices and its application to power Converters and demonstrate the triggering circuit and snubber circuits. CO2: Compare the operation of two, three Pulse Converters and draw output Waveforms with and without source and load inductance. CO3: Classify the operation of Choppers and outline the application of SMPS. CO4: Analyze the operation of single phase and three phase Inverters with and without. CO5: Illustrate the operation of cycloconverter and its application. CO6: Illustrate the operation of AC voltage controller and its application.

Course Code	**EE8591**
Name of the Course	**DIGITAL SIGNAL PROCESSING**
Year/Semester	III/V
Total Contact Hours	60
Course Outcome	CO1: Classify the different types of signals and systems and Explain the sampling process of continuous time signal. CO2: Apply z-transform and inverse Z transform and analyze discrete time systems. CO3:Apply Radix-2 Decimation in Time (DIT) and Decimation in Frequency (DIF) FFT Algorithm to Compute Discrete Fourier Transform CO4:Explain different types of Infinite Impulse Response (IIR) filters and Finite Impulse Response (FIR) filters CO5: An understanding of sampling conversion technique in signal processing and its applications. CO6: Explain various architectures of Digital signal processors.

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Course Code	**CS8392**
Name of the Course	**OBJECTED ORIENTED PROGRAMMING**
Year/Semester	III/V
Total Contact Hours	45
Course Outcome	CO1:Gain the basic knowledge on object oriented concepts CO2: Ability to implement features of object oriented programming to solve real world problems. CO3: Analyze the suitable test to validate the programs with exception handling mechanism. CO4: Analyze and apply to evaluate the concept of overloading. CO5: Develop the concept of java in creating classes, objects using arrays and control statements. CO6:Create packages, handle exceptions and develop multi-threaded programs

Course Code	**OAN551**
Name of the Course	**SENSORS AND TRASDUCERS**
Year/Semester	III/V
Total Contact Hours	45
Course Outcome	CO1. Expertise in various calibration techniques and signal types for sensors. CO2. Apply the various sensors in the Automotive and Mechatronics applications CO3. Study the basic principles of various smart sensors. CO4. Implement the DAQ systems with different sensors for real time

EEE-COURSE OUTCOME

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Course Code	**EE8511**
Name of the Course	**CONTROL AND INSTRUMENTATION LABORATORY**
Year/Semester	III/V
Total Contact Hours	60
Course Outcome	CO1:Determine the characteristics of P, PI and PID controllers experimentally and analyze the stability of the control system by (i) Bode plot (ii) Root Locus Plot and (iii) Nyquist plot using MATLAB CO2:Compute the transfer function of a Field controlled DC motor experimentally and Design the Lag, Lead and Lag-Lead Compensators for the given specifications and hook up it using RC networks CO3:Draw the transient response of Position Control system experimentally, Determine the Characteristics of Synchro-Transmitter- Receiver and Use the MATLAB forthe Simulation of Control Systems CO4:Calculate the unknown Capacitance, Inductance and Resistance using AC and DC Bridges experimentally and Analyze the Dynamics of Sensors/Transducers (a)Temperature (b) Pressure (c) Displacement (d) Optical (e) Strain and (f) Flow CO5:Measure the Power and Energy experimentally CO6:Analyze the Signal Conditioning units (a) Instrumentation Amplifier (b) ADC and DACs and Use the MATLAB for Process Simulation

Course Code	**HS8581**
Name of the Course	**PROFESSIONAL COMMUNICATION**
Year/Semester	III/V
Total Contact Hours	30
Course Outcome	CO1: Apply appropriate communication skills across settings, purposes and audiences. CO2: Demonstrate knowledge of communication theory and applications. CO3: Practice critical thinking to develop innovative and well-founded perspectives related to the students emphasis. Build and maintain healthy and effective relationships. CO4: Use technology to communicate effectively in various settings and contexts. CO5: Demonstrate appropriate and professional ethical behavior.

EEE-COURSE OUTCOME

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Course Code	**CS8383**
Name of the Course	**OBJECT ORIENTED PROGRAMMING LABORATORY**
Year/Semester	III/V
Total Contact Hours	60
Course Outcome	CO1: Design C++ programs using functions, classes with objects, member functions and constructors. CO2: Develop operator and function overloading and run time polymorphism using C++. CO3: Develop file handling techniques in C++ for sequential and random access also use Java code for strings. CO4: Construct packages and interfaces in Java. CO5: Create threads in Java and handle predefined and user defined exceptions. CO6:Ability to model and analyze electrical apparatus and their application to power system .

EEE-COURSE OUTCOME

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Course Code	**EE8601**
Name of the Course	**SOLID STATE DRIVES**
Year/Semester	III/VI
Total Contact Hours	45
Course Outcome	CO1: Classify the various types of drives and load torque characteristics and Apply the multiquadrant dynamics in hoist load system. CO2: Analyze the operation of steady state analysis of single phase and three phase fullycontrolled converter and Chopper fed separately excited dc motor drives and discuss the various control strategies of converter. CO3: Explain the operation and characteristics of various methods of solid state speed control of induction motor. CO4: Describe the operation of various modes of V/f control of synchronous motor drives and different types of permanent magnet synchronous motor drives. CO5: Design a current and speed controller and develop the transfer function for DC motor, load and converter, closed loop control with current and speed feedback. CO6:Ability to understand and apply basic science, circuit theory, and Electro-magnetic field theory control theory and apply them to electrical engineering problems

Course Code	**EE8602**
Name of the Course	**PROTECTION AND SWITCH GEAR**
Year/Semester	III/VI
Total Contact Hours	45
Course Outcome	CO1: Summarize the causes and effects of faults in power system and explain the necessity of protection in power system. CO2:Describe the operation of various relays and summarize the various protective schemes CO3: List out the various faults that can occur on alternator, transformer, bus bar and transmission line and select the suitable protection schemes. CO4: Synthesize the static relays using comparators and explain numerical relays. CO5: Derive the expression for RRRV, critical resistance value CO6: Express the various types of circuit breakers and its application.

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Course Code	**EE8691**
Name of the Course	**EMBEDDED SYSTEMS**
Year/Semester	III/VI
Total Contact Hours	45
Course Outcome	CO1: Analyze the basic build process of embedded systems, structural units in embedded processor and selection of processor and memory devices depending upon theapplications. CO2: Classify the types of I/O device ports and buses and different interfaces for data transfer. CO3:Model the Embedded Product Development Life Cycle (EDLC) by using different techniques like state machine model, sequential program model and concurrent model CO4:Analyze the basic concept of Real Time Operating Systems and plan to scheduling of different task and compare the features of different types of Real Time Operating Systems CO5:Apply the knowledge of programming concepts of Embedded Systems for variousapplications like Washing Machine automotive and Smart Card System applications

Course Code	**EE8002**
Name of the Course	**DESIGN OF ELECTRICAL APPARATUS**
Year/Semester	III/VI
Total Contact Hours	45
Course Outcome	CO1:Ability to understand basics of design considerations for rotating and static electricalmachines CO2: Ability to design of field system for its application. CO3: Ability to design sing and three phase transformer. CO4: Ability to design armature and field of DC machines. CO5: Ability to design stator and rotor of induction motor. CO6: Ability to design and analyze synchronous machines.

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Course Code	**EE8005**
Name of the Course	**SPECIAL ELECTRICAL MACHINES**
Year/Semester	III/VI
Total Contact Hours	45
Course Outcome	CO1: Ability to analyze and design controllers for special Electrical Machines. CO2: Ability to acquire the knowledge on construction and operation of stepper motor. CO3: Ability to acquire the knowledge on construction and operation of stepper switchedreluctance motors. CO4: Ability to construction, principle of operation, switched reluctance motors. CO5: Ability to acquire the knowledge on construction and operation of permanent magnetbrushless D.C. motors. CO6:Ability to acquire the knowledge on construction and operation of permanent magnetsynchronous motors CO7: Ability to select a special Machine for a particular application.

Course Code	**EE8661**
Name of the Course	**POWER ELECTRONICS AND DRIVES LABORATORY**
Year/Semester	III/VI
Total Contact Hours	60
Course Outcome	CO1:Draw the VI characteristics of SCR and generate the Gate Pulse using R, RC and UJT CO2:Plot the characteristics of MOSFET and IGBT CO3:Simulate a single phase AC to DC half and fully controlled converter CO4: Draw the output response of step up and step down MOSFET based chopper and Simulate a single phase IGBT based PWM inverter. CO5:Plot the output response of AC voltage controller and Simulate the Power Electronic Circuits CO6: Ability to understand and analyze, linear and digital electronic circuits.

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Course Code	**EE8681**
Name of the Course	**MICROPROCESSORS AND MICROCONTROLLERS LABORATORY**
Year/Semester	III/VI
Total Contact Hours	60
Course Outcome	CO1: Demonstrate and apply working of programs in microprocessor 8085 and 8051 microcontroller. CO2:Explain various assembly language programs CO3:Develop the basic knowledge of microprocessor and microcontroller interfacing and their application CO4:Design the system using capabilities of stack program counter and status register and show how these are used to execute a machine code program CO5:Justify the programming proficiency using various addressing modes and data transfer instruction of target microprocessor CO6:Develop mini-projects using 8085 processor

Course Code	**EE8611**
Name of the Course	**MINI PROJECT**
Year/Semester	III/VI
Total Contact Hours	60
Course Outcome	CO1: Able to develop their own innovative prototype of ideas. CO2: Able to frame and use right principles. CO3: Able to implement proper methodology. CO4: Able to take up their final year project work. CO5: Able to prepare mini project reports and examination. CO6: Able to find solution for real time applications.

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Course Code	**EE8701**
Name of the Course	**HIGH VOLTAGE ENGINEERING**
Year/Semester	IV/VII
Total Contact Hours	45
Course Outcome	CO1: Identify the causes of over voltage and its effects in power system. CO2:Classify the breakdown Mechanisms in Solid, Liquid, gases and Composite dielectrics CO3:Design different type of Generating circuit for high voltage D.C and high voltage A.C CO4:Measure A.C and D.C high voltage and current using appropriate method CO5:Test the transformer ,insulator , circuit breakers, surge diverters and cables also discuss the insulation coordination CO6: Ability to understand and analyze power system operation, stability, control and protection.

Course Code	**EE8702**
Name of the Course	**POWER SYSTEM OPERATION AND CONTROL**
Year/Semester	IV/VII
Total Contact Hours	45
Course Outcome	CO1: Explain the concept of transients and Compute the solution of transient current equation for RL and RLC system. CO2: Illustrate the importance of switching transients; Explain the concept of resistance switching, load switching and capacitance switching. CO3: Explain the concept of lightning mechanism, Describe the interaction between lightning and power system CO4: Apply the concept of reflection and refraction, Draw the Bewley Lattice diagram for different systems. CO5: Analyze the concept of short line (or) Kilometric fault and justify the EMTP for transient computation. CO6: Ability to understand and analyze power system operation, stability, control and protection.

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Course Code	**EE8703**
Name of the Course	**RENEWABLE ENERGY SYSTEMS**
Year/Semester	IV/VII
Total Contact Hours	45
Course Outcome	CO1:Examine the various types of renewable energy sources CO2:Acquiring the knowledge about the performance of IG, PMSG, SCIG and DFIG CO3:Ability to fabricate different power converters namely AC to DC , DC to DC and AC to AC converters for renewable energy sources CO4:Analyze various operating modes of wind electrical generators and solar energy system CO5:Strengthen the knowledge about maximum power point tracking algorithms CO6:Gain the knowledge about various grid integrated systems

Course Code	**OML751**
Name of the Course	**TESTING OF MATERIALS**
Year/Semester	IV/VII
Total Contact Hours	45
Course Outcome	CO1. Identify suitable testing technique to inspect industrial component CO2. Ability to use the different technique and know its applications and limitations

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Course Code	**GE8071**
Name of the Course	**DISASTER MANAGEMENT**
Year/Semester	IV/VII
Total Contact Hours	45
Course Outcome	CO1:Differentiate the types of disasters, causes and their impact on environment and society CO2: Assess vulnerability and various methods of risk reduction measures as well as mitigation. CO3: Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disasterdamage assessment and management.

Course Code	**EE8010**
Name of the Course	**POWER SYSTEMS TRANSIENTS**
Year/Semester	IV/VII
Total Contact Hours	45
Course Outcome	CO1: Ability to understand and analyze switching and lightning transients. CO2: Ability to acquire knowledge on generation of switching transients and their control. CO3: Ability to analyze the mechanism of lighting strokes. CO4: Ability to understand the importance of propagation, reflection and refraction oftravelling waves. CO5: Ability to find the voltage transients caused by faults. CO6: Ability to understand the concept of circuit breaker action, load rejection onintegrated power system.

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Course Code	**EE8711**
Name of the Course	**POWER SYSTEM SIMULATION LABORATORY**
Year/Semester	IV/VII
Total Contact Hours	60
Course Outcome	CO1:Determine the bus impedance and admittance matrices using C and MATLAB CO2:Apply numerical methods for solving load flow problems and verify using C and MATLAB CO3: Analyze various faults occurring in power system and simulate the faults using PSCAD. CO4: Analyze small signal stability of Single Machine Infinite Bus (SMIB) system and draw the swing curve using AUPOWER Lab and MATLAB. CO5: Generate the coding for economic dispatch problems and load frequency dynamics problems using MATLAB.

Course Code	**EE871**
Name of the Course	**RENEWABLE ENERGY SYSTEMS LABORATORY**
Year/Semester	IV/VII
Total Contact Hours	60
Course Outcome	CO1:Ability to understand and analyze Renewable energy systems CO2: Ability to train the students in Renewable Energy Sources and technologies. CO3: Ability to provide adequate inputs on a variety of issues in harnessing Renewable Energy. CO4: Ability to simulate the various Renewable energy sources. CO5: Ability to recognize current and possible future role of Renewable energy sources. CO6: Ability to understand basics of Intelligent Controllers.

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Course Code	**GE8076**
Name of the Course	**PROFESSIONAL ETHICS IN ENGINEERING**
Year/Semester	**IV/VIII**
Total Contact Hours	45
Course Outcome	CO1: Upon completion of the course, the student should be ability to apply ethics in society, discuss theethical issues related to engineering and realize the responsibilities and rights in the society.

Course Code	**EE8018**
Name of the Course	**MICROCONTROLLER BASED SYSTEM DESIGN**
Year/Semester	**IV/VIII**
Total Contact Hours	45
Course Outcome	CO1: Ability to understand and apply computing platform and software for engineeringproblems. CO2: Ability to understand the concepts of Architecture of PIC microcontroller CO3: Ability to acquire knowledge on Interrupts and timers. CO4: Ability to understand the importance of Peripheral devices for data communication. CO5:Ability to understand the basics of sensor interfacing CO6:Ability to acquire knowledge in Architecture of ARM processors

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Course Code	**EE8811**
Name of the Course	**PROJECT WORK**
Year/Semester	**IV/VIII**
Total Contact Hours	300
Course Outcome	CO1:Apply the fundamentals of mathematics, science and engineering knowledge to identify , formulate , design and investigate complex engineering problems of electrical and electronics engineering and allied applications . CO2: Apply appropriate techniques and modern engineering hardware and software tools in electrical and electronics engineering and allied applications. CO3:Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues with societal and environmental context, applying ethical principles in the field of electrical and electronics engineering and allied applications. CO4: Function effectively as an individual and as a member or leader in diverse teams in multidisciplinary settings and make effective presentation, and communicate effectively. CO5: Demonstrate the understanding of the engineering and management principles inmultidisciplinary environments to engage in lifelong learning in the broadest context of technological change.