COURSE OUTCOMES - REGULATION 2017

COURSE NAME: TECHNICAL ENGLISH - I (HS8151)

COURSE CODE: C101

CO1	Understand the basics of LSRW skills and will able to participate effectively in conversations, to exchange personal information and to express opinions in English. (K2)
CO2	Comprehend reading and listening tasks and also to describe a simple process with a right choice of vocabulary, Acquire new vocabulary identified from the assigned text. (K2)
CO3	Articulate ideas coherently and write on general and creative topics using grammatically correct sentences. (K3)
CO4	Read, comprehend and interpret articles of a general kind in magazines and newspapers and also write informal letters and e-mails in English employing grammatically correct sentences. (K2)
CO5	Speak clearly, confidently and comprehensively using communicative strategies and write paragraphs and short essays cohesively and coherently. (K4)

COURSE NAME: ENGINEERING MATHEMATICS - I (MA8151)

COURSE CODE: C102

CO1	Apply various techniques in solving differential equations with constant and variable coefficients.(K2)
CO2	Gain knowledge on limits, continuity and rules of differentiation and apply them to find the derivative of various functions.Apply various integration techniques to compute multiple integrals and find the area and volume using double and triple integrals respectively.(K3)
CO3	Apply the concepts of derivative and partial derivatives to find the Maxima and Minima of the function of one and two variables.(K2)
CO4	Understand the concepts of partial differentiation, total derivatives and Jacobian. (K3)

CO5	Evaluate integrals using Riemann sums, fundamental theorem of calculus and various integration techniques and determine the convergence and divergence of improper integrals.(K4)

COURSE NAME: Engineering Physics **(PH8151)**

COURSE CODE: C103

CO1	Gain fundamental knowledge on elasticity and its applications relevant to the field of engineering. (K2)
CO2	will acquire knowledge on the fundamental concepts of oscillatory motion and wave equation (K1)
CO3	understand the basic concepts in laser , fiber optics and crystals, their structures and different crystal growth techniques, their applications in the field of sensors (K3)
CO4	acquire adequate knowledge on the fundamental concepts of thermal properties of materials (K1)
CO5	Gain knowledge on the basic concept of Quantum theory and their application in the field of MicroscopicEngineering. Will gain adequate knowledge on various application based on thermal properties of material (K3)

COURSE NAME: Engineering Chemistry **I (CY 8151)**

COURSE CODE: C104

CO1	An ability to gain knowledge on various water treatment methods, basic design of adsorption systems, and fuels. (K2)
CO2	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost. (K4)
CO3	Analyze principles of kinetics and mechanisms of surface reactions. (K3)
CO4	Make use of the phase rule in identifying its applications in metallurgy and manufacture of alloys. (K3)

CO5	Acquire basic knowledge of methods to determine the calorific value of fuels and combustion analysis. Disseminating the knowledge about alternative energy sources and energy storage devices. (K4)

COURSE NAME: Engineering Graphics **(GE 8152)**

COURSE CODE: C105

CO1	Relate thoughts and ideas graphically in a neat fashion and ability to perform sketching of engineering curves used in engineering practices, multiple views of objects.(K2)
CO2	Understand the concepts of orthographic projection of basic geometrical constructions (K2)
CO3	Acquire the knowledge of Orthographic projection in three dimensional object(K3)
CO4	Build a strong foundation to analyse the design in various dimensions using Modelling software's.Apply the concept of Sectioning in the interior shapes of machine elements and structures.(K3)
CO5	Analyse the concepts of design in developing various 3-dimensional projections. (K4)

COURSE NAME: Problem Solving and Python Programming **(GE 8151)**

COURSE CODE: C106

CO1	Understand the syntax of python program statements. (K2)
CO2	Illustrate simple python programs using branching statements(K4)
CO3	Illustrate python programs using List, Tuples, and dictionaries. (K4)

CO4	Illustrate python programs using Files, modules, packages (K4)
CO5	Develop a python program for a given problem and compare different programming structures of python. (K5)

COURSE NAME: Problem Solving and Python Programming **Lab (GE 8161)**

COURSE CODE: C107

CO1	Write, test and debug simple Python programs.(K1)
CO2	Apply the concept of conditionals and loops in Python programs andPyGame.(K3)
CO3	Develop the Python programs step-wise by defining functions and calling hem(K4)
CO4	Use Python lists, tuples, dictionaries for representing compound data.(K3)
CO5	Read and write data from/to files in Python.(K1)

COURSE NAME: BS 8161 - PHYSICS AND CHEMISTRY LABORATORY

COURSE CODE: C108

CO 1	To introduce LASER, Spectrometer experiments to test the basic understanding of physics concepts applied in optics. (K2)
CO 2	To introduce Ultrasonic Interferometer experiments to test basic understanding of physics concepts of sound.(K2)

CO 3	To make the student acquire practical skills in Young's modulus using Non uniform bending method. To introduce Thermal conductivity experiments to test basic understanding of physics concepts.(K 3)
CO 4	To make the student acquire practical skills in the determination of water quality parameters through volumetric methods.(K3)
CO 5	To make the student understand the practical knowledge on pH and conduct metric titrations.(K3)

COURSE NAME: Technical English **(HS 8251)**

COURSE CODE: C109

CO1	The factors that influence the use of grammar and vocabulary in speech and writing, Read, identify the transition in texts and comprehend scientific and technical contexts in an enhanced way. (K1)
CO2	Read and interpret data from graphical representations and charts in an effective way. (K2)
CO3	Write reports effectively using appropriate vocabulary and accurate spelling and grammar. (K6)
CO4	Draft job application letters with Resume and e-mails in a convincing manner. (K2)
CO5	Describe processes, participate in formal and informal conversations, Group Discussions and make technical presentations effectively. (K6)

COURSE NAME: Engineering Mathematics II **(MA 8251)**

COURSE CODE: C110

CO1	Find Eigenvalues and Eigenvectors and diagonalizable the matrix using orthogonal transformation. (K2)
CO2	Compute the derivatives and line integrals of vector functions and learn their applications.(K3)

CO3	Evaluate surface and volume integrals and use these integrals to verify Green's, Gauss Divergence and Stoke's theorems.(K4)
CO4	Understand the significance of differentiability for complex functions and be familiar with the elementary complex functions and their properties.(K3)
CO5	Solve ordinary differential equations using Laplace transform. Identify the nature of singularities, find residues and evaluate contour integrals.(K4)

COURSE NAME: Physics for Electronics Engineering (PH 8253)

COURSE CODE: C111

CO1	gain knowledge on fundamentals Classical and Quantum electron theories (K2)
CO2	gain knowledge on the Energy Band Structures in solids (K2)
CO3	Understand the basics of semiconductor physics and its applications in semiconductor devices, the basics of quantum structures and their size dependent effects. (K3)
CO4	Acquire knowledge on magnetic properties of materials and their applications in data storage. (K2)
CO5	Get necessary understanding on the interaction of light with materials and its role in opto- electronics devices and quantum effect in quantum electronic devices. (K3)

COURSE NAME: BE 8252 BASIC CIVIL AND MECHANICAL ENGINEERING

COURSE CODE: C112

CO1	Understand the various surveying practices involved in the field, and gain knowledge about the properties of the materials like bricks, stones, cement, concrete and steel sections.(K3)

CO2	Understand the principals involved in the building components like foundation, super structure , bridges and dams (K2)
CO3	Ability to understand the concept of working principles of power plants (K3)
CO4	Students can able to identify the types and working principles of IC engines (K4)
CO5	Students can able to understand the concepts of Refrigeration and Air Conditioning (K3)

COURSE NAME: Circuit Theory (EE 8251)

COURSE CODE: C113

CO1	Overview of different types electrical circuits and analysis the DC circuits using network theorem (k1)
CO2	Derive and apply the knowledge solving AC circuit equations using network theorems (k3)
CO3	Study the phenomenon of resonance in coupled circuits (k2)
CO4	Learn the transient response of different types of electric circuits and Model and analyze the electric circuits in various power applications (k5)
CO5	Review the basics of Phasor diagrams of AC poly-phase circuits with balanced and unbalanced load (k4)

COURSE NAME: GE8291 Environmental Science and Engineering

COURSE CODE: C114

CO1	Understand the basics of Structure and functions of an ecosystem, the values of biodiversity and conservation of biodiversity(K2)

CO2	Understand the causes, effects and control measures of different pollution and disasters.(K2)
CO3	Understand the importance of natural resources and to know the role of an individual in conservation of natural resources and their case studies. (K2)
CO4	Understand the concept of sustainable development. Attain brief knowledge on environmental laws and role of Government and Non-Governmental Organizations (NGO) in Environmental Protection.(K3)
CO5	Learn the importance of family welfare programs, population explosion and Value education. (K3)

COURSE NAME: Engineering Practice Lab (GE 8261)

COURSE CODE: C115

CO1	Interpret electrical parameters such as voltage, current, resistance and power (K2)
CO2	Measure the electrical energy by single phase and three phase energy meters. (K2)
CO3	Prepare the carpentry and plumbing joints.(K3)
CO4	Perform different types of welding joints and sheet metal works(K3)
CO5	Perform different machining operations in lathe and drilling, hands on working experience with mechanical systems and electrical instruments (K3)

COURSE NAME: Electric Circuits Lab (EE 8261)

COURSE CODE: C116

CO1	Understand the basic concepts of electric circuits.(K2)
CO2	Understand the concept of applications of circuit theorems. (K2)
CO3	Apply the concepts of various theorems in engineering applications (K3)

CO4	Analyze the importance of various theorems in engineering applications (K4)
CO5	Implementation of various theorems in engineering applications to simulate electric circuits and Design of various theorems in engineering applications (K5)

COURSE NAME: MA8353 Transforms and Partial Differential Equations

COURSE CODE: C201

CO1	To understand the mathematical principles of partial differential equations and formulation of equations. (K2)
CO2	To do the Fourier series analysis in order to learn its applications. (K3)
CO3	To learn the applications of partial differential equations in the complicated Engineering concepts.(K2)
CO.4	To acquaint the student with Fourier transform techniques used in wide variety of situations.(K3)
CO5	To develop Z transform techniques for discrete time signals. (K4)

COURSE NAME: EC 8353 Electronic Devices and Circuits

COURSE CODE: C202

CO1	To understand the Structure and operation of PN junction devices.(K2)
CO2	To understand the Structure and operation of transistors.(K3)
CO3	To understand the operation of amplifiers.(K2)
CO4	To understand the operation of multistage amplifiers and differential amplifiers.(K3)

CO.5	To understand feedback amplifiers and oscillators. (K3)

COURSE NAME: Digital Logic Circuits (EE 8351)

COURSE CODE: C203

CO1	To Remember various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs(K1)
CO2	To Understand various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs (K2)
CO3	To apply various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs (K4)
CO4	To analyze various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs(K6)
CO5	To Evaluate various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs (K5)

COURSE NAME: Electrical Measurements (EI 8351)

COURSE CODE: C204

CO1	To understand the construction and Principle of Measurement Instrument (K2)
CO2	To derive the torque equation of all measurement instruments. (K2)
CO3	To Apply the comparison of measurements and study the errors in measurement. (K3)
CO4	To Analyze the sensitivity of each measurement devices and evaluate the performance of all measurement Instrument. Their applications (K4)
CO5	To Compute the parameters required for calculating the resistance, impedance in bridge (K4)

COURSE NAME: EI 8352 TRANSDUCER ENGINEERING

COURSE CODE: C205

CO1	To have knowledge about the principles and analysis of sensors, its error and error analysis. (K2)
CO2	To understand the characteristics and response of transducers.(K3)
CO3	To understand and have adequate knowledge about resistance transducers. (K3)
CO4	To study the characteristics of inductance and capacitance Transducers.(K3)
CO5	To understand and have adequate knowledge about various types of transducers.(K3)

COURSE NAME: CS8392 Object Oriented Programming

COURSE CODE: C206

CO1	To understand object-oriented concepts (K2).
CO.2	To understand object oriented programming through C++. (K3)
CO3	To gain the basic knowledge in Object Oriented concepts. (K2)
CO4	To develop applications using Object Oriented Programming Concepts and have an overview of JAVA. (K4)
CO5	Students acquire basic knowledge about Packages, Interfaces, Exception handling and about multithreaded programming. (K3)

COURSE NAME: Measurement and Transducers Lab (EI 8361)

COURSE CODE: C207

CO1	To obtain adequate knowledge in measurement and operation of different types of transducers. **(K1)**
CO2	To understand the characteristics of (LDR, STRAIN GAUGE, LOAD CELL) different types of Resistive transducers. **(K2)**
CO3	To derive and analyze step response of RTD, Thermocouple, Thermister.**(K4)**
CO4	To measure the Resistance, Capacitance and Inductance values using DC and AC Bridges**. (K2)**
CO5	To evaluate angular displacement using capacitive transducer andDesign series and shunt type ohmmeters. **(K5)**

COURSE NAME: CS8383 Object Oriented Programming Lab

 COURSE CODE: C208

CO1	To understand object-oriented concepts. (K2)
CO2	To understand object oriented programming through C++. (K2)
CO3	To gain the basic knowledge in Object Oriented concepts. (K3)
CO4	To develop applications using Object Oriented Programming Concepts.(K4)
CO5	To implement features of object oriented programming to solve real world problems.(K4)

COURSE NAME: MA8491   NUMERICAL METHODS

COURSE CODE: C209

CO1	Students gain the ability to solve algebraic, transcendental equations, systems of linear equations and Eigenvalue problems. (K3)
CO2	Thorough knowledge of Interpolation and approximation aid students in construction of approximate polynomials from large sets of experimental data.(K3)
CO3	The students will be able to differentiate and integrate an empirical function given by tabulated numerical values.(K3)
CO4	The students will be able to solve first order ordinary differential equations using single step methods and multistep methods.(K4)
CO5	The students gain knowledge in solving boundary value problems in ODE and PDE by finite difference methods.(K4)

COURSE NAME: Electrical Machines (EI 8451)

COURSE CODE: C210

CO1	To explain the construction and working of DC and AC- Motors (K2)
CO2	To explain the construction and working of DC and AC Generators. Also to understand the construction of transformers-single phase-three phase (K2)
CO3	To derive the torque equation of DC motors, Induction Motors- three phase, single phase and apply the concepts to solve real world problems To derive the emf equation of Generator, Transformer, Alternator and apply the concepts to solve real world problems. (K3)
CO4	To Analyse the Characteristics of DC and AC- Motors and Generators. Also to analyse the various applications of motors and Generators (K4)
CO5	To Analyse the Phasor diagrams of Transformers, Alternators and Synchronous Motors and apply the concepts to learn about Regulation and calculation of efficiency. (K4)

COURSE NAME: EI8452 INDUSTRIAL INSTRUMENTATION - I

CODE COURSE: C211

CO1	Students will be able to understand the measurement techniques of force, torque and speed. (K2)
CO2	Students will be able to understand the measurement techniques of acceleration, Vibration and density.(K2)
CO3	Students will be able to understand the pressure measurement techniques.(K3)
CO4	Students will be able to understand the basic temperature measurement techniques.(K3)
CO5	Students will have a sound knowledge about thermocouples and pyrometry techniques.(K4)

COURSE NAME: Linear Integrated Circuits and Applications **(EE 8451)**

COURSE CODE: C212

CO1	To acquire knowledge about fundamentals of IC fabrication procedure (K4)
CO2	To design Integrated circuits by fabricating various components and perform signal analysis of Op-Amp based circuits. (K3)
CO3	To design and analyze various linear applications of Op-Amps like adder, subtractor, differentiator , Integrator, filters.(K3)
CO4	To design and analyze various Non- linear applications of Op-Amps like Data converters, comparators, waveform generators, log amps, clippers.(K3)
CO5	To understand the working of voltage regulatorsand Amplifierslike Instrumentationamplifiers, Trans conductance amplifiers, antilog amplifiers. ICs.(K4)

COURSE NAME: IC8451 CONTROL SYSTEMS

COURSE CODE: C213

CO1	To understand the methods of representation of systems and to desire their transfer function models.(K2)
CO2	To have adequate knowledge in the time response of systems and steady state error analysis.(K3)
CO3	To acquire basic knowledge in obtaining the open loop and closed–loop frequency responses of systems.(K2)
CO4	To understand the concept of stability analysis and designing compensation for a control system.(K3)
CO5	To study the three ways of designing compensation for a control system Understand about state variable analysis.(K4)

COURSE NAME: EC8395 COMMUNICATION ENGINEERING

CODE COURSE: C214

CO1	To understand the different methods of analog communication and their significance.(K2)
CO2	To understand the Digital Communication methods for high bit rate transmission. (K2)
CO3	Analyze the concepts of source and line coding techniques for enhancing rating of transmission of minimizing the errors in transmission.(k3)
CO4	To understand MAC used in communication systems for enhancing the number of users. (K3)
CO5	Students are able to understand the various media for digital communication.(K4)

COURSE NAME: Devices and Machines Lab **(EI 8461)**

COURSE CODE: C215

CO1	To simulate using PSPICE/MATLAB and analyze the characteristics of PN Junction Diode, Transistor and FET (K4)
CO2	To simulate using PSPICE/MATLAB and analyze the characteristics of UJT, Phase Shift Oscillators and Multivibrator (K4)
CO3	To simulate using PSPICE/MATLAB and analyze the characteristics of Passive filters and rectifiers. (K4)
CO4	To conduct an experiment on DC generators and analyze the open circuit and load characteristics (K4)
CO5	To conduct an experiment on DC motors and analyze the load characteristics of DC Shunt motor and induction motors (K4)

COURSE NAME: Linear and Digital integrated Circuits Laboratory (EE 8461)

COURSE CODE: C216

CO1	To understand the working of linear and digital integrated circuits. (K2)
CO2	To construct linear and digital integrated circuits (K3)
CO3	To analyse linear and digital integrated circuits (K4)
CO4	To Evaluate the performance of linear and digital integrated circuits (K5)
CO5	To Understand the working of different application IC's.(K2)

COURSE NAME: EI 8551 ANALYTICAL INSTRUMENTS
Course Code: C301

CO1	To understand the theory of instrumental methods for identification and quantitative analysis of chemical substances by different types of Spectroscopy.(K2)

CO2	To impart fundamental knowledge on gas chromatography and liquid chromatography.(K2)
CO3	To integrate a fundamental understanding of the underlining principles of physics as they relate to specific instrumentation used for gas analyzers and pollution monitoring instruments.(K3)
CO4	To impart knowledge on the important measurement in many chemical processes and laboratories handling liquids or solutions.(K4)
CO5	To understand the working principle, types and applications of NMR and Mass spectroscopy.(K2)
CO6	To understand the operational principles of instrumental methods for identification and quantitative analysis of chemical substances by different types of Spectroscopy.(K2)

COURSE NAME: EI 8552 Industrial Instrumentation II

COURSE CODE: C302

CO1	To analyze about features, installation and applications variable head type flow meters for compressible and incompressible flow. (K4)
CO2	To evaluate coefficient of discharge of various variable head type flow meters like Orifice plate, Venturi tube, Flow nozzle, Dall tube and Pitot tube. (K5)
CO3	To analyze the features of positive displacement flow meters, Variable area flow meter and Mass flow meter, various electrical flow meters and dynamic weighing method for flow meter calibration .(K4)
CO4	To evaluate the different methods of level measurement for a variety of applications (K5)
CO5	To analyze the basic concepts of pneumatic and electronic transmitter (K4)
CO6	To examine the behavior of smart transmitter used in flow, level, pressure, temperature measurement together with its installation and calibration. (K4)

COURSE NAME: Process Control (EI 8553)

COURSE CODE: C303

CO1	To introduce technical terms and nomenclature associated with Process control domain.(K2)
CO2	To provide an overview of the features associated with Industrial type PID controller.(K4)

CO3	To elaborate the model parameters and design Specifications of controller(K4)
CO4	To make the students understand the various PID tuning methods and different types of control schemes such as cascade control ,feed-forward control and Model Based control schemes.(K2)
CO5	To elaborate different types of PID Implementation Issues (K4).
CO6	To familiarize the students with characteristics, selection, sizing of control valves. (K3)

COURSE NAME: Microprocessor and Microcontroller (EE 8551)

COURSE CODE: C304

CO1	Explain the architecture and memory organization of 8085 processor and 8051 Controller (K2)
CO2	Describe the importance and use of interrupt Structure, Ports, Timers/counters, memory of 8085 processor as well as 8051 Controller (K3)
CO3	Acquire knowledge in Addressing modes and instruction set of 8085 processor (K3)
CO4	Acquire knowledge in Addressing modes and instruction set of 8051 Microcontroller (K3)
CO5	Develop 8085 Microcontroller and 8051 Microprocessor application using Assembly language instructions and compare the instructions of 8085 and 8051 (K4)
CO6	Explain about various interfacing devices with their internal architecture and control registers. Compare various architectures. (K2).

COURSE NAME: EE 8591 DIGITAL SIGNAL PROCESSING
COURSE CODE: 305

CO1	To understand the importance of Fourier transform, digital filters and DS Processors.(K2)
CO2	To acquire knowledge on Signals and systems & their mathematical representation.(K4)
CO3	To understand and analyze the discrete time systems.(K2)

CO4	To analyze the transformation techniques & their computation.(K4)
CO5	To understand the types of filters and their design for digital implementation.(K2)
CO6	To acquire knowledge on programmability digital signal processor & quantization effects.(K3)

COURSE NAME: AIR POLLUTION AND CONTROL ENGINEERING (OCE 551)

COURSE CODE: C306

CO1	To understand the composition of atmosphere, measure of Air pollution, effect of air pollution in human, animals and plants, air quality standards. **(K6)**
CO2	Tocomputethe Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Wind profiles and stack plume patterns-Atmospheric Diffusion Theories - Dispersion models, Plume rise. **(K3)**
CO3	To Review the concept of control of particulate contaminants. **(K2)**
CO4	To Examine the controlof gaseous contaminants **(K4)**
CO5	To Discuss the effects wind profiles and indoorair quality management **(K5)**
CO6	To Remember the effects of noise pollution and Atmospheric Conditions. **(K1)**

COURSE NAME: EI 8561 Industrial Instrumentation Laboratory

COURSE CODE: C307

CO1	To experimentally measure industrial process parameters such as flow, level.(K2)
CO2	To experimentally measure industrial process parameters such as temperature, pressure.(K2)
CO3	To experimentally measure industrial process parameters such as viscosity.(K2)
CO4	To measure and analyze pH, conductivity. (K3)
CO5	To measure and analyze UV absorbance and transmittance.(K3)
CO6	To measure and analyze physiological parameters such as BP, ECG and pulse rate.(K4)

COURSE NAME: EI 8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY
COURSE CODE: C308

CO1	To understand and apply computing platform and software for engineering problems.(K2)
CO2	To programming logics for code conversion.(K2)
CO3	To understand basics of software simulators (K2)
CO4	To understand basics of serial communication. (K3)
CO5	To understand and impart knowledge in DC and AC motor interfacing.(K3)
CO6	To acquire knowledge on A/D and D/A..(K4)

COURSE NAME: Logic and Distributed Control Systems (EI 8651)

COURSE CODE: C309

CO1	To Understand all the important components such as PLC, SCADA, I/O modules and field devices of an industrial automation system. (K2)
CO2	To understand and Develop PLC programs using relay logic and ladder logic for industrial sequential applications (K2)
CO3	To Develop PLC program in different languages like FBD, structured list, sequential function chart for real time industrial applications (K3)
CO4	To obtain the knowledge on the architecture and local control unit of Distributed Control System (DCS). (K4)
CO5	Ability to gain knowledge on the recent developments in industrial automation and analyze various case studies in the application of SCADA, DCS and PLC. (K4)
CO6	To gain knowledge from studying about case studies. (K3)

COURSE NAME: Computer Control of Process (EI 8691)
COURSE CODE: C310

CO1	Understand the basic concepts of discrete state variable technique, system identification, z transform, multi loop and multi variable control (K2)
CO2	Apply the concepts like decomposition, least square methods, z transforms, RGA, Tuning methods, Dynamic matrix controller and FLC in computer control of process (K3)
CO3	Analysis of Controllability, Observability, stability test, parametric and non-parametric methods of system identification, Process interaction and pairing and case studies in multi variable control. (K4)
CO4	Design the discrete data system from state equation, Dead beat and Dahlin controller (K4)
CO5	Design the discrete data system from state equation, Dead beat and Dahlin controller. (K6)
CO6	Analyze IMC, Smith predictor, multiloop and multivariable PID controller (K4)

COURSE NAME: Data Structures **(CS 8391)**

COURSE CODE: C311

CO1	To understand the concepts of ADT. (K2)
CO2	To Learn linear data structures - lists, stacks, and queues (K3)
CO3	To understand sorting, searching and hashing algorithms (K2)
CO4	To apply Tree and Graph structures.(K3)
CO5	To Apply the different linear and non-linear data structures to problem. Solutions (K4)
CO6	To Critically analyze the various sorting algorithms. (K5)

COURSE NAME: Electronic Instrumentation (EI 8692)

COURSE CODE: C312

CO1	To Understand electronic Instruments and signal analysers. (K2)
CO2	To understand display devices, signal generators, virtual instrumentation, telemetry (K2)
CO3	To derive the expression for electronic instruments, signal analysers and waveform generators (K3)
CO4	To analyze electronic Instruments, display devices, signal analysers.(K4)
CO5	To analyze signal generators, virtual instrumentation, telemetry (K4)
CO6	To create programs using virtual instrumentation with DAQ and to design electronic instruments based on the application (K6)

COURSE NAME: MEMS and NANO SCIENCE (EE 8072)

COURSE CODE: C313

CO1	To remember the principle of operation of micro devices, micro systems, nano devices, nano systems (K1)
CO2	To understand the construction and working of micro devices, micro systems, nano devices, nano systems (K2)
CO3	To understand the method of fabrication of micro devices, micro systems, nano devices, nano systems (K2)
CO4	To design the micro devices, micro systems using the MEMS fabrication, nano devices, nano systems using the preparation methods. (K3)
CO5	To Analyze the characteristics of Mems and Nems Devices (K4)
CO6	To understand the applications micro devices, micro systems, nano devices, nano systems (K2)

COURSE NAME: Computer Networks (EI 8074)

COURSE CODE: C314

CO1	To Understanding the components required to build different types of networks and Understand network Interconnections (K2)
CO2	To analyze the required functionality at each layer for given application, Routing Protocols and Network structure (K3)
CO3	To evaluate solutions for each functionality at each layer and analyze Routing protocols. (K3)
CO4	To applying connection management information flow tracing from one node to another node in the network and understanding of network traffic for traditional applications (K4)
CO5	To applying various congestion control and Avoidance techniques and Remembering of Node to Node communication (K4)
CO6	To Understanding the tradition applications and web services and Remembering the network building (K4)

COURSE NAME: Advanced Instrumentation Systems (EI 8072)
COURSE CODE: C315

CO1	To understand the construction, working and calibration of Flow, level, pressure and temperature measuring instruments (K2).
CO2	To Analyze the Selection and Application of Flow, level, pressure and temperature measuring instruments. (K5).
CO3	To understand the working of chromatography, chemical analyzers and pollution monitoring Instruments (K2).
CO4	Ability to understand the role of Safety instrumentation system and instrumentation standards in the industry (K2).
CO5	To Separate and Analyze the different elements of the compound. To Analyze process hazards, Process control system and Safety control system. Also to determine the Safety integrity level of the process (K4).
CO6	To Design, develop and interpret the documents used to define instruments and control Systems for a typical project, including P&IDs, loop diagrams, specification forms, Instrument lists, logic diagrams, installation details, and location plans (K6).

Course Name: EE8071- Applied Soft Computing
Course Code: C316

CO1	To apply the basic concepts of science and mathematics to learn about neural networks, fuzzy and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K3)
CO2	To understand the definitions and working of feed forward, Feedback neural networks, fuzzy and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K2)
CO3	To apply basic neuron models for creating neural network, mathematical concepts like union and intersection to develop fuzzy and simple biological and mathematical concepts for metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K3)
CO4	To analyze the various learning concept of feed forward and feedback neural network, various fuzzification and defuzzification methods and various methods involved in metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K4)
CO5	To apply the functions of neural network, fuzzy logic controller and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search using mathematical modeling and solving problems(K3)
CO6	To design model-based applications using neural network, Fuzzy logic and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K4)

COURSE NAME: CS 8381 DATA STRUCTURES LABORATORY

COURSE CODE: C317

CO1	To implement linear and non-linear data structure operations.(K2)
CO2	To Suggest appropriate linear / non-linear data structure operations for solving a given problem.(K2)
CO3	Appropriately use the linear / non-linear data structure operations for a given problem.(K2)
CO4	To apply appropriate hash functions that result in a collision free scenario for data storage and retrieval. (K3)
CO5	To implement graph traversal algorithms.(K3)
CO6	To get familiarized to sorting and searching algorithms.(K4)

COURSE NAME: EI 8661 PROCESS CONTROL LABORATORY

COURSE CODE: C318

CO1	To understand and analyze process control engineering problems.(K2)
CO2	To build dynamic models using input - output data of a process.(K2)
CO3	To work with real time control loops (flow / level / temperature / pressure).(K2)
CO4	To simulation tools such as MATLAB/LABVIEW/ASPEN. (K3)
CO5	to learn and implement simple adaptive and model based control schemes.(K3)
CO6	To get familiarized to sorting and searching algorithms.(K4)

Course Name: HS 8581 - PROFESSIONAL COMMUNICATION

Course Code: C 319

CO1	To make effective presentations.(K1)
CO2	To enhance the Employability and Career Skills of students.(K2)
CO3	To participate confidently in Group Discussions.(K2)
CO4	To attend job interviews and be successful in them. (K2)
CO5	To develop adequate Soft Skills required for the workplace.(K2)
CO6	To make them Employable Graduates.(K2)

Course Name: EI8751- Industrial Data Networks
Course Code: C401

CO1	To remember the basic concepts of communication and networking in all networking devices(K1)
CO2	To understand OSI model, various types of communication and networking topologies (K2)
CO3	To apply OSI model, communication and networking topologies for networking devices. (K3)
CO.4	To analyze the various networking topology and protocol structures in all networking devices(K4)
CO.5	To evaluate the functions of various topology, protocol structure and networking devices for various applications (K5)
CO6	To understand the case study related to networking and communication topologies. (K6)

Course Name:EE8691 - Embedded Systems
Course Code: C402

CO1	Memorizing the basic concept of embedded processor ,I/O ports and Buses, Embedded Product Development Lifecycle, RTOS.(K1)
CO2	Analyze the various communication protocols for different applications.(K4)
CO3	Validating the various Processor and memory devices for a suitable embedded system (K5)
CO4	Apply the processor scheduling algorithms in embedded systems application.(K3)
CO5	Summarize the various Modeling techniques, Issues in Hardware-Software Co-design, shared memory and inter process communication.(K2)
CO6	Design and develop embedded system for various applications. (K6)

Course Name: EC8093 Digital Image Processing

Course Code: C403

CO1	To understand the basic concepts of digital image fundamentals, transforms and coding. (K2)
CO2	To understand the image enhancement techniques in Spatial and Frequency domain filtering and color models.(K2)
CO3	To derive the concepts of filtering, degradation function and restoration techniques.(K3)
CO4	To analyze the concept of the image segmentation , representation techniques features and Pattern classes.(K4)
CO5	To analyze the concepts of image compression and filtering techniques. (K4)
CO6	To compare the different ways of morphological and recognition methods. (K3)

Course Name:EI8075 - Fiber Optics & Laser Instruments
Subject Code: C404

CO1	To analyze about optical fibers, its construction, basic principle using the basic concepts of science and mathematics together with its classification, mechanical and transmission characteristics, working of various optical sources liker laser and detectors. (K4)
CO2	To apply basic concepts of optical fiber sensors to measure various parameters like pressure, temperature, current, voltage, liquid level and strain, attenuation, dispersion, scattering and absorption losses using various methods. (K3)
CO3	To analyze on the different types of lasers based on level, material used ,power produced along with its properties.(K4)
CO4	To discuss the basic concepts of laser using optical fiber in various Industrial applications together with parameter measurements like length, velocity, acceleration, current, voltage (K5)
CO5	To analyze the basic concepts of laser and optical fibers in industry material processing and medical applications of laser (K4)
CO6	To examine the behavior of holography technique with its classification. (K4)

Course Name: EI8092 THERMAL POWER PLANT INSTRUMENTATION

Course Code: C405

CO1	To Understand the basic methods of power generation ,basic electrical measurements, non-electrical parameters, temperature measurements, speed measurements, pressure measurement and smoke measurement.(K2)
CO2	To Analyze the working of thermal power plant, oxygen analysers, flue gas analyzer(K4)
CO3	To analyze the working of pulverizes , draught system, distributed control system in power plants and interlocks in boiler operation(K4)
CO4	To construct the working of boiler processes, Pand I Diagram ,cogeneration and soot blowing operation (K2)
CO5	To Analyze the various controls of furnace, boiler and turbine (K4).
CO6	To compare the various building blocks of thermal power plants with other power plants and its importance. Gain knowledge of measurement , controlling, monitoring Instruments and different parameters(K3)

Course Name: OME 754 Industrial Safety
Course Code: C406

CO1	Understand the basic concepts of mechanical, fire, chemical and environmental hazards (K2)
CO2	Apply fire prevention techniques, industrial hygiene, environmental control for industrial safety (K3)
CO3	Analysis of Industrial Health Hazards, System Safety Analysis -Techniques - Fault Tree Analysis (FTA), Failure Modes and Effects Analysis(FMEA), HAZOP analysis and Risk Assessment (K4)
CO4	Apply proper safety techniques for Fire prevention, Electrical exposure, Ionizing and Non-ionizing radiation, toxicology, Industrial Noise, Control of Noise, Vibration, Explosions - Disaster management (K3)
CO5	Apply modern safety concepts, catastrophe control, hazard control, Safety education and training - Factories Act, Safety regulations Product safety for industrial safety. (K3)
CO6	Analyze various case studies for identifying and preventing various types of hazards in industries (K4)

Course Name: EI8761 Industrial Automation Lab
Course Code: C407

CO1	Understand the basic concepts of PLC, SCADA and DCS (K2)
CO2	Understand the concept of Foundation Fieldbus /IOT/Wireless HART Enabled Transmitter. (K2)
CO3	Apply the Programming of PLC, SCADA and DCS in real time industrial automation (K3)
CO4	Analyze the interfacing of field devices with PLC and DCS (K4)
CO5	Design of various control schemes in PLC and DCS. (K5)
CO6	Implementation of various control schemes in PLC and DCS (K6)

Course Name: EI8762 INSTRUMENTATION SYSTEM DESIGN LABORATORY
Course Code: C408

CO1	To Obtain adequate knowledge in design of various signal conditioning circuits and Instrumentation systems.(K1)
CO2	To understand and Explain Piping and Instrumentation Diagram, a multi-channel data acquisition system and also prepare documentation of Instrumentation project ,project scheduling for the case study.(K2)
CO3	To derive and calculate the discharge coefficient of orifice plate and rotameter (K3)
CO4	To Analyze converters ,RPS, linearizing, cold compensation circuits, multi range DP transmitter and control valve characteristics(K4)
CO5	To Evaluate Electronics and Instrumentation design(K5)
CO6	To Design Active filters ,PID controller and Instrumentation amplifier(K6)

Course Name:C409- BIOMEDICAL INSTRUMENTATION
Subject Code: EI8073

CO1	To understand the basic medical terminology, relevant for biomedical instrumentation. (K2)
CO2	To understand the different diagnostic measurement methods for identification of human bio potentials and their necessary instrumentation. (K2)
CO3	To understand and measure the electrical and non-electrical parameters of biomedical system (K2)
CO4	To understand different imaging techniques and life assisting techniques (K2)
CO5	To Understand the position of biomedical instrumentation in modern hospital care(K2)
CO6	To Analyse different diagnostic measurement methods for different humane variables and their necessary instrumentation (K3)

Course Name: EI8078 Project management and finance

Subject Code: C410

CO1	To understand the current market trends and thus choose projects accordingly. (K2)
CO2	To understand project management, project implementation, project monitoring and project control. (K2)
CO3	To understand Project Evaluation: Project auditing and e markets in project management.(K3)
CO4	To understand the managerial applications of network analysis and the project cost estimation. (K4)
CO5	To understand asset management, working capital management and Capital budgeting. (K4)
CO6	To understand the concepts of finance and accounts carried out in project management. (K3)