CVR College of Engineering

(Autonomous)

Mangapally (V), Ibrahimpatan (M), Hyderabad-501510

EIE Department

R15 Batch -List of Course Outcomes

Course Title	Course Outcomes	Course Outcome Description
		At the end of the each course, student will be able to
		I B.Tech-I Sem
English	CO1	Write coherent, unified and complete sentences.
	CO2	Identify word meaning and know the vocabulary from stories
	CO3	Deduce meaning and know the use of familiar lexical items.
	CO4	Understand explicit and implicit information and read and comprehend a given text.
	CO5	understand how to write professional letters
Mathematics-I	CO1	Understand, model and solve linear differential equations by various methods
	CO2	Understand the solutions of higher order differential equations and applications
	CO3	Solve problems on function optimization with and without constraints using several theorems
	CO4	gain the knowledge of multiple integrals in solving problems
	CO5	Apply the knowledge of differentiation and integration in solving problemsof vector fields
Engineering Chemistry	CO1	Understand the importance of different types of portable energy sources, their limitations and to control the corrosion of metals and alloys.
	CO2	Attain the knowledge of water and its treatment in industries and for domestic purpose.
	CO3	Able to handle real time situations related to fuel energy sources.
	CO4	Acquire knowledge of principles involved in phase rules and surface chemistry with respect to absorption and colloids
	CO5	Attain the knowledge about polymerisation mechanisms and mechanisms of lubricants

Problem solving through 'C'	CO1	Understand programming concepts and analyze a problem, design a solution and develop an algorithm to solve it.	
	CO2	Modularize a problem and implement the solution using basic programming concepts, control statements and functions.	
	CO3	Evaluate the use of macros and implement solutions to complex problems using recursion and homogeneous data types.	
	CO4	Represent data in arrays and pointers, pointers for problems of relevance and use different dynamic memory allocation methods	
	CO5	Represent data in strings and manipulate them through a program	
Engineering Drawing	CO1	Know the standard conventions,design scale for drawing engineering components and draw geometrical constructions	
	CO2	Apply fundamentals of theory of projections, and draw orthographic projections of points and lines in any position	
	CO3	Construct orthographic projections of simple planes and regular solids in any position	
	CO4	Draw sectional views and developments of various basic 3D objects	
	CO5	Construct isometric views and construct multi view drawings of simple and complex 3D objects	
Computer Programming Lab	CO1	Familiarity of programming environment in particular operating system and to translate given algorithms to a working and correct program	
	CO2	to interpret syntax errors as reported by the compilers and to able to identify and correct logical errors encountered at run time using debuggers like GDM	
	CO3	to write iterative as well as recursive programs	
	CO4	to represent data in arrays, pointers, strings and structures and manipulate them through a program and use them in defining self referential structures designing a user defined data type	
	CO5	to implement file processing functions and be able to store, retieve and process data in text and binary formats	

Engineering Chemistry Lab	CO1	Understand various principles involved in experimental techniques involved in engineering chemistry.
	CO2	Students get hands-on experience with the different instruments and develop experimental skills.
	CO3	Students learn how to prepare organic compounds.
	CO4	Understand the basic concepts of kinetics
	CO5	Students develop analytical skills and learn how to analyze and present results of an experiment
English Language and Communication Skills lab-1	CO1	Emerge as good speakers and listeners
	CO2	Develop critical and analytical thinking
	CO3	Develop proficiency in speaking
	CO4	To read extensively and to develop good writing styles effectively
	CO5	Deliver effective presentation skills using the multimedia tools
IT Workshop Lab	CO1	Identify the peripherals of PC, assemble and disassemble PC components.
	CO2	Install the System software MS Windows, Linux and required device drivers.
	CO3	Work with productivity tools for Word Processing, Spread Sheet and Presentations.
	CO4	Design basic Web Pages
	CO5	Design Web forms or bio- data forms and including of elements

			I YEAR II SEM
Mathematics – II	CO1	Find rank of matrix and solve a linear system of equations and evaluate eigen values and eigen vectors	
	CO2	Learn diagonalisation and classify quadratic forms into definite and indefinite classes.	
	CO3	Develop the skill of evaluating Laplace and inverse Laplace transform which are required to solve linear systems under initial conditions	
	CO4	Express a given function into a Fourier series/ Half-Range Fourier cosine and sine series.	
	CO5	Solve linear and non-linear P.D.E of first order and solve P.D.E by the method of separation of variables.	
Data Structures through 'C'	CO1	Represent the real world data objects through arrays and structures and handle self referential structures.	
	CO2	Understand how to give persistance to data either in a recod form or in a text form and able to manipulate the same	
	CO3	Implement linear data structures like Stacks and understand the applications of stacks	
	CO4	Implement linear data structures like Queues and understand the non linear data structures	
	CO5	Understand and implement searching and sorting techniques	
Computational Mathematics	CO1	Find the real roots of Algebraic and Tanscendental equations	
	CO2	Understand the solutions for linear systems of equations	
	CO3	Understand Interpolation and obtain approximate solutions for evenly and unevenly spaced data	
	CO4	Fit agiven data to a linear and non linear curve and appreciate the concepts of numerical differentiation and integration	
	CO5	Develop the skill of finding approximate solutions to problems arising in first order intitial value problems in differential equations	

Applied Physics	CO1	Get familiarized with crystallographic terminology, crystal structures and understand the fundamentals of statistical mechanics.
	CO2	Learn basic concepts of quantum mechanics leading to an understanding of band theory of solids.
	CO3	Would develop an understanding of physics of semiconductors, working and characteristics of different types of diodes.
	CO4	Gain knowledge of behavior of magnetic and dielectric materials. Also learn basics of nanotechnology involving synthesis and characterization.
	CO5	Learn concepts involving physics of lasers and propagation of light through optical fibers.
Electrical Circuits	CO1	Understand the basic concepts of electrical parameters, responses of various electrical elements for non-sinusoidal signals and use analytical techniques to solve resistive circuits energized by direct current voltage and current sources.
	CO2	Understand the concept of magnetic circuits and able to solve problems related to coupled circuits.
	CO3	Define various terms related to alternating circuits which are used for all household appliances and understand the concept of impedance, power in AC circuits and understand the concept of resonance and able to plot locus diagrams.
	CO4	Understand the concept of network topology and can solve the complex circuits using graph theory.
	CO5	Solve complex circuits by applying different theorems with DC & AC excitation
Data Structures through 'C' Lab	CO1	Understand basic data structures such as arrays, linked lists, stacks and queues
	CO2	Interpret syntax errors and logical errors as reported by the compilers
	CO3	Apply algorithm for solving problems like sorting, searching insertion and deletion of data
	CO4	Solve problems involving graphs, trees, and heaps
	CO5	Apply hashing techniques for eeicient storage and retrieval of data

English Language and Communication Skills Lab-II	CO1	Evolve as effective and autonomous communicators and will develop narrative skills
	CO2	Emerge as decision makers and autonomous learners
	CO3	Develop critical and analytical skills
	CO4	Gather ideas and information and organize them coherently
	CO5	Develop leadership and team building skills
Engineering Workshop	CO1	Acquire skills of basic engineering trades like Carpentry, Tinsmithy etc.,
	CO2	Demonstrate an understanding of and comply with workshop safety regulations.
	CO3	Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.
	CO4	Apply the knowledge of the above trades in their day to day activities.
	CO5	Select appropriate equipment and consumables for required applications
Physics Lab	CO1	Understanding of errors and their role in physical measurements.
	CO2	develop skills in handling various kinds of laboratory instruments.
	CO3	Get awareness of magnitudes of the physical quantities involved.
	CO4	understand the laws of physics associate with the experiments
	CO5	Get an understanding of the physical concepts involved and learn how to present the observations and results at the end of an experiment.

Computational Mathematics Lab	CO1	write a program to find real roots of algebraic and tanscendental equations
	CO2	Write a program to determine functional value at any given intermediate point of the given data for an unknown function by interpolation
	CO3	Write a program for a best fit curve by least squares method for a given set of data points
	CO4	Write a program for numerical integration by Trapezoidal, Simpson's 1/3 and 3/8 rules
	CO5	Write a program to find the value of the solution of a given first order initial value problem of O. D.E

II B.Tech I semester

Mathematics - III	CO1	Understand the concepts of analyticity and integration of complex functions, construction of analytic functions if a part of it is known.
	CO2	Find the Taylor's and Laurent's series expansion of complex functions
	CO3	Evaluate line integrals using Cauchy's Integral formulae.
	CO4	Evaluate contour integrals of different types using Residue theorem
	CO5	Appreciate the concepts of Conformal mappings and Bilinear transformation of complex functions.

Logic and Switching Theory	CO1	To convert one number system into another, detect and correct errors and to optimize Boolean functions
	CO2	Design various combinational logic circuits
	CO3	To analyze and design various synchronous sequential logic circuits
	CO4	To synthesize the fundamental mode sequential circuits
	CO5	To implement logic functions using PLDs

Electronics Devices and Circuits	CO1	To analyze diode parameters
	CO2	To analyze and design different rectifier circuits
	CO3	To comprehend different transistor configurations and biasing techniques
	CO4	To analyze different small signal amplifiers at low frequency
	CO5	To gain familiarity of the devices FET, MOSFET, UJT, SCR
Principles of Electrical Engineering	CO1	Understand the basic concepts of transients and also be ableto solve real time electrical and electronic problems.
	CO2	Design two port networks using different parameter models
	CO3	Define various terms related to Filter and attenuation circuits which are used for all electrical and electronic applications and also the concept of Characteristic impedance.
	CO4	Learn the constructional features, principal of operation andthe significance of DC Motors and Generators and their characteristics.
	CO5	Study the Faraday's laws, Principle of operation of singlephase transformer, testing of transformer and also phase transformer, testing of transformer and also Calculation of efficiency and regulation of transformer.
Signals and Systems	CO1	To characterize and analyze the properties of continuous-time and discrete-time signals and systems
	CO2	To represent continuous signals and systems in the frequency domain using Fourier Transform
	CO3	To understand signal trnasmission through linear systems
	CO4	To compute convolution, correlation functions and spectral densities of deterministic signals.
	CO5	To apply the Laplace Transform and Z- Transform for analyzing continuous-time and discrete-time signals and systems.

Transduction of Physical Variables	CO1	Understand the basics of Instrumentation and measurement systems	
	CO2	Understand the significance of basic standards	
	CO3	Obtain basic knowledge on temperature measuring devices	
	CO4	Develop the skills in analyzing the pressure and sound measuring devices	
	CO5	Acquire confidence on analyzing flow measuring devices	
Electronics Devices and Circuits Lab.	CO1	To analyze PN and Zener diode characteristics	
	CO2	To design different rectifier circuits	
	CO3	To analyze transistor input and output characteristics	
	CO4	To observe and understand the FET and UJT characteristics	
	CO5	To analyze small signal amplifiers at low frequencies	
Electrical Engineering Lab.	CO1	Do simplification and Verification of theorems likesuperposition, Thevenin's and maximum power transfer etc.	
	CO2	Understand practical verification of two port network parameters.	
	CO3	Understand concept of series and parallel resonance circuits.	
	CO4	Analyse Magnetization characteristics of DC shunt generator are performed and characteristics are analyzed.	
	CO5	Conduct experiments like Swinburne's test and Break test onDC shunt motor and also analyze performance characteristics.	

Reasoning &Data Interpretation Lab	CO1	Understand the concepts of Statement-Argument, Assumption and Course of Action and use reasoning as a tool to match statements with arguments etc.	
	CO2	Look at data and find links and patterns, link data with conclusions and study data logically.	
	CO3	Study problem situations and use reasoning as a tool to find solutions	
	CO4	Nurture the ability to use reasoning as a skill in real time problems solving.	
	CO5	Analyze and infer the data with respect to trend and case based.	

II B.Tech II SEMESTER

Environmental Studies	CO1	Define the concepts of Ecology and Ecosystem and emphasize the importance of biodiversity and its conservation
	CO2	Gain knowledge on natural resources and advantages and disadvantages on renewable energy sources and technologies
	CO3	Develop awareness on pollution control technologies and global atmosphere changes
	CO4	Emphasize the importance of Environmental impact assessment and green technologies
	CO5	Understand about Environmental legislation and the concept of sustainable development

Principles of Communications	CO1	Understand the basic communication concepts and need for modulation
	CO2	Develop concepts of analog modulation techniques
	CO3	Understand the sampling theorem and pulse modulation
	CO4	Identify the need of digital communication and digital modulation methods
	CO5	Gain the knowledge of information theory and error control coding concepts

Analysis of Electronic Circuits	CO1	Find the gain of given amplifier circuit using BJT and FETs
	CO2	Use small signal LF and HF models to analyze various amplifier circuits and multistage amplifier
	CO3	Identify the feedback topology of given amplifier circuit
	CO4	Design and analyze the power amplifiers and heat sinks
	CO5	Design oscillators and tuned amplifiers
Linear and Digital Integrated Circuits	CO1	Understand classification and internal information of Op-Amps
	CO2	Construct and analyze the Op-Amp applications
	CO3	Analyze and design A/D and D/A convertors
	CO4	Understand the concepts of TTL and CMOS logic families
	CO5	gain the knowledge about digital ICs for combinational and sequential circuits
Transducers & Applications	CO1	Improve skills in selecting a suitable transducer for measuring displacement
	CO2	Acquire confidence in measurement of velocity and acceleration
	CO3	Design several bridges
	CO4	Design instruments for current and voltage measurement
	CO5	Design humidity and density measuring instruments

Control Systems Engineering	CO1	Understand the concepts of basics of control systems	
	CO2	Acquire the knowledge of time response and stability analysis	
	CO3	Determine stability in frequency domain analysis	
	CO4	Design Lead-lag compensators in frequency domain	
	CO5	Understand concepts of state space analysis of continuous systems	
Analysis of Electronic Circuits Lab	CO1	Design and understand the single stage and multistage Amplifiers.	
	CO2	Understand the operation of RC Oscillators practically	
	CO3	Design class A, B, C power amplifiers	
	CO4	Design oscillators and feedback amplifiers	
	CO5	Design MOS amplifiers	
Transducers and Instrumentation Lab.	CO1	Improve skills in designing of extension of range in different meters.	
	CO2	Acquire confidence in using capacitive & inductive transducers for displacement measurement.	
	CO3	Develop skills in finding out the accuracy of different transducers	
	CO4	Perform piezoelectric method of force and acceleration measurement.	
	CO5	Understand the basic principles and operation of Pressure, Temperature and Acceleration Transducers.	
Verbal Ability Lab	CO1	Develop familiarity with Corporate English	
	CO2	gain enriched vocabulary	
	CO3	develop the ability to write grammatically correct sentences and enhance their professional writing skills	
	CO4	Gain profieiency in answering reasoning based Questions	
	CO4	improve the word power	

Gender Sensitization	CO1	develop a better understanding of important issues related to gender in contemporary India.
	CO2	be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
	CO3	acquire insight into the gendered division of labour and its relation to politics and economics and will attain a finer grasp of how gender discrimination works in our society and how to counter it.
	CO4	be proficient in answering reasoning based Question
	CO5	will be better equipped to work and live together as equals.

III B.Tech I SEMESTER

Managerial Economics and Financial Analysis	CO1	Capable of analyzing fundamentals of economics such as demand, production, price, supply concepts etc., which helps in effective business administration.
	CO2	Analyze economies of scale and the Break-Even Point.
	CO3	Able to determine the Price-Output Relationship in different market Structures.
	CO4	Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity.
	CO5	Analyze accounting statements like income & expenditure statement, balance sheet to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.
Electronic Instrumentation	CO1	Develop skills in testing of Linear systems for standard inputs
	CO2	Acquire knowledge in design of instruments for voltage and current measurements
	CO3	Understand and design of several types of bridges
	CO4	Understand the concepts of oscilloscopes
	CO5	Improve the knowledge in designing of recorders

Signal Conditioning Circuits	CO1	Understand the importance of signal conditional circuit for resistive sensors
	CO2	Design the signal conditioning circuits for reactive sensors
	CO3	Acquire the knowledge in design of signal conditioning for self generating sensors
	CO4	Design analog and digital image sensors
	CO5	Implement the acquisition of real time variable in electrical format
Digital Signal Processing	CO1	Understand the various operations on discrete time signals & systems
	CO2	Apply Discrete Fourier Transform and Fast Fourier Transform on Discrete time signals
	CO3	Analyze and design an IIR digital filters
	CO4	Analyze and design FIR digital filters
	CO5	Understand the concept of Multirate signal processing and its applications
Advanced English Communication &Soft Skills Lab	CO1	Evolve as effective communicators.
	CO2	Emerge as decision makers, time managers and good negotiators.
	CO3	Develop holistic soft skills.
	CO4	Develop critical and analytical skills.
	CO5	Present their skills confidently in the job market.
Industrial Instrumentation Lab	CO1	Understand the control operation in the industry.
	CO2	Perform PLC programming to monitor and control the physical process.
	CO3	Gain knowledge in identifying the various instruments used to measure physical Parameters.
	CO4	Perform the wiring from field devices to industrial controllers
	CO5	Analyze and interpret physiological variables

Linear &Digital IC Applications Lab	CO1	Design practical op-amp applications.
	CO2	Understand design of oscillators
	CO3	Design active filters and applications
	CO4	Design digital blocks using digital IC's.
	CO5	Design and analyze the functionality of memory and shift registers
Effective Technical Communication Lab	CO1	Attain proficiency in Technical Writing.
	CO2	Use English language appropriately to write effective reports, notes and summaries.
	CO3	Write Emails suitable for Professional Communication.
	CO4	Develop Analytical and Critical Thinking Skills.
	CO5	Understand the importance of technical communications through case studies

III B.Tech II SEMESTER

Analytical Instrumentation	CO1	Understand ph and conductivity measurement
	CO2	Analyze different types of gas analyzers
	CO3	Understand the operation of chromatographic techniques
	CO4	Gain knowledge in operation of spectro photometers
	CO5	Gain knowledge in ESR and several types of nuclear radiation detectors
Microprocessors & Microcontrollers	CO1	Understand the architecture of 8086 microprocessor
	CO2	Write assembly level language programs for different application using assembler and Interface the processor with different peripheral devices
	CO3	Understand the operation of DMA controllers and several communication interfaces
	CO4	Describe the instruction set and addressing modes of 8086 and 8051
	CO5	Understand the real time applications of timers and serial communication of 8051

Process Control Instrumentation	CO1	Understand the concepts of process dynamics of pressure, flow and temperature
	CO2	Design continuous and discontinuous controllers
	CO3	Achieve knowledge in applying tuning method for process control application
	CO4	Understand the concept of pneumatic, electronic and hydraulic actuators
	CO5	Analyze different blocks of integrated in multi loop control system
Telemetry &Telecontrol (Professional Elective-I)	CO1	Understand the basics of telemetry principles.
	CO2	Analyze and understand the concepts of multiplexed systems
	CO3	Understand the concepts of satellite telemetry
	CO4	Obtain basic knowledge on optical telemetry
	CO5	Develop skills in analyzing the telecontrol methods
Digital System Design (Professional Elective-I)	CO1	Gain the knowledge of Finite State Model and simplifications.
	CO2	Understand design of digital systems using PLDs.
	CO3	Acquire confidence in designing SM charts
	CO4	Get knowledge about fault detection and diagnosis in digital systems.
	CO5	Understand fault diagnosis in sequential circuits
PC Based Instrumentation (Professional Elective -I)	CO1	Understand the basic ladder programming concepts of PLC
	CO2	Understand the importance of PC in the field of instrumentation
	CO3	Develop the concepts of programming of compact and modular PLCs and design a project
	CO4	Develop the knowledge on intermediate functions of PLCs
	CO5	Obtain basic knowledge on advanced PLC programming functions and their address formats.

Realibility Engineering (Professional Elective -II)	CO1	Understand the basics of reliability, reliabile systems and components
	CO2	Calculate reliability of the system knowing reliability of components.
	CO3	Calculate reliability of systems connected in series and parallel and combination thereof.
	CO4	Improve reliability and manage reliability of instruments and system.
	CO5	Gain the knowledge on economics of reliability engineering
Artificial Neural Networks (Professional Elective -II)	CO1	Understand the basics of Neural Networks and its functioning.
	CO2	Gain knowledge on various types of networks and its special features
	CO3	Acquire the confidence on designing various multi layer neural networks
	CO4	Understand basics of self organization maps
	CO5	Gain knowledge on various types of networks and its special features
Computer Networks (Professional Elective-II)	CO1	Understand the basis of network model and its architecture
	CO2	Gain knowledge on error detection and correction methods in data link layer
	CO3	Develop skills in analyzing the various LANs
	CO4	Understand the basics of network layer
	CO5	Obtain basic knowledge on transport layer
Microprocessors and Microcontroller Lab	CO1	Execute different programs for 8086 microprocessor in assembly level language using assembler
	CO2	Interface various I/O Devices like stepper motor, Key board, ADC, DAC etc. with 8086 microprocessor
	CO3	Set up communication between to microprocessors
	CO4	Execute different programs for 8051 microcontroller using integrated development environment (IDE)
	CO5	Develop real time applications by interfacing 8051 with peripheral devices

Process Control Instrumentation Lab	CO1	Acquire knowledge about several process control systems
	CO2	Understand real time applications in the industrial environment
	CO3	Analyze interfacing protocols between analog and digital devices.
	CO4	Acquire confidence in designing a process control instrumentation system
	CO5	Undersstand and design controllers
Quantitative Ability Lab	CO1	Solve the problems using arithmetic knowledge
	CO2	Practice general problems in Placement, CAT and GRE etc. tests.
	CO3	Understand problems related to profit and loss, averages etc.
	CO4	Solve time and work problems
	CO5	Understand the concepts of inequalities, mixtures and allegations
IV B.Tech I Semester		
Biomedical Instrumentation	CO1	Understand the basic components of medical instrumentation system
	CO2	Acquire confidence in designing medical recorders
	CO3	Develop skill in analyzing the interacts in Blood pressure measurement
	CO4	Obtain basic knowledge on therapectic equipments
	CO5	Understand the significance of respiratory instrumentation
VLSI Design	CO1	Familiarize with the basics of MOSFET and different IC fabrication technologies
	CO2	Analyze and design various CMOS combinational and sequential circuits
	CO3	Develop layouts for NMOS, CMOS logic circuits
	CO4	Design sequential circuits and datapath subsystems
	CO5	Understand the need for testing and design for testability and design of array sub systems

Virtual Instrumentation	CO1	Understand basics of Virtual instrumentation	
	CO2	Understand the basics of data acquisition of Virtual instrumentation	
	CO3	Understand the different requirements for interfacing different hardware	
	CO4	Acquire knowledge on applications of VTO	
	CO5	Create Virtual instrumentation using LabVIEW software for control system, Signal Processing and Image processing applications	
Robotics &Automation (Professional Elective -III)	CO1	Know the various parts of robots and fields of robotics.	
	CO2	Understand power sources and sensors associated with robotics	
	CO3	Construct manipulators and grippers	
	CO4	Understand various kinematics and inverse kinematics of robots	
	CO5	Understand the control of robots for some specific applications through case studies	
Digital Image Processing (Professional Elective-III)	CO1	Understand the basic concepts of two-dimensional signal acquisition, sampling, and quantization.	
	CO2	Understand the spatial filtering techniques, including linear and nonlinear methods.	
	CO3	Gain the concepts of 2D Fourier transform, including the 2D DFT and FFT, and their use in frequency domain filtering.	
	CO4	Acquire the knowledge of the fundamental image enhancement algorithms such as histogram modification, contrast manipulation, and edge detection.	
	CO5	Demonstrate programming skills in digital image compression techniques	

Instrumentation Process In Industry (Professional Elective-III)	CO1	Understand the operation of process in paper and pulp industry
	CO2	Understand the principle of functioning cement and nuclear industry
	CO3	Develop knowledge on various operations in Petrochemical industry
	CO4	Gain knowledge on principle of operation about flight instruments
	CO5	Acquire knowledge in Analyzing various parameters in flight instruments
Optoelectronics and Laser Instrumentation (Professional Elective-IV)	CO1	Understand the basics of fiber optics and its properties
	CO2	Gain knowledge on laser and its operation
	CO3	Acquire knowledge on working of fiber optic sensors
	CO4	Improve knowledge on several applications of Lasers
	CO5	Improve skills by using optical methods for communications
Embedded System Design (Professional Elective-IV)	CO1	Understand an embedded system and to know its applications
	CO2	Learn the processing elements used in embedded systems
	CO3	Understand different embedded application and domain specific systems
	CO4	Learn hardware software development to design embedded systems
	CO5	Familiarize with embedded system by several case studies

MEMS and Applications (Professional Elective-IV)	CO1	Understand the fabrication process in industry in the context of MEMS.
	CO2	Identify several techniques used in MEMS fabrication
	CO3	Understand the different types of transducers in MEMS technology
	CO4	Acquire knowledge in exploring capacitive transducers as MEMS transducer
	CO5	Identify thermal and Piezo electric transducers for MEMS
Power Plant Instrumentation (Professional Elective-V)	CO1	Gain knowledge to different power generation types
	CO2	Acquire confidence in identifying measuring systems in power plants.
	CO3	Understand role of instrumentation in boilers and spray controls
	CO4	Understand the operation of Turbine monitoring and control.
	CO5	Innovate ideas to improve plant efficiency, reduce leakages and losses and use technologies for designing and developing pollutant free industrial environment.
Automation In Industrial Process (Professional Elective-V)	CO1	Understand the basics of computer controlled using automation
	CO2	Acquire knowledge on control tuning methods in control system engineering
	CO3	Improve knowledge for designing discrete control system
	CO4	Acquire knowledge and design of feed forward controllers
	CO5	Gain confidence in designing advanced strategies using distributed control systems

SCADA and Distrubuted Control Systems (Professional Elective-V)	CO1	Understand the basic principle of SCADA system
	CO2	Develop knowledge on several protocols and communication interface
	CO3	Acquire knowledge on distributed control systems
	CO4	Develop skills on interfacing in DCS
	CO5	Gain knowledge on hard communication protocol
ECAD Lab	CO1	Design digital circuits of combinational and sequential ICs.
	CO2	Acquire to simulate and synthesize the digital circuits in Xilinx software.
	CO3	Develop programming skills in HDL using Xilinx software
	CO4	Design of digital circuits of sequential ICS
	CO5	Design of memory elements using Xilinx software
Analytical and Virtual Instrumentation lab	CO1	Understanding the principle and operation of Spectrometers.
	CO2	Acquire, Analyze and Display the results of gaseous present in sample.
	CO3	Develop knowledge on pH and conductivity measurement.
	CO4	Develop basic programming skills in Virtual Instrumentation using LabVIEW software
	CO5	Gain knowledge to acquire data of several parameters using LabVIEW software

Industry Oriented Mini Project	CO1	Write the requirement specifications of small real life problems.
	CO2	Gather the ideas through literature survey about new innovations, analyze and interpret into solutions.
	CO3	Motivate themselves aware of knowledge in industry perspective and new industry trends.
	CO4	Implement prototype modules for small scale industries.
	CO5	prepare documentation of the project and present.

<div align="center">**IV B.Tech II Sem**</div>

Management Science	CO1	Make business decisions for effective business administration.
	CO2	Identify Business strategies for effective and efficient utilization of resources.
	CO3	To explore new business opportunities in the dynamic business environment.
	CO4	To perform SWOT analysis of the internal and external environment.
	CO5	To implement contemporary best practices in an organization.
Digital Control System	CO1	Understand sampling and reconstruction
	CO2	Understand the Z-plane analysis of discrete time control systems
	CO3	Learn the methods of the stability analysis of a digital system.
	CO4	Understand the design procedures of discrete time control system by conventional methods
	CO5	Understand the design procedure of state feedback controller.

Seminar	CO1	Distinguish the multiple senses of a subjects (literal and beyond the literal).
	CO2	Identify and understand assumptions, thesis and arguments that exists in the work of authors
	CO3	Evaluate and synthesize evidence in order to draw conclusions consistent with the subjects
	CO4	Identify conforming and opposing evidence relevant to original and existing thesis
	CO5	Improve presentation skills
Comprehensive Viva	CO1	Face any type of interviews, viva-voice and aptitude test.
	CO2	Understand overall knowledge of the subjects
	CO3	Apply knowledge in building their carrier in particular field
	CO4	Enhance their communication skills and interactivity
	CO5	Able to improve the intellectuality along with effective presentation
Project Work	CO1	Design and implement the appropriate solutions for the real life problems.
	CO2	Present objective and utility of the complex problem to selected audience.
	CO3	Develop Project management skills, Problem solving skills and System integration skills
	CO4	Work in a team to solve real-life problems and maintain professionalism.
	CO5	Prepare the thesis to present focusing ideas and solutions