CVR College of Engineering

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EIE Department
R-18 Course Outcomes (CO)

Course Title	Course Outcomes	Course Outcome Description
I-I Semester		
Mathematics-I	CO1	Find rank of a matrix and solve a linear system of equations.
	CO2	Evaluate eigen values, eigen vectors and find the Modal matrix under a linear transformation
	CO3	Evaluate surface areas and volumes of solids of revolution, Apply Mean value theorems in relevant engineering domains.
	CO4	Determine the convergence/divergence of a given infinite series.
	CO5	Find the extremum of a multi-variate function with or without constraints
Engineering Chemistry	CO1	Rationalise periodic properties such as ionization potential, electron affinity, oxidation states and electronegativity
	CO2	Understanding the importance of EMF, corrosion and treatment of water
	CO3	List major chemical reactions that are used in the synthesis of molecules.
	CO4	Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
	CO5	Would develop ability to handle situations involving problems associated with chemical substances in engineering situations
Problem Solving through 'C'	CO1	Ability to understand programming concepts and analyze a problem, design a solution and develop an algorithm to solve it.
	CO2	Ability to modularize a problem and implement the solution using basic programming concepts, control statements and functions
	CO3	Ability to evaluate the use of macros and implement solutions to complex problems using recursion and homogeneous data types.

	CO4	Ability to implement pointers for problems of relevance and use different dynamic memory allocation methods
	CO5	Design and implement appropriate user defined structures to a given problem definition and apply various functions for processing files..
Environmental Science	CO1	Define the concepts of 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 atmospheric changes.
	CO4	Emphasize the importance of Environmental impact assessment and green technologies.
	CO5	Understand about Environmental legislation and the concept of Sustainable development
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
English Language and Communication Skills Lab- I	CO1	Emerge as good speakers and listeners
	CO2	Develop critical and analytical thinking
	CO3	Write effectively
	CO4	Develop effective presentation skills using the multimedia tools.
	CO5	Neutralize mother tongue influence on their English and make them proficient speakers.

	CO1	Estimate rate constants of reactions from concentration of reactants/products as a function of time.
Engineering Chemistry Lab	CO2	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, absorbance
	CO3	Understand the concepts of distribution and adsorption Phenomena
	CO4	Synthesize a small drug molecule
	CO5	Develop analytical skills and learn how to analyze and present results of an experiment
	CO1	Familiarity of programming environment in Linux operating system and to translate given algorithms to a working and correct program.
	CO2	: Ability to interpret syntax errors as reported by the compilers and to be able to identify and correct logical errors Encountered at run time using debuggers like GDB.
Computer Programming Lab	CO3	Ability to write iterative as well as recursive programs
	CO4	Ability to represent data in arrays, pointers, strings and structures and manipulate them through a program and use them in defining self-referential structures or structures or designing a user defined data type
	CO5	Ability to implement file processing functions and be able to store, retrieve and process data in text and binary formats
	CO1	Identify the peripherals of PC, assemble and disassemble PC components.
	CO2	Install the System software MS Windows, Linux and required device drivers.
IT Workshop Lab	CO3	Work with productivity tools for Word Processing, Spread Sheet and Presentations along with Designing basic Web Pages.
	CO4	Understand the main features of the SCILAB program development environment to enable their usage in higher learning.
	CO5	Interpret and visualize simple mathematical functions and operations using plots or display

I-II SEMESTER			
English	CO1	Write coherent, unified, and complete sentences.
	CO2	Identify word meaning and know the use of familiar lexical items.
	CO3	Understand explicit and implicit information and draw inferences for the given task.
	CO4	Communicate according to place, relation and medium
	CO5	Know, emphasize, conceptualize, comprehend, apply, synthesize, and evaluate the given text, and other authentic texts such as magazines/newspaper articles.
Mathematics-II	CO1	Solve the first order O.D.E and appreciate their applications
	CO2	Solve higher order O.D.E and appreciate their applications in engineering problems
	CO3	Evaluate double and triple integrals and apply them in engineering problems
	CO4	Evaluate the line, surface and volume integrals and converting them from one to another
	CO5	Solve first order linear and non-linear P.D.E
Computational Mathematics	CO1	Find the real roots of Algebraic and Transcendental equations.
	CO2	Understand interpolation and obtain approximate solutions for evenly and unevenly spaced data
	CO3	Fit a given data to a linear/non-linear curve and appreciate the concepts of numerical differentiation and integration.
	CO4	Develop the skill of finding approximate solutions to problems arising in first order initial value problems in differential equations
	CO5	Find finite difference solutions of certain P.D.E.
	CO1	The concepts involving the physics of lasers, lasing action, construction and working of He-Ne laser, semiconductor laser and propagation of light through optical fibers.

Subject	CO	Description
Applied Physics	CO2	Schrodinger wave equation and its application, free electron models, formation of bands in solids and electron occupation in bands
	CO3	Estimation of charge carrier concentration in semiconductors and understand the formation of pn junction, construction and characteristics of different diodes like rectifying, Zener & Tunnel diodes
	CO4	Transistor current components, characteristics of CB, CE and CC configurations, also understand the construction, working and characteristics of JFET & MOSFET.
	CO5	The principles of nanotechnology, types of nanomaterials, synthesis: Top-down and bottom-up methods, characterization:
Data Structures through 'C'	CO1	Understand basic concepts, Design and implement linear data structures such as linked lists, stacks, queues by using C as the programming language using static or dynamic implementations.
	CO2	Able to understand and analyze, differentiate and implement elementary algorithms: sorting, searching and hashing and will also be able to compare and contrast algorithms with respect to time and space complexity
	CO3	Able to implement nonlinear data structures like trees and graphs and apply appropriate data structures to designing solutions to real world complex problems.
	CO4	Demonstrate sound understanding of graph traversals and ability to implement various algorithms on graphs and
	CO5	Ability to implement hashing techniques for storing and searching efficiently.
English Language and Communication Skills Lab-II	CO1	Evolve as effective 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.

Data Structures through 'C' Lab	CO1	Understand basic data structures such as arrays, linked lists, stacks and queues.	
	CO2	Ability to interpret syntax errors as reported by the compilers and to be able to identify and correct logical errors encountered at run time using debuggers like GDB.	
	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 efficient storage and retrieval of data	
Applied Physics Lab	CO1	Get an understanding of errors and their estimation in determination of Physical quantities.	
	CO2	Get an understanding of the laws of physics associated with the experiments	
	CO3	Would develop skills in handling various kinds of laboratory instruments	
	CO4	Get awareness of the magnitudes of the different physical parameters and learn how to Present the observations and results at the end of an experiment	
	CO5	Get an understanding of the physical concepts involved in the experiments	
Engineering Workshop	CO1	Acquire skills of basic engineering trades like Carpentry, Tin smithy 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	
	CO1	Write a program to find real roots of Algebraic and Transcendental equations	

Computational Mathematics Lab	CO2	Write a program to determine functional value at any given intermediate point of the given data for an
	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	
Electronics Circuits-I	CO1	Analyze different rectifier circuits with and without filters
	CO2	Analyze clippers, clampers, RC circuits and comparator circuits
	CO3	Analyze different biasing circuits for BJTs and FETs
	CO4	Analyze different small signal BJT amplifiers at low frequencies
	CO5	Analyze different small signal BJT amplifiers at high frequencies and analyze different single stage JFET amplifiers
Signals and Systems	CO1	Characterize and analyze the properties of continuous and discrete time signals and systems. To apply the knowledge of linear algebra topics like vector space, basis, dimension, inner product, norm and orthogonal basis to signals
	CO2	Represent continuous signals and systems in the Frequency domain using Fourier Series and Fourier transform
	CO3	Understand the filter characteristics of LTI systems, correlation and the concept of sampling and reconstruction of analog signals
	CO4	Apply the Laplace transforms to analyze continuous-time signals and systems
	CO5	Apply Z- transforms to analyze discrete-time signals and systems
Transduction of Physical Variable	CO1	Understand the basics and its characteristics of Instrumentation
	CO2	Gain knowledge in analyzing different standards
	CO3	Understand the different temperature and strain transducers
	CO4	Identify the various methods of pressure and sound measurements
	CO5	Understand the principle and operation of AC & DC bridges.
	CO1	Develop the skill of evaluating Laplace and Inverse Laplace transform of functions which are required to solve linear systems under initial conditions.
	CO2	Develop the skill of evaluating Fourier transform of functions which are required to solve Partial Differential equations under given conditions.

Mathematics-III	CO3	Understand the concepts of analyticity and integration of complex functions, construction of analytic functions if a part of it is known.
	CO4	Evaluate integrals using Cauchy's Integral formulae around a simple closed contour.
	CO5	Find the Taylor's and Laurent's series expansion of complex functions and to evaluate contour integrals using Residue theorem.
Fundamental Of Electrical Engineering	CO1	Apply knowledge of mathematics, science, and engineering to the analysis and design of electrical circuits
	CO2	Solve the complex AC and DC electric circuits by applying the suitable principles
	CO3	Understand the concept and applications of Resonance and able to solve the problems using various network theorems
	CO4	Apply the concepts of two port network parameters and transient response of electrical circuits in the real time applications
	CO5	Acquire sufficient knowledge about the basic principles of various Electrical Machines
Electronics circuit-I Lab	CO1	Design and analyze different rectifier circuits with and without filters
	CO2	Design and analyze clippers, clampers and RC circuits
	CO3	Design biasing circuits for BJTs
	CO4	Design and analyze different small signal BJT, JFET amplifiers at low frequencies
	CO5	Use diode and transistor for different applications
Electrical Engineeering Lab.	CO1	Verify the network theorems practically and can apply wherever is necessary in the circuit analysis
	CO2	Understand about phenomenon of resonance and study the response of series and parallel resonant circuits
	CO3	Verify the two port network parameters practically
	CO4	Determine the efficiency of a transformer
	CO5	Analyze the magnetization characteristics of dc shunt generator
Transducer and Instrumentation Lab-1	CO1	Acquire confidence using Bridge circuits to measure several parameters.
	CO2	Analyze the effect of temperature on resistance using different transducers
	CO3	Analyze the effect of pressure using different transducers
	CO4	Gain knowledge on calibrating devices.
	CO5	Acquire knowledge on sound Measurement

	CO1	Understand the concepts of Statement-Argument, Assumption and Course of Action and use reasoning as a tool to match statements with arguments etc.
Reasoning and Data Interpretation Lab	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

	CO1	Identification and design feedback amplifiers of different topologies andDesign RC and LC oscillators using transistors
Analog Circuits and IC application	CO2	Analyze and design different types of power amplifiers
	CO3	Construct op-amp basic applications.
	CO4	Acquire confidence in designing active filters using Op-Amp.
	CO5	Analyze and design A/D and D/A convertors using Op-Amp and Develop different applications of 555 timer.

	CO1	Understand how to convert the one code format to other code format
	CO2	Optimize Boolean functions and design various combinational logic circuits
Digital Circuits and IC application	CO3	Analyze and design various synchronous sequential logic circuits
	CO4	Gain the knowledge to design basic digital gates using CMOS and TTL logic families
	CO5	Design combinational and sequential circuits using digital IC's

	CO1	Improve skills in selecting a suitable transducer for a given application
	CO2	Confidence in applying various transducer principles for many domestic requirements
Transducers and Applications	CO3	Measure velocity and Acceleration using appropriate transducers
	CO4	Measure force and torque using appropriate transducers
	CO5	Understand applications of medical transducers

Principles of Communications	CO1	Understand the use different amplitude modulation and demodulation techniques used in analog communication
	CO2	Understand the concepts of frequency and phase Modulation and their demodulation techniques
	CO3	Understand the different pulse modulation and demodulation techniques and signal multiplexing for various applications
	CO4	Design simple systems for generating and demodulating digital modulated signals
	CO5	Evaluate the performance of communication systems using coding techniques
Control Systems Engineering	CO1	Understand the basic concepts and transfer function representation of control system
	CO2	Understand the stability concept and their time domain analysis
	CO3	Understand the frequency response analysis in frequency domain
	CO4	Understand the compensating techniques of controller.
	CO5	Design state models
Analog Circuits and IC application Lab	CO1	Implement the feedback amplifiers of different topologies
	CO2	Design and implement RC and LC oscillators using transistors
	CO3	Analyze and implement the different types of power amplifiers
	CO4	Design practical op-amp applications and Acquire confidence in designing all filters.
	CO5	Develop different applications of 555 timers practically
Digital Circuits and IC application Lab	CO1	Design and Verify the Boolean functions and various combinational logic circuits
	CO2	Design and implement the various synchronous sequential logic circuits
	CO3	Design and verify the Asynchronous circuits of any size and shift registers of specific length using Digital ICs.
	CO4	Analyze and design combinational circuits using Digital ICs
	CO5	Design sequential circuits using Digital ICs
Transducers and Instrumentation Lab -II	CO1	Gain knowledge in identifying the various instruments used to measure physical Parameters.
	CO2	Acquire confidence using capacitive and inductive transducers for displacement measurement
	CO3	Perform piezoelectric method of force and acceleration measurement.
	CO4	Understand the control operation in the industry
	CO5	Measure the different Physical and electrical parameters in a plant

Verbal Ability Lab	CO1	Students will be empowered in English language skills and meet the demands of the global work environment
	CO2	Students will have enriched vocabulary
	CO3	Students will be proficient in answering reasoning based questions
	CO4	Students will develop the ability to write grammatically correct sentences
	CO5	Students will enhance their professional writing skills through business letters
Gender Sensitiztion	CO1	Students will have developed a better understanding of important issue related to gender in contemorary India
	CO2	Students will be sensitized to basic dimensions of the biological,sociological,phychological and legal aspects of gender.This will be achieved through discussion of materials derived from research,facts,everyday life,literature and film.
	CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
	CO4	Students will acquire in sight in to the gender divison of labour and its relation to politics and economics
	CO5	Men and women students and professionals will be better equipped to work and live together as equals.
III B.Tech I SEMESTER		
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 designing of signal conditioning circuit for self generating sensors.
	CO4	Acquire the knowledge in designing of digital & intelligent sensors.
	CO5	Design analog and digital image & other sensors.
Electronic Instrumentation	CO1	Develop skills in measurements by various measuring instruments
	CO2	Improve their knowledge in principle and operation of galvanometer and its calibration
	CO3	Understand the measurement procedure for resistance, inductance and capacitance.
	CO4	Understand the basics of Electronic Instruments for Measuring Basic Parameters and oscilloscope operations and fundamentals of Function generator.
	CO5	Understand the concepts of analog recording system and Wave analyzer.

Process Control Instrumentation	CO1	Learn about Process automation concepts.	
	CO2	Acquire confidence in controller's actions.	
	CO3	Understand different controller tuning procedures.	
	CO4	Study various Final control elements and their characteristics	
	CO5	Understand the concepts of multiloop control systems.	
Microprocessor and Microcontrollers	CO1	Understand the architecture and organization of 8086.	
	CO2	Explore the internal architecture of 8051 and to create ready to run programs using 8051 assemblers.	
	CO3	Understand basic embedded C programming and working of timers/counters to develop microcontroller-based systems.	
	CO4	Describe the serial communication feature of 8051 and how to write interrupt handler programs.	
	CO5	Interface real-world devices such as LCDs, Keyboards, ADC and DAC with 8051	
Digital Signal Processing and Applications	CO1	Understand the various operations on discrete-time signals & systems	
	CO2	Apply DFT and FFT on discrete-time signals	
	CO3	Analyze and design an IIR digital filter	
	CO4	Analyze and design an FIR digital filter	
	CO5	Apply concepts of DSP in various applications	
Process Control Instrumentation Lab	CO1	Gain knowledge about automation	
	CO2	Understand real time applications in the industry functioning.	
	CO3	Analyze interfacing between analog and digital devices.	
	CO4	Learn to control actions using PLC's.	
	CO5	Understand industrial control loop functionality.	
Signal Processing Lab	CO1	simulate the generation and operation of different types of signals and systems	
	CO2	Apply transform techniques for the analysis of signals	
	CO3	Simulate convolution and spectral densities of deterministic signals	
	CO4	Simulate response of LTI system for impulse input signal	
	CO5	Design IIR and FIR digital filters	

Microcontrollers Lab	CO1	Implement the Assembly Language Programs to perform various operations in 8051 Micro-Controller.
	CO2	Implement time delay between the events by programming the timers/interrupts in 8051 Micro-Controller.
	CO3	Transmit the message serially at different baud rates using UART operation in 8051 Micro-Controller.
	CO4	Interface various I/O Devices like DC Motor, LCD & LED to 8051 Micro-Controller
	CO5	Interface various I/O Devices like Keyboard, LCD, 7-Segment Display and DC Motor, Stepper Motor and Servo Motor to development boards.
Effective Technical Communication Lab	CO1	Attain proficiency in features of Technical communication
	CO2	Develop expertise in reading skills
	CO3	Use English language appropriately to write effective reports, e-mails, notes and summaries.
	CO4	Become proficient in Analytical and Critical Thinking Skills
	CO5	Be empowered to use English language effectively in Technical Communication
Universal Human Values	CO1	Understand the significance of values, distinguish between values and skills
	CO2	Apply the concept of happiness and prosperity to set the goals in life.
	CO3	Evaluate the current scenario in the society, in a right manner.
	CO4	Distinguish between the needs of the self and body through principles of co-existence.
	CO5	Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships.
	CO6	Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
III B.Tech II SEMESTER		
Managerial Economics and Financial Analysis	CO1	Familiarize with the fundamentals of Economics such as Demand function, Law of demand, Elasticity of demand and Demand Forecasting methods etc.
	CO2	Evaluate Economies of Scale and the Break-Even Point of the business activity.
	CO3	Understand the different Market Structures and Macro Economic concepts
	CO4	Able to understand the accounting system and preparation of Final Accounts.

	CO5	Analyze Accounting Statements like Income Statement and Balance Sheet to understand financial performance of the business.
Analytical Instrumentation	CO1	Know the various electrodes and analyzers
	CO2	Understand various gas analyzers.
	CO3	Understand the various chromatographic techniques.
	CO4	Understand the various spectrophotometers.
	CO5	Understand the NMR spectrophotometer and radiation detectors.
Virtual Instrumentation	CO1	Demonstrate the working of LabVIEW.
	CO2	Explain the various types of structures used in LabVIEW
	CO3	Apply the knowledge of LabVIEW programming for simulation & analyzing the data.
	CO4	Interface physical parameters to PC and representation
	CO5	Analyze and design different type of programs based on data acquisition & applications.
Professional Elective - I:		
Telemetry and Telecontrol	CO1	Understand the functional blocks in the Telemetry System
	CO2	Understand the concept of multiplexing the signals for communication
	CO3	Understand the Digital transmission system
	CO4	Understand the different optical sources and detectors
	CO5	Understand the concepts of different Analog and Digital Techniques used in Telecontrol Systems.
Digital System Design	CO1	Acquire knowledge about FSM design and implementation
	CO2	Understand the design of digital systems using PLDs.
	CO3	Acquire confidence in the design of digital systems using ASM Charts
	CO4	Get knowledge about fault detection and diagnosis of combinational circuits
	CO5	Understand the concepts about the testing of sequential circuits.
PC Based Instrumentation	CO1	Understand the importance PC in the field of Instrumentation
	CO2	Develop concepts of programming of Allen Bradley PLCs.
	CO3	Design a Project on control by using PLC as controller
	CO4	Able to write advanced programming language applications.
	CO5	Develop ability in designing human machine interface.

		Professional Elective - II:
Automation of Industrial Processes	CO1	Understand the elements of Computer Controlled Process and Distributed control Systems.
	CO2	Learn Control System Design and controller tuning.
	CO3	Understand Computer control loop.
	CO4	Learn design Of Feed Forward Controller.
	CO5	Understand Intelligent Control and Distributed Digital Control.
Artifical Neural Networks	CO1	Understand the basics of Neural Networks and its functioning.
	CO2	Identify the various types of networks and its special features.
	CO3	Implement the Neural Networks using several softwares in different applications.
	CO4	Understand the concept of self-organization maps
	CO5	Gain the knowledge about Neuro dynamics and Hopfield models.
Computer Networks (IT)	CO1	Understand network hardware and software issues and reference models.
	CO2	Demonstrate various error correction and detection techniques, framing techniques & channel access protocols.
	CO3	Realize address mapping and routing protocols in network layer.
	CO4	Identify the differences between connection oriented & connection less services congestion control techniques and QOS in transport layer.
	CO5	Demonstrate user-level network programs using the underlying network protocols at application layer.
Industrial Automation Lab	CO1	Understand the basic instructions of ladder programming.
	CO2	Perform advanced PLC programming for speed control applications.
	CO3	Gain knowledge in writing the PLC programming for industrial process control applications.
	CO4	Perform the wiring of field devices to industrial controllers.
	CO5	Develop HMI screens for various industrial applications.
Virtual Instrumentation-I & Analytical Instrumentation Lab	CO1	Understand the principle and operation of Spectrometers.
	CO2	Acquire, analyze and display the results of purity of water sample.
	CO3	Gain knowledge on pH and conductivity measurement.
	CO4	Perform the wiring of field devices to industrial controllers.
	CO5	Gain knowledge to develop programs using Graphs and charts in LabVIEW

	CO1	Evolve as effective communicators.
Advanced English Communication and Soft Skills Lab	CO2	Emerge as decision makers, time managers and good negotiators.
	CO3	Gain proficiency in resume writing and requisite interview skills
	CO4	Collate ideas and information and organize them relevantly and coherently.
	CO5	Be empowered to use soft skills in the global context.
	CO1	Solve the problems using Number Systems, Percentages and Profit & Loss
	CO2	Solve the problems using Interest, Speed Time and Distance
Quantitative Ability Lab	CO3	Solve the problems using Ratio and Proportion, Progressions and Inequality
	CO4	Solve the problems using Menstruation, Geometric, Clocks & Calendars questions
	CO5	Practice general problems in Placement, CAT and GRE etc. tests
	CO1	To gain a general idea of the vast Vedic literature and their content and to grasp the relevant concepts of the Vedas and appreciate its relevance in the modern world.
Essence of Indian Knowledge Tradition	CO2	Understand, connect up and explain basics of Indian Traditional Knowledge in Modern Scientific Perspective.
	CO3	Understand Yoga psychology as both a positive and a normative science and its contribution for a holistic health.
	CO4	Understand the views of our great philosophers to correlate their efforts to achieve unity in diversity.

B.Tech -IV-I Semester

	CO1	Understand the basic components of medical instrumentation system
	CO2	Develop skill in analyzing the ECG
Bio-Medical Instrumentation	CO3	Acquire confidence in designing medical recorders like EEG and EMG
	CO4	Obtain basic knowledge on blood pressure meters and the significance of Respiratory monitoring.
	CO5	Develop ability in designing therapeutic equipments.

VLSI Design	CO1	Familiarize with the basics of MOSFET and different IC Fabrication technologies
	CO2	Understand the basic electrical properties of MOS and CMOS circuits
	CO3	Develop the layouts for NMOS,CMOS logic circuits and understand the design flow
	CO4	Analyze and design various CMOS cominational and sequential circuits
	CO5	Understand the concepts of memory implementation and need for testing and design for testability.
Industrial Internet of Things	CO1	Understand the characteristics, protocols and communication models required for logical design of IIoT.
	CO2	Understand the differences between IoT and M2M networks and configurations
	CO3	Understand the hardware platforms for implementing and interfacing the IoT based board with different peripheral devices and serial communication devices.
	CO4	Integrate devices and develop an application that can communicate through IoT Cloud
	CO5	Understand various case studies in IoT design and Security in IoT.
Instrumentation Practices in Industries(PE-III)	CO1	Understand the different materials required for the manufacturing of Cement, Pulp, Paper, food, Power and pharmacy
	CO2	know the principles of different manufacturing processes in Cement Industry, Nuclear Industry
	CO3	Identify the different Petrochemical Industries working process and Measurements in refineries Petrochemical Industries
	CO4	Acquire the Primary Flight Instruments principle and operation
	CO5	Understand Measurement of aircraft Engine parameters and Fuel Quantity and Fuel Flow
Robotics and Automation(PE-III)	CO1	Gain the knowledge on various parts of robots and fields of robotics.
	CO2	Understand various power actuators & sensors.
	CO3	Understand the basic kinematics & grippers.
	CO4	Gain the knowledge on manipulator control & trajectory planning.
	CO5	Achieve the knowledge on robot specific applications.

Optoelectronics and Laser Instrumentation(PE-III)	CO1	Understand the basics of fiber optics and its properties
	CO2	Improve skills by using optical methods for communications
	CO3	Acquire knowledge on working of fiber optic sensors
	CO4	Gain knowledge on laser and its operation
	CO5	Improve knowledge on several applications of Lasers
VLSI Design Lab	CO1	Acquire the knowledge simulation of basic Boolean expressions
	CO2	Understand the design of digital circuits and applications
	CO3	Acquire confidence in the design of sequential circuits using FFS
	CO4	Simulate and Custom design tools
	CO5	Design and implement the basic combinational circuits using tools
Virtual Instrumentation-II Lab	CO1	Understands interfacing of different types of physical parameters to PC.
	CO2	Apply the knowledge of LabVIEW programming for simulation & analyzing the data.
	CO3	Analyze and design different type of programs based on data acquisition & applications.
	CO4	Develop knowledge on analysis of various biosensors with LabVIEW environment.
	CO5	Obtain knowledge on ECG signals, hand dynamometer working with iworx.
	CO1	Acquire knowledge in emerging areas.
	CO2	Perform well in competitive exams and group discussions.
	CO3	Apply knowledge in building their career in particular fields.
Technical Seminar - I	CO4	Enhance their communication skills and interactivity.
	CO5	Improve self confidence and stay updated with advanced technology.
Industry Oriented Mini Project	CO1	Offer students a glimpse into real world problems and Industrial challenges that need
	CO2	Introduce students to the vast array of literature available of the various research challenges in the field of electronics & Instrumentation
	CO3	Create awareness among the students of the characteristics of several domain areas where EIE concepts can be effectively used.
	CO4	Implement prototype modules for small scale industries.
	CO5	Improve the team building, communication and management skills of the students

IV-II Semester			
Nano sensors & Applications (Professional Elective-IV)	CO1	Learn about nano-science fundamentals.	
	CO2	Acquire confidence in various transduction principles.	
	CO3	Understand different structures of inorganic and organic sensors.	
	CO4	Develop concepts in various physical applications of nanosensors	
	CO5	Expertise in various applications of nanobiosensors.	
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-IV)	CO1	Monitor & Control Parameters in power plants.	
	CO2	Acquire confidence in identifying measuring systems in power Plants	
	CO3	Understand role of instrumentation in power plants	
	CO4	Understand and analyze the process of Turbine Monitoring and Control	
	CO5	Develop Innovate ideas to improve plant efficiency, reduce leakages, losses and use technologies for designing and developing pollutant free industrial environment	
SCADA & Distributed Control Systems(Professional Elective-V)	CO1	Understand the SCADA architecture & elements of SCADA system.	
	CO2	Develop knowledge on Remote Terminal &Master Terminal Units.	
	CO3	Acquire knowledge on distributed control systems.	
	CO4	Develop skills on several communication protocols for DCS (Distributed Control System).	
	CO5	Gain knowledge on HART & Field bus communication protocol.	
Reliability Engineering(Professional Elective-V)	CO1	Understand essentially what is meant by reliability and distinguish it from quality.	
	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 knowledge about economics of reliability engineering	

Technical Seminar - II	CO1	Acquire knowledge in emerging areas.	
	CO2	Perform well in competitive exams and group discussions.	
	CO3	Apply knowledge in building their career in particular fields.	
	CO4	Enhance their communication skills and interactivity.	
	CO5	Improve self confidence and stay updated with advanced technology.	
Major Project	CO1	To apply knowledge of Electronics and Instrumentation Engineering in designing solutions for real time problems.	
	CO2	To perform data collection and review research literature.	
	CO3	To use modern tools and research knowledge for developing products.	
	CO4	To learn the ethical principles that leads to innovation and teamwork that is inline with Lifelong learning, Project management and cost-effective system design	
	CO5	To develop presentation and communication skills.	