

Course outcome statements

GRADUATES WILL BE ABLE TO--

	SE Semester I
C201	Engineering Mathematics-III Graduates will be able to
C201.1	Solve system of higher order linear differential equation and apply it to describe Electrical circuits and various engineering systems.
C201.2	Analyze Laplace transform and develop the tool of Laplace transform to solve system of Differential Equations in control system description.
C201.3	Apply Fourier transform Z-transform for design and development of Instrumentation systems (linear time invariant system, signal system etc).
C201.4	Transform physical phenomena into vectors, describe gradient, curl and divergence and understand Vector Calculus and its applications in designing sensors and transducers, drives and control.
C201.5	To solve Line, Surface, Volume integrals with their applications in electromagnetic circuits.
C201.6	To extend concept of Differential Calculus to function of Complex Variable and its applications to Potential theory, Electrostatics and Electromagnetic engineering.
C203	Basic Instrumentation Graduates will be able to
C203.1	Apply the fundamental knowledge for measurements and instrumentation monitoring systems in applications.
C203.2	Demonstrate the knowledge of working principle, construction, mathematical relations, pros and cons and applications of analog and digital instruments.
C203.3	Extend the ranges of analog indicating instruments.
C203.4	Select the proper instrument for given applications.
C203.5	Explain the concept of Virtual Instrumentation and methods of waveform generation.
C203.6	Calibrate and Monitor the variety of electrical/ electronics instruments.
C202	Sensors and Transducers I Graduates will be able to
C202.1	Get exposure to the various physical sensing parameters and the need for its measurement
C202.2	Distinguish various sensors and transducers for the respective applications

C202.3	Do appropriate selection of various sensors for the defined application.
C202.4	Conduct calibration and measurements of various sensors and transducers
C202.5	Identify, formulate and solve a problem of Instrumentation
C202.6	Further design the signal conditioning circuits as per the requirement to applications.
C205	Network Theory Graduates will be able to
C 205.1	Discuss the method of analysis of circuit with initial conditions of network and solve the differential equation of RLC networks.
C 205.2	Realize the circuit with different network theorems.
C 205.3	Explain various network functions and discuss the criteria for stability of network function.
C 205.4	Design the two port network using various parameters.
C 205.5	Analyse one port network functions using foster and Cauer forms
SE Semester II	
C211	Industrial Drives Graduates will be able to
C211.1	Understand construction, working, characteristics, triggering and commutation of different power devices.
C211.2	Understand Principle, Working, and Classification of converters, choppers and inverters.
C211.3	Understand Principle, Construction, Working, Characteristics and Applications of DC and AC motors.
C211.4	Understand speed control techniques for different DC and AC motors
C209	Automatic Control System Graduates will be able to
C209.1	Students will be able to classify the control systems.
C209.2	Students will be able to develop mathematical models of control systems.
C209.3	Students will be able to analyse the linear time invariant system in time and frequency domain.
C209.4	Students get familiar with modern control theory.
C209.5	Students will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks. Use matlab and simulink tools, to analyze problems.
C211	Digital Techniques Graduates will be able to
C211.1	Students will be able to represent numerical values in various number systems and perform number conversions between different number systems.

C211.2	Students will be able to understand the basic logic gates, logic families and implement variable reduction techniques for digital logic circuits.
C211.3	Students will be able to analyze, design and develop various combinational and sequential digital circuits.
C211.4	Students will be able to understand operation of basic types of flip-flops, registers, counters, decoders, encoders, multiplexers, and de-multiplexers.
C210	Electronic Instrumentation Graduates will be able to
C210.1	Analyse the operation of different types of measuring instruments like True-RMS Meter, DMM, RLC-Q meter, Universal Counter and know the working of measuring instruments.
C210.2	Understand the operation of different types of signal generating instruments like Arbitrary Waveform Generator, Ramp wave Generator, Pulse Generator.
C210.3	Identify and select a signal convertor according to the requirement.
C210.4	Perform the analysis on ADC and DAC ICs & understand its internal structure.
C210.5	Understand the different types of modulation & analyse all modulation techniques in time and frequency domains.
C210.6	Analyse the operation of different types of signal analysers like Distortion Analyser, Spectrum Analysers, Wave analysers, FFT Analyser, Logic Analyser
C208	Sensors and Transducers II Graduates will be able to
C208.1	Illustrate role of different flow measurement and their devices.
C208.2	Explain basic principles of sensors for level measurement
C208.3	Demonstrate calibration of viscosity and density measurement with advanced concepts in industries with industrial background and society applications
C208.4	Select different miscellaneous sensors with specification depend on application with professional engineering solutions and lifelong engineering.
C208.5	Classify the sensors for different sensor signaling devices measurement systems with industrial application specifications and project management applications and proper finance.
C208.6	Apply their knowledge to specify and design various signal conditioning devices and their appropriate sensor for any measurement and control application with all the engineering principles.
	TE Semester I
C301	Embedded System Design Graduates will be able to
C301.1	Describe basics of microcontrollers and distinguish between microcontrollers, embedded processors, FPGAs and ASICs.
C301.2	Describe architectural details of 8051 microcontroller.
C301.3	Do external hardware interfacing with 8051 & AVR microcontrollers.
C301.4	Use embedded skills to design and implement complete embedded system.
C301.5	Explain detailed architectural features of AVR microcontroller.

C301.6	Write programs for the 8051 & AVR microcontrollers using assembly and C languages.
C302	Instrumental Methods for Chemical Analysis Graduates will be able to
C302.1	Apply knowledge of instrumentation in chemical analysis. And concluding the source and detector required for instruments.
C302.2	Select spectrophotometers which are based on law of photometry.
C302.3	Identify, formulate, and solve engineering problems , chemical equations based on IR Spectroscopy and AES analytical methods.
C302.4	Recognize the instruments like Raman ,X Ray ,HPLC,GC used in application area of analytical instrumentation.
C302.5	Select the Spectroscopy or Chromatography technique as per requirement/ need of application.
C302.6	Calibrate analytical Instruments and Maintenance of Analytical Instruments.
C304	Control System design Graduates will be able to
C304.1	Analyze the system in time and frequency domain.
C304.2	Design the compensator for required specifications using classical mathematical tools.
C304.3	Tune the PID controller using classical approach.
C304.4	Design the controllers using direct synthesis approach.
C304.5	Design state feedback controllers and observers.
C304.6	Analyze the controller performance using performance indices.
C306	Numerical Methods Graduates will be able to
C306.1	Apply range of mathematical and technical concepts to applications.
C306.2	Methods to learn control engineering.
C306.3	Able to find numerical solution.
C306.4	Able to solve numerical methods using software (C/Matlab).
C306.5	Able to develop the algorithm to implement mathematical solutions of any Problem
TE Semester II	
C309	Digital Signal Processing Graduates will be able to
C309.1	Perform operation on signals and classification of discrete time system
C309.2	Apply the various transforms and apply them in time and frequency domain.
C309.3	Compute the response of discrete-time systems to various input signals.

C309.4	Evaluate and analyse the frequency domain characteristics of discrete-time systems
C309.5	Design and implement different frequency selective FIR and IIR filters.
C310	Instrument and System Design Graduates will be able to
C310.1	explain functional requirements and specifications of instruments design with various packaging standard, guidelines for enclosures, components and accessories
C310.2	Explain concept of grounding, shielding, EMI/EMC and ESD effects
C310.3	demonstrate analog and digital system design guidelines and applications
C310.4	Design layout for analog and digital system.
C312	Biomedical Instrumentation Graduates will be able to
C312.1	Explain anatomy of various system in human body
C312.2	Select and apply the appropriate bioelectrode for measurement of physiological parameters.
C312.3	Demonstrate his/her skills by using biomedical equipments.
C312.4	Explain the function of component and its working
C312.5	Upcoming technology through continuous learning in biomedical instrumentation field.
C311	Unit Operations and Power Plant Instrumentation Graduates will be able to
C311.1	Understand various unit operations used in industries & also able to state difference between unit operation & unit process.
C311.2	Differentiate different power generation methods on the basis of site selection, basic principle of power generation, efficiency, advantages & disadvantages.
C311.3	Explain methods for the measurement of various parameters like power generation plant efficiency.
C311.4	Explain different types of sensors transducers used in different power plants & able to analyze it.
C311.5	Develop & apply various control loop strategies for controlling various parameters like temperature of steam, water level in boilers, output steam pressure, etc.
C311.6	Explain & develop basic controlling models for controlling different parameters like speed, vibration of turbines.
	BE Semester I
C402	Project Engineering and Management Graduates will be able to
C 402.1	Outline the fundamental activities involved in industrial organization and management for instrumentation projects.
C 402.2	Implement the planning and scheduling techniques in their project work and other activities.
C 402.3	Demonstrate installation and commissioning activities, procurement procedures and had an overview of different acceptance tests.

C 402.4	Prepare different engineering drawings like PID, PFD, loop wiring, installation sketches, specification & index sheets.
C 402.5	Differentiate the usage of different cables as per their applications
C 402.6	Realize the concept of Construction and Testing engineering
C403	Computer Techniques and Application Graduates will be able to
C403.1	Describe basics of operating system and CPU Scheduling
C403.2	Understand concept of memory management and file management.
C403.3	Learn various communication protocols and their features.
C403.4	Identify real time operating system, parallel computer and various data compression techniques.
C403.5	Explain detailed concept of software testing tools, debugging tools and maintenance.
C403.6	Learn software development life cycles.
C404A	Elective-I : Industrial Internet Of Things Graduates will be able to
C404A.1	Analyze the different building blocks of IOT and recognize functions of various sensors, actuators , routers and switches.
C404A.2	Differentiate various connectivity technologies and protocols in IOT.
C404A.3	Identify and select a IOT platform according to the application requirement.
C404A.4	Understand management of resources in IOT and discuss various identity management models .
C404A.5	Analyze the security issues in IOT and take appropriate steps to overcome them.
C404A.6	Develop architectural approach for IOT empowerment.
C405D	Opto Electronics Instrumentation Graduates will be able to
C405D.1	Apply optical fibre for various signal transmission.
C405D.2	Design, Analyze and perform optical power budget
C405D.3	Apply suitable optical sensor technology on various parameters of measurements.
C405D.4	Apply appropriate LASER for various applications.
C405D.5	Suggest and apply different technology for signal amplification
C405D.6	Use optical measuring instruments
BE Semester II	

C408	Process Instrumentation Graduates will be able to
C408.2	Analysis and design of controller for safety and process monitoring and understand the need for scaling of instruments.
C408.3	familiar about operation and have the ability to gain knowledge and analysis of unit processes and unit operations.
C408.4	Ability to understand and analysis how process dynamics and control are related to materials and systems of unit operations.
C408.5	Design appropriate controller, its tuning and analysis for various process control systems. Use Matlab and Simulink to analyze the problem.
C409	Industrial Automation Graduates will be able to
C409.1	Explain how to identify, select and suggest different types automation tools and how to implement the automation strategy in real life
C409.2	Describe the different communication protocols and their concepts, used in process industry
C409.3	Explain the basics, hardware structure, timer counters used in PLC and its importance using high speed output instructions like PTO, PWM, PID etc
C409.4	Do practical implementation of different applications using PLC and its interfacing with different controllers using different programming languages as per IEC 61131-3 standard
C409.5	Explain the design, functionality, specifications and techniques for different functional modules of DCS for different applications.
C409.6	Explain the different process hazard analysis, how to categorize it and how to implement the safety management system using SIS
C410	Building Automation Graduates will be able to
C410.1	Analyze and understand the architecture and different systems in BAS
C410.2	Understand thermal comfort conditions with respect to temperature and humidity and human clothing and activities and its impact on human comfort, productivity, and health.
C410.3	Articulate the purpose and operation of HVAC system components, the operation of HVAC systems
C410.4	Understand the working of chilled water and hot water systems.
C410.5	Understand the way in which a large fire alarm system would be connected and zoned.
C410.6	Understand the fundamental elements that make up an Access Control System.
C411C	Instrumentation in Agriculture and Food Graduates will be able to
C411C.1	Demonstrate soil properties and sensors used to measure.
C411C.2	Demonstrate continuous and batch process.
C411C.3	Develop automation scheme for green house.
C411C.4	Explain various standards related to food and safety
C411C.5	Develop cold storage control strategy.
C411B	Renewable Energy Systems

	Graduates will be able to
C411B.1	Identify the conventional and non-conventional Energy resources.
C411B.2	Understand the construction , characteristics of specifications of various renewable energy systems.
C411B.3	Recognize current and possible future role of renewable energy sources.
C411B.4	Appraise current technologies of utilizing renewable-energy sources
C411B.5	Assess the potential and economic viability of the utilization of a renewable-energy source.