

SSMINSTITUTE OF ENGINEERING AND TECHNOLOGY



(Approved by AICTE, New Delhi/Affiliated to Anna University, Chennai/Accredited by NAAC)

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Dindigul–Palani Highway, Dindigul 624002

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Anna University Regulations 2021

First Year Courses (I & II Semester)

Course Outcomes (COs)

C101	HS3152	Professional English-I
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Course Outcomes (Cos)

C101.1	To use appropriate words in a professional context
C101.2	To gain understanding of basic grammatic structures and use them in right context.
C101.3	To read and infer the denotative and connotative meanings of technical texts
C101.4	To write definitions, descriptions, narrations and essays on various topics

C102	MA3151	Matrices and Calculus
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Course Outcomes (Cos)

C102.1	Use the matrix algebra methods for solving practical problems
C102.2	Apply differential calculus tools in solving various application problems.
C102.3	Able to use differential calculus ideas on several variable functions.
C102.4	Apply different methods of integration in solving practical problems.
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.

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C103	PH3151	Engineering Physics
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Course Outcomes (Cos)

C103.1	Understand the importance of mechanics
C103.2	Express their knowledge in electromagnetic waves.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

C104	CY3151	Engineering Chemistry
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Course Outcomes (Cos)

C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
C104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.
C104.4	To recommend suitable fuels for engineering processes and applications.
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors

C105	GE3151	Problem Solving and Python Programming
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Course Outcomes (Cos)

C105.1	Develop algorithmic solutions to simple computational problems.
C105.2	Develop and execute simple Python programs.
C105.3	Write simple Python programs using conditionals and loops for solving problems
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.
C105.6	Read and write data from/to files in Python programs.

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C107	GE3171	Problem Solving and Python Programming Laboratory
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Course Outcomes (Cos)

C107.1	Develop algorithmic solutions to simple computational problems
C107.2	Develop and execute simple Python programs.
C107.3	Implement programs in Python using conditionals and loops for solving problems
C107.4	Deploy functions to decompose a Python program.
C107.5	Process compound data using Python data structures.
C107.6	Utilize Python packages in developing software applications.

C108	BS3171	Physics and Chemistry Laboratory
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Course Outcomes (Cos)

C108.1	Understand the functioning of various physics laboratory equipment. To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
C108.2	Use graphical models to analyze laboratory data. To determine the amount of metal ions through volumetric and spectroscopic techniques
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality. To analyse and determine the composition of alloys.
C108.4	Access, process and analyze scientific information. To learn simple method of synthesis of nanoparticles
C108.5	Solve problems individually and collaboratively. To quantitatively analyse the impurities in solution by electroanalytical techniques

C109	GE3172	English Laboratory
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Course Outcomes (Cos)

C109.1	To listen to and comprehend general as well as complex academic information
C109.2	To listen to and understand different points of view in a discussion
C109.3	To speak fluently and accurately in formal and informal communicative contexts
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately
C109.5	To express their opinion effectively in both formal and informal discussions

C110	HS3252	Professional English-II
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Course Outcomes (Cos)

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C110.1	To compare and contrast products and ideas in technical texts.
C110.2	To identify and report cause and effects in events, industrial processes through technical texts
C110.3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
C110.4	To present their ideas and opinions in a planned and logical manner
C110.5	To draft effective resumes in the context of job search.

C111	MA3251	Statistics and Numerical Methods
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Course Outcomes (Cos)

C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems
C111.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
C111.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
C111.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C111.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

C112	PH3254	Physics for Electronics Engineering
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Course Outcomes (Cos)

C112.1	know basics of crystallography and its importance for varied materials properties
C112.2	gain knowledge on the electrical and magnetic properties of materials and their applications
C112.3	understand clearly of semiconductor physics and functioning of semiconductor devices
C112.4	understand the optical properties of materials and working principles of various optical devices
C112.5	appreciate the importance of nanotechnology and nanodevices.

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C113	BE3254	Electrical and Instrumentation Engineering
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Course Outcomes (Cos)

C113.1	Explain the working principle of electrical machines
C113.2	Analyze the output characteristics of electrical machines
C113.3	Choose the appropriate electrical machines for various applications
C113.4	Explain the types and operating principles of measuring instruments
C113.5	Explain the basic power system structure and protection schemes

C114	GE3251	Engineering Graphics
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Course Outcomes (Cos)

C114.1	Use BIS conventions and specifications for engineering drawing
C114.2	Construct the conic curves, involutes and cycloid.
C114.3	Solve practical problems involving projection of lines.
C114.4	Draw the orthographic, isometric and perspective projections of simple solids.
C114.5	Draw the development of simple solids.

C115	EC3251	Circuit Analysis
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Course Outcomes (Cos)

C115.1	Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits.
C115.2	Apply suitable network theorems and analyze AC and DC circuits
C115.3	Analyze steady state response of any R, L and C circuits

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C115.4	Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.
C115.5	Analyze the coupled circuits and network topologies

C117	GE3271	Engineering Practices Laboratory
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Course Outcomes (Cos)

C117.1	Draw pipeline plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
C117.2	Wire various electrical joints in common household electrical wire work.
C117.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
117.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

C118	EC3271	Circuits Analysis Laboratory
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Course Outcomes (Cos)

C118.1	Design RL and RC circuits.
C118.2	Verify Thevenin & Norton theorem, KVL & KCL, and Superposition Theorems.

C119	GE3272	Communication Laboratory / Foreign Language \$
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Course Outcomes (Cos)

C119.1	Speak effectively in group discussions held in formal / semi formal contexts.
C119.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
C119.3	Write emails, letters and effective job applications.
C119.4	Write critical reports to convey data and information with clarity and precision
C119.5	Give appropriate instructions and recommendations for safe execution of tasks



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Anna University Regulations

2021 Second Year Courses (III & IV Semester)

r) Course Outcomes (COs)

C201	MA3355	Random Processes and Linear Algebra
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Course Outcomes (Cos)

C201.1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
C201.2	Demonstrate accurate and efficient use of advanced algebraic techniques.
C201.3	Apply the concept of random processes in engineering disciplines.
C201.4	Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.
C201.5	Understand the basic concepts of one and two dimensional random variables and apply them to model engineering problems.

C202	CS3353	C Programming and Data Structures
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Course Outcomes (Cos)

C202.1	Develop C programs for any real world/technical application.
C202.2	Apply advanced features of C in solving problems.
C202.3	Write functions to implement linear and non-linear data structure operations.
C202.4	Suggest and use appropriate linear/non-linear data structure operations for solving a given problem.
C202.5	Appropriately use sort and search algorithms for a given application.
C202.6	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

C203	EC3354	Signals and Systems
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Course Outcomes (Cos)

C203.1	determine if a given system is linear/causal/stable
C203.2	determine the frequency components present in a deterministic signal

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C203.3	characterize continuous LTI systems in the time domain and frequency domain
C203.4	characterize discrete LTI systems in the time domain and frequency domain
C203.5	compute the output of an LTI system in the time and frequency domains

C204	EC3353	Electronic Devices and Circuits
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Course Outcomes (Cos)

C204.1	Explain the structure and working operation of basic electronic devices.
C204.2	Design and analyze amplifiers.
C204.3	Analyze frequency response of BJT and MOSFET amplifiers
C204.4	Design and analyze feedback amplifiers and oscillator principles.
C204.5	Design and analyze power amplifiers and supply circuits

C205	EC3351	Control Systems
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Course Outcomes (Cos)

C205.1	Compute the transfer function of different physical systems.
C205.2	Analyze the time domain specification and calculate the steady state error.
C205.3	Illustrate the frequency response characteristics of open loop and closed loop system response.
C205.4	Analyze the stability using Routh and root locus techniques.
C205.5	Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.

C206	EC3352	Digital Systems Design
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Course Outcomes (Cos)

C206.1	Use Boolean algebra and simplification procedures relevant to digital logic.
C206.2	Design various combinational digital circuits using logic gates.
C206.3	Analyze and design synchronous sequential circuits.
C206.4	Analyze and design asynchronous sequential circuits.
C206.5	Build logic gates and use programmable devices

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C207	EC3361	Electronic Devices and Circuits Laboratory
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Course Outcomes (Cos)

C207.1	Characteristics of PN Junction Diode and Zener diode.
C207.2	Design and Testing of BJT and MOSFET amplifiers.
C207.3	Operation of power amplifiers.

C208	CS3362	C Programming and Data Structures Laboratory
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Course Outcomes (Cos)

C208.1	Use different constructs of C and develop applications
C208.2	Write functions to implement linear and non-linear data structure operations
C208.3	Suggest and use the appropriate linear/non-linear data structure operations for a given problem
C208.4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
C208.5	Implement Sorting and searching algorithms for a given application

C209	GE3361	Professional Development^s
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Course Outcomes (Cos)

C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

C210	EC3452	Electromagnetic Fields
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Course Outcomes (Cos)

C210.1	Relate the fundamentals of vector, coordinate system to electromagnetic concepts
C210.2	Analyze the characteristics of Electrostatic field
C210.3	Interpret the concepts of Electric field in material space and solve the boundary conditions

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C210.4	Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.
C210.5	Determinethesignificanceoftimevaryingfields

C211	EC3401	NetworksandSecurity
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Course Outcomes (Cos)

C211.1	Explain the Network Models, layers and functions.
C211.2	Categorizeandclassifytheroutingprotocols
C211.3	Listthefunctionsofthetransportandapplicationlayer.
C211.4	Evaluateandchoosethenetworksecuritymechanisms.
C211.5	Discussthehardwaresecurityattacksandcountermeasures.

C212	EC3451	LinearIntegratedCircuits
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Course Outcomes (Cos)

C212.1	DesignlinearandnonlinearapplicationsofOP–AMPS
C212.2	Design applications using analog multiplier and PLL
C212.3	Design ADC and DAC using OP – AMPS
C212.4	GeneratewaveformsusingOP–AMPCircuits
C212.5	Analyze special function ICs

C213	EC3492	DigitalSignalProcessing
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Course Outcomes (Cos)

C213.1	Apply DFT for the analysis of digital signals and systems
C213.2	DesignIIRandFIRfilters
C213.3	Characterizetheeffectsoffiniteprecisionrepresentationondigitalfilters
C213.4	Designmultiratefilters
C213.5	Apply adaptive filters appropriately in communication systems

C214	EC3491	CommunicationSystems
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Course Outcomes (Cos)

C214.1	Gain knowledge in amplitude modulation techniques
C214.2	UnderstandtheconceptsofRandomProcesstothedesignofcommunicationsystems
C214.3	Gainknowledgeindigitaltechniques

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C214.4	Gain knowledge in sampling and quantization
C214.5	Understand the importance of demodulation techniques

C215	GE3451	Environmental Sciences and Sustainability
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Course Outcomes (Cos)

C215.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
C215.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
C215.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
C215.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
C215.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

C216	EC3461	Communication Systems Laboratory
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Course Outcomes (Cos)

C216.1	Design AM, FM & Digital Modulators for specific applications.
C216.2	Compute the sampling frequency for digital modulation
C216.3	Simulate & validate the various functional modules of Communication system.
C216.4	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.
C216.5	Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication system.

C217	EC3462	Linear Integrated Circuits Laboratory
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Course Outcomes (Cos)

C217.1	Analyze various types of feedback amplifiers
C217.2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
C217.3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators, filters using SPICE Tool.
C217.4	Design amplifiers, oscillators, D-A converters using operational amplifiers.
C217.5	Design filters using op-amp and perform an experiment on frequency response



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Anna University Regulations 2021

Third Year Courses (V & VI Semester)

Course Outcomes (COs)

C301	EC3501	Wireless Communication
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Course Outcomes (Cos)

C301.1	Understand The Concept And Design Of A Cellular System.
C301.2	Understand Mobile Radio Propagation And Various Digital Modulation Techniques.
C301.3	Understand The Concepts Of Multiple Access Techniques And Wireless Networks
C301.4	Characterize a wireless channel and evolve the system design specifications
C301.5	Design a cellular system based on resource availability and traffic demands.

C302	EC3552	VLSI and Chip Design
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Course Outcomes (Cos)

C302.1	In depth knowledge of MOS technology
C302.2	Understand Combinational Logic Circuits and Design Principles
C302.3	Understand Sequential Logic Circuits and Clocking Strategies
C302.4	Understand Memory architecture and building blocks
C302.5	Understand the ASIC Design Process and Testing.

C303	EC3551	Transmission Lines and RF Systems
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Course Outcomes (Cos)

C303.1	Explain the characteristics of transmission lines and its losses.
C303.2	Calculate the standing wave ratio and input impedance in high frequency transmission lines.
C303.3	Analyze impedance matching by stubs using Smith Charts.
C303.4	Comprehend the characteristics of TE and TM waves.
C303.5	Design an RF transceiver system for wireless communication

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C360	CEC331	4G /5G COMMUNICATION NETWORKS
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Course Outcomes (Cos)

C360.1	To understand the evolution of wireless networks
C360.2	To learn the concepts of 5G networks.
C360.3	To comprehend the 5G architecture and protocols
C360.4	To understand the dynamic spectrum management
C360.5	To learn the security aspects in 5g networks

C323	CEC366	Image processing
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Course Outcomes (Cos)

C323.1	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
C323.2	Operate on images using the techniques of smoothing, sharpening and enhancement
C323.3	Understand the restoration concepts and filtering techniques
C323.44	Learn the basics of segmentation, feature extraction, compression and recognition methods for color models.
C323.5	Comprehend image compression concepts

C355	CEC352	satellite communication
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Course Outcomes (Cos)

C355.1	Identify the satellite orbits
C355.2	Analyze the satellite subsystems
C355.3	Evaluate the satellite link power budget
C355.4	Identify access technology for satellite
C355.5	Design various satellite applications

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C304	EC3561	VLSI Laboratory
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Course Outcomes (Cos)

C304.1	Write HDL code for basic as well as advanced digital integrated circuit
C304.2	Import the logic modules into FPGA Boards
C304.3	Synthesize Place and Route the digital IPs
C304.4	Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools
C304.5	Test and Verification of IC design

C305	ET3491	Embedded Systems and IOT Design
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Course Outcomes (Cos)

C305.1	Explain the architecture and features of 8051.
C305.2	Develop a model of an embedded system.
C305.3	List the concepts of real time operating systems.
C305.4	Learn the architecture and protocols of IoT.
C305.5	Design an IoT based system for any application.

C306	CS3491	Artificial Intelligence and Machine Learning
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Course Outcomes (Cos)

C306.1	Use appropriate search algorithms for problem solving
C306.2	Apply reasoning under uncertainty
C306.3	Build supervised learning models
C306.4	Build ensemble and unsupervised models
C306.5	Build deep learning neural network models

C333	CEC349	RFID SYSTEM DESIGN AND TESTING
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Course Outcomes (Cos)

C333.1	Classify RFID systems based on frequency, architecture and performance
C333.2	Define standards for RFID technology
C333.3	Illustrate the operation of various components of RFID systems
C333.4	Describe the privacy and security issues in RFID Systems
C333.5	Discuss the construction and applications of RFID enabled sensor

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C356	CEC348	REMOTE SENSING
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Course Outcomes (Cos)

C356.1	To understand the principles of electromagnetic radiation
C356.2	To learn the atmospheric radiation interactions.
C356.3	To study the laws of planetary motion
C356.4	To classify the different types of resolution
C356.5	To know the concepts of digital interpretation

C358	CEC345	OPTICAL COMMUNICATION & NETWORKS
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Course Outcomes (Cos)

C358.1	Realize Basic Elements In Optical Fibers, Different Modes And Configurations.
C358.2	Analyze The Transmission Characteristics Associated With Dispersion And Polarization Techniques.
C358.3	Design Optical Sources And Detectors With Their Use In Optical Communication System.
C358.4	Construct Fiber Optic Receiver Systems, Measurements And Techniques
C358.5	Design Optical Communication Systems And Its Networks.

C369	MX3089	INDUSTRIAL SAFETY
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Course Outcomes (Cos)

C369.1	Understand the basic concept of safety.
C369.2	Obtain knowledge of Statutory Regulations and standards.
C369.3	Know about the safety Activities of the Working Place
C369.4	Analyze on the impact of Occupational Exposures and their Remedies
C369.5	Obtain knowledge of Risk Assessment Techniques.

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C349	CEC367	Industrial IoT and industry 4.0
Course Outcomes (Cos)		
C349.1	Understand the building blocks of IoT technology and explore the vast spectrum of IoT applications	
C349.2	Use processors & peripherals to design & build IoT hardware	
C349.3	Assess, select and customize technologies for IoT applications	
C349.4	Connect numerous IoT applications with the physical world of humans and real life problem solving	
C349.5	Design and implement IoT applications that manage big data	

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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Third Year Courses (VII & VIII Semester)

Course Outcomes (COs)

C401	GE3791	Human Values and Ethics
Course Outcomes (Cos)		
C401.1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life	
C401.2	Practice democratic and scientific values in both their personal and professional life.	
C401.3	Find rational solutions to social problems.	
C401.4	Behave in an ethical manner in society	
C401.5	Practice critical thinking and the pursuit of truth	

C509	EC3711	Summer internship
Course Outcomes (Cos)		
C509.1	System-level design processes, verification and validation techniques, manufacturing and production processes in the firm or research facilities in the laboratory/research institute	
C509.2	Analysis of industrial / research problems and their solutions	
C509.3	Documentation of system specifications, design methodologies, process parameters, testing parameters and results	
C509.4	Preparing of technical report and presentation	

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C457	OBT354	Fundamentals of molecular and cell biology
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Course Outcomes (Cos)

C45.1	Understanding of cell at structural and functional level.
C45.2	Understand the central dogma of life and its significance
C45.3	Comprehend the basic mechanisms of cell division

C402	GE3751	principles of management
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Course Outcomes (Cos)

C402.1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling.
C402.2	Have some basic knowledge on international aspect of management.
C402.3	Ability to understand management concept of organizing
C402.4	Ability to understand management concept of directing
C402.5	Ability to understand management concept of controlling

C480	OMR353	Sensors
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Course Outcomes (Cos)

C480.1	Understand various sensor effects, sensor characteristics, signal types, calibration methods and obtain transfer function and empirical relation of sensors. They can also analyze the sensor response
C480.2	Analyze and select suitable sensor for displacement, proximity and range measurement.
C480.3	Analyze and select suitable sensor for force, magnetic field, speed, position and direction measurement
C480.4	Analyze and Select suitable sensor for light detection, pressure and temperature measurement and also familiar with other miniaturized smart sensors
C480.5	Select and design suitable signal conditioning circuit with proper compensation and linearizing element based on sensor output signal.

C510	EC3811	PROJECT WORK/ INTERNSHIP
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Course Outcomes (Cos)

C510.1	Formulate and analyze problem / create a new product/ process.
C510.2	Design and conduct experiments to find solution
C510.3	Analyze the results and provide solution for the identified problem, prepare project report and make presentation.