



MALLAREDDY ENGINEERING COLLEGE AND MANAGEMENT SCIENCES
 (Approved by AICTE New Delhi & Affiliated to JNTU Hyderabad)
 Kistapur Village, Medchal, Medchal District-501401

DEPT. OF ELECTRONICS & COMMUNICATION ENGINEERING						
R18 - COURSE OUTCOMES						
S. No	CLASS	REGULATION	Subject	Course Code	CO's	Course Oucomes
1	I/I	R-18	Mathematics - I Complex Variables	MA101BS	CO-1	Write the matrix representation of a set of linear equations and to analyse the solution
					CO-2	of the system of equations
					CO-3	Find the Eigen values and Eigen vectors.Reduce the quadratic form to canonical form using orthogonal transformations
					CO-4	Analyse the nature of sequence and series.
					CO-5	Solve the applications on the mean value theorems. Evaluate the improper integrals using Beta and Gamma functions
2	I/I	R-18	Applied Physics	AP102BS	CO-1	Learn the fundamental concepts on Quantum behaviour of matter in its microstate
					CO-2	Understand the of fundamentals of Semiconductor Physics, Optoelectronics which enable the students to apply to various systems like communication, solar cell, photocell etc.,
					CO-3	Learn the principle, working of various Laser systems and light propagation through Optical Fibers
					CO-4	Design, Characterize, and study the properties of materials and to prepare new materials for various engineering applications
					CO-5	Understand the Laws of Electro magnetism and get an exposure on Magnetic and Dielectric materials
3	I/I	R-18	Programming for Problem Solving	CS103ES	CO-1	Understand and analyze the different types of diodes, operations and its characteristics
					CO-2	Design and analyze the DC bias circuitry of BJT and FET
					CO-3	Design biasing circuits using diodes and transistors
					CO-4	Analyze and design diode application circuits amplifier circuits
					CO-5	Analyze and design oscillators employing BJT, FET devices
4	I/I	R-18	Engineering Graphics	ME104ES	CO-1	Make use of the knowledge of geometry and Engineering curves for constructions.
					CO-2	Make use of the knowledge of geometry and Engineering curves for constructions.
					CO-3	Construct various types of scales
					CO-4	Analyze the objects such as points, lines and regular planes held in different orientations using conventional drawing and CAD tools.
					CO-5	Develop the lateral surface for sheet metal work.
					CO-1	Understand the characteristics of Photo emitters and Photo detectors

5	I/I	R-18	Applied Physics Lab	AP105BS	CO-2	Construct RC & LCR circuit in Series and parallel.
					CO-3	Study the magnetic field variation along the axis of the circular coil carrying current.
					CO-4	Understand the working of Optical fiber and find the values of Numerical Aperture and Bending Losses.
					CO-5	Find the value of Energy gap and Hall coefficient of a given semiconductor material.
6	I/I	R-18	Programming for Problem Solving Lab	CS106ES	CO-1	To design algorithm, flowchart and pseudopodia
					CO-2	Develop c programs using control structures
					CO-3	Develop c programs using functions , arrays and memory management
					CO-4	Develop c programs for file processing
					CO-5	Develop c programs for processing strings .Develop c programs to organize and search for data
7	I/I	R-18	Environmental Science	*MC109ES	CO-1	Define basic definitions and can explain complex relationship between Predators, Prey and the plant community
					CO-2	Categorize resources in natural environment and its relationships with human activities as well as human impacts.
					CO-3	Demonstrate an awareness, knowledge and appreciation of the intrinsic values of ecological processes and communities
					CO-4	Assess different scientific research strategies, including collection, management, evaluation and interpretation of environmental data and role of information technology in environment
					CO-5	Examine the transnational character of environmental problems, protection acts and ways of addressing them, including interactions across local to global scales.
8	I/II	R-18	Mathematics - II	MA201BS	CO-1	Identify whether the given differential equation of first order is exact or not.Applications of first order differential equations
					CO-2	Solve higher differential equation and apply the concept of differential equation to real world problems.
					CO-3	Evaluate the multiple integrals and apply the concepts to find areas, volumes, center of mass and gravity for cubes, sphere and rectangular parallelepiped.
					CO-4	The physical quantities involved in engineering field related to vector valued functions
					CO-5	Evaluate the line, surface and volume integrals and converting them from one to another.
9	I/II	R-18	Chemistry	CH202BS	CO-1	The knowledge of atomic, molecular and electronic changes, band theory related to conductivity
					CO-2	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost
					CO-3	The required principles and concepts of electrochemistry,corrosion and in

					CO-4	understanding the problem of water and its treatments.electrochemistry
					CO-5	The knowledge of configurational and conformational analysis of molecules and reaction mechanisms
10	I/II	R-18	Basic Electrical Engineering	EE203ES	CO-1	To analyze and solve electrical circuits using network laws and theorems.
					CO-2	To understand and analyze basic Electric and Magnetic circuits. Representation of AC Quantities
					CO-3	To understand working principle, operation of transformers and its types.
					CO-4	To study the working principles of Electrical Machines.
					CO-5	To introduce components of Low Voltage Electrical installations and gain the knowledge on batteries and Protective Equipments.
11	I/II	R-18	Engineering Workshop	ME205ES	CO-1	Study and practice on machine tools and their operations
					CO-2	Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding
					CO-3	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiselling
					CO-4	Apply basic electrical engineering knowledge for house wiring practice.
					CO-5	Practice on Block smithy of components using workshops
12	I/II	R-18	English	EN205HS	CO-1	Use English Language effectively in spoken and written forms.
					CO-2	Comprehend the given texts and respond appropriately.
					CO-3	Communicate confidently in various contexts and different cultures.
					CO-4	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
					CO-5	Apply new oral vocabulary words in context to reinforce meaning.
13	I/II	R-18	Engineering Chemistry Lab	CH206BS	CO-1	Students are able to determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
					CO-2	Students are analyzing the various water samples with different methods and various water treatment methods for industrial usages.
					CO-3	Students are able to able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases
					CO-4	Students are able to prepare polymers like Bakelite and nylon-6.
					CO-5	Students are able to estimations saponification value, surface tension and viscosity of lubricant oils
14	I/II	R-18	English Language and Communication Skills Lab	EN207HS	CO-1	Better understanding of nuances of English language through audio- visual experience and group activities
					CO-2	Speak clearly with the right accent and intonation
					CO-3	Speaking skills with clarity and confidence which in turn enhances their employability skills
					CO-4	Neutralization of accent for intelligibility
					CO-5	Understand and apply knowledge of human communication and language process.

15	I/II	R-18	Basic Electrical Engineering Lab	EE208ES	CO-1	Get an exposure to basic electrical laws.
					CO-2	Understand the response of different types of electrical circuits to different excitations
					CO-3	Understand the measurement, calculations and relation between the basic electrical parameters
					CO-4	Understand the basic characteristics of transformers and connections
					CO-5	To Assess the performance of different machines using different methods.
16	II/I	R-18	Electronic Devices and Circuits Complex Variables	EC301PC	CO-1	Understand and analyze the different types of diodes, operations and its characteristics
					CO-2	Design and analyze the DC bias circuitry of BJT and FET
					CO-3	Design biasing circuits using diodes and transistors
					CO-4	Analyze and design diode application circuits amplifier circuits
					CO-5	Analyze and design oscillators employing BJT, FET devices
17	II/I	R-18	Network Analysis and Transmission Lines	EC302PC	CO-1	Gain the knowledge on basic RLC circuits behavior.
					CO-2	Analyze the Steady state and transient analysis of RLC Circuits.
					CO-3	Know the characteristics of two port network parameters.
					CO-4	Understand the transmission line parameters and configurations.
					CO-5	Analyze the transmission line parameters and configurations.
18	II/I	R-18	Digital System Design	EC303PC	CO-1	Understand the numerical information in different forms and Boolean Algebra theorems
					CO-2	Postulates of Boolean algebra and to minimize combinational functions
					CO-3	Design and analyze combinational circuits
					CO-4	Design and analyze sequential circuits
					CO-5	Known about the logic families and realization of logic gates.
19	II/I	R-18	Signals and Systems	EC304PC	CO-1	Formulate a given arbitrary signal in terms of complete set of orthogonal functions.
					CO-2	Express periodic signals in terms of Fourier series.
					CO-3	Extrapolate the filter characteristics of a system.
					CO-4	Evaluate a system response using Laplace transform properties.
					CO-5	Establish the relation between Fourier and Laplace transforms.
20	II/I	R-18	Probability Theory and Stochastic Processes	EC305ES	CO-1	Understand the concepts of Random Process and its Characteristics.
					CO-2	Understand the response of linear time Invariant system for a Random Processes.
					CO-3	Determine the temporal characteristics of Random Signals.
					CO-4	Determine the Spectral characteristics of Random Signals.
					CO-5	Understand the concepts of Noise in Communication systems.
					CO-1	Apply the concepts and analytical principles to analyze electronic (diodes, transistors, op-amps) circuits.

21	II/I	R-18	Electronic Devices and Circuits Lab	EC306PC	CO-2	Understand the operation of op-amps, diodes and transistors in order to build circuits.
					CO-3	Conduct experiments involving electric and electronic components and to analyze and interpret the measurements results.
					CO-4	Design, construct and characterize electric and electronic circuits according to specification.
					CO-5	Quantify their ability to communicate effectively through weekly written reports and lab notebooks.
22	II/I	R-18	Digital System Design Lab	EC307PC	CO-1	Understand the pin description of digital IC's
					CO-2	Implement Arithmetic logic circuits using digital IC's.
					CO-3	Implement combinational circuits using digital IC's.
					CO-4	Apply concept of universal logic gates for digital circuit designing.
					CO-5	Examine the behavior of sequential circuits using digital IC's.
23	II/I	R-18	Basic Simulation Laboratory	EC308PC	CO-1	Generate, analyze and perform various operations on Signals/Sequences both in time and Frequency domain
					CO-2	Analyze and Characterize Continuous and Discrete Time Systems both in Time and Frequency domain along with the concept of Sampling
					CO-3	Generate different Random Signals and capable to analyze their Characteristics
					CO-4	Apply the Concepts of Deterministic and Random Signals for Noise removal Applications and on other Real Time Signals
					CO-5	Understand autocorrelation and cross correlation between signals and sequences .
24	II/I	R-18	Constitution of India	*MC309	CO-1	Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
					CO-2	To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
					CO-3	To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.
25	II/II	R-22	Laplace Transforms, Numerical Methods & Complex Variables	MA401BS	CO-1	Use the Laplace transforms techniques for solving ODE's
					CO-2	Find the root of a given equation.
					CO-3	Estimate the value for the given data using interpolation
					CO-4	Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems.
					CO-5	Understand Taylor's and Laurent's series expansions of complex Function
					CO-1	Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields.

26	II/II	R-18	Electromagnetic Fields and Waves	EC402PC	CO-2	Get the knowledge of Basic Laws, Concepts and proofs related to Magnetostatic Fields.
					CO-3	Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
					CO-4	Analyze the Wave Equations for good conductors, good dielectrics and evaluate the UPW Characteristics for several practical media of interest.
					CO-5	Analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems.
27	II/II	R-22	ANALOG AND DIGITAL COMMUNICATIONS	EC403PC1	CO-1	Analyze and design of various continuous wave and amplitude modulation and demodulation techniques
					CO-2	Understand the effect of noise present in continuous wave and angle modulation techniques.
					CO-3	Attain the knowledge about AM , FM Transmitters and Receivers
					CO-4	Analyze and design the various Pulse Modulation Techniques.
					CO-5	Understand the concepts of Digital Modulation Techniques and Baseband transmission.
28	II/II	R-18	Linear IC Applications	EC404PC	CO-1	Understand and analyze the IC 741 operational amplifier and its characteristics.
					CO-2	Design the solution for linear & non-linear applications using IC741
					CO-3	Elucidate and design the active filters and oscillators.
					CO-4	Attain the knowledge of functional diagrams and applications of IC 555 and IC 565
					CO-5	Acquire the knowledge about the Data converters.
29	II/II	R-18	ELECTRONIC CIRCUIT ANALYSIS	EC405PC	CO-1	Design and analysis of the DC bias circuitry of BJT
					CO-2	Design and analysis of the DC bias circuitry of FET
					CO-3	Analyze the different types of the amplifiers, operation and its characteristics
					CO-4	Design circuit like amplifiers.
					CO-5	Design circuit like oscillators using the transistors, diodes
30	II/II	R-18	ANALOG AND DIGITAL COMMUNICATIONS LABARATORY	EC406PC	CO-1	Demonstrate generation and detection of analog and digital modulation techniques.
					CO-2	Explain sampling, PCM, delta modulation, adaptive delta modulation and superheterodyne receiver.
					CO-3	Compare the different analog and digital modulation techniques.
					CO-4	Distinguish various line coding schemes used for digital data transmission.
					CO-5	Apply time division multiplexing concepts in different pulse modulation techniques.
					CO-1	Understand the basics of Op-Amp and implement the linear applications of 741 IC

31	II/II	R-18	IC Applications Lab	EC407PC	CO-2	Design the first order filters and generate different types of input signals using 741 IC
					CO-3	Design the multivibrator circuits using IC555 and determine the frequency of oscillation
					CO-4	Determine the Hysteresis voltage of Schmitt trigger using 741 Op-Amp
					CO-5	Construct and analyze voltage regulator circuits
32	II/II	R-18	ELECTRONIC CIRCUIT ANALYSIS LABORATORY	EC408PC	CO-1	Design common emitter amplifier, two stage RC coupled amplifier and simulate in simulation laboratory using Multi-Sim software
					CO-2	Design feedback amplifiers and simulate in simulation laboratory using Multi-Sim software
					CO-3	Design phase shift oscillators and simulate it in simulation laboratory using Multi-Sim software
					CO-4	Design class A, class B complimentary symmetry amplifier and simulate in simulation laboratory using Multi-Sim software
					CO-5	Quantify their ability to communicate effectively through weekly written reports and lab notebooks.
33	II/II	R-18	GENDER SENSITIZATION LAB	*MC409	CO-1	To develop students' sensibility with regard to issues of gender in contemporary India and To expose the students to debates on the politics and economics of work
					CO-2	To provide a critical perspective on the socialization of men and women.
					CO-3	To introduce students to information about some key biological aspects of genders.
					CO-4	To help students reflect critically on gender violence.
					CO-5	To expose students to more egalitarian interactions between men and women.
34	III/I	R-18	Microprocessors & Microcontrollers	EC501PC	CO-1	Understand the principle of operation of Intel 8086 microprocessor
					CO-2	Execute assembly language programs on Intel 8086 including ascending order and descending order of data, string operations
					CO-3	Integrate Intel 8086 processor with 8255, DMA controller, Intel 8259, USART to develop the microprocessor based system
					CO-4	Develop and run program of Intel 8051 microcontroller
					CO-5	Analyze architecture and interrupt structure of RISC microcontrollers
35	III/I	R-18	Data Communications and Networks	EC502PC	CO-1	Understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model.
					CO-2	Understand various types of transmission media, network devices; and parameters of evaluation of performance for each media and device.
					CO-3	Understand the concept of flow control, error control and LAN protocols; to explain the design of, and algorithms used in, the physical, data link layers.

					CO-4	Understand the functions performed by a Network Management System and to analyze connection establishment and congestion control with respect to TCP Protocol.
					CO-5	Understand the principles and operations behind various application layer protocols like HTTP, SMTP, FTP.
36	III/I	R-18	Control Systems	EC503PC	CO-1	Describe the feedback control
					CO-2	Describe basic components of control systems
					CO-3	Analyze various time domain methodologies for the design of linear control systems
					CO-4	Analyze frequency domain methodologies for the design of linear control systems
					CO-5	Analyze methods of stability analysis of systems from transfer function forms and able to develop the state space models for various systems
37	III/I	R-18	Business Economics & Financial Analysis	SM504MS	CO-1	Understand the various Forms of Business and the impact of economic variables on the Business.
					CO-2	Analyse the Demand and Supply requirements of the firm,
					CO-3	Understand Production, Cost, Market Structure, Pricing aspects.
					CO-4	Interpret the firm's financial position of a Company.
					CO-5	Analyze the Financial Statements of a Company.
38	III/I	R-18	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	EC504PC	CO-1	provides an understanding of various measuring system functioning and metrics for performance analysis.
					CO-2	Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
					CO-3	Understanding the concepts of various measuring bridges and their balancing conditions.
					CO-4	Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.
					CO-5	Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers and bridges
39	III/I	R-18	Microprocessors & Microcontrollers Lab	EC505PC	CO-1	Demonstrate MASM assembler programming.
					CO-2	Develop an ALP in 8086 and its interfacing circuits.
					CO-3	Develop an ALP in 8051 for parallel ports and timers
					CO-4	Develop an ability in designing a microprocessor and microcontroller systems
					CO-5	Apply standard test and measurement equipment to evaluate digital interfaces.
					CO-1	Understand fundamental underlying principles of computer networking

40	III/I	R-18	Data Communications and Networks Lab	EC506PC	CO-2	Apply mathematical foundations to solve computational problems in computer networking
					CO-3	Analyze performance of various communication protocols.
					CO-4	Compare routing algorithms
					CO-5	Practice packet /file transmission between nodes.
41	III/I	R-18	Advanced Communication Skills Lab	EN508HS	CO-1	Develop their LSRW skills
					CO-2	Overcome their Mother tongue influence
					CO-3	Express/interpret their views without hesitation
					CO-4	Lose their stage fear and develop self-confidence
42	III/I	R-18	Intellectual Property Rights	*MC510	CO-1	Discuss the fundamental aspects of Intellectual property Rights which play a major role in development and management of innovative projects in industries.
					CO-2	Examine Trademarks, Acquisition of Trade Mark Rights and its registration processes.
					CO-3	Evaluate various aspects relating to copyrights and its procedure for registration processes.
					CO-4	Evaluate with the Trade Secret Law, protection for submission, Unfair Competition
43	III/II	R-18	Antennas and Propagation	EC601PC	CO-1	Understand the parameter consideration viz antenna efficiency, beam efficiency etc.
					CO-2	Design antenna and field evaluation under various conditions
					CO-3	Understand the array system of the different antennas , will gain knowledge of about means of propagation of EM WAVES i.e., free space propagation
					CO-4	Understand the design issues, operations of fundamental antennas like yagi-uda, horn antenna etc..
44	III/II	R-18	Digital Signal Processing	EC602PC	CO-1	Students will be able to understand LTI system characteristics and Multirate signal processing.
					CO-2	Students will be able to represent inter-relationship between DFT and various transforms.
					CO-3	Students will be able to design a digital IIR filter for a given specification.
					CO-4	Students will be able to design a digital FIR filter for a given specification.
					CO-5	Students will be able to acknowledge the significance of various filter structures and effects of round off errors.
					CO-1	Understand operation of a MOS transistor

45	III/II	R-18	VLSI Design	EC603PC	CO-2	Understand down to physical level and relate the knowledge to the development of its operational equations
					CO-3	Analyze and implement various logic gates and circuits, using MOS Transistors
					CO-4	Design circuit components and verify their performance using simulation tools
					CO-5	Design static CMOS Combinational circuits
46	III/II	R-18	EMBEDDED SYSTEM DESIGN	EC603PC	CO-1	Express any periodic function in terms of sine and cosine
					CO-2	Find the root of a given polynomial and transcendental equations.
					CO-3	Estimate the value for the given data using interpolation
					CO-4	Find the numerical solutions for a given first order ODE's
47	III/II	R-18	BASIC SENSORS TECHNOLOGY	OE603PC	CO-5	Analyze the complex function with reference to their analyticity, integration using Cauchy' integral and residue theorems
					CO-1	To provide basic knowledge in transduction principles, sensors and transducer technology and measurement systems.
					CO-2	To provide better familiarity with the Theoretical and Practical concepts of Transducers
					CO-3	To provide familiarity with different sensors and their application in real life.
					CO-4	To provide the knowledge of various measurement methods of physical and electrical parameters
48	III/II	R-18	Digital Signal Processing Lab	EC604PC	CO-5	To provide the knowledge of various calibration and interfacing devices
					CO-1	Develop and Implement DSP algorithms in software using a computer language such as C with TMS320C6713 floating point Processor.
					CO-2	Develop various DSP Algorithms using MATLAB Software package.
					CO-3	Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth, Chebyshev filters.
					CO-4	Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques.
49	III/II	R-18	e – CAD Lab	EC605PC	CO-5	Design and Analyze Digital Filters using FDA Tool.
					CO-1	Understand the physical design process of Digital Integrated Circuits.
					CO-2	Describe procedure for designing of programmable circuits.
					CO-3	Demonstrate the ability to use various EDA tools for digital system design
					CO-4	Implement various combinational and sequential circuits using VHDL on FPGA.

					CO-5	Implement schematic and layout of various digital CMOS logic circuits using EDA tools.
50	III/II	R-18	Scripting Languages Lab	EC606PC	CO-1	Outline Functional, Logic and Scripting Programming Language Concept
					CO-2	Design and test programs to solve mathematical problems
					CO-3	Develop programs Using Ruby Script
					CO-4	Develop Programs Using TCL Script
					CO-5	Develop Programs Using Perl Script
51	III/II	R-18	Environmental Science	*MC609	CO-1	Understand technologies on the basis of ecological principles and environmental regulations
					CO-2	Evaluate technologies on the basis of ecological principles and environmental regulations
					CO-3	Develop technologies on the basis of ecological principles and environmental regulations
					CO-4	Understand the impacts of developmental activities and mitigation measures
					CO-5	Understand the importance of ecological balance for sustainable development
52	IV/I	R-18	Microwave and Optical Communications	EC701PC	CO-1	Understand power generation at microwave frequencies and derive the performance characteristics.
					CO-2	Comprehend the need for solid state microwave sources and understand the principles of solid state devices.
					CO-3	Distinguish between the different types of waveguide and ferrite components, and select proper components for engineering applications
					CO-4	Understand the utility of S-parameters in microwave component design and learn the measurement procedure of various microwave parameters.
					CO-5	Understand the mechanism of light propagation through Optical Fibres.
53	IV/I	R-18	DIGITAL IMAGEING PROCESSING	EC713PE	CO-1	Known about basics of Linux and Linux Networking
					CO-2	Use Linux environment and write programs for automation
					CO-3	Understanding the Perl by utilizing the advanced features
					CO-4	Categorize strengths and weakness TCL and select an appropriate language for solving a given problem
					CO-5	Create and run scripts using Python scripting language.
54	IV/I	R-18	DATABASE MANAGEMENT SYSTEMS	EC722PE	CO-1	Describe data models and schemas in DBMS
					CO-2	Understand the features of database management systems and Relational database.
					CO-3	Use SQL- the standard language of relational databases.
					CO-4	Understand the functional dependencies and design of the database.
					CO-5	Understand the concept of Transaction and Query processing.

55	IV/I	R-18	PYTHON PROGRAMMING	OE723OE	CO-1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
					CO-2	Demonstrate proficiency in handling Strings and File Systems.
					CO-3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
					CO-4	Interpret the concepts of Object-Oriented Programming as used in Python.
					CO-5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
56	IV/I	R-18	Professional Practice, Law & Ethics	SM702MS	CO-1	Inculcate moral values and become and socially responsible citizens of the society
					CO-2	Sense of right and wrong based on the moral philosophy and spirituality of our tradition
					CO-3	Aware of the problems of modern society and to make them understand the need for them as engineers and responsible citizens
					CO-4	Follow professional ethics and ethical practices in their profession
					CO-5	Sense of responsibility for the mankind and the need to practice harmonious and synergetic way of life respecting nature, environment and values
57	IV/I	R-18	Microwave and Optical Communications Lab	EC703PC	CO-1	Verify characteristics of Reflex Klystron.
					CO-2	Analyze various parameters of Waveguide Components.
					CO-3	Estimate the power measurements of RF Components such as directional Couplers.
					CO-4	Demonstrate characteristics of various optical sources.
					CO-5	Measure data Rate, Numerical Aperture and Losses in Optical Link.
58	IV/I	R-18	Industrial Oriented Mini Project/ Summer Internship	EC704PC	CO-1	Apply his/her knowledge to understand the industrial applications
					CO-2	Observe the process of problem identification its formulation and solution.
					CO-3	Prepare a detailed report on the work carried
					CO-4	Present in front of the evaluation committee and other participants
59	IV/I	R-18	Seminar	EC705PC	CO-1	Conduct the literature survey in his / her chosen work of the specialized engineering domain
					CO-2	Have the recent developments in the chosen work
					CO-3	Prepare a detailed report on the work carried
					CO-4	Present in front of the evaluation committee and other participants
60	IV/I	R-18	Project Stage - I	EC706PC	CO-1	Demonstrate the technical knowledge of their selected project topic.
					CO-2	Undertake problem identification, formulation and solution.
					CO-3	Design engineering solutions to complex problems utilizing a systems approach.
					CO-4	Work with practicing engineers
					CO-5	Demonstrate the knowledge and skills acquired during the course work
					CO-1	Demonstrate the CW and FMCW Radars, MTI

61	IV/II	R-18	Radar Systems	EC812PE	CO-2	Evaluate radar Signals in Noise.
					CO-3	Design of radar system with the knowledge of Radar Equation.
					CO-4	Understand the tracking of radar, its range, phase and scanning parameters.
					CO-5	Design of Matched filter to extract radar signals in noise.
					CO-1	Understand the operation of conventional and renewable electrical power generating stations.
62	IV/II	R-18	System on Chip Architecture	EC821PE	CO-2	Evaluate the power tariff methods and Economics associated with power generation.
					CO-3	Analyze the operations of AIS & GIS, Insulators and Distribution systems.
					CO-4	Able to develop the understanding of contingency Analysis.
					CO-5	Able to develop programs for power system studies.
					CO-1	Describe about basic concepts of Learning system, Learning Problems, Learning Task and mathematics behind machine learning.
63	IV/II	R-18	MACHINE LEARNING	CS821OC	CO-2	Explain the machine learning models and basic concepts of artificial neural network.
					CO-3	Apply regression, classification and clustering techniques of Machine learning.
					CO-4	Explain the concepts of Genetic algorithm and Reinforcement Learning.
					CO-5	Develop an appreciation for what is involved in learning from data.
					CO-1	Develop comprehensive solution of issues identified in project stage-1 and to meet the requirements as stated in project brief.
64	IV/II	R-18	Project Stage - II	EC801PC	CO-2	Synthesize the results of the detailed analytical studies conducted, lay down validity and design criteria, interpret the result for application to the problem, develop the concept and detailed design solution and to effectively communicate the thesis rationale.
					CO-3	Demonstrate the knowledge, skills and attitudes of a professional engineer.
					CO-4	Communicate with engineers and the community at large in written an oral forms.
					CO-5	Able to write effective technical report and demonstrate through presentation