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Dept: ECE- BTech (FT)

Mapping of COs and Pos

2019 regulation- UG (FT)

Sem	Course Code	Title of the Course	COs	POS											
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
I	19147S11	Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.	?	?	?	?	?	✓	✓	✓	✓	✓	✓	?

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	19148S12	Engineering Mathematics – I	• Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. • Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	✓	✓	✓	✓	?	?	?	?	?	?	✓	✓

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			• Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.											
	19149S13	Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications, • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, • The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in	✓	✓	✓	✓	?	?	?	?	?	?	✓	✓

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			expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques.											
	19149S14	Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	✓	✓	✓	✓	?	?	?	?	?	?	✓	✓

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	19154S15	Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects. • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.	✓									✓	✓	✓
	19150S16	Problem Solving and Python	• Develop algorithmic solutions to simple computational problems • Read, write, execute	✓	✓	✓	✓	✓						✓	✓

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		Programming	by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries. • Read and write data from/to files in Python Programs.											
	19150L17	Problem Solving and Python Programming Laboratory	• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them. • Use Python lists,	✓	✓	✓	✓	?	?	?	?	?	?	✓	✓

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			tuples, dictionaries for representing compound data. • Read and write data from/to files in Python.											
	19149L18	Physics and Chemistry Laboratory	Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications. • To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis. • To acquaint the students with the determination of molecular weight of a	✓	✓	✓	✓	?	?	?	?	?	?	✓	✓

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			polymer by viscometery.												
	191VEA19	Value Education	• To learn about philosophy of Life and Individual qualities • To learn and practice social values and responsibilities • To learn and practice mind culture, forces acting on the body • To learn more of Responsibilities and Rights as Professional and facing Global Challenges • Emerge as responsible citizen with clear conviction to be a role-model in the society.	?	?	✓	?	✓	?	✓	✓	✓	✓	✓	?
II	19147S21	Technical English	• Read technical texts and write area- specific texts effortlessly. • Listen and	?	?	?	?	✓	✓	✓	✓	✓	✓	✓	✓

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			comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.											
	19148S22	Engineering Mathematics – II	• Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume	✓	✓	✓	✓	?	?	?	?	?	?	✓	✓

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			integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.											
	19149S23B	Physics for Electronics Engineering	• Gain knowledge on classical and quantum electron theories, and energy band structuues, • Acquire knowledge on basics of semiconductor physics and its applications in various	✓	✓	✓	✓	?	?	?	?	?	?	✓	✓

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			devices, • Get knowledge on magnetic and dielectric properties of materials, • Have the necessary understanding on the functioning of optical materials for optoelectronics, • Understand the basics of quantum structures and their applications in spintronics and carbon electronics.											
	19153S24B	Basic Electrical and Instrumentation Engineering	• Understand the concept of three phase power circuits and measurement. • Comprehend the concepts in electrical generators, motors and transformers • Choose appropriate measuring instruments	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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			for given application											
	19152S25B	Circuit Analysis	• Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time • Design and understand and evaluate the AC and DC circuits.	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152S26B	Electronic Devices	• Explain the V-I characteristic of diode, UJT and SCR • Describe the equivalence circuits of transistors • Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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	19154L27	Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works. • Use welding equipments to join the structures. • Carry out the basic machining operations • Make the models using sheet metal works • Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings • Carry out basic home electrical works and appliances • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.	✓	✓	✓	✓	✓	?	?	?	?	?	✓	✓

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	19152L28B	Circuits and Devices Laboratory	• Analyze the characteristics of basic electronic devices • Design RL and RC circuits • Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems	✓	✓	✓	✓	✓	☐	☐	☐	☐	☐	✓	✓
	191ICA29	Fundamentals of Indian Constitution and Economy	• Understand the emergence and evolution of Indian Constitution. • Understand the structure and composition of Indian Constitution • Understand and analyse federalism in the Indian context. • Understand and analyse the three organs of the state in the contemporary scenario.	☐	☐	✓	☐	☐	✓	✓	✓	✓	✓	☐	☐

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			• Understand and Evaluate the Indian Political scenario amidst the emerging challenges.										
III	19148S31B	Linear Algebra and Partial Differential Equations	• Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts. • Demonstrate accurate and efficient use of advanced algebraic techniques. • Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements proven by the text. • Able to solve various	✓	✓	✓	✓	✓	?	?	?	?	?	✓	✓

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			types of partial differential equations. Able to solve engineering problems using Fourier series.												
	19152C32	Control Systems Engineering	• Identify the various control system components and their representations. • Analyze the various time domain parameters. • Analysis the various frequency response plots and its system. • Apply the concepts of various system stability criterions. • Design various transfer functions of digital control system using state variable models.	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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	19152C33	Fundamentals of Data Structures In C	• Implement linear and non-linear data structure operations using C • Suggest appropriate linear / non-linear data structure for any given data set. • Apply hashing concepts for a given problem • Modify or suggest new data structure for an application • Appropriately choose the sorting algorithm for an application	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152C34	Digital Electronics	• Use digital electronics in the present contemporary world • Design various combinational digital circuits using logic gates • Do the analysis and	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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			design procedures for synchronous and asynchronous sequential circuits • Use the semiconductor memories and related technology • Use electronic circuits involved in the design of logic gates												
	19152C35	Signals and Systems	• To be able to determine if a given system is linear/causal/stable • Capable of determining the frequency components present in a deterministic signal • Capable of characterizing LTI systems in the time domain and frequency	✓	✓	✓	✓	✓	✓					✓	✓

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			domain • To be able to compute the output of an LTI system in the time and frequency domains												
	19152C36	Electronic Circuits- I	• Acquire knowledge of o Working principles, characteristics and applications of BJT and FET o Frequency response characteristics of BJT and FET amplifiers • Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers • Apply the knowledge gained in the design of Electronic circuits	✓	✓	✓	✓	✓	✓					✓	✓
	19152L37	Fundamentals	• To understand and	✓	✓	✓	✓	✓	✓					✓	✓

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		of Data Structures In C Laboratory	implement basic data structures using C • To apply linear and non-linear data structures in problem solving. • To learn to implement functions and recursive functions by means of data structures • To implement searching and sorting algorithms												
	19152L38	Analog and Digital Circuits Laboratory	• Design and Test rectifiers, filters and regulated power supplies. • Design and Test BJT/JFET amplifiers. • Differentiate cascode and cascade amplifiers. • Analyze the limitation in bandwidth of single stage and multi stage	✓	✓	✓	✓	✓	✓					✓	✓

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			amplifier • Measure CMRR in differential amplifier • Simulate and analyze amplifier circuits using PSpice. • Design and Test the digital logic circuits.												
	19152L39	Interpersonal Skills / Listening & Speaking	• Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills. • Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities. • improve general and	?	?	?	?	?	?	?	?	?	?	?	?

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			academic listening skills • Make effective presentations.											
IV	19148S41B	Probability and Random Processes	• Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. • Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. • Apply the concept random processes in engineering disciplines. • Understand and apply the concept of correlation and spectral densities.	✓	✓	✓	✓	✓	?	?	?	?	?	✓	✓

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			• The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems.										
	19152C42	Electronic Circuits II	• Analyze different types of amplifier, oscillator and multivibrator circuits • Design BJT amplifier and oscillator circuits • Analyze transistorized amplifier and oscillator circuits • Design and analyze feedback amplifiers • Design LC and RC oscillators, tuned	✓	✓	✓	✓	✓	✓					✓	✓

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			amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors.										
	19152C43	Communication Theory	• Design AM communication systems • Design Angle modulated communication systems • Apply the concepts of Random Process to the design of Communication systems • Analyze the noise performance of AM and FM systems • Gain knowledge in sampling and quantization	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152C44	Electromagnetic Fields	• Display an understanding of fundamental electromagnetic laws	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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			and concepts • Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning • Explain electromagnetic wave propagation in lossy and in lossless media • Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws											
	19152C45	Linear Integrated Circuits	• Design linear and non linear applications of OP – AMPS • Design applications using analog multiplier and PLL • Design ADC and DAC using OP – AMPS • Generate waveforms	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			using OP – AMP Circuits • Analyze special function Ics										
	19149S46	Environmental Science and Engineering	One will obtain knowledge on the following after completing the course. • Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in standard of living has lead to serious environmental disasters	✓	✓	☐	✓	☐	✓	✓	✓	☐	☐	✓	✓
	19152L47	Circuits Design and Simulation Laboratory	• Analyze various types of feedback amplifiers • Design oscillators, tuned amplifiers, wave-	✓	✓	✓	✓	✓	✓	☐	☐	☐	☐	✓	✓

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			shaping circuits and multivibrators • Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool.										
	19152L48	Linear Integrated Circuits Laboratory	• Design amplifiers, oscillators, D-A converters using operational amplifiers. • Design filters using op-amp and performs an experiment on frequency response. • Analyze the working of PLL and describe its application as a frequency multiplier. • DesignDC power supply using ICs. • Analyze the	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.											
	19152CRS	Research Led Seminar	• Exposure to various research domains • Acquaintance with languages of research • Development for research aptitude	✓	✓	✓	✓	✓	✓						
V	19152C51	Digital Communication	• Design PCM systems • Design and implement base band transmission schemes • Design and implement band pass signaling schemes • Analyze the spectral characteristics of band pass signaling schemes and their noise performance • Design error control	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

			coding schemes											
	19152C52	Discrete-Time Signal Processing	• Apply DFT for the analysis of digital signals and systems • Design IIR and FIR filters • Characterize the effects of finite precision representation on digital filters • Design multirate filters • Apply adaptive filters appropriately in communication systems	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152C53	Computer Architecture and Organization	• Describe data representation, instruction formats and the operation of a digital computer • Illustrate the fixed point and floating-point arithmetic for ALU operation	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			• Discuss about implementation schemes of control unit and pipeline performance • Explain the concept of various memories, interfacing and organization of multiple processors • Discuss parallel processing technique and unconventional architectures												
	191__FE54 _	**Free Elective - I**													
	19150FE54 A	Database Management Systems	• Understand relational data model, evolve conceptual model of a given problem, its mapping to relational model and Normalization	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			• Query the relational database and write programs with database connectivity • Understand the concepts of database security and information retrieval systems											
	19150FE54 B	Cloud Computing	• Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Learn the key and enabling technologies that help in the development of cloud. • Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models. • Explain the core issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Mapping of COs and Pos

			of cloud computing such as resource management and security. • Be able to install and use current cloud technologies. • Choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.												
	19153FE54A	Industrial Nano Technology	• To possess knowledge on nanotechnology based applications in each industry • To provide details of contemporary industrial applications of nanotechnology • To provide an overview of future technological	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Mapping of COs and Pos

			advancements and increasing role of nanotechnology in each industry											
	19153FE54 B	Energy Conservation and Management	• Can carry out energy accounting and balancing • Can suggest methodologies for energy savings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19154FE54 A	Renewable Energy Sources	• Understanding the physics of solar radiation. • Ability to classify the solar energy collectors and methodologies of storing solar energy. • Knowledge in applying solar energy in a useful way. • Knowledge in wind energy and biomass with its economic aspects.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Mapping of COs and Pos

			• Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.											
	19154FE54 B	Automotive Systems	• Identify the different components in automobile engineering. • Have clear understanding on different auxiliary and transmission systems usual.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	19155FE54 A	Air Pollution and Control Engineering	• An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management • Ability to identify, formulate and solve air	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Mapping of COs and Pos

			and noise pollution problems • Ability to design stacks and particulate air pollution control devices to meet applicable standards. • Ability to select control equipments. • Ability to ensure quality, control and preventive measures.												
	19155FE54 B	Geographic Information System	• Have basic idea about the fundamentals of GIS. • Understand the types of data models. • Get knowledge about data input and topology. • Gain knowledge on data quality and standards. • Understand data management functions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓

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Mapping of COs and Pos

			and data output												
	19152C55	Communication Networks	• Identify the components required to build different types of networks • Choose the required functionality at each layer for given application • Identify solution for each functionality at each layer • Trace the flow of information from one node to another node in the network	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152E56_	**Elective - I**													
	19152E56B	Medical Electronics	• Know the human body electro- physiological parameters and recording of bio-potentials	✓	✓	?	?	?	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			• Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood cell count, blood flow meter etc. • Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators • Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgical diathermies , and bio-telemetry principles and methods • Know about recent trends in medical instrumentation																		

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	19152E56E	Nano Technology and Applications	• Describe the basic science behind the properties of materials. • Interpret the creation, characterization, and manipulation of nanoscale materials. • Comprehend the exciting applications of nanotechnology at the leading edge of scientific research • Apply their knowledge of nanotechnology to identify how they can be exploited for new applications.	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	✓
	19152E56G	Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	?	?	?	?	?	✓	✓	✓	?	?	?	✓

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Mapping of COs and Pos

	19152E56H	Digital Audio Engineering	• Analyze the type of dither. • Analyze the recording and transmission principles in digital audio. • Analyze the various compression techniques. • Design and analyze the digital audio editing. • Analyze the various application of digital audio.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19152E56I	Logic and Distributed Control Systems	• Ability to understand and analyze Instrumentation systems and their applications to various industries. • Ability to understand and analyse, linear and digital electronic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Mapping of COs and Pos

			circuits.										
	19152L57	Discrete Time Signal Processing Laboratory	• Carryout basic signal processing operations • Demonstrate their abilities towards MATLAB based implementation of various DSP systems • Analyze the architecture of a DSP Processor • Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals • Design a DSP system for various applications of DSP	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152L58	Communication Systems Laboratory	• Simulate & validate the various functional modules of a	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			communication system • Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes • Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system • Simulate end-to-end communication Link												
	19152L59	Communication Networks Laboratory	• Communicate between two desktop computers • Implement the different protocols • Program using sockets. • Implement and	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			compare the various routing algorithms • Use the simulation tool.											
	19152CRM	Research Methodology	• Understand the approaches towards and constraints in good research.Use the statistical tools used in research methodology • Compose the manuscript for publication • Obtain computational and excel- skills for research in engineering	✓	✓	✓	✓	✓	✓	✓	✓	?	?	?	?
VI	19152C61	Microprocessors and Microcontrollers	• Understand and execute programs based on 8086 microprocessor. • Design Memory Interfacing circuits. • Design and interface	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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			I/O circuits. • Design and implement 8051 microcontroller based systems.												
	19152C62	VLSI Design	• Realize the concepts of digital building blocks using MOS transistor. • Design combinational MOS circuits and power strategies. • Design and construct Sequential Circuits and Timing systems. • Design arithmetic building blocks and memory subsystems. • Apply and implement FPGA design flow and testing.	✓	✓	✓	✓	✓	✓					✓	✓
	19152C63	Wireless Communication	• Characterize a wireless channel and evolve the system design specifications	✓	✓	✓	✓	✓	✓					✓	✓

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			• Design a cellular system based on resource availability and traffic demands • Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.												
	19152C64	Principles of Management	• Upon completion of the course, students will be able to have clear understanding • Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management	?	?	?	?	?	✓	✓	✓	?	✓	✓	✓
	19152C65	Transmission	• Explain the	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

		Lines and RF Systems	characteristics of transmission lines and its losses • Write about the standing wave ratio and input impedance in high frequency transmission lines • Analyze impedance matching by stubs using smith charts • Analyze the characteristics of TE and TM waves • Design a RF transceiver system for wireless communication															
	19152E66_	**Elective - II**																
	19152E66A	Cryptography and Network Security	• Understand the fundamentals of networks security, security architecture, threats and	✓	✓	✓	✓	✓	✓	?	✓	✓	✓	?	✓			

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			vulnerabilities • Apply the different cryptographic operations of symmetric cryptographic algorithms • Apply the different cryptographic operations of public key cryptography • Apply the various Authentication schemes to simulate different applications. • Understand various Security practices and System security standards												
	19152E66B	Advanced Digital Signal Processing	• Articulate and apply the concepts of special random processes in practical applications • Choose appropriate spectrum estimation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			techniques for a given random process • Apply optimum filters appropriately for a given communication application • Apply appropriate adaptive algorithm for processing non-stationary signals • Apply and analyse wavelet transforms for signal and image processing based applications											
		Wireless Networks	• Conversant with the latest 3G/4G networks and its architecture • Design and implement wireless network environment for any application using latest wireless protocols and standards	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			• Ability to select the suitable network depending on the availability and requirement • Implement different type of applications for smart phones and mobile devices with latest network strategies											
	19152E66H	SCADA System and Applications Management	This course gives knowledge about various system components and communication protocols of SCADA system and its applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19152E66I	Software Engineering	• Identify the key activities in managing a software project. • Compare different	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Mapping of COs and Pos

			process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required.												
	19152L61	Microprocessors and Microcontrollers Laboratory	• Write ALP Programmes for fixed and Floating Point and Arithmetic operations • Interface different I/Os with processor • Generate waveforms using Microprocessors • Execute Programs in	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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			8051 • Explain the difference between simulator and Emulator											
	19152L62	VLSI Design Laboratory	• Write HDL code for basic as well as advanced digital integrated circuit • Import the logic modules into FPGA Boards • Synthesize Place and Route the digital IPs • Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152L63	Professional Communication	• Make effective presentations • Participate confidently in Group Discussions. • Attend job interviews and be successful in	?	?	?	?	?	✓	?	?	?	✓	?	✓

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			them. • Develop adequate Soft Skills required for the workplace											
	19152L64	Technical Seminar	• To study research papers for understanding of a new field, in the absence of a textbook, to summarise and review them • To identify promising new directions of various cutting edge technologies • To impart skills in preparing detailed report describing the project and results • To effectively communicate by making an oral presentation before an evaluation committee	?	✓	?	✓	✓	✓	?	✓	✓	✓	✓	✓

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	19152CBR	Participation in Bounded Research	• Hands on exposure to problem solving tools in contemporary research • Evolve research intuitiveness and orientation • Familiarize with cutting edge research trends	✓	✓	✓	✓	✓	✓	✓	✓	?	?	?	?
VII	19152C71	Antennas and Microwave Engineering	• Apply the basic principles and evaluate antenna parameters and link power budgets • Design and assess the performance of various antennas • Design a microwave system given the application specifications	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓
	19152C72	Optical Communication	• Realize basic elements in optical fibers, different modes and	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			configurations. • Analyze the transmission characteristics associated with dispersion and polarization techniques. • Design optical sources and detectors with their use in optical communication system. • Construct fiber optic receiver systems, measurements and coupling techniques. • Design optical communication systems and its networks.											
	19152C73	Embedded and Real Time Systems	• Describe the architecture and programming of ARM processor • Outline the concepts of embedded systems	✓	✓	✓	✓	✓	✓					✓	✓

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			• Explain the basic concepts of real time operating system design • Model real-time applications using embedded-system concepts												
	191__FE74_	**Free Elective - II**													
	19150FE74A	Introduction to C Programming	• Develop simple applications using basic constructs • Develop applications using arrays and strings • Develop applications using functions and structures	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19150FE74B	Data Structures and Algorithms	• Implement linear data structures and solve problems using them. • Implement and apply trees and graphs to solve problems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			• Implement the various searching and sorting algorithms.											
	19153FE74 A	Basic Circuit Theory	• introduce electric circuits and its analysis • impart knowledge on solving circuit equations using network theorems • introduce the phenomenon of resonance in coupled circuits. • introduce Phasor diagrams and analysis of three phase circuits	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19153FE74 B	Introduction to Renewable Energy Systems	• understand and analyze power system operation, stability, control and protection. • handle the engineering aspects of electrical energy generation and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			utilization. • understand the stand alone and grid connected renewable energy systems. • design of power converters for renewable energy applications. • acquire knowledge on wind electrical generators and solar energy systems. • design power converters used for hybrid renewable energy systems.												
	19154FE74A	Industrial Safety	• identify and prevent chemical, environmental mechanical, fire hazard through analysis and apply proper safety techniques on safety engineering and	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓

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			management.											
	19154FE74 B	Testing of Materials	• Identify suitable testing technique to inspect industrial component • Use the different technique and know its applications and limitations	✓	?	✓	✓	✓	✓	✓	✓	✓	✓	?	✓
	19155FE74 A	Green Building Design	• Identify existing energy codes, green building codes and green rating systems. • Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged	✓	?	✓	✓	✓	✓	✓	✓	✓	✓	?	✓

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			materials and incorporate them into design. • Identify and use construction materials and methods that more easily allow for salvage and re-use of building materials. • Understand the techniques and benefits of building performance testing, monitoring and metering. • Identify and make use of techniques for weatherization and sustainable remodeling of existing structures												
	19155FE74 B	Waste Water Treatment	• Will have knowledge about adsorption and oxidation process. • Will gain idea about various methods	✓	?	✓	✓	✓	✓	✓	✓	✓	✓	?	✓

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			available for water treatment. • Will appreciate the necessity of water and acquire knowledge of preliminary treatment.											
	19152C75	Adhoc and Wireless Sensor Networks	• Know the basics of Ad hoc networks and Wireless Sensor Networks • Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement • Apply the knowledge to identify appropriate physical and MAC layer protocols • Understand the transport layer and security issues possible in Ad hoc and sensor networks.	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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			• Be familiar with the OS used in Wireless Sensor Networks and build basic modules													
	19152E76_	**Elective - III**														
	19152E76A	Advanced Wireless Communication	• Comprehend and appreciate the significance and role of this course in the present contemporary world • Apply the knowledge about the importance of MIMO in today's communication • Appreciate the various methods for improving the data rate of wireless communication system	✓	✓	✓	?	✓	✓	✓	✓	✓	✓	?	✓
	19152E76B	Cognitive Radio	• Gain knowledge on the design principles on software defined	✓	✓	✓	?	✓	✓	✓	✓	✓	✓	?	✓

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Mapping of COs and Pos

			radio and cognitive radio • Develop the ability to design and implement algorithms for cognitive radio spectrum sensing and dynamic spectrum access • Build experiments and projects with real time wireless applications • Apply the knowledge of advanced features of cognitive radio for real world applications													
	19152E76F	Mixed Signal IC Design	• Apply the concepts for mixed signal MOS circuit. • Analyze the characteristics of IC based CMOS filters. • Design of various	✓	☐	✓	☐	✓	✓	✓	✓	✓	✓	☐	✓

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			data converter architecture circuits. • Analyze the signal to noise ratio and modeling of mixed signals. • Design of oscillators and phase lock loop circuit.											
	19152E76H	Space Time Wireless Communication	• Design and analyze the channel characterization. • Analyze the capacity of random MIMO channel. • Design and analyze the order diversity and channel variability. • Analyze the multiple antenna coding and receivers. • Analyze the MIMO multi user detection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓

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	19152E76I	Telecommunication Network Management	• Design and analyze of fault management. • Analyze the common management information protocol specifications. • Design and analyze of management information model. • Design the simple network management protocol. • Design the various types of network management tools.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓
	19152L77	Embedded Laboratory	• Write programs in ARM for a specific Application • Interface memory, A/D and D/A convertors with ARM system • Analyze the performance of	✓	✓	✓	✓	✓	✓	?	?	?	?	✓	✓

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Mapping of COs and Pos

			interrupt • Write program for interfacing keyboard, display, motor and sensor. • Formulate a mini project using embedded system											
		Advanced Communication Laboratory	• Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber • Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER • Estimate the Wireless Channel Characteristics and Analyze the performance of	✓	✓	✓	✓	✓	✓	[2]	[2]	[2]	[2]	✓	✓

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Mapping of COs and Pos

			Wireless Communication System • Understand the intricacies in Microwave System design											
	19152CSR	Design/Socio Technical Project	• Sensitive to social needs for innovation • Develop teams and work towards interdisciplinary synchronous research strategy • Develop critical thinking and synergistic research approach.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VIII	19152E81_	Elective – IV												
	19152E81A	Electro Magnetic Interference and Compatibility	• Identify the various types and mechanisms of Electromagnetic Interference• Propose a suitable EMI mitigation technique•	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			Describe the various EMC Standards and methods to measure them												
	19152E81E	Digital Image Processing	• Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms. • Operate on images using the techniques of smoothing, sharpening and enhancement. • Understand the restoration concepts and filtering techniques. • Learn the basics of segmentation, features extraction, compression and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			recognition methods for color models.												
	19152E81F	Professional Ethics in Engineering	• to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.	☐	☐	☐	☐	✓	✓	✓	✓	✓	✓	☐	✓
	19152E81G	Telecommunication System Modeling and Simulation	• Apply the constituents of a telecommunication systems. • Analyze various modeling methodologies and simulation techniques. • Estimate the performance measures of telecommunication systems. • Apply system modeling in telecommunication.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	☐	✓

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			• Demonstrate light wave communication and satellite communication systems.											
	19152E81H	Transducer Engineering	• to model and analyze transducers.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19152E82_	**Elective – V**													
	19152E82B	DSP Architecture and Programming	• Analyze the concepts of Digital Signal Processors • Demonstrate their ability to program the DSP processor for signal processing applications • Discuss, compare and select the suitable Advanced DSP Processors for real-time signal processing applications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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	19152E82C	Satellite Communication	• Analyze the satellite orbits • Analyze the earth segment and space segment • Analyze the satellite Link design • Design various satellite applications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19152E82F	Fundamentals of Nano Science	• Will familiarize about the science of nanomaterials • Will demonstrate the preparation of nanomaterials • Will develop knowledge in characteristic nanomaterial	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19152E82G	Environmental and Social Impact Assessment	• carry out scoping and screening of developmental projects for	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Mapping of COs and Pos

			environmental and social assessments • explain different methodologies for environmental impact prediction and assessment • plan environmental impact assessments and environmental management plans • evaluate environmental impact assessment reports											
		Telehealth Technology	• Apply multimedia technologies in telemedicine. • Explain Protocols behind encryption techniques for secure transmission of data. • Apply telehealth in healthcare.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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		Project Work	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. • use effectively oral, written and visual communication. • identify, analyze, and solve problems creatively through sustained critical investigation. • integrate information from multiple sources. • demonstrate an awareness and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			application of appropriate personal, societal, and professional ethical standards. • practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.											
	19152PEE	Programme Exit Examination	• The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them	✓	✓	✓	✓	-						✓

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Sem	Course Code	Title of the Course	COs	POS											
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	19148S11BP	Transforms and Partial Differential Equations	• Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results. • Have gained a well founded knowledge of Fourier series, their different possible forms and	✓	✓	✓	✓	✓						✓	✓
	19152H12P	Electromagnetic Theory	• analyze fields a potentials due to static changes • evaluate static magnetic fields • understand how materials affect electric and	✓	✓	✓	✓	✓	✓					✓	✓

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			magnetic fields • understand the relation between the fields under time varying situations • understand principles of prop											
	19152H13P	Digital Electronics	• introduce number systems and codes • introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions • introduce the methods for simplifying Boolean expressions • outline the formal procedures for the analysis and des	✓	✓	✓	✓	✓	✓					✓	✓
	19152H14P	Electronic Circuits - I	• The methods of biasing transistors • Design of simple	✓	✓	✓	✓	✓	✓					✓	✓

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			amplifier circuits • Mid – band analysis of amplifier circuits using small - signal equivalent circuits to determine gain input impedance and output impedance • Method of calculating cutoff fre												
	19152H15P	Signals and Systems	• To study the properties and representation of discrete and continuous signals. • To study the sampling process and analysis of discrete systems using z-transforms. • To study the analysis and synthesis of discrete time	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

			systems.• To study the properties											
II	19148S21P	Numerical Methods	• The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution. • When huge amounts of experimen	✓	✓	✓	✓	✓					✓	✓
	19152S22P	Electrical Engineering and Control Systems	• To understand the operation of Electrical machines and transformers • To understand the open loop and closed loop	✓	✓	✓	✓	✓	✓				✓	✓

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Mapping of COs and Pos

			(feedback) systems • To understand time domain and frequency domain analysis of control systems required for stability analysis. • To unde												
	19152H23P	Linear Integrated Circuits	• To introduce the basic building blocks of linear integrated circuits. • To teach the linear and non-linear applications of operational amplifiers. • To introduce the theory and applications of analog multipliers and PLL. • To teach the theory of ADC and	✓	✓	✓	✓	✓	✓					✓	✓
	19152H24P	Electronic Circuits - II	• The advantages and method of analysis of feed	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

			back amplifiers • Analysis and design of RC and LC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time based generators. • The advantages and method of analysi											
	19152H25P	Transmission Lines and Waveguides	• To become familiar with propagation of signals through lines • Understand signal propagation at Radio frequencies• Understand radio propagation in guided systems• To become familiar with resonators • To become	✓	✓	✓	✓	✓	✓					✓	✓

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			familiar with propagation of sig											
III	19148S31BP	Probability and Random Processes	• Have a fundamental knowledge of the basic probability concepts. • Have a well – founded knowledge of standard distributions which can describe real life phenomena. • Acquire skills in handling situations involving more than one random variable and funct	✓	✓	✓	✓	✓					✓	✓
	19152H32P	Microprocessor Interfacing and Applications	• To introduce the architecture and programming of 8085 microprocessor. • To introduce the interfacing of peripheral devices with 8085	✓	✓	✓	✓	✓	✓				✓	✓

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Mapping of COs and Pos

			microprocessor. • To introduce the architecture and programming of 8086 microprocessor. • To introduce the applications,											
	19152H33P	Digital Signal Processing	• To study DFT and its computation • To study the design techniques for digital filters • To study the finite word length effects in signal processing • To study the non-parametric methods of power spectrum estimations • To study the fundamentals of digit	✓	✓	✓	✓	✓	✓					✓	✓
	19152H34P	Communication Theory	• To provide various Amplitude modulation and demodulation	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

			systems. • To provide various Angle modulation and demodulation systems. • To provide some depth analysis in noise performance of various receiver. • To study some basic information theory with so											
	19152L35P	Digital Signal Processing and Microprocessor Lab	• Carryout basic signal processing operations • Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals • Interface different I/Os with processor • Generate waveforms using	✓	✓	✓	✓	✓	✓				✓	✓

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Mapping of COs and Pos

			Microprocessors •											
IV	19152H41P	Digital Communication	• To study pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals. • To learn baseband pulse transmission, which deals with the transmission of pulse-amplitude, modu	✓	✓	✓	✓	✓	✓					✓	✓
	19152H42P	Antenna and Wave Propagation	• To study radiation from a current element. • To study antenna arrays • To study aperture antennas • To learn special antennas such as frequency	✓	✓	✓	✓	✓	✓					✓	✓

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			independent and broad band antennas. • To study radio wave propagation. • To study radiation from a current e											
	19152H43P	Computer Networks	• To introduce the students the functions of different layers. • To introduce IEEE standard employed in computer networking. • To make students to get familiarized with different protocols and network components.• To introduce the students the functions o	✓	✓	✓	✓	✓	✓				✓	✓
	191__E44_P	Elective-I												

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	19152E44AP	High Speed Networks	• Students will get an introduction about ATM and Frame relay. • Students will be provided with an up-to-date survey of developments in High Speed Networks. • Enable the students to know techniques involved to support real-time traffic and congestion cont	✓	✓	✓	✓	✓	✓				✓	✓
	19152E44BP	Advanced Digital Signal Processing	• To study the parametric methods for power spectrum estimation. • To study adaptive filtering techniques using LMS algorithm and to study the applications of adaptive filtering. • To study	✓	✓	✓	✓	✓	✓				✓	✓

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			multirate signal processing fundamentals. • To study the analysis												
	19152E44CP	Speech Processing	• To introduce the models for speech production • To develop time and frequency domain techniques for estimating speech parameters • To introduce a predictive technique for speech compression • To understand speech recognition, synthesis and speaker ident	✓	✓	✓	✓	✓	✓						✓
	19152E44DP	Fuzzy Logic and Neural Networks	• To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience • To become	✓	✓	✓	✓	✓	✓						✓

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			familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems • To prov												
	19152E44FP	Digital Audio Engineering	• Analyze the type of dither. • Analyze the recording and transmission principles in digital audio. • Analyze the various compression techniques. • Design and analyze the digital audio editing. • Analyze the various application of digital audio. • Analyze	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

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	19152L45P	Networks and Communication Lab	• Communicate between two desktop computers• Implement the different protocols• Implement and compare the various routing algorithms• Use the simulation tool.• Simulate & validate the various functional modules of a communication system• Apply variou	✓	✓	✓	✓	✓	✓					✓	✓
V	19152H51P	Optical Communication and Networks	• To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures. • To understand the different kind of losses, signal distortion in	✓	✓	✓	✓	✓	✓					✓	✓

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			optical wave guides and other signal degradation factors. Design optimization o											
	19152H52P	Microwave Engineering	• To study passive microwave components and their S-Parameters. • To study Microwave semiconductor devices & applications. • To study Microwave sources and amplifiers. • To study passive microwave components and their S-Parameters. • T	✓	✓	✓	✓	✓	✓					✓	✓
	19152H53P	VLSI Design	• To learn the basic CMOS circuits. • To learn the CMOS process	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

			technology. • To learn techniques of chip design using programmable devices. • To learn the concepts of designing VLSI subsystems. • To learn the concepts of modeling a digital system using H												
	191__E54_P	**Elective II**													
	19149E54AP	Environmental Science and Engineering	• Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in standard of living has lead to serious	✓	✓		✓		✓	✓	✓			✓	✓

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Mapping of COs and Pos

			environmental disasters• Public awareness of environmental is a											
	19152E54BP	Optoelectronic Devices	• To know the basics of solid state physics and understand the nature and characteristics of light. • To understand different methods of luminescence, display devices and laser types and their applications. • To learn the principle of optical detection me	✓	✓	✓	✓	✓	✓					✓	✓
	19152E54DP	Digital Image Processing	• To study the image fundamentals and mathematical transforms necessary for image processing. • To study the image enhancement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

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			techniques • To study image restoration procedures. • To study the image compression procedures. • To study the image segmentati												
	19152E54EP	Engineering Acoustics	• To provide mathematical basis for acoustics waves • To introduce the concept of radiation reception absorption and attenuation of acoustic waves. • To present the characteristic behaviour of sound in pipes, resonators and filters. • To introduce the pro	✓	✓	✓	✓	✓	✓					✓	✓

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	19152E54FP	Software Engineering	• Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
	19152L55P	Optical Communication and Microwave Lab	• Analyze the performance of simple optical link. • Test microwave and optical components. • Analyse the mode characteristics of fiber • Analyse the	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

			radiation of pattern of antenna.• Analyze the performance of simple optical link. • Test microwave and op											
VI	19152H61P	Mobile and Wireless Communication	• It deals with the fundamental cellular radio concepts such as frequency reuse and handoff. This also demonstrates the principle of trunking efficiency and how trunking and interference issues between mobile and base stations combine to affect the overal	✓	✓	✓	✓	✓	✓					✓	✓
	19152H62P	Medical Electronics	• To study the methods of recording various biopotentials • To study how to measure biochemical and	✓	✓	✓	✓	✓						✓	✓

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Mapping of COs and Pos

			various physiological information • To understand the working of units which will help to restore normal functioning • To understand the use of radiation f											
	19152H63P	Micro Controller and Embedded systems	• To study 8051 architecture • To write assembly language programming • To study the embedded architecture and real time applications. • To study 8051 architecture • To write assembly language programming • To study the embedded architecture and	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

		real time												
191__E64_P	**Elective III**													
19160E64AP	Principles Of Management	• Upon completion of the course, students will be able to have clear understanding• Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management• Upon completion of t						✓	✓	✓		✓	✓	✓
19152E64BP	Satellite Communication	• Overview of satellite systems in relation to other terrestrial systems. • Study of satellite orbits and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

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				launching. • Study of earth segment and space segment components • Study of satellite access by various users. • Study of DTH and compression standar										
		19152E64CP	Robotics	• The course has been so designed to give the students an overall view of the mechanical components and mathematics associated with the same. • Actuators and sensors necessary for the functioning of the robot. • The course has been so designed to give the	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

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	19152E64DP	Remote sensing	• Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for modeling applications • Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for modeling applications	✓	✓	✓	✓	✓	✓					✓	✓
	19150E64FP	Transducer Engineering	• to model and analyze transducers	✓	✓	✓	✓	✓	✓					✓	✓
	19152L65P	VLSI and Embedded systems Lab	• Write HDL code for basic as well as advanced digital integrated circuit • Import the logic modules into FPGA Boards • Synthesize Place and Route the digital IPs • Write programs	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

			in ARM for a specific Application • Interface memory, A/D and D/A convertor											
VII	19160S71P	Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.					✓	✓	✓		✓	✓	✓
	19152H72P	Wireless Networks	• To understand physical as wireless MAC layer alternatives techniques. • To learn planning and operation of wireless networks. • To study various wireless LAN and WAN concepts. • To understand WPAN and geo-location systems.	✓	✓	✓	✓	✓					✓	✓

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	19152H73P	Telecommunication Switching and Networks	• To introduce the concepts of Frequency and Time division multiplexing. • To introduce digital multiplexing and digital hierarchy namely SONET / SDH • To introduce the concepts of space switching, time switching and combination switching, example of a sw	✓	✓	✓	✓	✓						✓	✓
	191__E74_P	**Elective IV**													
	19152E74AP	Power Electronics	• To study about power electronic circuits for voltage and current control and protection. • To learn the switching characteristics of transistors and	✓	✓	✓	✓	✓	✓					✓	✓

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			SCRs. Series and parallel functions of SCRs, Programmable triggering methods of SCR. • To learn controll											
	19152E74BP	Advanced Microprocessors	• To introduce the concepts in internal programming model of Intel family of microprocessors. • To introduce the programming techniques using MASM, DOS and BIOS function calls. • To introduce the basic architecture of Pentium family of processors. • To in	✓	✓	✓	✓	✓	✓					✓	✓
	19152E74CP	Electromagnetic Interference and Compatibility	• To understand EMI Sources, EMI problems and their solution methods in PCB level /	✓	✓	✓	✓	✓	✓					✓	✓

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				Subsystem and system level design. • To measure the emission. immunity level from different systems to couple with the prescribed EMC standards											
		19152E74DP	Solid State Electronic Drives	• To learn crystal structures of elements used for fabrication of semiconductor devices. • To study energy band structure of semiconductor devices. • To understand fermi levels, movement of charge carriers, Diffusion current and Drift current. • To study	✓	✓	✓	✓	✓	✓				✓	✓

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	19152E74FP	Space TimeWireless Communication	• Design and analyze the channel characterization. • Analyze the capacity of random MIMO channel. • Design and analyze the order diversity and channel variability. • Analyze the multiple antenna coding and receivers. • Analyze the MIMO multi user detectio	✓	✓	✓	✓	✓	✓					✓	✓
	19152P75P	Project Work & Viva Voce	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study.•	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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			demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.•													

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Vallam, Thanjavur-613 403.

PRIST DEEMED TO BE UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613 403 - TAMIL NADU

Dept:ECE(M.TECH COMM.SYS REG2019-FT) **School:E&T**

Mapping of COs and POs

Sem	Course Code	Title of the Course	COs	POS											
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	19248S11B	Applied mathematics for Electronics Engineering	• Concepts on vector spaces, linear transformation, inner product spaces, eigen values and generalized eigenvectors. • Apply various methods in linear algebra to solve system of linear equations. • Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

		solving linear programming problems.															
19271H12	Statistical Signal Processing	• Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts. • State Parseval's theorem, W-K theorem, principle of orthogonality, spectral factorization theorem, Widrow-Hoff LMS algorithm and Shannon's sampling theorem, and define linear prediction, linear estimation, sample auto-correlation, periodogram, bias and consistency.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			• Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation and adaptive echo cancellation, speed verses convergence issues, channel equalization, sampling rate change, subband coding and wavelet transform.													
	19271H13	Modern Digital Communication Systems	• Develop the ability to understand the concepts of signal space analysis for coherent and non-coherent receivers. • Conceptually appreciate different	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

			Equalization techniques • Possess knowledge on different block codes and convolutional codes. • Comprehend the generation of OFDM signals and the techniques of multiuser detection.														
	19271S14	Communication Protocol Engineering	• Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance. • The student would also be able to design a	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.													
19271H15	Advanced Radiation Systems	• Ability to understand antenna concepts • Ability to design antenna for various applications • Knowledge of modern antenna design	✓	✓	✓	✓	✓	✓	✓		✓	✓				
ELECTIVE-I																
19271E16A	Internetworking and Multimedia	• Understand the state-of-art developments in Internet technologies and applications • Understand the development of next generation Internet • Appreciate the principles used in designing Internet protocols for multimedia applications, and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

			so understand why standard protocols are designed the way that they are • Be able to solve problems for the design of multimedia applications on Internet.													
	19271E16B	Digital Image Processing	• Explain the fundamentals digital image processing. • Describe image various segmentation and feature extraction techniques for image analysis. • Discuss the concepts of image registration and fusion.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	19271E16C	LASER Communication	Recognize and classify the structures of Optical fiber and types. • Discuss the channel impairments like losses and dispersion. • Analyze	✓	✓	✓	✓	✓	✓	✓	✓	✓				

			various coupling losses. • Classify the Optical sources and detectors and to discuss their principle. • Familiar with Design considerations of fiber optic systems. • To perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyze the results to provide valid conclusions.													
	19271E16D	MEMS and NEMS	Ability to understand the operation of micro devices, micro systems and their applications Ability to design the micro devices, micro systems using the	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			MEMS fabrication process. Gain a knowledge of basic approaches for various sensor design Gain a knowledge of basic approaches for various actuator design Develop experience on micro/nano systems for photonics . Gain the technical knowledge required for computer-aided design, fabrication, analysis and characterization of nano-structured materials, micro- and nano-scale devices.														
	19271L19	Communication Systems Lab - I	• Measure and analyze various transmission line parameters.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			• Design Microstrip patch antennas. • Implement the adaptive filtering algorithms • To generate and detect digital communication signals of various modulation techniquesusing MATLAB.													
	19271CRS	Research Led Seminar	a. Exposure to various research domains b. Acquaintance with languages of research c. Development of research aptitude									✓				
SEMESTER-II																
II	19271H21	Mobile Communication Networks	• Discuss cellular radio concepts.• Identify various propagation effects.• To have knowledge of the mobile system specifications.• Classify multiple access techniques in mobile	✓	✓	✓	✓	✓	✓	✓		✓	✓			

			communication. • Outline cellular mobile communication standards.Analyze various methodologies to improve the cellular capacity														
	19271H22	Advanced Microwave Systems	• Capability to design Microwave circuits. • To be able to analyze microwave integrated circuits.	✓	✓	✓	✓	✓		✓	✓	✓	✓				
	19271H23	Fiber Optic Networking	• Design and Analyze Network Components • Assess and Evaluate optical networks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
	ELECTIVE II																
	19271E24A	High Speed Switching Architecture	• The student would be able to identify suitable switch architectures for a specified networking scenario and	✓	✓	✓	✓	✓	✓	✓	✓			✓			

			demonstrate its blocking performance. • The student would be in a position to apply his knowledge of switching technologies, architectures and buffering strategies for designing high speed communication networks and analyse their performance													
	19271E24B	DSP Processor Architecture and Programming	• Become Digital Signal Processor specialized engineer • DSP based System Developer	✓	✓	✓	✓	✓	✓	✓	✓					
	19271E24C	Digital Speech Processing	• Model speech production system and describe the fundamentals of speech. • Extract and compare different speech parameters. • Choose an	✓	✓	✓	✓	✓	✓	✓	✓		✓			

			appropriate statistical speech model for a given application. • Design a speech recognition system. • Use different text analysis and speech synthesis techniques.												
	19271E24D	ASIC and FPGA Design	• Demonstrate VLSI tool-flow and appreciate FPGA architecture. • Understand the issues involved in ASIC design, including technology choice, design management, tool-flow, verification, debug and test, as well as the impact of technology scaling on ASIC design. • Understand the	✓	✓	✓	✓	✓	✓	✓	✓	✓			

			algorithms used for ASIC construction • Understand the basics of System on Chip, On chip communication architectures like AMBA,AXI and utilizing Platform based design. • Appreciate high performance algorithms available for ASICs													
	19271E25A	Digital Communication Receivers	• Apply basic principles of digital communication techniques. • Discuss on receivers for AWGN & Fading channel • Describe various synchronization techniques. • Design adaptive equalization	✓	✓	✓	✓	✓	✓	✓	✓	✓			

			algorithms to satisfy the evolving demands in digital communication.														
	19271E25B	Soft Computing	• Knowledge on concepts of soft computational techniques. • Able to apply soft computational techniques to solve various problems. • Motivate to solve research oriented problems.	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	19271E25C	Communication Network Security	• Explain digital signature standards • Discuss authentication • Explain security at different layers	✓	✓	✓	✓	✓		✓	✓	✓	✓				
	19271L26	Communication Systems Lab - II	• Apply knowledge to identify a suitable architecture and systematically design an RF system. •	✓	✓	✓	✓	✓	✓	✓	✓	✓					

			Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and produce the meaningful conclusions. • Design and develop microstrip filters.													
	192TECWR	Technical Writing /Seminars	Selecting a subject, narrowing the subject into a topic 2. Stating an objective. 3. Collecting the relevant bibliography (atleast 15 journal papers) 4. Preparing a working outline. 5. Studying the papers and understanding the authors contributions and critically analysing each							✓	✓	✓	✓			

			paper. 6. Preparing a working outline 7. Linking the papers and preparing a draft of the paper. 8. Preparing conclusions based on the reading of all the papers. 9. Writing the Final Paper and giving final Presentation													
	19271CRM	Research Methodology	a. Understanding research questions and tools b. Experience in scientific writings c. Practice in various aspects of scientific publications d. Inculcation of research ethics									✓	✓	✓	✓	
	19271CBR	Participation in Bounded Research	a. Hands on exposure to problem solving tools in contemporary researchb. Evolution of research intuitiveness and orientationc.									✓	✓	✓	✓	

			Familiarity with cutting edge research trends													
III	19271H31	Wireless Sensor Networks	• Familiar with the latest 4G networks and LTE • Understand about the wireless IP architecture and LTE network architecture. • Familiar with the adaptive link layer and network layer graphs and protocol. • Understand about the mobility management and cellular network. • Understand about the wireless sensor network architecture and its concept.	✓	✓	✓	✓	✓		✓	✓	✓	✓		
	ELECTIVE IV															

19271E32A	Software Defined Radio	• Compare MAC and network layer design for software defined radio • Discuss cognitive radio for Internet of Things and M2Mtechnologies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
19271E32B	Satellite Communication	• Discuss satellite navigation and global positioning system • Outline deep space networks and inter planetary missions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E32C	CDMA Systems	• Analyze MIMO system. • Discuss millimeter wave communication. • Demonstrate software defined radio and cognitive radio.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
19271E25D	Speech Processing and Synthesis	• Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and word	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

			• Determine and apply Mel-frequency cepstral coefficients for processing all types of signals • Justify the use of formant and concatenative approaches to speech synthesis • Identify the apt approach of speech synthesis depending on the language to be processed • Determine the various encoding techniques for representing speech.														
	ELECTIVE V																
19271E33A	Wavelets and Multi Resolution Processing		• The students will be able to apprehend the detailed knowledge about the Wavelet transforms& its applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

19271E33B	High performance Communication Networks	• Diagnose problems and make minor repairs to computer networks using appropriate diagnostics software • Demonstrate how to correctly maintain LAN computer systems • Maintain the network by performing routine maintenance tasks • Apply network management tools	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
19271E33C	Advanced Microprocessors and Microcontrollers	• The student will be able to work with suitable microprocessor / microcontroller for a specific real world application.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓				
19271E33D	Reconfigurable computing	1. Identify the need for reconfigurable architectures 2. Discuss the architecture of FPGAs 3. Point out the	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						

		salient features of different reconfigurable architectures 4. Build basic modules using any HDL 5. Develop applications using any HDL and appropriate tools 6. Design and build an SoPC for a particular application														
	ELECTIVE VI															
19271E34A	Simulation of Communication Networks	• Apply Monte Carlo simulation • Discuss Lower Layer and Link Layer Wireless Modeling • Compare channel modeling and mobility modeling	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			

19271E34B	Medical Imaging	• Explain computer aided tomography • Discuss ultrasonic systems • Outline magnetic resonance imaging	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E34C	Mobile ADHOC networks	• Identify different issues in wireless ad hoc and sensor networks. • To analyze protocols developed for ad hoc and sensor networks. • To identify and address the security threats in ad hoc and sensor networks. • Establish a Sensor network environment for different type of applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E34D	Ultra Wide Band Communication	radio technology that can use a very low energy level for short-range, high-	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	

		bandwidth communications over a large portion of the radio spectrum												
19271P35	Project Phase – I	The student should be able to: • Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. • Use effectively oral, written and visual communication. • Identify, analyze, and solve problems creatively through sustained critical investigation.						✓						

			• Integrate information from multiple sources. • Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards. • Practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.												
	19271CSR	Participation in Scaffolded Research(Design/Societal Project)	a. Sensitization of social needs for innovation b. Team work towards interdisciplinary synchronous research strategy c. Development of critical thinking and synergistic research approach.						✓						
	SEM IV														
	19271P41	Project Phase – II	The student should be able to: • Apply						✓						

			fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. • Use effectively oral, written and visual communication. • Identify, analyze, and solve problems creatively through sustained critical investigation. • Integrate information from multiple sources. • Demonstrate an awareness and application of appropriate personal, societal,												

			and professional ethical standards. • Practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.												

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Mapping of COs and POs

Sem	Course Code	Title of the Course	COs	POS											
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	P O 11	PO12
	SEM-I														
I	19248S11 BP	Applied mathematics for Electronics Engineering	• Concepts on vector spaces, linear transformation, inner product spaces, eigen values and generalized eigenvectors. • Apply various methods in linear algebra to solve system of linear equations. • Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems.	✓	✓		✓	✓	✓	✓		✓	✓	✓	

	19271C12P	Statistical Signal Processing	• Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts. • State Parseval's theorem, W-K theorem, principle of orthogonality, spectral factorization theorem, Widrow-Hoff LMS algorithm and Shannon's sampling theorem, and define linear prediction, linear estimation, sample auto-correlation, periodogram, bias and consistency. • Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation and adaptive echo cancellation, speed verses convergence issues, channel equalization, sampling rate change, subband	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			coding and wavelet transform.													
	19271C13P	Modern Digital Communication Systems	• Develop the ability to understand the concepts of signal space analysis for coherent and non-coherent receivers. • Conceptually appreciate different Equalization techniques • Possess knowledge on different block codes and convolutional codes. • Comprehend the	✓	✓		✓	✓	✓	✓		✓	✓	✓		

			generation of OFDM signals and the techniques of multiuser detection.														
	19271L14P	Communication Systems Lab - I	• Measure and analyze various transmission line parameters.• Design Microstrip patch antennas.• Implement the adaptive filtering algorithms• To generate and detect digital communication signals of various modulation techniquesusing MATLAB.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	19271CRSP	Research Led Seminar	a. Exposure to various research domains b. Acquaintance with languages of research c. Development of research aptitude						✓			✓				
	SEM-II																

	19271C21P	Mobile Communication Networks	• Discuss cellular radio concepts. • Identify various propagation effects. • To have knowledge of the mobile system specifications. • Classify multiple access techniques in mobile communication. • Outline cellular mobile communication standards. Analyze various methodologies to improve the cellular capacity	✓	✓	✓	✓	✓		✓	✓	✓	✓		
	19271C22P	Advanced Microwave Systems	• Capability to design Microwave circuits. • To be able to analyze microwave integrated circuits.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	19271L24P	Communication Systems Lab - II	• Apply knowledge to identify a suitable architecture and systematically design an RF system. • Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and produce the meaningful conclusions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			• Design and develop microstrip filters.												
	19271TEC WRP	Technical Writing /Seminars	Selecting a subject, narrowing the subject into a topic 2. Stating an objective. 3. Collecting the relevant bibliography (atleast 15 journal papers) 4. Preparing a working outline. 5. Studying the papers and understanding the authors contributions and critically analysing each paper. 6. Preparing a working outline 7. Linking the papers and preparing a draft of the paper. 8. Preparing conclusions based on the reading of all the papers.						✓					

			9. Writing the Final Paper and giving final Presentation													
	19271CRMP	Research Methodology	a. Understanding research questions and tools b. Experience in scientific writings c. Practice in various aspects of scientific publications d. Inculcation of research ethics						✓							
	19271CBRP	Participation in Bounded Research	a. Hands on exposure to problem solving tools in contemporary researchb. Evolution of research intuitiveness and orientationc. Familiarity						✓							

			with cutting edge research trends													

	19271CSRP	Design/Socio technical Project	Sensitization of social needs for innovation b. Team work towards interdisciplinary synchronous research strategy c. Development of critical thinking and synergistic research approach.						✓			✓						
	SEM-IV																	
	19271C41P	Wireless Sensor Networks	• Familiar with the latest 4G networks and LTE • Understand about the wireless IP architecture and LTE network architecture. • Familiar with the adaptive link layer and network layer graphs and protocol. • Understand about the mobility management and cellular network. • Understand about the wireless sensor network architecture and its concept.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	19271C42P	Fiber Optic Networking	• Design and Analyze Network Components • Assess and Evaluate optical networks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

	19271P44P	Project Phase – I	The student should be able to:• Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study.• Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.• Use effectively oral, written and visual communication.• Identify, analyze, and solve problems creatively through sustained critical investigation.• Integrate information from multiple sources.• Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.• Practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.						✓						
	ELECTIVE-I														

	19271E23AP	High Speed Switching Architecture	• The student would be able to identify suitable switch architectures for a specified networking scenario and demonstrate its blocking performance. • The student would be in a position to apply his knowledge of switching technologies, architectures and buffering strategies for designing high speed communication networks and analyse their performance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	19271E23BP	DSP Processor Architecture and Programming	• Become Digital Signal Processor specialized engineer • DSP based System Developer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

	19271E23CP	Digital Speech Processing	• Model speech production system and describe the fundamentals of speech. • Extract and compare different speech parameters. • Choose an appropriate statistical speech model for a given application. • Design a speech recognition system. • Use different text analysis and speech synthesis techniques.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

	19271E23DP	ASIC and FPGA Design	• Demonstrate VLSI tool-flow and appreciate FPGA architecture.• Understand the issues involved in ASIC design, including technology choice, design management, tool-flow, verification, debug and test, as well as the impact of technology scaling on ASIC design.• Understand the algorithms used for ASIC construction• Understand the basics of System on Chip, On chip communication architectures like AMBA,AXI and utilizing Platform based design.• Appreciate high performance algorithms available for ASICs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	ELECTIVE-II															

	19271E33AP	Internetworking and Multimedia	• Understand the state-of-art developments in Internet technologies and applications • Understand the development of next generation Internet • Appreciate the principles used in designing Internet protocols for multimedia applications, and so understand why standard protocols are designed the way that they are • Be able to solve problems for the design of multimedia applications on Internet.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	19271E33BP	Digital Image Processing	• Explain the fundamentals digital image processing. • Describe image various segmentation and feature extraction techniques for image analysis. • Discuss the concepts of image registration and fusion.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

	19271E33CP	LASER Communication	Recognize and classify the structures of Optical fiber and types. • Discuss the channel impairments like losses and dispersion. • Analyze various coupling losses. • Classify the Optical sources and detectors and to discuss their principle. • Familiar with Design considerations of fiber optic systems. • To perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyze the results to provide valid conclusions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

	19271E33DP	MEMS and NEMS	Ability to understand the operation of micro devices, micro systems and their applications Ability to design the micro devices, micro systems using the MEMS fabrication process. Gain a knowledge of basic approaches for various sensor design Gain a knowledge of basic approaches for various actuator design Develop experience on micro/nano systems for photonics . Gain the technical knowledge required for computer-aided design, fabrication, analysis and characterization of nano-structured materials, micro- and nano-scale devices.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	EELECTIVEIII																

19271E43AP	Digital Communication Receivers	• Apply basic principles of digital communication techniques. • Discuss on receivers for AWGN & Fading channel • Describe various synchronization techniques. • Design adaptive equalization algorithms to satisfy the evolving demands in digital communication.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19271E43BP	Soft Computing	• Knowledge on concepts of soft computational techniques. • Able to apply soft computational techniques to solve various problems. • Motivate to solve research oriented problems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19271E43CP	Communication Network Security	• Explain digital signature standards • Discuss authentication • Explain security at different layers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

| | | |

		simulate the signal processing in a radar.												
ELECTIVE IV SEM-V														
19271E51AP	Software Defined Radio	• Compare MAC and network layer design for software defined radio• Discuss cognitive radio for Internet of Things and M2Mtechnologies												
19271E51BP	Satellite Communication	• Discuss satellite navigation and global positioning system • Outline deep space networks and inter planetary missions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

19271E51CP	CDMA Systems	• Analyze MIMO system. • Discuss millimeter wave communication. • Demonstrate software defined radio and cognitive radio.	✓	✓	✓	✓	✓		✓	✓	✓	✓		
19271E51DP	Speech Processing and Synthesis	• Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and word • Determine and apply Mel-frequency cepstral coefficients for processing all types of signals • Justify the use of formant and concatenative approaches to speech synthesis • Identify the apt approach of speech synthesis depending on the language to be processed • Determine the various encoding techniques for representing speech.	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	ELECTIVE V														
19271E52AP	Wavelets and Multi Resolution	• The students will be able to apprehend the detailed knowledge about the Wavelet	✓	✓	✓	✓	✓		✓	✓	✓	✓		

	Processing	transforms& its applications.											
19271E52BP	High performance Communication Networks	• Diagnose problems and make minor repairs to computer networks using appropriate diagnostics software • Demonstrate how to correctly maintain LAN computer systems • Maintain the network by performing routine maintenance tasks • Apply network management tools	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19271E52CP	Advanced Microprocessors and Microcontrollers	• The student will be able to work with suitable microprocessor / microcontroller for a specific real world application.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19271E52DP	Reconfigurable computing	1. Identify the need for reconfigurable architectures 2. Discuss the architecture of FPGAs 3. Point out the salient features of different reconfigurable architectures 4. Build basic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

		modules using any HDL 5. Develop applications using any HDL and appropriate tools 6. Design and build an SoPC for a particular application															
ELECTIVEVI																	
19271E53AP	Simulation of Communication Networks	• Apply Monte Carlo simulation• Discuss Lower Layer and Link Layer Wireless Modeling• Compare channel modeling and mobility modeling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
19271E53BP	Medical Imaging	• Explain computer aided tomography • Discuss ultrasonic systems • Outline magnetic resonance imaging	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

	19271E53CP	Mobile ADHOC networks	• Identify different issues in wireless ad hoc and sensor networks. • To analyze protocols developed for ad hoc and sensor networks. • To identify and address the security threats in ad hoc and sensor networks. • Establish a Sensor network environment for different type of applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓							
	19271E53DP	Ultra Wide Band Communication	radio technology that can use a very low energy level for short-range, high-bandwidth communications over a large portion of the radio spectrum	✓	✓	✓	✓	✓		✓	✓	✓	✓						
	SEM VI																		

	19271P61 P	Project Phase – II	The student should be able to: • Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. • Use effectively oral, written and visual communication. • Identify, analyze, and solve problems creatively through sustained critical investigation. • Integrate information from multiple sources. • Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards. • Practice the skills, diligence, and commitment to excellence needed to engage in lifelong						✓			✓			

			learning.												