List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Electronics and Communication Engineering*

Programme Name : *B.Tech.*

Academic Year : 2018-19

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	EC01TBS01	Mathematics-II
02.	EC01TBS02	Chemistry
03.	EC01TES01	Programming for Problem Solving
04.	EC01TES02	Engineering Mechanics
05.	EC01PBS01	Chemistry Lab
06.	EC01PES01	Programming for Problem Solving Lab
07.	EC01PES02	Workshop Manufacturing & Practices
08.	EC01PES03	Engineering Mechanics Lab
09.	EC01PMC01	Induction Training Programme
10.	EC02TBS03	Physics
11	EC02TES01	Basic Electrical Engineering
12	EC02TBS04	Mathematics-I
13	EC02THS01	English
14	EC02TMC01	Environment Sciences
15	EC02PBS02	Physics Lab
16	EC02PES04	Basic Electrical Engineering Lab
17	EC02PES05	Engineering Graphics & Design Lab
18	EC3THS03	Engineering Economics
19	EC3TPC01	Signals and Systems
20	EC3TBS01	Engineering Mathematics-III
21	EC3TES01	Network Analysis And Synthesis
22	EC3TES02	Electronic Devices
23	EC3TPC02	Digital Logic Circuits
24	EC3PES02	Electronics Devices Lab
25	EC3PPC02	Digital Logic Circuits Lab
26	EC4TBS02	Numerical Analysis

27	EC4TPC03	Automatic Control Systems
28	EC4TPC04	Analog Circuits
29	EC4TPC05	Communication System-I
30	EC4TPC06	Electronics Measurements & Instrumentation
31	EC4PPC04	Analog Circuits Lab
32	EC4PPC05	Communication System-I Lab
33	EC4PPC06	Electronic Measurements & Instrumentation Lab
34	EC5TPC07	Lic & Its Application
35	EC5TPC08	Communication System- II
36	EC5TPC09	Electromagnetic Field Theory
37	EC5TPE01	Microprocessor & Its Application
38	EC5TPE02	Data Structure & Operating System
39	EC5TOE11	Computer Architecture
40	EC5TOE12	OOP in C++
41	EC5TOE13	Introduction to Information Security
42	EC5TOE14	Project Management
43	EC5TOE15	Rural Technology and Community Development
44	EC5PPC07	LIC & ITS APPLICATION Lab
45	EC5PPE01	Microprocessor & Its Application Lab
46	EC5PPC08	Communication System -II Lab
47	EC6TPC10	Digital Signal Processing
48	EC6TPC11	Antenna & wave prapogation
49	EC6TPE03	Data Communication & Computer Networking
50	EC6TPE04	Fundamental of VLSI Design
51	EC6T0E21	UNIX, Operating System
52	EC6T0E22	Probability & Stochastic Process
53	EC6TOE23	Advanced Instrumentation
54	EC6T0E24	Knowledge management
55	EC6T0E25	Engineering System Design Optimization
56	EC6PPE02	VHDL Lab
57	EC6PPC06	Digital Signal Processing Lab
58	EC6PSP01	Seminar
59	EC7TPC12	Microwave Engineering
60	EC7TPC13	Wireless Mobile Communication
61	EC7TPE05	Advance Hardware Design

62	EC7TPE06	Power Electronics
63	EC7TOE31	Wireless Sensor Network
64	EC7TOE32	Information theory and coding
65	EC7TOE33	Nanotechnology
66	EC7TOE34	Optical instrumentation and measurement
67	EC7TOE35	Neural Network and Fuzzy Logic
68	EC7TPPC12	Microwave Engineering Lab
69	EC7TPPE05	Comprehensive Viva
70	EC7PSP02	Project-I
71	EC8TPC14	Radar and Satellite Engineering
72	EC8TPC15	Optical Fiber Communication
73	EC8TPE07	VLSI Fabrication Methodology
74	EC8TOE41	Basic building block of Microwave Engineering
75	EC8TOE42	Principle of Management
76	EC8TOE43	Mobile Computing
77	EC8TOE44	Embedded System
78	EC8TOE45	Advanced Power Electronics
79	EC8TPPC15	Optical Fiber Communication Lab
80	EC8TPPC16	Advanced RF and Microwave Design lab
81	EC8TPSP03	Project-II
82	EC8TPSP04	Comprehensive Viva
83	IT7100	Research Methodology in engineering
84	ECE7102	Vaccume Technology
85	ECE7103	Finite Element Method
86	ECE7104	Sensors Measurement Science & Technology
87	ECE7105	Artificial Intelligence

विभागाध्यक्ष (इले. एवं संचार अभियांत्रिकी)
H.O.D. (Elect. & Comm. Engineering)
प्रौद्योगिकी संस्थान
Institute of Technology
गु. घा. वि., बिलासपुर (छ.ग.)
G. G. V. Bilaspur (C.G.)

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TPC11	3	1		3 hours	40	60	4

Course Objective:

The main objective of the course of determination of the fields radiated from antennas; wire antennas; array antennas; parabolic reflectors; antenna radiation pattern; antenna directivity; effects of the lossy ground on the wave propagation.

ANTENNA AND WAVE PROPAGATION

UNIT – I

Fundamental Parameters of Antenna: Introduction, Radiation Pattern, Radiation Power Density, Beam- width, Directivity, Antenna Efficiency, Gain, Bandwidth, Polarization, Antenna Radiation Efficiency, Friss Transmission Equation.

UNIT – II

Electromagnetic Radiation: Short electric dipole, Half wave dipole, Radiation from a small current element, power radiated, Radiation from a half wave dipole, Power radiated, Radiation resistance, Isotropic radiators and radiation pattern, Effective length, Antenna top loading and tuning effect of earth.

UNIT – III

Antenna Arrays and Their Design: Broadside and End fired arrays Collinear array, Array of point source, Non isotropic but similar point sources, Pattern Multiplication, Linear array with n Isotropic point sources of equal amplitude and spacing, Binomial, Dolph Tchebyscheff arrays.

UNIT – IV

Practical Antennas: Resonant and Non resonant antennas, Tower radiator, Long wire antenna, V antenna, Rhombic antenna, Loop antenna, Folded Dipole Antenna, Yagi -Uda Antenna, Reflector Antenna, Helical Antenna, Turnstile Antenna, Babinet's Principle, Horn Antenna, Micro-strip Antenna, Dielectric Resonator Antenna, Smart Antenna

UNIT – V

Wave Propagation : Modes of propagation of EM waves, UHF and Microwave Propagation, sky wave, Surface wave, Space wave range and fields calculations, Ionosphere characteristics, Earth's magnetic field, Ionospheric propagation, Refractive index at high frequencies, Mechanism of radio wave bending, critical frequency, Effect of earth's magnetic fields, Effective dielectric constant and conductivity, MUF, Skip distance, Optimum working frequency, Multi hop propagation, Ionosphere abnormalities, Troposheric propagation, Effect of earth's curvature and dielectric constant, Tropospheric scatter and Duct propagation.

SUGGESTED BOOKS & REFERENCE:-

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TPE03	3	0		3 hours	40	60	3

Course objective

1. To introduce analysis and design concept of computer and communication networks.
2. To understand the network layered architecture and the protocol stack.

DATA COMMUNICATION AND COMPUTER NETWORKING

UNIT- I

Model of digital communication system, OSI Reference, TCP/IP, ATM Reference Model, Characteristics of signals, basic concepts, Analog and digital transmission, parallel and serial transmission, Multi formats, T1, E1, SONET, SDH, QC, Asynchronous and Synchronous transmission, simplex, half duplex and duplex, different guided and unguided media, Wireless & Mobile, channel capacity.

UNIT-II

Review of different types of Encoding.

MAC Protocols, Network topologies, error detection techniques like parity check, LRC and CRC (Cyclic Redundancy Check) Implementations using shift register method. Interfacing standard: RS232, RS423A, Data link control, Flow control using stop and wait ,DRQ, go back to N ARQ and selective Reject ARC, Data link Control protocol :DLC,SDLC.

UNIT- III

Circuit Switching, Circuit Switched Networks, Switching concept, space, division switching. Time division switching, Packet Switching, principle. Switching techniques, Comparison with circuit switching, Routing and congestion control algorithm. Application of spread spectrum.

UNIT- IV

Layered network model, OSI layer standard, medium access control, Network protocol, internet working, TCP-IP, IPV-4, IPV-6, Ethernet, ISDN, B-ISDN, ATM, binary synchronous character in BSC frame.

UNIT- V

Application Layer: DNS, Telnet, TFP, SMTP, World Wide Web, HTML, URL, HTTP. IEEE-802.2 LLC, IEEE 802.3 Ethernet, IEEE 802.5 MAC Frame format, IEEE 802.11 Wireless Local Area Network: Layered Architecture, DCF, PCF, MAC Frame of IEEE 802.11, Physical layer of IEEE 802.11.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TPE04	3	0		3 hours	40	60	3

Subject Objective

1.To understand the fabrication process of CMOS technology
2. To teach fundamentals of VLSI circuit design and implementation using circuit simulators and layout editors.
3. To study various problems due to VLSI technology advancement.
4. To study digital circuits using various logic methods and their limitations.
5. To highlight the circuit design issues in the context of VLSI technology.

Fundamental of VLSI Design

UNIT I

Evolution of VLSI, VLSI Design Methodology, VLSI Design Flow, Full Custom & Semicustom Design Approach, FPGA Design, CAD Technology, MOS structure, MOS system under external bias condition, Structure and operation of MOSFET, N-MOS and P-MOS technology, Accumulation, Depletion, Inversion, I-V characteristics, Threshold voltage, Body Effect, MOSFET Capacitance, Latch-up , Second order Effects.

UNIT II

CMOS Fabrication process flow, CMOS N-well process, Layout design rules, stick diagram, CMOS design rules, Diagram for N-MOS and CMOS inverter & Gates, P-well process, Twin-Tub process, Fabrication of bipolar Transistor.

UNIT III

MOS Inverter static characteristics, CMOS inverter, Voltage transfer characteristics, Noise margin, CMOS inverter circuit operation, Switching characteristics, Delay time definitions, Power dissipation- static and dynamic power, BiCMOS Inverter.

UNIT IV

Combinational MOS logic circuit, CMOS logic circuits, Complex logic circuit, CMOS Transmission Gate, Pseudo NMOS logic, Sequential MOS logic circuits, Latches and Flip Flop circuits.
Dynamic CMOS logic circuits, Domino CMOS logic, NORA, ZIPPER logic

UNIT V

Introduction to VHDL, EDA tools, Entity and Architecture declaration, Data Objects, Data Types, Operators, Concurrent and Sequential Statements, Various Architecture Styles of Modeling, Design of Combinational and Sequential Circuits.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TOE21	3	0		3 hours	40	60	3

Course outcomes:

Objective of this subject to familiarizes the students with concept, design and structure of UNIX operating system and also learn the file management.

UNIX Operating System

UNIT-I

The Operating System, The UNIX Operating System, Knowing Your Machine, A Brief Session [Logging in with Username and Password, The Command, Displaying Both Date and Time, Clearing the Screen, The Calendar, Viewing Processes, Listing Files, Directing Output to a File, Counting Number of Lines in a File].

UNIT-II

The UNIX Architecture [Division of Labor : Kernel and Shell, The File and Process, The System Calls], Features of UNIX [Multiuser System, Multitasking System, Building Block Approach, UNIX Toolkit, Pattern Matching, Programming Facility, Documentation], Locating Commands [The PATH], Internal and External Commands, Command Structure [Options, Filename Arguments, Exceptions], Flexibility of Usage, Browsing the Manual Pages [man].

UNIT-III

General Purpose Utilities [The Calendar, Displaying The System Date, Displaying A Message, An Alternative To Echo, The Calculator, Recording Your Session, Email Basics, The Universal Mailer, Changing Your Password, Who, Uname, Tty, Stty, Changing The Settings]

UNIT-IV

The File [Ordinary, Directory, Device], The Parent Child Relationship, The Home Directory, Checking Your Current Directory, Changing The Current Directory, Making Directories, Removing Directories, Absolute Path Names, Relative Pathnames, Listing Directory Contents.

UNIT-V

Displaying And Creating Files, Copying A File, Deleting Files, Renaming Files, Paging Output, Printing A File, Knowing The File Types, Counting Lines/Words/Characters, Displaying Data In Octal, Comparing Two Files, Comm, Converting One File To Other, Compressing And Archiving Files, Compressing And Decompressing Files

SUGGESTED BOOKS & REFERENCE:-

1. *S. Das, UNIX CONCEPTS AND APPLICATIONS, TMH.*
2. *H. Hahn, HARLEY HAHN'S STUDENT GUIDE TO UNIX, McGraw Hill Companies.*
3. *S.M. Sarwar, R. Korektsy AND S.A. Sarwar, UNIX : THE TEXTBOOK, Addison-Wesley Longman.*

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TOE22	3	0		3 hours	40	60	3

Course Objective

The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc.

Probability & STOCHASTIC PROCESS

UNIT-I

Probability Theory Refresher: Axiomatic construction of probability spaces, random variables and vectors, probability distributions, functions of random variables; mathematical expectations, transforms and generating functions, modes of convergence of sequences of random variables, laws of large numbers, central limit theorem.

UNIT-II

Introduction to Stochastic Processes (SPs): Definition and examples of SPs, classification of random processes according to state space and parameter space, types of SPs, elementary problems.

UNIT-III

Discrete-time Markov Chains (MCs): Definition and examples of MCs, transition probability matrix, Chapman-Kolmogorov equations; calculation of n-step transition probabilities, limiting probabilities, classification of states, ergodicity, stationary distribution, transient MC; random walk and gambler's ruin problem, applications.

Continuous-time Markov Chains (MCs): Kolmogorov-Feller differential equations, infinitesimal generator, Poisson process, birth-death process, Applications to queueing theory, inventory analysis, communication networks, finance and biology.

Brownian Motion: Wiener process as a limit of random walk; first -passage time and other problems, applications to finance.

UNIT-IV

Branching Processes: Definition and examples branching processes, probability generating function, mean and variance, Galton-Watson branching process, probability of extinction. Renewal Processes: Renewal function and its properties, elementary and key renewal theorems, cost/rewards associated with renewals, Markov renewal and regenerative processes, applications.

Stationary Processes: Weakly stationary and strongly stationary processes, moving average and auto regressive processes.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TOE23	3	0		3 hours	40	60	3

Course objective

1 .To familiarizes the student with general concept of instrumentation and measurement.
2. To introduce the concept of Temperature and flow measurement.

ADVANCED INSTRUMENTATION

UNIT – I

Generalized Performance Characteristics of Instruments-I: Static Characteristics and static calibration, Measured Value and True Value, Some Basic Statistics, Least Square calibration Curves, 2-σ limits in defining imprecision, Chi-square test, Calibration Accuracy and Installed accuracy, Static sensitivity, Linearity, Threshold, Noise Floor, Resolution, Hysteresis, Dead Space, Span, Loading Effect.

UNIT – II

Generalized Performance Characteristics of Instruments-II: Dynamic Characteristics, Generalized model of measurement system, Digital simulation method, Operational Transfer Function, Sinusoidal Transfer Function, Zero order instrument.

UNIT – III

Generalized Performance Characteristics of Instruments-III: 1st order instrument - Step Response, Frequency Response, Impulse Response, 2nd order instruments - Step Response, Frequency Response, Impulse Response, Loading effect under dynamic conditions.

UNIT – IV

Temperature Measurement: Thermal Expansion Method, Thermo-electric Sensors, Electrical Resistance Sensors, Junction Semiconductor Sensors, Digital Thermometers, Radiation Methods.

UNIT – V

Flow Measurement: Flow visualization, Pitot-Static Tube, Dynamic Wind-Vector Indicator, Hot-Wire and Hot-Film Anemometers, Hot-Film Shock-Tube Velocity Sensor.

SUGGESTED BOOKS & REFERENCE:-

1.Measurement Systems, Ernest O Doebelin & Dhanesh N Manik, Mc Graw Hill publication
2.Electronic Instrumentation, 3edition by H. S. Kalsi Tata Mc Graw Hill publication
3. A Course in Electronic Measurements and Instrumentation, A.K.Sahani, Dhanpat Rai & Sons

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TOE23	3	0		3 hours	40	60	3

Course objective

1 .To familiarizes the student with general concept of instrumentation and measurement.
2. To introduce the concept of Temperature and flow measurement.

ADVANCED INSTRUMENTATION

UNIT – I

Generalized Performance Characteristics of Instruments-I: Static Characteristics and static calibration, Measured Value and True Value, Some Basic Statistics, Least Square calibration Curves, 2-σ limits in defining imprecision, Chi-square test, Calibration Accuracy and Installed accuracy, Static sensitivity, Linearity, Threshold, Noise Floor, Resolution, Hysteresis, Dead Space, Span, Loading Effect.

UNIT – II

Generalized Performance Characteristics of Instruments-II: Dynamic Characteristics, Generalized model of measurement system, Digital simulation method, Operational Transfer Function, Sinusoidal Transfer Function, Zero order instrument.

UNIT – III

Generalized Performance Characteristics of Instruments-III: 1st order instrument - Step Response, Frequency Response, Impulse Response, 2nd order instruments - Step Response, Frequency Response, Impulse Response, Loading effect under dynamic conditions.

UNIT – IV

Temperature Measurement: Thermal Expansion Method, Thermo-electric Sensors, Electrical Resistance Sensors, Junction Semiconductor Sensors, Digital Thermometers, Radiation Methods.

UNIT – V

Flow Measurement: Flow visualization, Pitot-Static Tube, Dynamic Wind-Vector Indicator, Hot-Wire and Hot-Film Anemometers, Hot-Film Shock-Tube Velocity Sensor.

SUGGESTED BOOKS & REFERENCE:-

1.Measurement Systems, Ernest O Doebelin & Dhanesh N Manik, Mc Graw Hill publication
2.Electronic Instrumentation, 3edition by H. S. Kalsi Tata Mc Graw Hill publication
3. A Course in Electronic Measurements and Instrumentation, A.K.Sahani, Dhanpat Rai & Sons

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TOE24	3	0		3 hours	40	60	3

Course Objective

1. Promoting enhanced knowledge dissemination within the organization with the help of internal as well as external learning processes and systems.
2. Transforming individual knowledge into the structural capital of the enterprise and organization.
3. Aligning business strategy with the existing core competencies of the organization and its capabilities.

Knowledge Management

Unit 1: Introduction: Definition, evolution, need, drivers, scope, approaches in Organizations, strategies in organizations, components and functions, understanding knowledge; Learning organization: five components of learning organization, knowledge sources, and documentation.

Unit 2: Essentials of Knowledge Management; knowledge creation process, knowledge management techniques, systems and tools.

Unit 3: Organizational knowledge management; architecture and implementation strategies, building the knowledge corporation and implementing knowledge management in organization.

Unit 4: Knowledge management system life cycle, managing knowledge workers,knowledge audit, and knowledge management practices in organizations, few case studies.

Unit 5: Futuristic KM: Knowledge Engineering, Theory of Computation, Data Structure.

SUGGESTED BOOKS & REFERENCE:-

1. Knowledge Management – a resource book – A Thohothathri Raman, Excel, 2004.
2. Knowledge Management- Elias M. Awad Hasan M. Ghazri, Pearson Education
3. The KM Toolkit – Orchestrating IT, Strategy & Knowledge Platforms, Amrit Tiwana, Pearson, PHI, II Edn.
4.The Fifth Discipline Field Book – Strategies & Tools For Building A learning Organization – PeterSenge et al. Nicholas Brealey 1994
5. Knowledge Management – Sudhir Warier, Vikas publications
6. Leading with Knowledge, Madanmohan Rao, Tata Mc-Graw Hill.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TOE25	3	0		3 hours	40	60	3

Course Objective

Objective of this course to introduce
1. the multidisciplinary character of engineering systems,
2 design of these complex systems, and
3. Introduce the various concept of optimization.

Engineering System Design Optimization

Unit1: Introduction- Optimization problem formulation, optimization algorithms, applications and examples, different optimization methods available.

Unit 2: Single Variable optimization-Optimization criteria, bracketing methods – Exhaustive search method, bound phase method; Region Elimination methods – Fibonacci search method, Golden search method; Gradient based methods – Newton Raphson method, Bisection method; Root finding using optimization technique.

Unit 3: Multi objective optimization- Optimization criteria, Different search methods, Unidirectional search, Direct search method – Evolutionary optimization method, Powell"s 74 conjugate direction method; Gradient based methods – Newton"s method and Variable metric method.

Unit 4: Specialized Methods- Integer programming, Geometric programming, simulated annealing, Global optimization using - steep descent method, simulated annealing.

Unit 5: Genetic algorithms and evolutionary approaches-Differences and similarities between genetic algorithms and traditional techniques, operators of GA"s, Computer program for simulated annealing, Newton Raphson method, Evolutionary optimization method.

SUGGESTED BOOKS & REFERENCE:-

1. *Kalyanmoy Deb, "Optimization for Engineering design", Prentice Hall, India, 2005.*
2. *Kalyanmoy Deb, "Multi objective optimization using Evolutionary algorithms", John Wiley, 2001.*
3. *Taha, Operations Research, TMH 2010*

Subject outcomes:

1. Engineering systems modeling for design and optimization.
2. Selection of design variables, objective functions and constraints.
3. Overview of principles, methods and tools in multidisciplinary design optimization (MDO) for systems.
4. Subsystem identification, development and interface design.
5. Review of linear and non-linear constrained optimization formulations.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TPC12	3	1		3 hours	40	60	4

Microwave Engineering

CourseObjectives : Students will try to learn:

1. To understand Analysis of Waveguides and gain complete knowledge about Microwave Components.
2. Design of Impedance Matching and Tuning using lumped and distributed elements for network.
3. To Analysis and study characteristics of microwave tube Generators and Amplifiers.
4. To Analysis and study characteristics of microwave Semiconductor of detector, switch, generator and amplifier.

UNIT – I

Microwave Waveguides: Introduction, Types of waveguides, TE and TM modes in Rectangular wave guide, Dominant mode, Various field components of TE and TM modes, Cut off frequency of a wave guide, Phase velocity, Group velocity, Guide wave length, Wave impedance, Power transmission in rectangular wave guide, TE and TM modes for Circular wave guide.

UNIT –II

Microwave tubes and Measurements: Introduction, High frequency limitations of conventional tubes, Two cavity Klystron amplifier, Bunching process, Applegate diagram, Analysis of two cavity Klystron, Reflex Klystron: Performance characteristics, Travelling Wave Tube (TWT): Constructional features and operating principle of TWT, Magnetron: Construction and operating principle of cavity magnetron, Analysis of Cylindrical Magnetron, Mode jumping.

UNIT –III

Solid State Microwave Devices: Introduction to Microwave Transistors, MESFETs Varactor Diode, Parametric Amplifiers, Masers, PIN diode; Schottky Barrier Diodes, Tunnel Diode, Transferred Electron Devices: Gunn Effect, Gunn diode as an amplifier & Oscillator, Avalanche transit time devices: IMPATT diode, TRAPATT diode, BARITT diode.

UNIT –IV

Microwave Network Analysis: Scattering Matrix, Properties of Scattering Matrix, Microwave T junctions: H-plane Tee, E-plane Tee, Magic Tee junction and its applications; Directional Couplers: Introduction and Scattering Matrix of a Directional Coupler; Rate Race Junction, Isolator, Circulator, Attenuator, Phase Shifters.

UNIT –V

ELECTRONICS & COMMUNICATION ENGINEERING — Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TPC13	3	1		3 hours	40	60	4

WIRELESS & MOBILE COMMUNICATION

Course Objectives: Students will try to learn:

1. To study the concept of Mobile radio propagation, cellular system design.
2. To understand mobile technologies like GSM and CDMA.
3. To know the mobile communication evolution of 2G, 3G and beyond in brief.

UNIT - I

Introduction to Wireless Communication System: Evolution mobile communications, Mobile radio around the world, Types of Wireless communication system, comparison of Common wireless system, Trend in Cellular radio and personal Communication. Second generation Cellular Networks, Third Generation (3G) Wireless Networks, Wireless Local Loop(WLL), Bluetooth and Personal Area Networks.The Cellular Concept-System design Fundamentals:Cellular System, Hexagonal geometry cell and frequency reuse concept, channel assignment strategies, Distance to frequency reuse ratio, channel & Co-channel interference reduction factor, S/I ratio consideration and calculation for minimum Co-channel and adjacent interference, Handoff strategies, Umbrella Cell Concept, Trunking and Grade Of Service(GOS),Improving Coverage & Capacity in cellular System-splitting, cell sectorization, Repeaters, Micro cell zone concept.

UNIT – II

Mobile Radio Propagation: Large Scale Path Loss : Free space propagation model, The three basic propagation Mechanism: reflection, diffraction, scattering, Practical link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse response model of a Multipath Channel, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, Rayleigh and Ricean Distributions, Statistical for models multipath fading channels and diversity techniques in brief.

UNIT-III

Modulation Techniques: Orthogonal Frequency Division Multiplexing, Performance of Digital Modulation in Slow-Flat Fading Channels and Frequency Selective Mobile Channels. Equalization: Survey of Equalization Techniques, Linear Equalization, Non-linear Equalization, Algorithms for Adaptive Equalization.

UNIT – IV

Multiple Access Techniques for Wireless Communication: Introduction, FDMA, TDMA, CDMA:DS-SS,FH-SS, space division multiple access, packet radio, capacity of a cellular systems.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TPE05	3			3 hours	40	60	3

ADVANCE HARDWARE DESIGN

CourseObjective: Students will try to learn:
1. The architecture and operation of typical microprocessors and microcontrollers.
2. To familiarize the students with the programming and interfacing of microprocessors and microcontrollers.
3. To provide strong foundation for designing real world applications using microprocessors and microcontrollers

UNIT – I

Microprocessor Applications: Interfacing of LEDs, Common cathode and common anode connection, interfacing of keyboards, interfacing of seven segment device, Case studies of microprocessor based systems.

UNIT –II

Review of Evolution of Advanced Microprocessors:8086, 8088, 186/286/386/486/Pentium. RISC & CISC processor. Serial I/O & Data communication: RS 232c etc., Various BUS Standards, Introduction to ISA, EISA (82350 chip set).

UNIT –III

Microcontroller: Introduction to 8051 microcontroller, Architecture of 8051 microcontroller, Microcontroller resources, ALU, Special function register, Memory Organization, Internal and external memory. Assembly language programming.

UNIT –IV

Interrupt and Timer/Counter: Interrupts, Types of interrupt Timers/Counters, Programming external Hardware Interrupt, Interrupt priority in 8051.

UNIT –VEmbedded system: Introduction to Embedded system, Properties of embedded system, Working of embedded system, challenges of embedded systems

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TPE06	3			3 hours	40	60	3

Power Electronics

Course Objectives: Students will try to learn:

1. The basic theory of power semiconductor devices and passive components, their practical applications in power electronics.
2. To familiarize students to the principle of operation, design and synthesis of different power conversion circuits and their applications.
3. To provide strong foundation for further study of power electronic circuits and systems.

UNIT – I

Introduction to Power Electronics:- Introduction, Power electronics versus Linear Electronics, scope and applications. Overview of Power semiconductor switches.

Thyristor characteristics, Two transistor model of Thyristor. Thyristor Turn–On di/dt protection, dv/dt protection, Thyristor Turn–On , Series and parallel operation of Thyristor, Various Thyristor Commutation Techniques.

UNIT – II

Controlled Rectifiers:- Introduction, Principle of Phase controlled converter operation, Single Phase semi converter with RL load, Single Phase full converter with RL load, Single phase dual converters, , Three phase half wave converters, Three phase semi converters with RL load, Three phase full converter with RL load, Three phase Dual converters, Power factor improvements, Excitation angle control, PWM control, Sinusoidal Pulse Width Modulation

UNIT – III

Inverters: Single Phase - Half and Full Bridge Inverter with R and RL Load, fourier analysis single phase inverter output voltage. Performance parameters, Voltage control of single phase inverters, 3-Phase Bridge Inverters, PWM inverters.

UNIT – IV

DC Choppers:-Introduction, Principle of Step-Down operation, Step Down chopper with RL load, Principle of Step-Up operation, Performance parameters, Switch mode regulators, **Thyristor based chopper circuits:** Impulse commutated choppers, Impulse commutated three thyristor chopper, Resonant pulse choppers.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TOE31	3			3 hours	40	60	3

WIRELESS SENSOR NETWORK

Course Objectives: Students will try to learn:

1. To Understand the basic WSN technology and supporting protocols, with emphasis placed on standardization basic sensor systems and provide a survey of sensor technology
2. Understand the medium access control protocols and address physical layer issues
3. Learn key routing protocols for sensor networks and main design issues
4. Learn transport layer protocols for sensor networks, and design requirements
5. Understand the Sensor management, sensor network middleware, operating systems.

UNIT- I

Wireless Sensor Network: Introduction, Architecture, Hardware and Software used in Wireless Sensor Network.

UNIT- II

Sensor network application: Motion monitoring, Environmental monitoring, Generic Architecture, Sensor network Evolution.

UNIT- III

Wireless Sensor Network : Design , Goals and Issues , Sensor deployment, Scheduling and coverage issues, self configuration and topology control, Querying, data collection and processing, Collaborative information processing and group connectivity.

UNIT- IV

Wireless Sensor Routing Protocols: Data Centric, Hierarchical, Location based, Energy efficient routing,

UNIT- V

Sensor Network Challenges – Miniaturization, power management, scalability, remote management, usability, standardization and security, System Challenges- Tiny OS, Network Sensor Platforms.

SUGGESTED BOOKS &REFERENCE:-

1. *Building Wireless Sensor Networks by Robert Faludi Binding: Paperback Publisher: O'reilly Released: 2011*

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2018-19 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TOE32	3	0		3 hours	40	60	3

INFORMATION THEORY AND CODING

Course Objectives: Student will try to learn:

1. To equip students with the basic understanding of the fundamental concept of entropy and information as they are used in communications.
2. To enhance knowledge of probabilities, entropy, measures of information.
3. To guide the student through the implications and consequences of fundamental theories and laws of information theory and coding theory with reference to the application in modern communication and computer systems

UNIT 1: Uncertainty, information, Entropy, Joint Entropy and Conditional Entropy, Relative Entropy and Mutual Information, Relationship between Entropy and Mutual Information, Chain Rules for Entropy, Entropy of binary memoryless source and its extension to discrete memoryless source, source coding theorem, data compression, Prefix coding, Huffman coding, Lempel-Ziv coding, Source with memory and its entropy.

UNIT 2: Introduction to information Channels, Communication Channels, Continuous channels, discrete communication channels. Discrete memory less Channels, Channel Capacity, Channel coding theorem and its application to BSC, Shannon's theorem on channel capacity.

UNIT 3: Block Code and its Properties, Kraft-McMillan Equality and Compact Codes, Encoding of the source output, Shannon's encoding algorithm, Coding Strategies, Shannon-Fano-Elias Coding and Introduction to Arithmetic Coding.

UNIT 4: Introduction to Error Control Coding, Linear block codes, Systematic codes and its encoding circuit, Syndrome and error detection, minimum distance, error detecting and correcting capabilities of block code, decoding circuit.

UNIT 5: Basic properties of Cyclic codes, Generator and parity check matrix of cyclic codes, Introduction to convolution code, its construction and Viterbi algorithm for maximum likelihood decoding.

SUGGESTED BOOKS:-