List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Electronics and Communication Engineering*

Programme Name : *B.Tech.*

Academic Year : 2019-20

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	EC03TPC01	Electronic Devices
19	EC03TPC02	Digital System Design
20	EC03TPC03	Signals and Systems
21	EC03TPC04	Network Theory
22	EC03TBS05	Mathematics-III
23	EC03THS02	Engineering Economics
24	EC03TMC02	Constitution of India
25	EC03PPC01	Electronics Devices Lab
26	EC03PPC02	Digital System Design Lab

27	EC04TPC05	Analog and Digital Communication
28	EC04TPC06	Analog Circuits
29	EC04TPC07	Microcontrollers
30	EC04TBS06	Numerical Methods
31	EC04TES05	Electronics Measurement & Instrumentation
32	EC04THS03	Effective Technical Communication
33	EC04PPC03	Analog and Digital Communication Lab
34	EC04PPC04	Analog Circuits Lab
35	EC04PPC05	Microcontrollers Lab
36	EC5TPC07	Lic & Its Application
37	EC5TPC08	Communication System- II
38	EC5TPC09	Electromagnetic Field Theory
39	EC5TPE01	Microprocessor & Its Application
40	EC5TPE02	Data Structure & Operating System
41	EC5TOE11	Computer Architecture
42	EC5TOE12	OOP in C++
43	EC5TOE13	Introduction to Information Security
44	EC5TOE14	Project Management
45	EC5TOE15	Rural Technology and Community Development
46	EC5PPC07	LIC & ITS APPLICATION Lab
47	EC5PPE01	Microprocessor & Its Application Lab
48	EC5PPC08	Communication System -II Lab
49	EC6TPC10	Digital Signal Processing
50	EC6TPC11	Antenna & wave prapogation
51	EC6TPE03	Data Communication & Computer Networking
52	EC6TPE04	Fundamental of VLSI Design
53	EC6T0E21	UNIX, Operating System
54	EC6T0E22	Probability & Stochastic Process
55	EC6TOE23	Advanced Instrumentation
56	EC6T0E24	Knowledge management
57	EC6T0E25	Engineering System Design Optimization
58	EC6PPE02	VHDL Lab
59	EC6PPC06	Digital Signal Processing Lab
60	EC6PSP01	Seminar
61	EC7TPC12	Microwave Engineering

62	EC7TPC13	Wireless Mobile Communication
63	EC7TPE05	Advance Hardware Design
64	EC7TPE06	Power Electronics
65	EC7TOE31	Wireless Sensor Network
66	EC7TOE32	Information theory and coding
67	EC7TOE33	Nanotechnology
68	EC7TOE34	Optical instrumentation and measurement
69	EC7TOE35	Neural Network and Fuzzy Logic
70	EC7TPPC12	Microwave Engineering Lab
71	EC7TPPE05	Comprehensive Viva
72	EC7PSP02	Project-I
73	EC8TPC14	Radar and Satellite Engineering
74	EC8TPC15	Optical Fiber Communication
75	EC8TPE07	VLSI Fabrication Methodology
76	EC8TOE41	Basic building block of Microwave Engineering
77	EC8TOE42	Principle of Management
78	EC8TOE43	Mobile Computing
79	EC8TOE44	Embedded System
80	EC8TOE45	Advanced Power Electronics
81	EC8TPPC15	Optical Fiber Communication Lab
82	EC8TPPC16	Advanced RF and Microwave Design lab
83	EC8TPSP03	Project-II
84	EC8TPSP04	Comprehensive Viva
85	ET7100	Research Methodology in engineering
86	EC102	Vaccume Technology
87	EC103	Finite Element Method
88	EC104	Sensors Measurement Science & Technology
89	EC105	Artificial Intelligence
90	EC106	Optimization Techniques
91	EC107	Antenna for Modern Wireless Communication
92	EC108	Wireless and Computer Network

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
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:-

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TOE33	3	0		3 hours	40	60	3

NANOTECHNOLOGY

CourseObjectives: Student will try to learn:

1.To foundational knowledge of the Nanoscience and related fields.

2.To make the students acquire an understanding the Nanoscience and Applications

3. To help them understand in broad outline of Nanoscience and Nanotechnology.

UNIT-1

Introduction to Nanotechnology: Essence of Nanotechnology, Nano in daily life, Brief account of nano applications, Properties of nano materials, Properties at nanoscale (optical, electronic and magnetic), Metal nano clusters, Semiconductor nano particles.

UNIT-2

Nano Materials-Metal and Semiconductor Nanomaterials, Quantum Dots, Wells and Wires, Molecule to bulk transitions.

UNIT-3

Carbon Nano Structures :Introduction, Carbon molecules, Carbon clusters, Carbon nanotubes, Applications of carbon nanotubes.

UNIT-4

Synthesis Of Nanomaterials :Top-down (Nanolithography, CVD), Bottom-up (Sol-get processing, chemical synthesis). Wet Depositiontechniques, Self-assembly (Supramolecular approach), Molecular design and modeling.

UNIT-5

Application: Solar energy conversion and catalysis, Molecular electronics and printed electronics Nanoelectronics, Polymers with a special architecture, Liquid crystalline systems,Linear and nonlinear optical and electrooptical properties, Applications in displays and other devices, Advanced organic materials for data storage, Photonics, Plasmonics, Chemical and biosensors,Nanomedicine and Nanobiotechnology.

SUGGESTED BOOKS &REFERENCE:-

1. Nanotechnology by Richard Booker, Earl Boysen, Wiley Publishing Inc., 2006.
2. Introduction to Nanotechnology by Charles P. Poole Jr., Frank J. Owens, John Wiley & Sons Publications, 2003.

3. Hari Singh Nalwa, "Nanostructured Materials and Nanotechnology", Academic Press, 2002

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC7TOE34	3	0		3 hours	40	60	3

Optical Instrumentation & Measurements

CourseObjectives: Student will try to learn:

1. The different types of optical sources and their characteristics.
2. The different aspects of optical instrumentation.
3. Study about different optical sensors.
4. Different methods to calculate the various parameter for optical fiber.

Unit 1. Light Sources: Introduction, LEDs, power, efficiency, types and structures of LEDs, characteristics and modulation, driver circuits, semiconductor lasers diodes, modulation characteristics, driving circuitry.

Unit 2. Optical Instrument: Optical time domain reflectometer, optical low coherence reflectometer,optical power and energy meter, monochrometer, CCD, optical spectrum analyzer, ellipsometer, Transducers, Lock-in-Amplifier, Box car averager.

Unit 3. Fiber optic components and devices: Direction couplers, beam splitters, switches modulations, connectors, couplers, polarizers, polarization controllers, amplifiers, fiber lasers, reflectors, wavelength filters, polarizing beam splitters, wavelength division multiplexers, fiber optic isolators etc.

Unit 4.Fibre optic sensors: Pressure, temperature, strain, magnetic and electric field sensors based on the characteristics like intensity, phase, polarization, frequency and wavelength of light wave.

Unit 5.Measurements methods in optical fibre: General experimental consideration, measurement of refractive index profile, numerical aperture, attenuation, pulse dispersion and bandwidth. Cut off wavelength, mode field diameter and birefringence of single mode fiber.

SUGGESTED BOOKS &REFERENCE:-

1. B. P. Pal : Fundamentals of Fibre Optics in Telecommunication and Sensor Systems, New Age, New Delhi, 1992.
2. A. K. Ghatak and K. Thyagarajan, Introduction to Fiber Optics, Cambridge, 1998.
3. S.M. Senior : Optical Fibre Communication: Principles and Practice, PHI, New Delhi, 2002.
4. A.K.Ghatak, M.R. Shenoy : Fibre Optics Measurements, Viva, New Delhi, 1995.

Course Outcome: After the successful completion of the course the students will be able to:
1. explain the basic concepts of optical transmitting and receiving

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

NEURAL NETWORK & FUZZY LOGIC SYSTEM

Course Objectives: Students will try to learn:
1. Concepts and understanding of artificial neural networks
2. Fuzzy logic basic theory and algorithm formulation
3. To solve real world problems.

UNIT-I

Introduction to ANS Technology: Elementary Neurophysiology, Models of a Neuron, Neural Networks viewed as directed graphs, Feedback, from neurons to ANS, Artificial Intelligence and Neural Networks.

UNIT-II

Learning and Training: Hebbian, Memory based, Competitive, Error-Correction Learning, Credit Assignment Problem: Supervised and Unsupervised learning, Memory models, Recall and Adaptation. Network Architectures, Single-layered Feed-forward Networks, Multi-layered Feedforward Networks, Recurrent Networks, Topologies.

UNIT-III Algoritms for ANN: Activation and Synaptic Dynamics, Stability and Convergence. A Survey of Neural Network Models : Single-layered Perceptron – least mean square algorithm, Multi-layered Perceptrons – Back propagation Algorithm, XOR – Problem, The generalized Delta rule, BPN Applications, Adalines and Madalines – Algorithm and applications.

UNIT-IV

Applications: The Traveling salesperson problem, Talking Network and Phonetic typewriter : Speech Generation and Speech recognition, Character Recognition and Retrieval, Handwritten Digit rcognition.

UNIT-V

Adaptive Fuzzy Systems: Introduction to Fuzzy sets and operations, Examples of Fuzzy logic, Fuzzy Associative memories, Fuzziness in neural networks, Comparison of Fuzzy and neural Truck-Backer upper control systems.

SUGGESTED BOOKS &REFERENCE:-

1. Artificial Neural Networks by B. Yagna Narayan, PHI

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TPC14	3	1		3 hours	40	60	4

RADAR &SATELLITE COMMUNICATION

Course Objectives: Student will try to learn:

1.The fundamentals of satellite communication.
2. To provide them with a sound understanding of how a satellite communication system successfully transfers information from one earth station to another.
3. Working principle of different RADAR systems and their applications.

UNIT – I

INTRODUCTION: Origin and brief history of satellite communication; Element of satellite communication link; Current status of satellite communication.

ORBITAL MECHANISM AND LAUNCHING OF SATELLITE: Equation of orbit. Describing the orbit, Look angle determination, Azimuth and elevation calculation, Geostationary and other orbit, Orbital perturbation, Orbit determination, Mechanic's of launching a synchronous satellite, selecting a launch vehicle.

UNIT – II

SPACECRAFT: Satellite subsystem, power supply altitude and orbit control system, Telelmetry and Command, Thermal control system communication subsystem, Space craft antennas, Frequency re-use antennas.

UNIT – III

SATELLITE CHANNEL &LINK DESIGN: Basic transmission theory, Noise temperature, Calculation of system noise temperature. Noise figure, G/T Ratio of earth station, Design of down and uplink using C/N ratio, FM improvement factor for multi channel signal, Link design for FDM/FM, TV signal and Digital signals.

UNIT – IV

MULTIPLE ACCESS TECHNIQUES & EARTH STATION TECHNOLOGY: Frequency Division Multiple Access (FDMA), FDM/FM/FDMA, Time Division Multiple Access, Frame structure and synchronization, Code Division Multiple Access, Space qualification and Equipment Reliability, random Access, Earth station design requirement, earth station subsystem, Monitoring and control, Antenna noise temperature, Tracking, Design of

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TPC15	3	1		3 hours	40	60	4

OPTICAL FIBER COMMUNICATION

Course Objectives: Students will try to learn:

1. The basics of signal propagation through optical fibers,
2. Study about fiber impairments, components and devices and system design.

UNIT – I

Introduction to optical communication, Principles of light transmission, optical fiber modes and configurations, mode theory for circular wave-guides, single-mode fibers, multimode fibers, numerical aperture, mode field diameter, V-number, fiber materials, fiber fabrication techniques.

UNIT – II

Optical sources, LED´s, LASER diodes, Model reflection noise, Power launching and coupling, Population Inversion, Fiber Splicing, Optical connector, Photo detector, PIN, Avalanche detector, response time, avalanche multiplication noise.

UNIT – III

Signal degradation in optical fibers, attenuation losses, signal distortion in optical waveguides, material dispersion, wave guide dispersion, chromatic dispersion, inter-modal distortion, Pulse broadening in graded index fiber, mode coupling, advanced fiber designs: dispersion shifted, dispersion flattened, dispersion compensating fibers, design optimization of single mode fibers.

UNIT – IV

Coherent optical fiber communication, modulation techniques for homodyne and heterodyne system, optical fiber link design, Rise time budget and link power budget long haul systems, bit error rate, line coding, NRZ, RZ, Block codes, eye pattern.

UNIT – V

Advanced system and techniques, wavelength division multiplexing, optical amplifiers, semiconductor amplifier, EDFA, Comparison between semiconductor and optical amplifier, Gain bandwidth, photonic switching, optical networks, optical fiber bus, ring topology, star architecture, FDDI.

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TPE07	3			3 hours	40	60	3

VLSI Fabrication Methodology

CourseObjective: Student will try to learn:
1.The basic MOS Circuits
2. the MOS Process Technology.
3. To understand the operation of MOS devices.
4.To impart in-depth knowledge about analog and digital CMOS circuits.

Unit 1
Introduction, Processing steps of BJT, Processing steps of MOSFET, Control of threshold voltage of MOS, Ion implantation, CVD, Patterning of polysilicon by etching, Self aligned technology, Advantage of polysilicon and problems of metal gate process.

Unit 2
Si structure, Packing density, Hard sphere model, Mismatch with dopant atom & Misfit factor, Concept of different crystal planes of Si, Natural cleavage plane, Self limiting etching or V-groove etching. Crystal defects- Point, Dislocation, Volume defects

Unit 3
Si crystal growth by Reduction process, Bridgemann Process, Czochralski Technique, Control of defects in crystal, Zone Refining, Gettering process.

Unit 4

Si Epitaxy, 3 cardinal rule of hetero-epitaxy, Liquid Phase Epitaxy, Vapor Phase Epitaxy, Problems of VPE, Tilted sample holder, Reactor configuration, Optimization of temperature and pressure, LPCVD from Silicon epitaxy by Silane route, Surface catalysed reaction, Efficiency of deposition, Problems of Silane route.

Unit 5

Doping during Epitaxy, Autodoping, Junction shift, Pattern shift and distortion, Molecular Beam Epitaxy, Insitu cleaning, Oxidation, Kinetics of oxidation

SUGGESTED BOOKS &REFERENCE:-

1. VLSI Fabrication Principles by S K Ghandhi,
2. VLSI Technologyed S M Sze,
3. Silicon VLSI Technology by J D Plummer, M Deal, P D Griffin

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC8TOE41	3			3 hours	40	60	3

Basic Building Blocks of Microwave Engineering

CourseObjective: Student will try to learn
1. Rectangular and circular wave guides using field theory.
2. The theoretical principles underlying microwave devices and networks.
3. To design microwave components such as power dividers, hybrid junctions, Directional Couplers, microwave filters, Microwave Wave-guides and Components, Ferrite Devices.
4. about Microwave Solid-State Microwave Devices and Microwave Tubes.
5. about Microwave Measurement Techniques.

Unit 1: Concept of Mode, TEM, TE, TM and Impedance concept. Loss associated with microwave transmission –Coaxial line, Rectangular waveguide, Circular waveguide, Planar transmission line.

Unit2: Challenges of Microwave design-Smith Chart (1st tool), Measurement f unknown impedances, Need of impedance matching at Microwave frequencies, Lumped element based impedance matching network by Smith Chart, Distributed impedance matching by Smith Chart, Broadband impedance matching network.

Unit 3: Voltage and current at microwave frequency, Scattering parameter (2nd tool) Properties of scattering parameter, Network analyser, Problem solving by equivalent voltage and current in waveguide and on scattering parameters.

Unit 4: Coaxial connectors, Microwave power divider and combiner, Microwave Resonators, Attenuators, Switching diode.

Unit 5: Microwave tubes, Microwave solid state diode oscillators, and Amplifiers, Microwave transistors

SUGGESTED BOOKS &REFERENCE:-

1. Microwave Engineering, David M Pozar,
2. Microwave Devices & Circuits, Samuel Y Liao,
3. Antenna Theory, C A Balanis

CourseOutcome : After completion of course, the student will be able to understand :
1. Integrating a wide range of Microwave components into one design oriented frame work
2. Design and solve real world problems
3. Characterize microwave devices in terms of the directionality of communication.
4. Use a microwave test bench in analyzing various types of microwave measurements.