List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Electronics and Communication Engineering*

Programme Name : *B.Tech.*

Academic Year : 2020-21

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	MA201TBS01	Mathematics-I
02.	PH201TBS02	Physics
03.	EC201TES01	Basic Electrical & Electronics Engineering
04.	IT201TES02	Introduction to Information Technologies
05.	EN201THS01	English Communication
06.	PH201PBS01	Physics Lab
07.	ME201PES01	Engineering Graphics
08.	ME201PES02	Workshop Technology & Practices
09.	EC201PES03	Basic Electrical Engineering Lab
10.	MA202TBS03	Mathematics-II
11	CY202TBS04	Chemistry
12	CE202TES03	Engineering Mechanics
13	CS202TES04	Computer Programming
14	CM202TES05	Basic Civil & Mechanical Engineering
15	CY202PBS02	Chemistry Lab
16	CE202PES04	Engineering Mechanics Lab
17	CS202PES05	Computer Programming 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	EC03PPC01	Electronics Devices Lab
25	EC03PPC02	Digital System Design Lab
26	EC04TPC05	Analog and Digital Communication

27	EC04TPC06	Analog Circuits
28	EC04TPC07	Microcontrollers
29	EC04TBS06	Numerical Methods
30	EC04TES05	Electronics Measurement & Instrumentation
31	EC04THS03	Effective Technical Communication
32	EC04PPC03	Analog and Digital Communication Lab
33	EC04PPC04	Analog Circuits Lab
34	EC04PPC05	Microcontrollers Lab
35	EC05TPC08	Electromagnetic Waves
36	EC05TPC09	Computer Network
37	EC05TPC10	LIC and its Application
38	EC05TPC11	Control Systems
39	EC05TPE01	Information Theory & Coding
40	EC05TPE02	CMOS Design
41	EC05TPE03	Introduction to MEMS
42	EC05TPE04	Computer Architecture
43	EC05TOE01	Data Structure and Algorithms
44	EC05TOE02	Operating Systems
45	EC05PPC06	Electromagnetic Waves Lab
46	EC05PPC07	Computer Networks Lab
47	EC05PPC08	LIC and its Application Lab
48	EC06TPC12	Digital Signal Processing
49	EC06TPC13	Probability Theory and Stochastic Processes
50	EC06TPE05	Antenna & Wave Propagation
51	EC06TPE06	Power Electronics
52	EC06TPE07	High Speed Devices & Circuits
53	EC06TPE08	Nanoelectronics
54	EC06TOE03	Cryptography & network Security
55	EC06TOE04	Artificial Intelligence
56	EC06TBS07	Life Science
57	EC06PPC09	Digital Signal Processing Lab
58	EC06PPC10	Electronic Measurement Lab
59	EC06PPC11	Mini Project/Electronic Design Wokshop
60	EC5TPC07	Lic & Its Application
61	EC5TPC08	Communication System- II

62	EC5TPC09	Electromagnetic Field Theory
63	EC5TPE01	Microprocessor & Its Application
64	EC5TPE02	Data Structure & Operating System
65	EC5TOE11	Computer Architecture
66	EC5TOE12	OOP in C++
67	EC5TOE13	Introduction to Information Security
68	EC5TOE14	Project Management
69	EC5TOE15	Rural Technology and Community Development
70	EC5PPC07	Lic & Its Application Lab
71	EC5PPE01	Microprocessor & Its Application Lab
72	EC5PPC08	Communication System -II Lab
73	EC6TPC10	Digital Signal Processing
74	EC6TPC11	Antenna & wave propagation
75	EC6TPE03	Data Communication & Computer Networking
76	EC6TPE04	Fundamental of VLSI Design
77	EC6T0E21	UNIX, Operating System
78	EC6T0E22	Probability & Stochastic Process
79	EC6TOE23	Advanced Instrumentation
80	EC6T0E24	Knowledge management
81	EC6T0E25	Engineering System Design Optimization
82	EC6PPE02	VHDL Lab
83	EC6PPC06	Digital Signal Processing Lab
84	EC6PSP01	Seminar
85	EC7TPC12	Microwave Engineering
86	EC7TPC13	Wireless Mobile Communication
87	EC7TPE05	Advance Hardware Design
88	EC7TPE06	Power Electronics
89	EC7TOE31	Wireless Sensor Network
90	EC7TOE32	Information theory and coding
91	EC7TOE33	Nanotechnology
92	EC7TOE34	Optical instrumentation and measurement
93	EC7TOE35	Neural Network and Fuzzy Logic
94	EC7TPPC12	Microwave Engineering Lab
95	EC7TPPE05	Comprehensive Viva
96	EC7PSP02	Project-I

97	EC8TPC14	Radar and Satellite Engineering
98	EC8TPC15	Optical Fiber Communication
99	EC8TPE07	VLSI Fabrication Methodology
100	EC8TOE41	Basic building block of Microwave Engineering
101	EC8TOE42	Principle of Management
102	EC8TOE43	Mobile Computing
103	EC8TOE44	Embedded System
104	EC8TOE45	Advanced Power Electronics
105	EC8TPPC15	Optical Fiber Communication Lab
106	EC8TPPC16	Advanced RF and Microwave Design lab
107	EC8TPSP03	Project-II
108	EC8TPSP04	Comprehensive Viva
109	ET7100	Research Methodology in engineering
110	EC102	Vaccume Technology
111	EC103	Finite Element Method
112	EC104	Sensors Measurement Science & Technology
113	EC105	Artificial Intelligence
114	EC106	Optimization Techniques
115	EC107	Antenna for Modern Wireless Communication
116	EC108	Wireless and Computer Network

विभागाध्यक्ष (इले. एव 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
EC5TPE01	3	0		3 hours	40	60	3

Course Objective

1. Introduce the concept of microprocessor and its history and evolution with integration technology.
2. Introduce the concept of interfacing and also assembly language programming in 8085 and 8086.
3. Introduce the concept of architecture of microprocessor.

MICROPROCESSOR & ITS APPLICATION

UNIT – I

Microprocessor architecture and Microcomputer systems: History And Evolution, Types Of Microprocessors, Functions of Microprocessor, Architecture of 8085, Pin configuration and Function, Tristate Bus concept, Generation of Timing Signals, Bus Timing, Demultiplexing, Instruction execution, Instruction cycle, Machine cycles, T states, Fetch executes cycle, Instruction Timing and Operation status.

UNIT – II

Memory map & addresses, I/P devices ,I/P Addressing, The 8085 Programming model, Instruction Classification, Instruction & Data Formats, Addressing Modes, Instruction for data transfer, Arithmetic and Logical operation, Branching operation, Addressing mode, Writing Assembly Language Programs.

Counters, Time Delays And interrupts: Memory interfacing, Absolute, Partial Decoding, Multiple Address Range, Interfacing memory with wait states, Interfacing I/O devices, Peripheral I/O, Memory Mapped I/O, 8085 Single Board Microcomputer System. Interfacing Of 8085 with 8155/8156(RAM), 8355/8755(ROM).

UNIT – III

Programming Techniques with additional instructions, Looping, counting and indexing, Data transfer from/to memory to/from microprocessor, 16-bit arithmetic instructions, Logic Operations like rotate, compare, Time delays, Counters, Stacks, Subroutine, Call and return instructions. Interrupts, The 8085 interrupt process, multiple interrupt and priorities, Vectored interrupts. Restart as software instruction.

UNIT – IV

Programmable Interfacing devices: Basic Concept, 8279 programmable Keyboard/Display interface,8255A Programmable Parallel interface, Interfacing keyboard and display using 8255A, 8254 Programmable Interval Timer, 8259A Programmable Interrupt Controller, Direct Memory Access(DMA), 8237 DMA Controller. Basic Concept in Serial I/O, Data Communication over Telephone Lines, 8085-serial I/O lines, 8251A Programmable Communication interface, Interfacing a matrix keyboard, Interfacing LED and seven segment displays.

UNIT –V

Introduction of 16-bit Microprocessor: Internal organization of 8086, Signal descriptions, Physical memory organization, Minimum & Maximum mode, Bus Organization and timing. Addressing modes, Instruction set, Assembler directives, Interrupts and Interrupt service routine.

SUGGESTED BOOKS & REFERENCE:-

1. *"Microprocessor Architecture, Programming & Applications with the 8085",R.S.Gaonkar, Penram Publication.*
2. *"Advance Microprocessor & Peripherals", A K Rai , K M Bhurchandi, TMH*
3. *"The Intel Microprocessor", Barray B. Brey, PHI*

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TPE02	3	0		3 hours	40	60	3

Course Objective:

1. To introduce the concept of Data Structure.
2. To introduce operating system as a resource manager, its evolutions and fundamentals.
3. To help student understand concept of process and different process (linear and concurrent) Scheduling policies.
4. To help student familiar with memory, file and I/O management policies.

DATA STRUCTURE & OPERATING SYSTEM

UNIT – I

Data structure: Introduction, classification, operations, algorithm analysis.
Array: insertion, deletion, searching, sorting. Dynamic memory allocation.

UNIT - II

Linked List: Singly, Doubly and their operations, **Stack:** Basic Operation, Conversion of infix notation using
stack, evaluation of postfix expression, recursion, **Queue:** Basic Operation, Circular & Linear Queue.

UNIT - III

Tree: Introduction, binary tree traversal, binary search tree and their operations.
Graph: Representation of graph, shortest path, graph traversal, spanning tree, minimum spanning tree.

UNIT - IV

Operating System Overview: Operating system objectives and functions, evolution of operating system, System calls.
Process Management: Process concepts, CPU scheduling, Deadlocks, Deadlock detection, prevention and recovery.

UNIT - V

Memory Management: Swapping, Contiguous allocation, Paging, Segmentation, Virtual memory, Demand paging, Page replacement policies, Thrashing.
Disk Management: Free space management, Disk management, Disk scheduling.

SUGGESTED BOOKS & REFERENCE:-

1. *Data Structures, Seymour Lipschutz, Schaum's Series, Tata McGraw Hill Publication.*
2. *Operating System, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Tata McGraw Hill Publication.*
3. *Data Structure Using C, Aaron M. Tanenbaum, Pearson Publication.*
4. *Operating Systems, William Stallings, Pearson Education.*

Subject outcomes:

1) To Learn linear data structures – lists, stacks, and queues
2) To understand sorting, searching and different algorithms
3) To apply Tree and Graph structures

And also familiar with the operating system and memory concept and process management.

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TOE11	3	0		3 hours	40	60	3

Course Objective

1.Discuss the basic concepts and structure of computers
2. Understand concepts of register transfer logic and arithmetic operation
3. Explain different types of addressing modes and memory organization.
4. Learn the concept of pipeline architecture.
5. Summarize the Instruction execution stages.

COMPUTER ARCHITECTURE

UNIT-I

Basic of Computer Organization & Architecture: Introduction, Computer Organization vs. Computer architecture, Von Neumann Architecture vs. Harvard Architecture, Introduction to Simple as Possible (SAP) Computer Architecture.

Input & Output Organization: Introduction, Simple Bus Architecture, Types of Buses, I/O Communication Methodologies: Programmed I/O (Polling), Interrupt-driven I/O &Direct Memory Access (DMA), I/O channel & I/O Processor, Accessing I/O device: Memory Mapped I/O, Isolated or I/O Mapped.

UNIT-II

Computer Arithmetic: Introduction, Addition & Subtraction: Addition & Subtraction with Signed-Magnitude Data, Hardware Implementation & Algorithm, Addition & Subtraction with Signed-2's Complement Data, Multiplication Algorithm: Hardware Implementation for Signed-Magnitude Data, Hardware Algorithm, Booth Multiplication Algorithm, Array Multiplier, Division Algorithms: Hardware Implementation for Signed-Magnitude Data& Algorithm , Carry Look Ahead Adder.

UNIT-III

Memory Organization: Introduction, Types of Memory, Memory Hierarchy, Main Memory, Cache Memory, Virtual Memory, Associative Memory.

Processor Organization: Introduction, Control Unit: Hardwired Control Unit, Micro programmed Control Unit, Instruction Set Computer: Reduced Instruction Set Computer (RISC) vs. Complex Instruction Set Computer (CISC).

UNIT-IV

Pipelining: Introduction, Concept of Instruction Pipeline, Design Problems with Pipeline: Structural Hazard, Data Hazard & Control Hazard, Extension in Pipeline Designed: Super Pipelining, Superscalar Processor, Very Long Instruction Width (VLIW) Architecture.

UNIT-V

Multiprocessor System: Introduction, Shared Memory Multiprocessor, Distributed Memory Multiprocessor, Flynn's Classification: Single Instruction Single Data (SISD), Single Instruction Multiple Data (SIMD), Multiple Instruction Single Data (MISD), Multiple Instruction Multiple Data (MIMD), Cache Coherence, Message Passing Model, Cluster Computing, Distributed Computing.

SUGGESTED BOOKS & REFERENCE:-

1. *Computer System Architecture, M. Morris Mano, Pearson Education India.*
2. *Computer Organization & Architecture, W. Stalling, Pearson Education India.*

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TOE12	3	0		3 hours	40	60	3

Course Objective

1. To learn advanced features of the C++ programming language as a continuation of the previous course.
2. To learn the characteristics of an object-oriented programming language: data abstraction and information hiding, inheritance, and dynamic binding of the messages to the methods.
3. To learn the basic principles of object-oriented design and software engineering in terms of software reuse and managing complexity.
4. To enhance problem solving and programming skills in C++ with extensive programming projects.

OBJECT ORIENTED PROGRAMMING IN C++

UNIT I

Principles of OOP –A look at procedure oriented programming, OOP paradigm, Basic Concepts of OOPs, Benefits of OOP, object oriented Language. Beginning with C^{++} characters used in C^{++}, Basic Data Types , C^{++} Tokens, Identifiers , Keywords , Constants , Variables , Input / Output statements ,Structure of C^{++} program.

UNIT II

Operations and Expressions - Concept, Arithmetic Operations and Expressions, Relational and Logical operators and Expressions ,Order of evaluation of expressions ,Type conversion , Compound assignment Operator ,Standard Library Functions and header files. Flow of control – Compound statement , sequential structure ,selection structure ,simple if ,if … else nested if , ladder ,switch , go to , loop structure , do … while ,for , statement break , continue , function exit ( )

UNIT III

Array and Function - Concept of array, Concept of subprogram, Parameter passing in function, Function prototype, Calling function, Call by value, Call by reference, Array parameters, Default argument, Returning values, Scope rules, Storage class, Inline function, Function overloading, Recursive functions. Structure, Class and Object - Define structure, Returning structure elements, Nested structure, Passing structure to function, User defined data type, Specifying a class, Defining member function, Scope of class and its member, Nested class, Data Hiding and encapsulation, Friend function, Object as function argument, Function returning object, Static member.

UNIT IV

Constructors, Destructors, constructor function, parameterized multiple constructor, Default constructor, Copy constructor and Destructor function. Inheritance and aggregation - Derived class, various type of inheritance, Inheriting Constructors, Parts explosion as aggregation, Abstraction and property of aggregation, Constructing aggregations. Polymorphism, overloading and operator overloading.

UNIT V

Pointer and virtual function - Pointer variable, dynamic allocation operators, new and delete, this operator Pointers to derived class, Working with files - File & stream, Opening and closing a file, read( ) and write( ) functions, detecting end of file.

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TOE13	3	0		3 hours	40	60	3

Course Objective

This course focuses on the models, tools, and techniques for enforcement of information security with some emphasis on the use of cryptography. Students will learn information security from multiple perspectives

INTRODUCTION TO INFORMATION SECURITY

UNIT I

Introduction to security attacks, Services & Mechanism, Introduction to Cryptography, Conventional encryption, Classical encryption techniques- Substituion and Transposition ciphers, Cryptanalysis, Stegnography. Simplified DES ,Block cipher principles, The data encryption standard, the strength of DEC, Differential and linear Cryptanalysis, Block cipher design principles, Block cipher modes of operation, evaluation criteria for AES, The AES cipher, Triple DES, blowfish

UNIT II

Principle of public key cryptosystem, Public key cryptosystems, Application for public key cryptosystem, requirement for public key cryptography, public key crypto analysis, The RSA algorithm, computational aspects ,The security of RSA, Key managements, Distribution of public key, public key distribution of secret keys, s security requirements for signature scheme.

UNIT III

Elliptic curves cryptography message, authentication and hash function, authentication requirement, authentication functions, message authentication code security of hash function, Hash and Mac algorithm, MDS message digest algorithm, secure hash algorithm(SHA-l).

UNIT IV

Authentication applications – Kerberos – X.509 authentication service – Electronic mail security – PGP – S/MIME – IP security – Web security.

UNIT V

Intruders:-Intrusion techniques, Intrusion detection, Honey pots, firewall design principles, firewall characteristics, Type of firewall, fire wall configurations.

Web security:-Web security threats, web traffic security approaches, SSL architecture, SSL record protocol, change cipher spec protocol, Alert protocol, Handshake Protocol, Cryptographic Computations, Transport layer security, Secure Electronic Transaction.

SUGGESTED BOOKS & REFERENCE:

1. *Cryptography and Network Security, Principles and Practice, William Stallings, PHI*
2. *Cryptography Theory and Practice, Douglas R. Stinso, Champan & hall/CRC*
3. *Applied Cryptography, Bruce Schiener, John Wiley & Sons.*
4. *Network Security & Cryptography, Bernard Menezes, Cengage Learning.*
5. *Introduction to Cryptography, Johannes A Buchmann, Springer-Verlag.*
6. *Network Security: Private Communication in public world, Charlie Kaufman, R Perlman, M Speciner, Prentice Hall.*

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TOE14	3	0		3 hours	40	60	3

Course Objective

1. To make them understand the concepts of Project Management for planning to execution of projects.
2. To make them understand the feasibility analysis in Project Management and network analysis tools for cost and time estimation.
3. To enable them to comprehend the fundamentals of Contract Administration, Costing and Budgeting.
4. Make them capable to analyze, apply and appreciate contemporary project management tools and methodologies .

PROJECT MANAGEMENT

UNIT-I, *Basics of Project Management:* Introduction, Characteristics of projects, Definition and objectives of Project Management, Stages of Project Management, Project Management Processes, Project Management Principles

UNIT-II, *Project Identification and Selection:* Introduction, Project Identification Process, Project Initiation, Pre-Feasibility Study, Feasibility Studies, Project Break-even point

Project Planning: Introduction, Project Planning, Need of Project Planning, Project Life Cycle, Roles, Responsibility and Team Work, Project Planning Process, Work Breakdown Structure (WBS)

UNIT-III, *Resources Considerations in Projects:* Introduction, Resource Allocation, Scheduling, Project Cost Estimate and Budgets, Cost Forecasts

PERT and CPM: Introduction, Development of Project Network, Time Estimation, Determination of the Critical Path, PERT Model, Measures of variability, CPM Model, Network Cost System

UNIT-IV, *Project Management Information System:* Introduction, Project Management Information System (PMIS), Planning of PMIS, Design of PMIS

Project Management Software: Introduction, Advantages of Using Project Management Software, Common Features Available In Most of the Project Management Software.

UNIT-V, *Post-Project Analysis:* Project review and control- Initial review, performance evaluation, abandonment analysis and its behavioral issues.

SUGGESTED BOOKS & REFERENCE:-

1. Shtub, Bard and Globerson, Project Management: Engineering, Technology, and Implementation, PHI
2. Lock, Gower, Project Management Handbook.
3. Cleland and King, VNR Project Management Handbook.
4. Wiest and Levy, Management guide to PERT/CPM, Prentice Hall. Ibdia
5. Horald Kerzner, Project Management: A Systemic Approach to Planning, Scheduling and Controlling, CBS Publishers, 2002.
6. S. Choudhury, Project Scheduling and Monitoring in Practice.
7. P. K. Joy, Total Project Management: The Indian Context, Macmillan India Ltd.
8. Project planning, analysis, selection, implementation and review by Prasanna Chandra, TMH.

Course Objective:

Objective of this subject is to introduce the concept of Rural development and community development in aspect of technology.

RURAL TECHNOLOGY AND COMMUNITY DEVELOPMENT

Unit- 1: PMGDISHA, digital literacy program, role of electronics in cashless rural economy, constraint in digitalization of rural areas, problems in community networking.

Unit- 2: Data, Information and Knowledge; concept of information, need of information (professional, educational, research), qualities of information, value of information, difference between data and information, properties of the needed information. Information and Management; planning, organizing, co-ordinating and controlling,

Unit- 3: Concepts of rural marketing; difference between rural and urban marketing, selling and retailing; marketing mix, market-segmentation, marketing planning, Strategy and Approaches; modern concept of marketing.

Unit- 4: Community development; concept, definition, meaning, need, history, principles, objectives and scope. Critical analysis of different rural development program organized by government of INDIA. PRA and RRA for problem analysis of villages .

Unit-5: Strategies for enhancing rural infrastructures. The Role of various NGOs in Community Development. Community Development Initiatives.

SUGGESTED BOOKS & REFERENCE: -

1. *Biddle, William Wishart. 1968. Encouraging Community Development: A Training Guide for Local Workers. New York: Holt, Rinehart and Winston.*

2. Kramer, Ralph M. and Harry Specht. 1975. Readings in Community Organization Practice. 2d ed. Englewood Cliffs, NJ: Prentice-Hall.

3. Sustainable Rural Technology, by M.S. Virdi, Daya Publishing House, ISBN: 8170355656

4. Rural Education and Technology, by S B Verma S K Jiloka Kannaki Das, Publisher: Deep & Deep Publications Pvt. Ltd. (2006)

5. Participatory Rural Appraisal. By Neela Mukharjee, Concept Publisher New Delhi.

6. India's developing villages. By G.R. Madan, Kalyani Publication, New Delhi.

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC6TPC10	3	1		3 hours	40	60	4

Course objective

The primary objective of this course is to provide a thorough understanding and working knowledge of design, implementation and analysis of DSP systems.

DIGITAL SIGNAL PROCESSING

UNIT – I

Realization of Systems: Realization of digital linear system, Signal flow graph. Structures for realization of discrete time systems, Structures for IIR and FIR systems, State space system analysis and structures, Representation of numbers, Quantization of filter coefficients, Round off effects in digital filters, Introduction to digital signal processors.

UNIT – II

Infinite Impulse Response Filter design (IIR): Features of IIR filters, Design stages, Filter design by Approximation of Derivatives, Impulse invariance method, Bilinear transformation method, Butterworth and Chebyshev Design Method, Frequency Transformations in Analog and Digital domain. .

UNIT – III

Finite Impulse Response (FIR) Filter Design: Linear phase response- Symmetric and Antisymmetric, Design by Window method, Optimal method, Rectangular, Triangular, Hamming, Blackman & Kaiser Window, Frequency sampling method, Design of FIR differentiators, Design of Hilbert transformer, Comparison of various design methods.

UNIT – IV

Multirate DSP: Introduction, Sampling Rate Conversion by rational factor, Decimation of Sampling rate by an Integer factor, Interpolation of sampling rate by an Integer Factor, Sampling rate alteration or conversion by a rational factor. Simple Structures of decimator and interpolator. Applications of Multirate Digital Signal Processing (MDSP).

UNIT – V

Applications of Digital Signal Processing: Introduction, Applications of DSP: Digital Sinusoidal Oscillators, Digital Time Control Circuits, Digital Comb Filters. Applications in broader sense: Removal of noise from pictures, Applications of DSP to Radar, Applications of DSP in Image Processing, Applications of DSP in speech processing.

SUGGESTED BOOKS & REFERENCE:-

1. *"Digital Signal Processing", J. Johnson, Pearson - PHI*
2. *"Digital Signal Processing", Proakis, Manolakis & Sharma, Pearson Education*
3. *"Digital Signal Processing", Nair, PHI*
4. *"Discrete Time Signal Processing", Oppenheim & Schafer, Pearson – PHI*

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.