SANDIP FOUNDATION'S
SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE
MAHIRAVANI, TRIMBAK ROAD, TAL & DIST: NASHIK-422213, MAHARASHTRA,INDIA
B. Tech Electronics & Telecommunication Engineering

Semester – III

Sr. No.	Course Type	Course Code	Course Name	Teaching Scheme (Hrs./Week)				Examination Scheme				Total Marks
				L	T	P	C	Formative Assessment CIA		Summative Assessment ESE		
								Theory	Lab	Theory	Lab	
1	PC	2317201	Semiconductor Devices & Circuits	3	--	--	3	50	--	50	--	100
2	PC	2317202	Digital Circuits	3	--	--	3	50	--	50	--	100
3	PC	2317203	Data Structures	2	--	--	2	25	--	50	--	75
4	PC	2317204	Semiconductor Devices & Digital Circuits Lab	--	--	2	1	--	--	--	50	50
5	PC	2317205	Data Structure Lab	--	--	2	1	--	--	--	25[a]	25
6	OE	2317206	Open Elective-I	3	--	--	3	50	--	50	--	100
7	IC (HSSM)	2300201	Principles of Managements	2	--	--	2	25	--	50	--	75
8	IC (VEC)	2300202	Industrial Psychology	2	--	--	2	25	--	50	--	75
9	IC (MD)	2300203	Multidisciplinary –Design Thinking	1	--	2	2	25	25	--	25[a]	75
10	IC (CEP)	2300204	Community Engagement Project	--	--	4	2	--	25		25[a]	50
11	SDC	2317701	PC Assembly and OS Installation	--	--	2	--	--	--	--	--	--
12	EEC	2317801	Advanced C and C++ Programming	--	--	--	--	--	--	--	--	--
TOTAL				**16**	**00**	**12**	**21**	**250**	**75**	**300**	**100**	**725**
Open Elective I												
7	OE	2317206A	Control Systems	3	--	--	3	50	--	50	--	100
7	OE	2317206B	Computer Organization & Operating System	3	--	--	3	50	--	50	--	100
Value Added Course												
13	VAC	VAC171	Identification and Testing of Electronic Components and Devices	-	--	2	1	--	25	--	--	25

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S.Y. B. Tech(Electronics and Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317201: SEMICONDUCTOR DEVICES & CIRCUITS

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3 hrs/week	**Th:03**	**Theory**	**CIA: 50**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Basic Electronics Engineering		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. Understand the need of biasing and stabilization techniques of bipolar junction transistor.
2. Explain the construction, working principle and characteristics of junction field effect transistor.
3. Elaborate the operation and non-ideal characteristics of MOSFET.
4. Describe the feedback topologies of feedback amplifier and operation of oscillator.
5. Study the different types of voltage regulators.
6. Explore various applications of OP-AMP.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Determine operating point and stability factors of bipolar junction transistor.

CO2: Analyze and model the JFET for small signal operation as amplifier.

CO3: Analyze the effect of non-ideal characteristics of MOSFET.

CO4: Evaluate the performance of feedback amplifier and oscillator.

CO5: Design three terminal adjustable voltage regulator for given specifications.

CO6: Identify suitable OP-AMP circuits as per desired applications.

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S.Y. B. Tech(Electronics and Telecommunication Engineering)

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Sem-III

2317201: SEMICONDUCTOR DEVICES & CIRCUITS

Unit 1 : Bipolar Junction Transistor Circuits **7hrs**	**CO**
BJT Biasing: Need and Types, Voltage Divider biased (Self bias) circuit, DC Analysis, Numerical on DC Analysis, The Operating Point, Stabilization against Variations in ICO, VBE and β, Stability Factors and numerical based on it for self-bias circuit, BJT as a switch, Bias Compensation Techniques, Thermal Runaway.	CO1
Unit 2 : Junction Field Effect Transistor Circuits **7hrs**	CO2
Introduction to FET, Types of FET, N-Channel JFET: Construction, working principle, drain and transfer characteristics, JFET parameters, JFET Configurations (CS/CD/CG) and their Comparison, DC Analysis: Self biased JFET circuits and its numerical, Single stage JFET CS Amplifier circuit, small signal model, small signal equivalent circuit, AC analysis and numerical on it, JFET Application: High input impedance circuit.	
Unit 3 : MOSFET and its circuits **7hrs**	CO3
Introduction to MOSFET, Types of MOSFET, N-Channel MOSFET: Construction, working principle, drain and transfer characteristics, MOSFET parameters, DC Load Line and Modes of operations, DC Analysis and numerical on it. Non ideal characteristics: Finite output resistance, Body effect, Sub-threshold conduction, breakdown effects, temperature effect. Single stage MOSFET CS Amplifier circuit, MOSFET Applications: MOSFET as switch, CMOS inverter and Current Mirror Circuits.	
Unit 4 : Feedback Amplifiers and Oscillators **7hrs**	CO4
Concept of feedback, Types and comparison between feedback signals, The Transfer gain with Feedback, Four types of feedback amplifiers, Feedback topologies. Effect of feedback on terminal characteristics of amplifiers, Analysis of Current Series feedback topology and numerical on it, Introduction to Oscillators and its start-up mechanism, Barkhausen criterion, Types of oscillators, RC Phase Shift and Wien Bridge Oscillators: Circuit diagram, working principle and numerical on it.	
Unit 5 : Voltage Regulators **7hrs**	CO5
DC Power Supply: Introduction, Need and block diagram, concept of load and line regulations, Block diagram of an adjustable three terminal positive and negative regulators (317,337). Typical connection diagram, Design numerical on adjustable three terminal positive and negative regulators, current boosting. Low drop out voltage regulators, SMPS: Block diagram, Types, features and specifications. Comparison of Linear Power supply and SMPS.	
Unit 6 : OP-AMP and its applications **7hrs**	CO6
Introduction to OP-AMP: concept of virtual ground and virtual short. OP-AMP Applications: Circuit diagram, Working Principle, Derivation of output voltage and numerical: Voltage follower, Summing amplifier, Differential amplifier, Practical integrator, Practical differentiator, Instrumentation amplifier, Comparator, Schmitt trigger, Square and triangular wave generator.	

Text Books

1. Millman and Halkias, "Integrated Electronics- Analog and Digital Circuits and Systems", 2nd TMH.
2. Donald Neamaen, "Electronic Circuit Analysis and Design", 3rd Edition, TMH.
3. Boylstad, Nashlesky, "Electronic Devices and Circuits Theory", 9th Edition, PHI, 2006.
4. Ramakant Gaikwad, "Op Amps & Linear Integrated Circuits", Pearson Education.

Reference Books

1. David A. Bell, "Electronic Devicesand Circuits", 5th Edition, Oxford press.
2. Anil K. Maini and Varsha Agarwal "Electronic Devices and Circuits", Wiley India.
3. K. R. Botkar, "Integrated Circuits", 5th Edition, Khanna Publication.
4. Salivahan and Kanchana Bhaskaran, "Linear Integrated Circuits", Tata McGraw Hill.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317202-DIGITAL CIRCUITS

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3hrs/week	**Th:03**	**Theory**	**CIA: 50**
Practical: -	**Practical: --**		**End-Sem:50**
Prerequisite : Basic Electronics Engineering		**Pract:**	**-**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. Understand common forms of number representation in logic circuits.
2. Learn fundamental concepts used in the design of digital systems.
3. Describe minimization techniques of Boolean functions.
4. Understand the concepts of combinational logic circuits and sequential circuits.
5. Understand the concepts of Registers and Counters.
6. Understand system design using programmable logic devices.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Explore the basic logic gates and various reduction techniques of digital logic circuit.

CO2: Design and analyze combinational circuits.

CO3: Design and analyze Sequential logic circuits.

CO4: Apply Minimization Techniques of Boolean functions.

CO5: Design and analyze Synchronous/Asynchronous counters and registers.

CO6: Evaluate the performance parameters of logic devices.

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S.Y. B. Tech(Electronics & Telecommunication Engineering)

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Sem-III

2317202-DIGITAL CIRCUITS

Unit 1: Number Systems & Logic Gates **7hrs**	**CO**
Number Systems - Decimal, Binary, Octal and Hexadecimal systems, conversion from one base to another, Codes-BCD, Excess- 3, Gray, Reflected ASCII, EBCDIC. **Logic gates and binary operations-** AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR Implementations of Logic Functions using gates, NAND–NOR implementations – Multi level gate implementations- Multi output gate implementations	CO1
Unit 2: Boolean postulates and laws **7hrs**	
De-Morgan's Theorem, Principle of Duality, Boolean function, Canonical and standard forms, Minimization of Boolean functions, Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS), Karnaugh map Minimization, Don't care conditions, Quine-McCluskey method of minimization.	CO2
Unit 3: Combinational logic circuits **7hrs**	CO3
Adder, Half adder, Full Adder, subtractor, Half subtractor, Full subtractor, Parallel binary adder, parallel binary Subtractor, BCD adder, Binary Multiplier, Binary Divider ,Multiplexer/De-multiplexer, decoder ,encoder ,parity checker , parity generators ,code converters ,Magnitude Comparator	
Unit 4: Sequential Logic Design **7hrs**	CO4
Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, Pseudo Random Binary Sequence generator, Clock generation.	
Unit 5: Registers and Counters **7hrs**	CO5
Synchronous/Asynchronous counter operation, Up/down synchronous counter, application of counter, Serial in/Serial out shift register, Serial in/parallel out shift register, parallel in/ parallel out shift register, parallel in/Serial out shift register, Bi-directional register	
Unit 6: Logic Families and Semiconductor Memories **7hrs**	
Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Concept of Programmable logic devices like FPGA. Logic implementation using Programmable Devices.	CO6

Text Books

1. Malvino & Leach, “Digital Principles and Applications”, TMH.
2. M. Morris Mano, “Digital Logic Design”, PHI
3. R.P. Jain, “Modern Digital Design”, TMH.

Reference Books

1. S. Salivahanan & S. Arivazhagan, “Digital Circuits and Design”, Vikas Publishing.
2. D. Roy Chaudhuri, Digital Circuits, “An Introduction Part -1 & 2”, Eureka Publisher.
3. Ronald J Tocci, “Digital Systems, Principles and Applications”, PHI.
4. Taub & Schilling, “Digital Integrated Electronics”, TMH. DIGITAL SYSTEM

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S.Y. B. Tech(Electronics & Telecommunication Engineering)

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Sem-III

2317203:DATA STRUCTURES

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**CIA: 25**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Nil		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. Learn different sorting and searching algorithms and their analysis.
2. Learn linear data structures: Stack and Queue, Linked List and their applications.
3. Learn nonlinear data structures: Tree, Graph and their applications.
4. Solve problems using data structures such as binary tree, binary search tree, and graph and writing programs.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Analyze the concepts of algorithm evaluation and find time and space complexities for searching and sorting algorithms.

CO2: Demonstrate applicability of Linked List.

CO3: Apply the different linear data structures like stack and queue to various computing problems.

CO4: Solve problem involving graphs and trees.

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Sem-III

2317203:DATA STRUCTURES

Unit 1: Introduction, Searching & Sorting Algorithm **7hrs**	**CO**
Data Structures – Introduction to Data Structures, abstract data types. **Algorithms**: Analysis of Iterative and Recursive algorithms, Space & Time complexity, Asymptotic notation- Big-O, Theta and Omega notations. **Searching methods**: Linear & Binary Search, **Sorting methods**: Bubble, Insertion, Selection, Merge, and Quick Sort.	CO1
Unit 2: Arrays & Linked list **7hrs**	CO2
Arrays and List: Array: Definition, Representation, Address Calculation; List: singly linked list implementation, insertion, deletion and searching operations on linear list, Operations for Circularly linked lists, doubly linked list implementation, insertion, deletion and searching operations, applications of linked lists.	
Unit 3: Stack and Queue **7hrs**	CO3
Stacks and Queues: Stacks, Stacks using dynamic arrays, Queues, Circular Queues using dynamic arrays. Evaluation of an expression: Expressions, evaluating postfix expression, conversion of infix expression to postfix expression.	
Unit 4: Trees & Graphs **7hrs**	CO4
Trees – Definitions, tree representation, properties of trees, Binary tree, Binary tree representation, binary tree properties, binary tree traversals, binary tree implementation, applications of trees. Graph: Basic Concepts & terminology. Graph Types, Representations: static, dynamic; Implementations, Searching in graphs – BFS, DFS, Shortest path in graphs, Applications	

Text Books

1. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structures”, Galgotia Books Source,2nd Edition
2. Richard. F. Gilberg and Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C,” Cengage Learning, 2nd Edition.
3. A. Tannenbaum, Data Structure Using C, Pearson Education, 2003.

Reference Books

1. E Balgurusamy, “Programming in ANSI C”, Tata McGraw-Hill, 3rd Edition.
2. Yedidyah Langsam, Moshe J Augenstein and Aaron M Tenenbaum “Data structures using C and C++” PHI Publications, 2nd Edition.
3. Reema Thareja, “Data Structures using C”, Oxford University Press, 2nd Edition.

MOOC / NPTEL Courses

1) NPTEL Course “Programming & Data Structure”
https://nptel.ac.in/courses/106/105/106105085/

2) NPTEL Course “Data Structures & Algorithms”
https://nptel.ac.in/courses/106/102/106102064/

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317204-SEMICONDUCTOR DEVICES & DIGITAL CIRCUITS LAB

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: --	**Theory:--**	**Theory**	**CIA: --**
Practical: 2hrs/week	**Practical: 01**		**End-Sem:--**
Prerequisite : Nil		**Pract:**	**50**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. Understand common forms of number representation in logic circuits
2. Understand the concepts of combinational logic circuits and sequential circuits, registers and Counters.
3. Understand the behavior of transistor as an amplifier.
4. Understand the significance of voltage regulator and Operational amplifier.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Verify the basic logic gates of digital logic circuit.

CO2: Design & analyze combinational circuits with Adder / Subtractor, MUX/DEMUX.

CO3: Interpret the results of transistor as an amplifier and compare the practical reading with theoretical one.

CO4: Design and test the voltage regulator and OP-AMP based circuits for desired specifications.

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S.Y. B. Tech(Electronics &Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317204:SEMICONDUCTOR DEVICES & DIGITAL CIRCUITS LAB

SEMICONDUCTOR DEVICES LAB

List of Laboratory Experiments (Perform any 4)	CO
1. Design a single stage BJT CE configuration (voltage divider biased) and verify DC operating point.	CO1
2. Build and test single stage CS amplifier using JFET and calculate the value of Av, Ri, and Ro.	CO2
3. Simulate single stage MOSFET CS amplifier and determine the voltage gain, input impedance and output impedance.	CO3
4. Implement or Simulate current series feedback amplifier and find the values of Rif, Rof, Gmf and validate with and without feedback.	CO4
5. Simulate the Wein Bridge / RC phase shift oscillator using BJT / JFET and determine the frequency of oscillations.	CO4
6. Design and implement an adjustable voltage regulator using three terminals positive voltage regulator IC for specified output voltage rating.	CO5
7. Design and simulate the integrator using OP-AMP for given frequency fa.	CO6
8. Simulate any one OP-AMP applications from below: 1. Instrumentation amplifier, 2. Schmitt trigger, 3. Square and triangular wave generator.	CO6

Text Books

1. Millman and Halkias, “Integrated Electronics- Analog and Digital Circuits and Systems”, 2nd TMH.
2. Donald Neamaen, “Electronic Circuit Analysis and Design”, 3rd Edition, TMH.
3. Boylstad, Nashlesky, “Electronic Devices and Circuits Theory”, 9th Edition, PHI, 2006.
4. Ramakant Gaikwad, “Op Amps & Linear Integrated Circuits”, Pearson Education.

Reference Books

5. David A. Bell, “Electronic Devicesand Circuits”, 5th Edition, Oxford press.
6. Anil K. Maini and Varsha Agarwal “Electronic Devices and Circuits”, Wiley India.
7. K. R. Botkar, “Integrated Circuits”, 5th Edition, Khanna Publication.
8. Salivahan and Kanchana Bhaskaran, “Linear Integrated Circuits”, Tata McGraw Hill.

DIGITAL CIRCUITS LAB

List of Laboratory Experiments (Perform any 4)	CO
1. Study of different basic digital logic gates and verification of their Truth Table.	CO1
2. Study and verification of the law of Boolean Algebra and De-Morgan's Theorem.	CO3
3. Construction and verification of various combinational circuits such as Half Adder, Full Adder, Half & Full Subtractor.	CO3
4. Study of Multiplexer, De-multiplexer.	CO3
5. Study of Different Code Converters, Encoder, Decoder.	CO1
6. Construction and verification of various types of Flip-Flops using gates and IC's.	CO5
7. Construction and Verification of different Shift Registers.	CO5
8. Construction and verification of different types of Counters.	CO5

Text Books

1. Malvino & Leach, "Digital Principles and Applications", TMH.
2. M. Morris Mano, "Digital Logic Design", PHI
3. R.P. Jain, "Modern Digital Design", TMH.

Reference Books

1. S. Salivahanan & S. Arivazhagan, "Digital Circuits and Design", Vikas Publishing.
2. D. Roy Chaudhuri, Digital Circuits, "An Introduction Part -1 & 2", Eureka Publisher.
3. Ronald J Tocci , "Digital Systems, Principles and Applications", PHI.
4. Taub & Schilling, "Digital Integrated Electronics", TMH. DIGITAL SYSTEM

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Sem-III

2317205:DATA STRUCTURE LAB

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: --	**Th:--**	**Theory**	**CIA:--**
Practical: 2hrs/week	**Practical: 01**		**End-Sem:--**
Prerequisite : Nil		**Pract:**	**--**
		Oral:	25
		Termwork	**--**

Course Objectives: The student should be able to

1. To develop programming skills with a systematic approach in organizing and debugging programs in C.
2. To implement data structures for problem solving.
3. To implement and analyze the searching algorithms in the context of specific engineering problems.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Explore a systematic approach in organizing, writing and debugging C programs

CO2: Implement sorting and searching algorithms using relevant data structures.

CO3: Implement linear and non-linear data structure operations using C programs.

CO4: Apply the different linear data structures like stack and queue to various computing problems.

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Sem-III

2317205:DATA STRUCTURE LAB

[Any 8 to be performed]	**CO**
Write a C Program to	
1)Implement Database Management using array of structures with operations Create, Display, Modify, Append, Search and Sort. (For any database like Employee or Bank database with and without pointers to structures)	CO1, CO3
2) Implement Quicksort.	CO2
3)Implement Stack and Queue using arrays.	CO3, CO4
4) Create a singly linked list with options: a. Insert (at front, at end, in the middle) b. Delete (at front, at end, in the middle) c. Display d. Display Reverse e. Revert the SLL	CO1, CO3
5) Implement Binary search tree with operations Create, search, and recursive traversal.	CO3
6) Implement Graph using adjacency Matrix with BFS & DFS traversal.	CO3
7) Implement stack and queue using linked list.	CO4
8) Implement Dijkstra‟s Algorithm.	CO4
9) Evaluate postfix expression (input will be postfix expression).	CO3
10) Add two polynomials using linked list.	CO3
Virtual LAB Links: 1. Data Structures - I: https://ds1-iiith.vlabs.ac.in/data-structures-1/ 2. Data Structures - II: https://ds2-iiith.vlabs.ac.in/data-structures-2/ 3. Data Structures Lab: http://cse01-iiith.vlabs.ac.in/ 4. Computer Programming Lab: http://cse02-iiith.vlabs.ac.in/	

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

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Sem-III

2317206A: CONTROL SYSTEMS

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3 hrs/week	**Th:03**	**Theory**	**CIA: 50**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Nil		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To overview the elements and modeling of physical control system.
2. To explain the time response of first and second order system.
3. To describe the process of constructing Root Locus.
4. To study the frequency domain specification technique.
5. To introduce the state space analysis methods.
6. To explain the working of PLC, PID and Digital Control System.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Determine the transfer function of different physical system.

CO2: Determine the steady state error and transient specification of control system.

CO3: Construct the Root Locus to determine the stability.

CO4: Evaluate the stability of system using Bode Plot and Nyquist Plot.

CO5: Express and solve system equation in state variable form.

CO6: Choose suitable controllers as per applications.

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Sem-III

2317206A: CONTROL SYSTEMS

Unit 1 : Control System Modeling **7hrs**	**CO**
Basic Elements of Control System, Open loop and Closed loop systems, Differential equations and Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems, Block diagram reduction Techniques, Signal flow graph.	CO1
Unit 2 : Time Response Analysis **7hrs**	CO2
Type and Order of the Control Systems, Types of Standard Inputs, Response of First Order System to Step, Ramp and Parabolic Inputs, Response of Second Order System to Step Input, Time Domain Specifications of Second Order Systems, Steady State Error and Error Coefficients.	
Unit 3 : Stability Analysis **7hrs**	CO3
Concept of Stability, Absolute, Relative, Marginal and Unstable Stability analysis in S Plane, Characteristics Equation, Poles and Zeros, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus.	
Unit 4: Frequency Response Analysis **7hrs**	CO4
Need of Frequency Domain Analysis, Correlation between Time & Frequency Domain, Frequency Domain Specifications, Bode Plot, Construction of Bode Plot, Gain and Phase Margin, Nyquist Stability Criterion and construction of Nyquist plot. Stability analysis from Bode and Nyquist plots.	
Unit 5: State Space Analysis **7hrs**	CO5
State space advantages and representation, Transfer function from State space, physical variable form, phase variable forms: controllable canonical form, observable canonical form, Solution of homogeneous state equations, state transition matrix and its properties, computation of state transition matrix by Laplace transform method only, Concepts of Controllability and Observability.	
Unit 6: Controllers and Digital Control Systems **7hrs**	CO6
Introduction to PLC: Block schematic, PLC addressing, any one application of PLC using Ladder diagram. Introduction to PID controller: P, PI, PD and PID Characteristics and concept of Zeigler-Nicholas method. Digital control systems: Special features of digital control systems, Necessity of sample and hold operations for computer control, z-transform and pulse transfer function, Stability and response of sampled-data systems.	

Text Books

1. N. J. Nagrath and M. Gopal, "Control System Engineering", New Age International Publishers, 5th Edition.
2. Katsuhiko Ogata, "Modern Control Engineering", Fifth Edition, PHI Learning Private Limited, New Delhi, 2010.
3. Schaum's Outline Series, "Feedback and Control Systems" Tata McGraw-Hill, 2007.
4. M. Gopal, "Control System – Principles and Design", Tata McGraw Hill, 4th Edition, 2012.

Reference Books

1. Benjamin C. Kuo, "Automatic control systems", Prentice Hall of India, 7th Edition.
2. John J. D"Azzo and Constantine H. Houpis, "Linear Control System Analysis and Design", Tata McGraw-Hill, Inc.
3. Richard C. Drof, Robert N. Bishop, "Modern Control Systems", Addison Wesley Publishing Company, 2001.
4. Curtis D Johnson, "Process Control Instrumentation Technology", 8th Edition, PHI Private Limited, New Delhi, 2011.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317206B :COMPUTER ORGANIZATION AND OPERATING SYSTEM

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3 hrs/week	**Th:03**	**Theory**	**CIA: 50**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Nil		**Pract:**	**--**
		Oral:	**--**
		Term work	**--**

Course Objectives: The student should be able to

1. Understand basic structure and operation of Digital Computer thoroughly.
2. Understand in detail the operation of the arithmetic unit.
3. Understand the hierarchical memory system including Cache Memories and Virtual Memory.
4. Explore different ways of communicating with I/O devices and standard I/O interfaces.
5. Implement Operating Systems Concept considerably.
6. Demonstrate the functions of Operating System, Memory Management, File Sharing and Interfaces.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Evaluate the arithmetic and logical operations of binary number system.

CO2: Understand the design of the Control unit and Register transfer.

CO3: Understand the design of Memory unit, Learn the overview of computer system hardware

CO4: Explore the organization of Arithmetic and Logical unit and I/O unit.

CO5:Describe the major activities of an OS with regard to file management, operating system functions.

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S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317206B :COMPUTER ORGANIZATION AND OPERATING SYSTEM

Unit 1: Basic Structure of Computers **6hrs**	**CO**
Basic Structure Of Computers: Computer Types, Functional Unit, Basic Operation Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating Point Representation. Register Transfer	CO1
Unit 2: Register Transfer Language and Micro Operations **7hrs**	CO2
Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions – Instruction Cycle, Memory – Reference Instructions, Input – Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.	
Unit3: Micro Programmed Control **7hrs**	CO3
Micro Programmed Control: Control Memory, Address Sequencing, Micro program Examples, Design of Control Unit, Hard Wired Control and Micro programmed Control. **The Memory System:** Basic Concepts Of Semi Conductor RAM Memories, Read Only Memories, Cache Memories and Performance Considerations, Virtual memories Secondary Storage, Introduction to Raid	
Unit 4 Input-Output Organization **7hrs**	CO4
Input Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP), Introduction To Peripheral Components, Interconnect (PCI) Bus, Introduction To Standard Serial Communication Protocols Like RS232, USB and IEEE1394.	
Unit 5 Operating Systems Overview **8hrs**	
Operating Systems Overview: Overview of Computer Operating Systems Functions, Protection and Security, Distributed System, Special Purpose Systems, Operating Systems Structure, Operating System Services and System Calls, System Programs, Operating System Generation. **Memory Management:** Swapping, Contiguous Memory Allocation, Paging, Structure of Paging Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation Of Frames, Thrashing Case Studies Unix, Linux, and Windows. **Principles of Deadlock:** System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery From Deadlock.	CO5
Unit 6 File System Interface **7hrs**	
File System Interface: The Concept of a File Access Methods, Directory Structure, File System Mounting, File Sharing, Protection. **File System Implementation:** File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free- Space Management.	CO5

Text Books

1. Computer Organization- Carl Hamacher, ZvonksVranesic, Safeazaky, 5th Edition, Mcgraw Hill
2. Computer Systems Architecture- M. Morris Mano, 3rd Edition, Pearson
3. Operating System Concepts- Abraham Silberchatz,Peter, B.Galvin,Greg Gagne, 8th Edition,John Wiley

Reference Books

1. Computer Organization and Architecture- William Stallings 6th Edition, Pearson
2. Structured Computer Organization- Andrew S. Taenbaum, 4th Edition PHI.
3. Fundamentals of Computer Organization and Design-Sivaraama Dandamudi Springer Interdiction
4. Operating Systems- Internals and Design Principles, Stallings, 6th Edition-2009, Pearson Education.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) *(2023 Pattern)*

Sem-III

2300201: Principles of Management

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2 hrs/week	**Th:02**	**Theory**	**CIA: 25**
			End-Sem:50
		Pract:	--
		Oral:	--
		Termwork	--

Course Objectives: The student should be able to

1. Comprehend the nature and characteristics of management, its scope, and various functional areas.
2. Recognize the importance of ethical values in managerial decision-making and actions.
3. Explore the concepts of authority, delegation, decentralization, and their impact on organizational structure.
4. Analyze the techniques of coordination in managing complex organizational tasks.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Inculcate The Ability To Apply Multifunctional Approach To Organizational Objective.

CO2: Apply Process Based Thinking And Risk Based Thinking For Managing And Improving The Functioning Of An Organization

CO3: Examine The Inter-Relationships Between The Planning And Organising, Directing And Communicating, Controlling And Coordinating Etc.

CO4: Develop Skills For Corrective Action Management And Continual Improvement Project Management.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S. Y. B. Tech (Common) ***(2023 Pattern)***

Semester: III

2300201: Principles of Management

Unit 1:Introduction to Management **7hrs**	**CO**
Definition and scope of management, Evolution of management theories, Functions of management: planning, organizing, leading, and controlling, Managerial roles and skills, Challenges and opportunities in contemporary management, Management As A Science, Art Or Profession; Management And Administration; Difference Between management And Administration. Significance Of Values And Ethics In Management	CO1
Unit 2: Planning, Organizing and Decision Making **7hrs**	CO2
Nature, Scope, Objective And Significance Of Planning, Elements And Steps Of Planning, Decision Making Organizing Principles, Span Of Control, Line And Staff Relationship, Authority, Delegation And Decentralization. Effective Organizing, Organizational Structures, Formal And Informal Organizations, Staffing, Importance of planning in achieving organizational goals, Types of plans: strategic, tactical, operational, Process of decision making, Decision-making models and techniques, Setting objectives and formulating strategies	
Unit 3:Organizing and Organizational Structure, Leading and Managing Human Resources **7hrs**	CO3
Principles of organizing, Types of organizational structures, Departmentalization and delegation of authority, Coordination and integration of activities, Formal and informal organization, The role of leadership in management, Leadership styles and their impact on organizational culture, Recruitment,Selection,Placement,Promotion,Separation,Performance Appraisal,Meaning And Nature Of Direction, Motivation theories and their application in the workplace, Communication and its importance in effective leadership, Managing diversity and fostering inclusivity.	
Unit 4: Communicating, Controlling And Coordinating **7hrs**	CO4
Communication - Meaning And Importance, Communication Process, Barriers To Communication, Steps To Overcome Communication Barriers, Types Of Communication; Motivation Theories – Maslow's Need Hierarchy Theory, Herzberg's Two Factor Theory. **Leadership** – Meaning, Formal And Informal Leadership, Characteristics Of Leadership; Leadership Styles – Autocratic Style, Democratic Style, Participative Style, Laissez Faire Leadership Styles, Transition Leadership, Charismatic Leadership Style, Elements Of Managerial Control, Control Systems, Management Control Techniques, Effective Control Systems. Coordination Concept, Importance, Principles And Techniques Of Coordination, Concept Of Managerial Effectiveness.	

Text Books

1. Principles of Management" by P. C. Tripathi and P. N. Reddy
2. Fundamentals of Management" by R. S. Dwivedi
3. "Management: Theory and Practice" by Kris Cole
4. "Principles of Management" by V. S. Ramaswamy and S. Namakumari
5. Essentials of Management" by Harold Koontz and Heinz Weihrich (Indian adaptation by A. Aryasri)

Reference Books

1. Management: Tasks, Responsibilities, Practices" by Peter F. Drucker
2. The Practice of Management" by Peter F. Drucker
3. "Management: Text and Cases" by V. S. P. Rao
4. Management: Concepts and Practices" by Tim Hannagan
5. Management: Principles and Practice" by S. K. Chakraborty and D. Chatterjee
6. Modern Management: Concepts and Skills" by Samuel C. Certo and S. Trevis Certo
7. Management: A Global and Entrepreneurial Perspective" by Heinz Weihrich, Mark Cannice, and Harold Koontz

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech*(2023 Pattern)*

Sem-III

2300202:INDUSTRIAL PSYCHOLOGY

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**CIA: 25**
			End-Sem:50
		Pract:	--
		Oral:	--
		Termwork	--

Course Objectives: The student should be able to

1. Develop an awareness of the major perspectives underlying the field of Industrial Psychology.
2. Apply the principles of human psychology to the corporate field and familiarize them with the current practices in the corporate. .
3. Develop an understanding of group dynamics, norms, and cohesiveness, enabling them to build and lead effective teams within the organization.
4. Familiarize with the field of occupational psychology and its applications in selection, placement, counseling, and training of employees.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: learn about theories of motivation and group behavior.

CO2: Understanding of key concepts, theoretical perspectives, and trends in industrial psychology.

CO3: Analyze and interpret the role of motivation & Morale in behavior modification.

CO4: Analyze the impact of human engineering and physical environment on job performance and employee well-being**.**

CO5: Apply psychological principles in addressing work-related challenges**...**

CO6: Design the role of psychologists in industrial settings and appreciate their impact on employee well-being and organizational performance**.**

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech*(2023 Pattern)*

Sem-III

2300202:INDUSTRIAL PSYCHOLOGY

Unit 1:Introduction **6hrs**	**CO**
The role of the psychologist in industry, the field of occupational Psychology: Study of behavior in work situation and applications of Psychological principles to problems of selection, Placement, Counseling and training	CO1
Unit 2: Design of Work Environments **7hrs**	
Human engineering and physical environment techniques of job analysis, Social environment: Group dynamics in Industry Personal psychology, Selection, training, placement, promotion, counseling, job motivations, job satisfaction. Special study of problem of fatigue, boredom and accidents	CO2
Unit 3: Individual and Group Behavior **7 hrs**	
Introduction, Objectives, Individual Behavior,Individual Differences: Meaning, Nature, Dimensions and Values, Factors Influencing Individual Behavior, Group Behavior: Introduction, Objectives, Meaning, Definition and Advantages of Groups, Types of Groups, Group Dynamics, Group Norms Group Cohesiveness	CO3, CO4
Unit 4: Morale, Motivation& Counseling **8hrs**	
Morale: Meaning, Types and Aspects, Characteristics of High and Low Morale and Essential and Psychological Requirements for High Morale, Introduction, Objectives, Meaning, Importance and Types of Motivation in Industry, Monetary and Non-Monetary Incentives, Fatigue, Boredom and Monotony: Meaning, Causes and Remedies, Introduction, Objectives, Counseling: Meaning, Significance, Types and Process, Employee Health, Safety and Security, Industrial Accidents: Accident Proneness and Prevention	CO5 CO6

Text Books

1. Tiffin, J and McCormic E.J., Industrial Psychology, Prentice Hall, 6th Edn., 1975.
2. McCormic E.J., Human Factors Engineering and Design, McGraw Hill, 4th Edn.,1976.
3. Mair, N.R.F., Principles of Human relations
4. Gilmer, Industrial Psychology
5. Ghiselli & Brown, Personnel and Industrial Psychology.
6. Myer, Industrial Psychology.
7. Dunnete, M.D., Handbook of Industrial and Organizational Psychology.
8. Blum & Taylor, Industrial Psychology

Reference books

1. Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.
2. Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBSPublication.
3. Aamodt, M.G. (2007) Industrial/Organizational Psychology : An Applied Approach
4. (5 th edition) Wadsworth/Thompson : Belmont, C.A.Blum M.L. Naylor J.C., Horper& Row, Industrial Psychology, CBS Publisher, 1968
5. Luthans, Organizational Behaviour, McGraw Hill, International, 1997
6. Morgan C.t.,King R.A.,JohnRweisz&JohnSchoples, Introduction to Psychology, McHraw Hill, 1966
7. Schermerhorn J.R.Jr., Hunt J.G &Osborn R.N., Managing, Organizational Behaviour, John Willy

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) *(2023 Pattern)*

Sem-III

2300203: Design Thinking

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 1hrs/week	**Th:01**	**Theory**	**CIA: 25**
Practical: 2 hrs/week	**Practical: 01**		**ESE:--**
Prerequisite :		**Pract:**	**--**
		Oral:	**25**
		Termwork	**25**

Course Objectives:

The student should be able to

1. Learn design thinking concepts and principles
2. Use design thinking methods in every stage of the problem
3. Learn the different phases of design thinking
4. Apply various methods in design thinking to different problems

Course Outcomes:

On completion of the course, learner will be able to

CO1. Define key concepts of design thinking

CO2. Practice design thinking in all stages of problem solving

CO3. Apply design thinking approach to real world problems

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) *(2023 Pattern)*

Sem-III

2300203:Design Thinking

Unit 1 Introduction, Understand, Observe and Define The Problem7hrs	**CO**
Why Design? - Four Questions, Ten Tools - Principles of Design Thinking - The process of Design Thinking - How to plan a Design Thinking project. Search field determination - Problem clarification - Understanding of the problem - Problem analysis - Reformulation of the problem - Observation Phase - Empathetic design - Tips for observing - Methods for Empathetic Design - Point-of-View Phase - Characterization of the target group - Description of customer needs	CO1 CO2 CO3
Unit 2 Ideation, Prototyping, Testing and Implementation 7hrs	
Ideate Phase - The creative process and creative principles - Creativity techniques - Evaluation of ideas - Prototype Phase - Lean Startup Method for Prototype Development - Visualization and presentation techniques. Test Phase - Tips for interviews - Tips for surveys - Kano Model - Desirability Testing - How to conduct workshops - Requirements for the space - Material requirements - Agility for Design Thinking	CO1 CO2 CO3

TEXT BOOKS :

1. Christian Mueller-Roterberg, Handbook of Design Thinking - Tips &Tools for how to design thinking.
2. Designing for Growth: a design thinking tool kit for managers By Jeanne Liedtka and Tim Ogilvie.
3. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation by Tim Brown.

REFERENCES:

1. Johnny Schneider, “Understanding Design Thinking, Lean and Agile”, O'Reilly Media, 2017.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.
3. HassoPlattner, ChristophMeinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
4. http://ajjuliani.com/design-thinking-activities/
5. https://venturewell.org/class-exercises

LIST OF EXPERIMENTS:

1. Case study on understanding of the design thinking problems.
2. Case study on observations of the parameters of design thinking problems.
3. Case study on defining design thinking problems.
4. Case study on description of customer needs of the parameters of design thinking problems.
5. Case study of ideation phase of solving design thinking problems
6. Case study of prototyping phase of solving design thinking problems
7. Case study of testing phase of solving design thinking problems
8. Case study of implementation phase of solving design thinking problems

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) *(2023 Pattern)*

Sem-III

2300204 : Community Engagement Project

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: --	**Pr:02**	**Theory**	**CIA: --**
Practical: 4 hrs/week			**End-Sem:--**
		Pract:	--
		Oral:	25
		Termwork	25

Course Objectives: The student should be able to

1. sensitize the students to the living conditions of the people in the surroundings.
2. bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability.
3. make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
4. make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
5. help students to initiate developmental activities in the community in coordination with public and government authorities.
6. develop a holistic life perspective among the students by making them to study culture, traditions, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Survey for the development of the community.
CO2: Interpret the social issues that confront the vulnerable / marginalized sections of the society.
CO3: Build team for societal change.
CO4: Create an opportunity to familiarize themselves with urban / rural community they live in.
CO5: plan activities based on the focused groups.
CO6: implement the ways of transforming the society through systematic programmeimplementation.

PROCEDURE

Students in a group (Maximum 5) can take up a planned community work for minimum of 50 hours. Evaluation of student's work will be based on the planning, execution and documentation of work, and a viva-voce by Departmental panel.

A group of students could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.

The Community Service Project is a twofold one

i. First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. For ex., a student of Arts will focus on socio-economic conditions, social survey and about the Government's social security schemes. This should not be viewed as a duplication of work by the Village or Ward volunteers; rather, it could be another primary source of data.
ii. Secondly, the student/s could take up a project work related to following domains.

a. Agriculture
b. Health
c. Marketing and Cooperation
d. Animal Husbandry
e. Horticulture
f. Fisheries
g. Sericulture
h. Revenue and Survey
i. Natural Disaster Management
j. Irrigation
k. Law & Order
l. Excise and Prohibition
m. Mines and Geology
n. Energy

The assessment is to be conducted for 50 marks. The number of credits assigned is 2. Later as per the present practice the marks are converted into grades and grade points to include finally in the SGPA and CGPA.

The weightings shall be:

Project Report	50%
Presentation	50%

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317701: PC ASSEMBLY & OS INSTALLATION

(Skill Development Course)

Teaching Scheme:	**Credits - --**	**Examination Scheme**	
Practical: 02hrs/week	Pr: --	**Practical**	**CIA:----**
			End-Sem:----
NBA Code:			

Course Objectives: Students will be able to

1. Explore the working of PC and Configuration of various types of Motherboards and Processors.
2. Understand the Configuration and working of BIOS as well as Installation of OS.
3. Know about the installation and Configuration of various devices and their drivers.
4. Implement the troubleshooting and maintenance of PC. .

Course Outcomes: On completion of the course, Students will be able to --

CO1: Identify the Personal Computer as well as the working of Motherboard and Processor.

CO2: Explore the BIOS Configuration and Installation of Operating System.

CO3: Demonstrate the Installation of Device Drivers and Configuration of External devices.

CO4: Diagnose and troubleshoot of the Personal Computer.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

2317701: PC ASSEMBLY & OS INSTALLATION

(Skill Development Course)

Modules	**CO**
Module 1: Introduction to PC Hardware, Motherboard and Processor **8 Hrs**	
1. Study of basic I/O systems, Types of Memories- Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM 2. Central Processing Unit, Study of different types of Motherboards, Motherboard Configuration, Identifying Internal and External connectors 3. Types of Processor- Intel Pentium IV, Dual core, Core 2 Duo, Quad processor, Core i3	CO1
Module 2: BIOS Configuration and Installation of OS **7 Hrs**	
1. Study of BIOS Set-up- Advance set-up, Boot configuration, Boot Menu 2. Operating System: Windows XP, Vista, Windows-7, Windows-8 and Windows-10 3. Service Pack and installation of different types of Service Packs	CO2
Module 3: Installation and Configuration of Devices and Drivers **8 Hrs**	
1. Formatting of Hard disk, Partitioning of Hard disk in different logical drives, Disk defragmentation, Disk clean up, Scan disk 2. Different types of Motherboard drivers, LAN, Audio, and Video drivers 3. Physical set-up of Printers, Scanner set-up, Webcam, Bluetooth device, Memory card reader.	CO3
Module 4: Diagnostic and troubleshooting of PC **7 Hrs**	
1. POST (Power on Self Test), Identifying problems by Beep codes errors 2. Checking power supply using Multi-meter, Replacement of components	CO4

Textbooks

1. Peter Norton, "Inside the PC", Tec media Publications, 1999.
2. B. Govindarajalu, "IBM PC and Clones: Hardware and Maintenance", McGraw Hill Education India Pvt Ltd, 2001.
3. Dr. Tariq Hussain Sheikh, Naresh Kumar, "PC Assembly and Installation", Booksclinic Publishing, 2020.
4. Stephen Bigelow, "Bigelow's Troubleshooting, Maintaining & Repairing PCs", McGraw Hill Education, 2017.

Reference books

1. Aubrey Pilgrim , "Build Your Own Pentium Processor PC", McGraw-Hill Inc., US 1995.
2. Mark Minasi, "The Complete PC Upgrade and Maintenance Guide", BPB Publications, 2005.

MOOC / NPTEL Courses

1) NPTEL Course on "Computer Organization" by Pof. S. Raman, IIT Madras
Link: https://nptel.ac.in/courses/106106092

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Electronics and Telecommunication)

(2023 Pattern)

Sem-III

2317801: ADVANCED C AND C++ PROGRAMMING

(Employability Enhancement Course)

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: --	**Th:--**	**Theory**	**CIA:--**
Practical: --	**Audit Course**		**End-Sem:--**
Prerequisite : Nil		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. Set up a development environment for C programming.
2. Work efficiently on arrays, strings, and pointers in the C language.
3. Understand principles of Object-Oriented Programming (OOP) and C++ language features.
4. Explore advanced C++ programming concepts such as operator overloading and templates.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Write program using C on software tool.

CO2: Demonstrate working of one-dimensional and multi-dimensional arrays.

CO3: Implement constructors and destructors, and demonstrate knowledge of inheritance and polymorphism.

CO4: Perform overloading unary and binary operators.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Electronics and Telecommunication Engineering)
(2023 Pattern)
Sem-III
2317801:ADVANCED C AND C++ PROGRAMMING
(Employability Enhancement Course)

Module 1: Introduction to Programming and Basics of C **6 hrs**	**CO**
Introduction to Programming: Overview of programming languages: Introduction to the C and C++ languages, Setting up the development, environment Basics of C Programming: C syntax and structure, Variables, data types, and constants, Input and output (printf and scanf), Control flow statements (if-else, switch-case, loops) Functions and Scope: Function declaration and definition, Function arguments and return values, Scope of variables (global and local)	CO1
Module 2: Arrays, Strings, and Pointers in C **6 hrs**	CO2
Arrays: One-dimensional arrays, Multi-dimensional arrays, Array manipulation and operations Strings in C: String basics and null-terminated strings, String input/output and manipulation functions, String handling using pointers Pointers in C: Introduction to pointers, Pointer arithmetic and arrays, Dynamic memory allocation (malloc, calloc, free)	
Module 3: Object-Oriented Programming in C++ **6 hrs**	CO3
Introduction to C++: C++ features and enhancements over C, C++ program structure and compilation process Classes and Objects: Defining classes and creating objects, Constructors and destructors, Member functions and data members Inheritance and Polymorphism: , Inheritance and its types (single, multiple, multilevel), Polymorphism through function overloading and virtual functions	
Module 4: More C++ Programming Concepts **6 hrs**	CO4
Operator Overloading: Overloading unary and binary operators, Rules and best practices for operator overloading, Templates and Generic Programming: Function templates, Class templates, Template specialization and usage.	

Text Books

1. "C Programming Absolute Beginner's Guide" by Perry, Dean
2. "C++ Primer" by Lippman, Stanley, Lajoie, Josée, and Moo, Barbara E.
3. "Data Structures and Algorithms in C++" by Drozdek, Adam
4. "Object-Oriented Programming with C++" by E. Balagurusamy

Reference Books

1. "The C++ Programming Language" by Stroustrup, Bjarne
2. "C Programming: A Modern Approach" by King, K. N.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

VAC171:IDENTIFICATION AND TESTING OF ELECTRONIC COMPONENTS AND DEVICES

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory:	**Th:--**	**Theory**	**CIA: -**
Practical: 02hrs /week	**Practical: 01**		**End-Sem:-**
Prerequisite : Basic Electronics Engineering		**Pract:**	**--**
		Oral:	**--**
		Termwork	**25**

Course Objectives: The student should be able to

1. Understand the fundamental concepts and characteristics of basic electronics components.
2. Identify and test various passive and active electronic components.
3. Learn the properties and specifications of different electronic components.
4. Apply the knowledge gained to design and implement simple electronic circuits and projects.

Course Outcomes:

On completion of the course, learner will be able to–

CO1:Describe the basic principles and functionalities of various electronics components.

CO2:Identify and measure the values and characteristics of resistors, capacitors, and inductors using appropriate instruments.

CO3:Evaluate and analyze the performance of passive components based on their specifications.

CO4: Perform component identification, testing, and circuit design.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(Electronics & Telecommunication Engineering)

(2023 Pattern)

Sem-III

VAC171:Identification And Testing Of Electronics Components And Devices

Module 1: Introduction to Basic Electronics Components **7 hrs**	**CO**
1) Introduction to basic electronics components: Resistors, Capacitors, Inductors, Diodes, Transistors, and Integrated Circuits (ICs). 2) Passive components: Understanding the properties and characteristics of resistors, capacitors, and inductors. 3) Active components: Understanding the properties and characteristics of diodes, transistors, and ICs. 4) Reading component values: Color coding for resistors, identifying capacitor and inductor values, and IC marking. **Practicals:-** 1) Identifying and measuring resistors, capacitors, and inductors using a digital multimeter. 2) Using color codes to identify resistor values. 3) Measuring capacitance and inductance using appropriate instruments. 4) Familiarization with diode and transistor packages and their identification. Note: Perform any two	CO1
Module 2 : Testing and Analysis of Passive Components **8 hrs**	
1) Resistors: Different types (fixed, variable, SMD), power rating, tolerance, and testing methods. 2) Capacitors: Types (electrolytic, ceramic, tantalum, etc.), capacitance, voltage rating, and testing procedures. 3) Inductors: Types (air-core, iron-core, SMD), inductance, and testing techniques. **Practicals:** 1) Measuring resistance, tolerance, and power rating of resistors. 2) Testing capacitors for capacitance, voltage rating, and ESR (Equivalent Series Resistance). **3)** Measuring inductance and checking the quality of inductors. Note : Perform any two	CO2
Module 3: Testing and Analysis of Active Components **7 hrs**	
1) Diodes: Understanding different types (rectifier diodes, Zener diodes, LEDs, etc.), forward and reverse biasing, voltage-current characteristics, and applications. 2) Transistors: Types (BJT, FET), configurations (common emitter, common collector, common base), and testing methods. 3) Integrated Circuits (ICs): Classification (analog, digital, linear, and logic ICs), pin configuration, datasheets, and testing procedures. **Practicals:** 1) Testing diodes and identifying their polarity. 2) Characterizing different types of transistors and measuring their parameters. 3) Familiarization with various ICs, reading datasheets, and testing their functionality.	CO3

Note : Perform any two	
Module 4: Project and Applications **8 hrs** 1) Overview of basic electronic circuits: Amplifiers, oscillators, rectifiers, voltage regulators, etc. 2) Circuit building blocks using basic components. 3) Introduction to PCB design and soldering techniques. **Practicals:** 1) Design and build simple electronic circuits using the components studied throughout the course. 2) Troubleshooting faulty circuits and component replacement techniques. 3) PCB fabrication and soldering practice. Note : Perform any two	CO4

Reference Book:

1) "The Art of Electronics" by Paul Horowitz and Winfield Hill
2) "Electronic Devices and Circuit Theory" by Robert L. Boylestad and Louis Nashelsky

Textbook:

1) "Practical Electronics for Inventors" by Paul Scherz and Simon Monk
2) "Electronic Principles" by Albert Malvino and David J. Bates
3) "Introduction to Electric Circuits" by Richard C. Dorf and James A. Svoboda