

Third Semester

Sr. No.	Course Type	Course Code	Course Name	Teaching Scheme			Credits
				L	T	P	
1.	BSC	MA04	Discrete Structure	2	1	-	3
2.	PCC	CI01	Analog and Digital Communication	2	1	-	3
3.	PCC	CI02	Data Structure and Algorithm	2	1	-	3
4.	PCC	CI03	Computer System Organization	2	1	-	3
5.	HSMC	HS03	Innovation and Creativity	-	-	2	1
6.	LC	CI01(P)	Analog and Digital Communication Lab	-	-	2	1
7.	LC	CI02(P)	Data Structure and Algorithm Lab	-	-	4	2
8.	LC	CI03(P)	Computer System Organization Lab	-	-	2	1
9.	SBC	CI01(P)	IT Workshop (C++)	-	-	4	2
10.	LLC	LLC02	Liberal Learning Course – II	Credit to be added in Fourth Semester			
11.	MLC	MLC01	Professional Laws, Ethics, Gender, Human Values and Harmony	*1	-	-	Audit
Total Credits							19

- **Liberal Learning Course-II, LLC02 (Any One Course from NCC/NSO/NCA)**

- A. NCC

- B. NSO

- Any one Sports at State Level

- C. NCA

- (A) Music

- (B) Dance

- (C) Photography

- (D) Cinematography

- (E) Podcasting

- (F) Theatre

- (G) Painting

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III- Semester

MA04	Discrete Structure	2L: 1T: 0P (3 hrs.)	3 Credits
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Prerequisite: Nil

Course Objective:

This course introduces the applications of discrete mathematics in the field of computer science. It covers sets, logic, proving techniques, combinatory, functions, relations, Graph theory and algebraic structures.

Course Content:

Module 1: (10 hrs.)

Set Theory, Relation, Function, Theorem Proving Techniques : Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets
Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job- Scheduling problem
Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof by contradiction.

Module 2: (08 hrs.)

Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

Module 3: (08 hrs.)

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers.

Module 4: (08 hrs.)

Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

Module 5: (10 hrs.)

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices.
Combinatorics: Introduction, Permutation and combination, Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms, linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions, Generating functions, Solution by method of generating functions.

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III- Semester

Course Outcomes:

1. Describe sets, relations, functions and mathematical induction.
2. Formulate and solve Groups and Rings problems.
3. Apply Propositional logic and finite state automata to solve problems.
4. Apply the Concepts of Graph theory to Solve real world problems.
5. Formulate and solve Poset and recurrence relations.

List of Text Books / Reference Books:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata McGraw-Hill Edition.
2. J Trembley, R Manohar; "Discrete Mathematical Structure with Application CS", 2001 McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", 7th Ed., McGraw Hill.
4. R K Bisht, H S Dhami, "Discrete Mathematics", 2015, Oxford University Press.
5. P C Biswal, "Discrete Mathematics & Graph Theory", 4th Ed. , PHI.

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III- Semester

CI01	Analog and Digital Communication	2L: 1T: 0P (3 hrs.)	3 Credits
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Prerequisite: Mathematics, Basics of Electronics.

Course Objective: The course is designed to cover the fundamentals, principles, concepts, and techniques of analog communication systems like various modulation techniques, data transmission, communication technologies, time-domain and frequency domain multiplexing technique and noise analysis. To understand the key modules of digital communication systems with emphasis on digital modulation techniques.

Course Content:

Module 1: Signals and Systems

(8 Hrs.)

Introduction of a communication system, signal-definition, types of signals. System definition, classification of systems. Fourier transforms: Time domain and frequency domain representation of signal, Fourier Transform and its properties, Transform of Gate, unit step, constant, impulse, sine and cosine wave. Shifting property of delta function, convolution, time and frequency convolution theorems.

Module 2: Amplitude Modulation

(8 Hrs.)

Modulation, need of modulation, types of modulation techniques, AM modulators, advantages and disadvantages of AM. Suppressed carrier amplitude modulation systems, DSB-SC, SSB-SC, VSB-SC systems, comparison of various amplitude modulation systems. Demodulation of AM, square law and envelope detector, synchronous detection of AM, Design of AM transmission system.

Module 3: Angle modulation

(8 Hrs.)

Introduction and types of angle modulation, frequency modulation, frequency deviation, modulation index, deviation ratio, bandwidth requirement of FM wave, types of FM. Phase modulation, difference between FM and PM, Direct and indirect method of Design FM Transmitter, FM demodulators- slope detector, Foster seeley discriminator, ratio detector. Introduction to pulse modulation systems.

Module 4: Sampling of signal

(8 Hrs.)

Sampling theorem. Pulse amplitude modulation (PAM), Time division, multiplexing (TDM). Types of sampling, Aperture effect, Introduction to pulse position and pulse duration modulations, Digital signal, Quantization, Pulse code modulation, signal to noise ratio, Companding, Data rate and Baud rate, Bit rate, multiplexed PCM signal, Differential PCM (DPCM), Delta Modulation (DM) and Adaptive Delta Modulation (ADM), comparison of various systems.

Module 5: Digital modulations Techniques

(8 Hrs.)

Amplitude shift keying (ASK), Binary Phase Shift keying (BPSK), Differential phase shift keying (DPSK), offset and non-offset Quadrature phase shift keying (QPSK), M-Ary PSK, Binary frequency Shift Keying (BFSK), M-Ary FSK Quadrature Amplitude modulation (QAM).

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III- Semester

Course outcomes:

Students earning credits will develop ability to:

1. Apply Fourier transforms to solve communication engineering problems.
2. Demonstrate AM transmitters and receivers.
3. Demonstrate FM transmitters and receivers.
4. Convert Analog signals to Digital signals.
5. Compare different digital modulation techniques.

List of Text Books /Reference Books:

1. Singh & Sapre, "Communication Systems", TMH.
2. Taub Schilling, "Principles of Communication Systems", TMH.
3. W. Tomasi "Electronic Communications Systems", Pearson Education Pvt. Ltd.
4. Abhay Gandhi, "Analog and Digital Communication", CENGAGE Learning.
5. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2004.
6. B. P. Lathi, "Modern Analog and Digital Communication Systems",
7. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
8. Martin S. Roden, "Analog and Digital Communication System", 3rd Edition, Prentice Hall of India, 2002.
9. B. Sklar, "Digital Communication Fundamentals and Applications" 2nd Edition Pearson Education 2007.

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III- Semester

CI02	Data Structure and Algorithm	2L : 1T : 0P (3 hrs.)	3 credits
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Prerequisite: Programming for Problem Solving

Course Objective:

The objective of this course is to understand different types of data structures and algorithms used in program.

Course Contents:

Module 1: (10 hrs.)

Review of C programming language. Introduction to Data Structure: Concepts of Data and Information, Classification of Data structures, Abstract Data Types, Implementation aspects: Memory representation. Analysis of algorithm: Time Complexity and Space Complexity, Data structures operations and its cost estimation, Basic of Asymptotic notation. Introduction to linear data structures- Arrays, representation & Operations, Linked List: Representation of linked list in memory, different implementation of linked list. Circular linked list, doubly linked list, etc. Application of linked list: polynomial manipulation using linked list, etc.

Module 2: (10 hrs.)

Stacks: Stacks as ADT, Different implementation of stack, multiple stacks. Application of Stack: Conversion of infix to postfix notation using stack, evaluation of postfix expression, Recursion. Queues: Queues as ADT, Different implementation of queue, Circular queue, Concept of Dqueue and Priority Queue, Application of queues.

Module 3: (10 hrs.)

Tree: Definitions - Height, depth, order, degree etc. Binary Search Tree - Operations, Traversal, Search, AVL Tree, Heap, Applications and comparison of various types of tree; Introduction to forest, multi-way Tree, B tree, B+ tree.

Module 4: (08 hrs.)

Graphs: Introduction, Classification of graph: Directed and Undirected graphs, etc, Representation, Graph Traversal: Depth First Search (DFS), Breadth First Search (BFS), Graph algorithm: Minimum Spanning Tree (MST)- Kruskal, Prim's algorithms. Dijkstra's shortest path algorithm; Comparison between different graph algorithms. Application of graphs.

Module 5: (08 hrs.)

Sorting: Introduction, Classification of sorting method, Sort methods like: Bubble Sort, Quick sort. Selection sort, Heap sort, Insertion sort, Shell sort, Merge sort and Radix sort; comparison of various sorting techniques. Searching: Basic Search Techniques: Sequential search, Binary search, Comparison of search methods. Case Study: Application of various data structures in operating system, DBMS etc.

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III- Semester

Course Outcome:

1. Understand basic data structures such as arrays, linked lists, stacks and queues
2. Introduce the concept of data structures through ADT including List, Stack, Queues.
3. Understand the basic operations of trees and its types.
4. Understand the basic concept of graph and its operations.
5. Demonstrate and implement searching sorting algorithms.

List of Text / Reference Books:

1. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures" Computer Science Press.
2. Mark Allen Weiss "Algorithms, Data Structures, and Problem Solving with C++", Pearson Education (US) 1996
3. R. G. Dromey "How to Solve it by Computer", 2nd Impression by, PHI
4. AM Tanenbaum, Y Langsam & MJ Augstein, "Data structure using C and C++", 2nd Ed., 2006, Prentice Hall India.
5. Robert Kruse, Bruce Leung, "Data structures & Program Design in C", 2nd Ed., 1997, Pearson Education.
6. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education.
7. Richard, Gilberg Behrouz, Forouzan, "Data structure – A Pseudocode Approach with C", 2nd Ed., Thomson press.

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III- Semester

CI03	Computer System Organization	2L : 1T : 0P (3 hrs.)	3 credits
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Prerequisite: Basic Electronics Engineering

Course Objective:

Students to be familiarize the basic principles of computer architecture, Design and Multi Processing, Types of data transfer, Concept of semi conductor memories which is useful for research work in field Computer System.

Course Contents:

Module 1:

(08 hrs.)

Basic Structure of Computer: Structure of Desktop Computers, CPU: General Register Organization- Memory Register, Instruction Register, Stack Organization, Instruction Format, Fetch and Execution cycle, Instruction Types, ALU, I/O System, CPU and Memory Program Counter, Bus Structure, Register Transfer Language-Bus and Memory Transfer, addressing modes.

Module 2:

(10 hrs.)

Control Unit Organization Micro Instruction Formats, Hardwired and Micro- programmed Control unit, micro program sequencer, Control Memory, Sequencing and Execution of Micro Instruction.

Computer Arithmetic: Number concept, 1's and 2's complement representation, Signed Addition and Subtraction, addition and subtraction using 2's complement. Multiplication and division, Booths Algorithm, Division Operation, Floating Point Arithmetic Operation.

Module 3:

(08 hrs.)

I/O Organization: Introduction of I/O Interface–PCI Bus, SCSI Bus, USB, Data Transfer: Serial, Parallel, Synchronous, Asynchronous, handshaking method, Modes of Data Transfer: programmed I/O, interrupt-initiated I/O, Parallel Priority interrupt, Daisy chaining method, Direct Memory Access (DMA), I/O Processor.

Module 4:

(08 hrs.)

Memory Organization: Main memory-RAM, ROM, Secondary Memory –Magnetic Tape, Disk, Optical Storage, associative memory and match logic, Cache Memory: Cache Structure and Design, Mapping Scheme, Replacement Algorithm, Improving Cache Performance, Virtual Memory, memory management hardware.

Module 5:

(08 hrs.)

Multiprocessors: Characteristics of Multiprocessor, Inter-Processor Communication and Synchronization. Memory in Multiprocessor System, Concept of Pipelining, Vector Processing, Array Processing, RISC and CISC, Study of Multicore Processor –Intel, AMD

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III- Semester

Course Outcome:

1. Explain the basic structure & components of the computer system.
2. Explain Control unit organization and Demonstrate concepts of computer arithmetic.
3. Explain the input output organization of the computer system.
4. Illustrate memory organization and memory management techniques.
5. State the core concepts of multiprocessor and pipelining.

List of Text / Reference Books:

1. Morris Mano , “Computer System Architecture ” 3rd Ed., 2007, PHI
2. Alan Clements: “Computer Organization and Architecture”, 2012, Cengage Learning
3. Subrata Ghosal: “Computer Architecture and Organization”, 2011, Pearson Education
4. William stalling ,“Computer Organization and Architecture” 10th Ed., 2016, Pearson Education
5. M. Usha, T.S. Shrikant: “Computer System Architecture & Organization”, 2019, Willey India
6. Chaudhuri, P.Pal: “Computer Organization and Design”, 3rd Ed. PHI

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III- Semester

HS03	Innovation and Creativity	1L : 0T : 0P (1 hrs.)	1 credits
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Prerequisite(s): Nil

Course Objectives:

1. To give an insight into creativity and innovation
2. To develop an appreciation for innovation among students, and
3. To enhance sensitivity to creativity and innovation

Course Contents:

Module 1:

Overview of Creativity Meaning and concept of creativity, Process, Nature and characteristics of creativity, Factors affecting creativity.

Module 2:

Overview of Innovation Difference between Invention & Innovation, Importance & Principles of Innovation, Process of Innovation, Domain wise Innovations, How to safe guard innovations.

Module 3:

Tools for Innovation Traditional V/s Creative Thinking, Individual Creativity Techniques: Meditation, SelfAwareness, & Creative Focus Group Creative Techniques: Brain Storming, off The Wall Thinking

Module 4:

Evaluation of Effectiveness of Innovation- Legal Aspects like IPR, patent filing, copyright, Patenting Procedures, Design patents etc.

Module 5: Innovation Management Concept, Scope, Characteristics, Evolution of Innovation Management, Significance, Factors Influencing Innovation. Organizational Aspects- Economic Aspects like venture capital, angel investors. Case Studies on Innovation business ideas i.e. RedBus, Flipcart, Ola, Big Basket, Patented products, Chemical products and Materials, special patents of procedures.

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III- Semester

Course Outcomes:

1. Analyze creativity concepts and principles & process for problem solving.
2. Understand innovation & apply creativity for innovation.
3. Understand innovative products or services.
4. Apply design thinking tools techniques for IPR.
5. Understand the concept of Innovation Management.

Text Books:

1. S.Salivahanan, S.Suresh Kumar, D.Praveen Sam, “Introduction to Design Thinking”, Tata Mc Graw Hill, First Edition, 2019.
2. Kathryn McElroy, “Prototyping for Designers: Developing the best Digital and Physical Products”, O’Reilly, 2017.

Reference Books:

1. Michael G. Luchs, Scott Swan, Abbie Griffin, “Design Thinking – New Product Essentials from PDMA”, Wiley, 2015.
2. Vijay Kumar, “101 Design Methods: A Structured Approach for Driving Innovation in Your Organization”, 2012.

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III- Semester

CI01(P)	Analog & Digital Communication Lab	2L : 0T : 0P (3 hrs.)	1 credits
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Prerequisite: Mathematics, Basics of Electronics.

Course Objective: The course is designed to cover the fundamentals modulation & demodulation experiments of analog & digital communication systems like various modulation techniques like AM, FM, PAM, ASK, PSK etc.

Course Content:

Module 1: Signals and Systems

Introduction of a communication system, signal-definition, types of signals. System definition, classification of systems. Fourier transforms and its properties.

Module 2: Amplitude Modulation

Modulation, DSB-FC, DSB-SC, SSB-SC, VSB-SC systems, Demodulation of AM, square law and envelope detector, synchronous detection of AM, Design of AM transmission system.

Module 3: Angle modulation

Frequency modulation, types of FM. Phase modulation, difference between FM and PM, Direct and indirect method of Design FM Transmitter, FM demodulators- slope detector, Foster seeley discriminator, ratio detector.

Module 4: Sampling of signal

Sampling theorem. Pulse amplitude modulation (PAM), Time division, multiplexing (TDM), pulse position and pulse duration modulations, , Pulse code modulation, signal to noise ratio, Companding, Data rate and Baud rate, Bit rate, multiplexed PCM signal.

Module 5: Digital modulations Techniques:

Amplitude shift keying (ASK), Binary Phase Shift keying (BPSK), Differential phase shift keying (DPSK), offset and non-offset Quadrature phase shift keying (QPSK), M-Ary PSK, Binary frequency Shift Keying (BFSK), M-Ary FSK Quadrature Amplitude modulation (QAM).

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III- Semester

Course outcomes:

Students earning credits will develop ability to:

1. Apply Fourier transforms to solve communication engineering problems.
2. Demonstrate AM transmitters and receivers.
3. Demonstrate FM transmitters and receivers.
4. Convert Analog signals to Digital signals.
5. Compare different digital modulation techniques

List of Text Books /Reference Books:

1. Singh & Sapre, "Communication Systems", TMH.
2. Taub Schilling, "Principles of Communication Systems", TMH.
3. W. Tomasi "Electronic Communications Systems", Pearson Education Pvt. Ltd.
4. Abhay Gandhi, "Analog and Digital Communication", CENGAGE Learning.
5. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2004.
6. B. P. Lathi, "Modern Analog and Digital Communication Systems",
7. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
8. Martin S. Roden, "Analog and Digital Communication System", 3rd Edition Prentice Hall of India, 2002.
9. B. Sklar, "Digital Communication Fundamentals and Applications" 2nd Edition Pearson Education 2007.

List of Experiments List:-

1. To perform & analysis of AM Modulation and Demodulation (Envelope Detector)
2. To perform & analysis of Frequency modulation using reactance modulator.
3. To perform & analysis of Frequency modulation using varactor modulator.
4. To perform & analysis of Pulse Amplitude Modulation and Demodulation
5. To perform & analysis of Pre-emphasis and De-emphasis
6. To perform & analysis of Analog Multiplexing.
7. To perform & analysis of Amplitude Modulation using Pspice
8. To perform & analysis of Receiver characteristics (selectivity, sensitivity, fidelity).
9. To perform & analysis of Operation of foster-seeley loop detector.
10. To perform & analysis of Operation of ratio detector.

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III- Semester

CI02(P)	Data Structure & Algorithm Lab	0L : 0T : 4P (4 hrs.)	2 credits
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Prerequisite: Programming for Problem Solving Lab

Course Objective:

The objective of this course is to understand different types of data structures and algorithms used in program.

Course Contents:

Module 1:

Arrays, String, & their representation & Operations. Linked List: Representation of linked list in memory, different implementation of linked list. Circular linked list, doubly linked list, etc.

Module 2:

Stacks: Stacks as ADT, Different implementation of stack, multiple stacks. Application of Stack: Conversion of infix to postfix notation using stack, evaluation of postfix expression, Recursion, Example of recursion.

Module 3:

Queues: Queues as ADT, Different implementation of queue, Circular queue, Concept of Dequeue and Priority Queue, Queue simulation, Application of queues.

Module 4:

Tree: Definitions - Height, depth, order, degree etc. Binary Search Tree - Operations, Traversal, Search, Graphs: Introduction, Classification of graph: Directed and Undirected graphs, etc, Representation, Graph Traversal: Depth First Search (DFS), Breadth First Search (BFS)

Module 5:

Sorting: Introduction, Classification of sorting method, Sort methods like: Bubble Sort, Quick sort. Selection sort, Heap sort, Insertion sort Searching: Basic Search Techniques: Sequential search, Binary search, Comparison of search methods.

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III- Semester

Course Outcome:

1. Understand basic data structures such as arrays, linked lists.
2. Introduce the concept of data structures through ADT including stack and Recursion .
3. Understand the basic operations of Queues.
4. Understand the basic concept of Tree and Graph and their operations.
5. Demonstrate and implement searching sorting algorithms.

List of Text / Reference Books:

1. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures" Computer Science Press.
2. Mark Allen Weiss "Algorithms, Data Structures, and Problem Solving with C++", Pearson Education (US) 1996
3. R. G. Dromey "How to Solve it by Computer", 2nd Impression by, PHI
4. AM Tanenbaum, Y Langsam & MJ Augstein, "Data structure using C and C++", 2nd Ed., 2006, Prentice Hall India.
5. Robert Kruse, Bruce Leung, "Data structures & Program Design in C", 2nd Ed., 1997, Pearson Education.
6. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education.
7. Richard, Gilberg Behrouz, Forouzan, "Data structure – A Pseudocode Approach with C", 2nd Ed., Thomson press.

List of Experiments: Write a Program:

1. To perform insertion and deletion operations on array. (CO1)
2. To perform multiplication operation on matrix. (CO1)
3. To implement single linked list. (CO1)
4. To implement doubly linked list. (CO1)
5. To calculate factorial of number using recursion. (CO2)
6. To demonstrate static implementation of stack. (CO2)
7. To demonstrate dynamic implementation of stack. (CO2)
8. To demonstrate static implementation of Linear queue. (CO3)
9. To demonstrate dynamic implementation of Linear queue. (CO3)
10. To implement circular queue. (CO3)
11. To implement binary search tree. (CO4)
12. To perform BFS and DFS operations on graph. (CO4)
13. To perform binary search operation. (CO5)
14. To perform sorting operation using bubble sort. (CO5)
15. To perform sorting operation using insertion sort. (CO5)

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III- Semester

CI03(P)	Computer System Organization Lab	0L : 0T : 2P (2 hrs.)	1 credits
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Prerequisite: Basic Electronics Engineering

Course Objective:

Students to be familiarize the basic principles of computer architecture, Design and Multi Processing, Types of data transfer, Concept of semi conductor memories which is useful for research work in field Computer System.

Course Contents:

Module 1:

Introduction to Desktop Computers, Introduction to 8085 microprocessor, 8085 Instruction set, Flags, Logic Gates, Combinational circuits, Multiplexer, Demultiplexer.

Module 2:

Introduction to Binary number systems, 1's & 2's Complement, Arithmetic Operations, Half adder, Half subtractor, Full Adder and Full Subtractor.

Module 3:

Introduction to Assembly Language, Programming Arithmetic and Logic Operations, Shift Operations, Program Loops.

Module 4:

Memory Hierarchy, Main Memory, Types of Memory, Memory Allocation Methods, Virtual Memory, Page Replacement Algorithms.

Module 5:

Characteristics of Multiprocessor, RISC And CISC, Study of Multicore Processor –Intel, AMD.

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Course Outcome:

1. Explain the basic structure & components of the computer system, 8085 Micro Processor.
2. Demonstrate the concepts of computer arithmetic.
3. Demonstrate the concepts of Assembly Language.
4. Illustrate memory organization and memory management techniques.
5. State the core concepts of multiprocessor.

List of Text / Reference Books:

1. Morris Mano , “Computer System Architecture ” 3rd Ed., 2007, PHI
2. Alan Clements: “Computer Organization and Architecture”, 2012, Cengage Learning
3. Subrata Ghosal: “Computer Architecture and Organization”, 2011, Pearson Education
4. William stalling , “Computer Organization and Architecture” 10th Ed., 2016, Pearson Education
5. M. Usha, T.S. Shrikant: “Computer System Architecture & Organization”, 2019, Willey India
6. Chaudhuri, P.Pal: “Computer Organization and Design”, 3rd Ed. PHI

List of Experiments:

1. Case study of Desktop Computers . (CO1)
2. Study of Multiplexer and Demultiplexer. (CO1)
3. Write a Program to demonstrate Flags in microprocessor 8085. (CO1)
4. Study of Half Adder and Half Subtractor. (CO2)
5. Study of Full Adder and Full Subtractor. (CO2)
6. Write a program to add the contents of memory locations 4000H and 4001H and place the result in memory location 4002H. (CO3)
7. Write a program to multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H.(CO3)
8. Program for simulate memory allocation strategies (First fit, Best fit, Worst fit).(CO4)
9. Programs for page replacement algorithms.(CO4)
10. Case study of RISC and CISC.(CO5)

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III- Semester

CI01(P)	IT Workshop (C++)	0L : 0T : 4P (4 hrs.)	2 credits
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Prerequisite: NIL

Course Objective:

Interpret good knowledge in C++ programming language and enable them to build Programs.

Course Contents:

Module 1:

Introduction of C++, Programming paradigms, Language translator, Structure of C++ program. Declaration, Expression and statements: Data types, Variables, Constants, Operator and expression, Operator precedence and associativity & Control statements

Module 2:

Array: Declaration & Initialization, 2-D Array & Multidimensional Array. Function: Declaration, Definition and call, Inline function, Main function argument, Reference variable, Function overloading, Default argument, Parameter passing, Recursion, Scope of variable, Return-by-value and Return-by-reference.

Module 3:

Class: Class, Members, Constructor and destructor, Copy constructor, parameterized constructor, Static member, Scope of class names. Dynamic memory management: Operators new and delete.

Module 4:

Introduction, Polymorphism, Overloading, Parametric and inclusion polymorphism Inheritance: inheritance and Types of inheritance, Virtual base class, Virtual function, Abstract class, Overriding and hiding, Dynamic binding of functions.

Module 5:

Class template, Member function inclusion, Function template, Specialization, Inheritance, Namespace. Concept of exception handling, Catch block, Nested try-catch block, Condition expression in throw expression, Constructor & destructor, Runtime standard exception. Standard library function, Input and output, Iostream class hierarchy, Class ios, Other stream classes, Basics of file handling.

IPS Academy, Institute of Engineering & Science
(A UGC Autonomous Institute, Affiliated to RGPV, Bhopal)
Scheme Based on AICTE Flexible Curriculum

Department of Computer Science & Engineering
Bachelor of Technology (B. Tech.)
[Computer Science & Information Technology]

III- Semester

Course Outcome:

1. Understand expression and statements and apply them in solving Problems.
2. Explain and be able to use array and function in writing programs.
3. Explain and be able to use class in writing programs.
4. Explain and be able to use Polymorphism and Inheritance in writing programs.
5. Explain and be able to use template and exception handling in writing programs
- 6.

List of Text / Reference Books:

1. B. Stroutstrup “The C++ Programming Language”, 3rd Edition, 2002, Pearson Education.
2. Josée Lajoie and Stanley B. Lippman “C++ Primer”, 3rd Edition, Addison Wesley
3. E.Balagurusamy “Object Oriented Programming with C++ “, 7e, TMH
4. Rajesh K.Shukla “Object Oriented Programming in C++”, Wiley India

List of Experiments:

Write a C++ Program:

1. To declare Struct. Initialize and display contents of member variables.(CO1)
2. Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members.(CO1)
3. To create an array of pointers. Invoke functions using array objects.(CO2)
4. To display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.(CO3)
5. To declare a class. Declare pointer to class. Initialize and display the contents of the class member.(CO3)
6. To read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary).(CO3)
7. To use scope resolution operator. Display the various values of the same.(CO4)
8. To allocate memory using new operator.(CO4)
9. To create multilevel inheritance. (Hint: Classes A1, A2, A3)(CO4)
10. To use pointer for both base and derived classes and call the member function. Use Virtual keyword.(CO4)
11. To illustrate the concepts of console I/O operations.(CO5)
12. To implement a file handling program for demonstration of database connectivity.(CO5)
13. To make a small project using C++ (All CO).