**DIPLOMA ( CSE) LNCT University**
**III Semester Syllabus**

**Computer Architecture (301)/ (DCS-301)**

**COURSE OUTCOMES:**

**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | To understand the structure, function and characteristics of computer systems. |
| **CO-2** | To understand the design of the various functional units and components of computers. |
| **CO-3** | To understand control unit operations. |
| **CO-4** | Understand the concept of I/O organization and have ability to understand the concept of cache mapping techniques. |
| **CO-5** | Discuss memory organization and mapping techniques. |

**COURSE CONTENTS:**

**UNIT I COMPUTER ARCHITECTURE:**

Register Transfer and Micro operations, Register Transfer: Bus and Memory Transfers. Three State Bus Buffers, Memory Transfer. Arithmetic Micro operations: Binary Adder, Binary Adder Sub tractor, Half Adder and Full Adder Binary Incrementor. Arithmetic Circuit, Logic Micro operations: List of Logic Micro operations, Hardware, Implementation. Shift Micro operations: Hardware Implementation.

**UNIT II BASIC COMPUTER ORGANIZATION AND DESIGN:**

Instruction Codes: Stored Program Organization, Indirect Address Computer Registers: Common Bus System, Computer Instruction: Instruction Set Completeness Timing and Control Instruction Cycle: Fetch and Decode, Type of Instruction, Register- Reference Instructions Memory-Reference Instructions: AND to AC, ADD to AC, Load to AC, Store to AC, Branch Unconditionally, Branch and Save Return Address, ISZ, Control Flowchart Input-Output Configuration, Input-Output Instructions, Program Interrupt, Interrupt Cycle, Complete Computer Description, Design of Basic Computer: Control Logic Gates, Control of Registers and Memory, Control of Single flip- flops, Control of Common Bus Design of Accumulator Logic: Control of AC Register, Adder and Logic Circuit, Character Manipulation, Program Interrupt.

**UNIT III CENTRAL PROCESSING UNIT**:

Introduction, General Register Organization: Control Word Stack Organization: Register Stack, Memory Stack, Reverse Polish Notation, Evaluation of Arithmetic Expressions Instruction Formats: Three Address Instructions, Two Address Instructions, One Address Instructions, Zero Address Instructions, RISC Instructions Addressing Modes Data Transfer and Manipulation: Data Transfer Instructions, Data Manipulation Instructions, Arithmetic Instructions, Logical and Bit Manipulation Instructions, Shift Instructions Program Control: Status Bit Conditions, Conditional Branch Instructions Subroutine Call and Return, Program Interrupt, Types of Interrupts Reduced Instruction Set Computer (RISC): CISC Characteristics, RISC, Characteristics, Overlapped Register Windows.

**UNIT IV INPUT OUTPUT ORGANIZATION:**

Peripheral Devices: ASCII Alphanumeric Characters Input-Output Interface: I/O Bus and Interface Modules, I/O Versus Memory Bus, Isolated versus Memory-Mapped I/O Asynchronous Data Transfer: Strobe Control, Handshaking, Asynchronous Serial Transfer, Asynchronous Communication Interface First-In, First-Out, Buffer Modes of Transfer: Interrupt-Initiated I/O, Software Considerations Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt, Priority Encoder, Software Routines, Direct Memory Access

(DMA):DMA Controller, DMA Transfer Input-Output Processor: CPU-IOP Communication Serial Communication: Character-Oriented Protocol, Data Transparency Bit-Oriented Protocol.

**UNIT V MEMORY ORGANIZATION:**

Memory Hierarchy Main Memory: RAM and ROM Chips, Memory Address Map, Memory Connection to CPU Auxiliary Memory: Magnetic Disks, Magnetic Tape, CD, DVD Associative Memory: Hardware Organization, Read Operation, Write Operation Cache Memory: Associative Mapping, Direct Mapping, Set-Associative Mapping, Writing into Cache, Cache Initialization Virtual Memory: Address Space and Memory Space, Address Mapping.

**Reference Books: -**


1. Morris Mano. M., Computer System Architecture, PHI Learning.
2. Tanenbaum, 5/e, Structured Computer Organization, PHILearning.
3. Hwang & Brigg, Advanced Computer Architecture, McGraw Hill.
4. Stallings, 4/e, Computer Organization &Architecture.
5. Murdocca Computer Architecture &Organization WileyIndia.
6. ISRD group Computer OrganizationTMH.
7. T.K. Ghosh, Computer Organization& Architecture, TMH.
8. Computer Organization & Architecture by V. Rajaraman & T. Radha Krishnan, PHILearning.
9. Computer System Architecture by P.V.S. Rao, PHI Learning.

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**Operating System (302)/ (DCS-302)**

**COURSE OUTCOMES:**

**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Describe basics Concept of Operating System and its functionality. |
| **CO-2** | Describe Computer System Processes management concept and apply concept on given problem. |
| **CO-3** | Identify Basics of Memory Management and its Schemes and explain concept of Virtual Memory and paging. |
| **CO-4** | Describe techniques of file system in OS and explain the concept of file and directory system. |
| **CO-5** | List the type of Disk scheduling algorithms and identify RAID Technology concept. |

**COURSE CONTENTS:**

**UNIT I INTRODUCTION TO OPERATING SYSTEM:**

Basics of Operating System, its functions, Objectives and Types of operating System Introduction of time sharing, real time, Parallel and Distributed Multiprocessor embedded O.S. Structure of Operating System: System components, Operating System services, System calls and Programs, System Structure.

**UNIT II PROCESS MANAGEMENT:**

Concepts of Processes; Process state (state diagram), Process Scheduling & Process control block (PCB), Operation on Processes, Threads multiprocessor scheduler. Process Scheduling & Algorithms- Basic Concepts, Scheduling criteria, Scheduling Algorithms- FCFS, SJF, Priority, RR, Multiple queues, Multiple processor Scheduling, Real time Scheduling. Dead Locks - Basic Concept of deadlock, deadlock detection, deadlock prevention, deadlock Avoidance, recovery from deadlock & Banker's algorithm.

**UNIT III MEMORY MANAGEMENT**:

Concept of Memory Management- Logical v/s Physical address, Cache Memory, Swapping, Allocation Techniques (contiguous and Non-contiguous), Fragmentation &Compaction. Concepts of paging and segmentation - Paged Segmentation & Segmented Paging. Concepts of Virtual Memory- Demand Paging, Page Fault, Page replacement and its Algorithms, Allocation of frames, Thrashing.

**UNIT IV FILE SYSTEM:**

File System interface: File Concepts, Types of Files, Access Methods, Directory Structure, File System mounting, Protection. File System Implementation: File System Structure, Allocation Methods (Contiguous, Non Contiguous, index allocations), Free space Management (Fragmentation compaction), Directory implementation, File- sharing, recovery, network file system, (NFS), Efficiency and performance.

**UNIT V DEVICE MANAGEMENT:**

Input Output System: I/O Hardware & Interface, Kernel I/O Sub System, I/O request streams. Disk Management-Disk Structure, Disk Scheduling and its algorithms, RAID TECHNOLOGY., protection & security, other operation system:

**Reference Books: -**


1. Galvin, Operating Systems, Wiley Eastern.

2. Godbole A.S Operating Systems, TMH NewDelhi.
3. Pal Chaudhury, Operating system, Principals & Design PHILearning
4. Bach M.J., Design of the UNIX Operating System,PHI
5. Milankovic, Operating Systems,TMH
6. Ray Dunkan Advance Dos Programming,BPB.
7. Donovons&Mendric, Operating Systems,TMH.
8. William stalling Operating System, pearsonedu.

**List of suggestive core experiments: -**

1. BIOS Configuration.
2. Installation of Various Operation System.
    a. Windows Vista.
    b. Windows XP.
    c. Linux.
    d. Unix.
3. File Management Commands, Use of Administration Commands, System Calls.
4. Simulation of CPU Scheduling Algorithms (FCFS, SJF, RR).
5. Simulation of Memory Allocation, Paging and fragmentation.
6. Case study of UNIX, Linux, Windows Vista & Windows XP.

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**Data Communication (303)/(DCS-303)**

**COURSE OUTCOMES:**

**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Understand various Data communication concept & technology. |
| **CO-2** | Compare different types of transmission media and media access methods. |
| **CO-3** | Understand the concept of modulation and demodulation, Digital modulation methods. |
| **CO-4** | Understand the concepts of Multiplexing, Spreading and Switching. |
| **CO-5** | Recognize various Error Detection and Correction. |

**COURSE CONTENTS:**

**UNIT I DATA COMMUNICATION CONCEPT & TECHNOLOGY:**

Data Representation, Data Transmission. Modes of Data Transmission- Analog Data, Digital Data, Communication Channels, Synchronous & Asynchronous Data & Communication, Series & Parallel data Communication, Bit rate and Baud rate, Bandwidth & Channel Capacity, Nyquist's, and Shannon's theorems.

**UNIT II TRANSMISSION MEDIA:**

Transmission Line Characteristic, Liner Distortions, Crosstalk, Twisted Pairs Cable, Coaxial Cable, UTP, STP. Optical Fiber – Multimode Fibers, Modal Dispersion, Mono Mode Fiber, Graded Index Fibers, Total Dispersion, Fiber Attenuation, Radio Media, UHF & Microwaves, Satellite Link, Equalization.

**UNIT III MODULATION AND DATA MODEMS**:

Concept of modulation and demodulation, Digital modulation methods: PCM, Amplitude, Shift-keying, Frequency Shift-keying, Quadrature PSK (QPSK), Differential PSK (DPSK), Simplex, Half Duplex, Full Duplex.

**UNIT IV MULTIPLEXING, SPREADING AND SWITCHING:**

MULTIPLEXING: Frequency-Division Multiplexing, Wavelength-Division Multiplexing, Synchronous Time-Division Multiplexing, Statistical Time- Division Multiplexing, SPREAD SPECTRUM: Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum. CHANNELIZATION: Frequency-Division Multiple Access (FDMA), Time- Division Multiple Access (TDMA), Code-Division Multiple Access (CDMA).

**UNIT V ERROR DETECTION AND CORRECTION:**

INTRODUCTION: Types of Errors, Redundancy, Detection versus Correction, Forward Error Correction Reverse Error Correction. BLOCK CODING: Error Detection, Error Correction, Hamming Distance and Minimum Hamming Distance. Liner Block Code, CRC, Checksum, telephone and cable networks, cellular and satellite networks.

**Reference Books: -**


1. Behrouz A Forouzan, Data Communication and Networking, 4e, Tata McGraw-Hill,2008.
2. William Stallings, Data and Computer Communications, 8e, Pearson Education,2008.

**3.** Tomasi Wayne, Introduction to Data Communications and Networking, Pearson Education, 2007.
**4.** Rajneesh Agrawal and Bharat Bhushan Tiwari, Data Communication and Computer Networks, Vikas Publishing house Ltd.,2005.
**5.** S. Tanenbaum, Computer Networks, Fourth Edition, PearsonEducation.
**6.** Leon-Gracia and I. Widjaja, Communication Networks, Tata McGraw Hill,2004.
**7.** K. Pahlavan and P. Krishnamurthy, Principles of Wireless Networks, PHILearning.

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**Data Structure & Algorithms (304)/(DCS-304)**

**COURSE OUTCOMES:**

**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Apply basics of data structures and algorithm design. |
| **CO-2** | Understand representation of arrays. |
| **CO-3** | Use Static symbol table, Hash tables and hashing techniques to solve real world problems. |
| **CO-4** | Explain the basic structure of linked list with its various operations. |
| **CO-5** | Illustrate stack and queue data structure. |

**COURSE CONTENTS:**

**UNITI INTRODUCTION:**

Introduction to algorithm design and data structure, Top-down and bottom-up approaches to algorithm design**,** Analysis of Algorithm, complexity measures in terms of time and space Concept of Pointer Variable.

**UNITII ARRAYS:**

Representation of arrays: single and multidimensional arrays, Address calculation using column and row major ordering.

**UNITIII SYMBOL TABLES**:

Static symbol table, Hash tables, Hashing Techniques, Collision Handling Techniques.

**UNITIV STACKS AND QUEUES:**

Representation of stacks and queues using arrays, Type of queues-Linear queue, circular queue, De-queue, Applications of stacks: Conversion form infix to postfix and prefix expressions, Evaluation of postfix expression using stacks.

**UNITV LINKED LISTS:**

Singly linked list: operations on list, linked stacks and queues, Polynomial representation and manipulation using linked lists, Circular linked lists, Doubly linked lists, Generalized lists. searching and sorting algorithms, trees, graphs.

**Reference Books: -**


1. Sahani, Data structure & Algorithms,TMH.
2. Langsam, Tenenbaum, Data Structure using C/C++,PHILearning
3. Data structure (Schum outline series) Indian edition,TMH
4. Drozdek Adams, Data Structures and Algorithms in C++, Vikas Publishing House Pvt.Ltd.
5. Kunth D. E., Art of Computer Programming and Fundamentals of Algorithms, Vol.-I,Narosa.
6. Kunth, Art of computer programming, Vol.-III,Sortingsearching.


**List of suggestive core experiments: -**

1. Program implementation for
    A. Reading and printing of single array and multidimensional array.
    B. Matrix manipulation.
    C. For one dimensional, 2D & 3D array.

2. Program for inserting an element in an array
3. Program for deleting an element from an array
4. Program for Implementation of stack operations PUSH and POP using array.
5. Program for Implementation of queue operations Insert and Delete using array.
6. Program implementation for creating, updating, deleting, traversing, searching, and sorting of arrays, linear and circular link, lists, doubly link list, trees, post, prefix.
7. Program implementation for manipulation of strings and match algorithms.
8. Program implementation for adjacency matrix, traversing and searching.
9. Program implementation for adjacency creating matrix tree.

**DIPLOMA( CSE) LNCT University**
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**Programming with C++ (305)/(DCS-305)**

**COURSE OUTCOMES:**

**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Describe the procedural and object-oriented paradigm along with basic structure of C++ program - sequence, selection and iteration. |
| **CO-2** | Understand concepts of streams, classes, functions, data and objects. |
| **CO-3** | Understand tokens, expressions, and control structures |
| **CO-4** | Explain arrays and strings and create programs using them |
| **CO-5** | Describe and use constructors and destructors |

**COURSE CONTENTS:**

**UNIT I INTRODUCTION:**

Introduction to Object oriented concepts, Operators in C++, Token, Expressions and Control Structures Tokens, Keywords, Identifiers, Basic Data Types, User-Defined Data Types, Derived Data Types, Type Compatibility, Scope Resolution Operator, Operator Precedence.

**UNIT II CLASSES & OBJECTS**

Classes and Objects Specifying a Class, Defining Member Functions, Making a Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a Class, Memory Allocation for Objects

**UNIT III CONSTRUCTORS AND DESTRUCTORS**

Constructors, Parametric Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor, Destructors. Operator Overloading and Type Conversions Definition

**UNIT IV INHERITANCE:**

Inheritance Defining Derived Classes, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes.

**UNIT V POINTERS & POLYMORPHISM:**

Pointers, Virtual Functions and Polymorphism Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions

**Reference Books: -**


1. Balguruswamy E. (2001), Object-Oriented Programming with Turbo C++, 3rd edition, TMH.
2. Lafore Robert, 2001), Object-Oriented Programming in Turbo C++, 3rd edition, Galgotia Publications.
3. M. kumar, programming with C ++,
4. Shukla, object oriented programming in C++,wileyIndia.
5. Stevens, Teach Yourself C++, BPB
6. Schildt H, 1997, C++ Complete Reference,TMH
7. Kanetkar Y, Programming in C++,BPB.
8. Mahapatra P.B, Thinking in C++,KhannaPublisher.• Bruce Euckel , Thinking inC++.
9. Introduction to object oriented programming in C++,TMH ISRDgroup

**List of suggestive core experiments: -**

1. Write a program in C++ to find the no is even or odd.
2. Write a program in C++ to print a String.
3. Write a program in C++ to reverse a number.
4. Write a program in C++ to arrange an array in ascending order
5. Write a program in C++ to inline function.
6. Write a program in C++ to friend function.
7. Problems related to classes and objects.
8. Problems to illustrate constructor & destructor.
9. Problems related to operator overloading.
10. Problems related to default arguments, function overloading, functions overriding.
11. Problems related to different types of inheritance.
12. Moderately large function-based problems for which the solutions should be represented by coordinating modules. Formatting a text, replacing a given word in a text with another, counting the number of words, in a text.

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**Visual Basic Programming (306)/ (DCS-306)**

**COURSE OUTCOMES:**

**After Completing the course student should be able to:**

| | |
|---|---|
| **CO-1** | Understand the concepts of Visual Basic |
| **CO-2** | Learn the advantages of Controls in VB |
| **CO-3** | Design and develop the event-driven applications using Visual Basic framework. |
| **CO-4** | Apply the knowledge of database methods. |
| **CO-5** | Understand the concepts of Visual Basic |

**Reference Books: -**


1. Visual Basic 6 by Deitel & Deitel Nietro, Person Education.
2. Programming with Visual Basic 6.0 Mohammed Azam, Vikas Publication.
3. Visual Basic 6 from the ground up, garycornell, TMH
4. Visual Basic 6 in easy steps T.M Andercon willey India


**List of suggestive core experiments: -**

1. Introductory Part
   A. Knowledge of IDE of VB, Menu Bar, Tool Bar, Project Explorer, Tool Box, Properties Window, Form Designer, Form Layout, Immediate Window.
   B. Concept of Event Driven Programming.
   C. Customizing the environment: Editor Tab, Format Tab, General Tab, Docking Tab, and Environment Tab.
   D. Working with from: Loading, Showing & Hiding Form.
   E. Controlling one form from another.
2. **Practical Part**
   Experiments based on:
   A. Data types of VB.
   B. Control Flow Statements and conditional Statements.
   C. Array and types of Arrays.
   D. Designing Menus and Pop-Up Menus.
   E. Use of MsgBox & InputBox.
   F. VB Controls.
   G. Control Arrays & Collections.
   H. Procedures, Subroutines & Functions.
   I. Graphics with VB.
   J. MDI
3. **Application Development Using VB Like:**
   A. Exam System
   B. Library System
   C. Banking System
   D. Hospital System
   E. Inventory & Stock System
   F. Small Gaming Program.