

2017-
18

Multani Mal Modi College

Unit Planning of PGDCA

Computer Science Department



MULTANI MAL MODI COLLEGE, PATIALA

UNIT PLAN

Class – PGDCA Sem.-I

PGDCA-101 Fundamentals of Information Technology

Max Marks: 75

Maximum Time: 3 Hrs.

TILLMST-I

- **Historical Evolution of Computer:** Block Diagram of computer, characterisation of computers, types of computers, the computer generations.
 - **Basic Anatomy of Computers:** memory unit, input-output unit, arithmetic logic unit, control unit, central processing unit, RAM, ROM, PROM, EPROM.
 - **Input-Output Devices:** Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Voice Recognition Devices, Optical Recognition devices, Dot matrix, Character and Line printer, DeskJet printer, Laser printer, and plotters.
- Assignment-1**
- **Number System:** Non-positional and positional number systems, Base conversion, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other.
 - **Binary Arithmetic:** Addition, subtraction and multiplication.
 - **Computer Codes:** weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode, XS-3, Grey Codes.

TILLMST-II

- **Computer Software:** Introduction, types of software, systems software, GUI, operating system, high level languages, assemblers, compilers and interpreters, system utilities, application packages, stages in the development of software, program testing and debugging, program documentation, concept of firmware
- Assignment-2**
- **Applications of Information Technology and Trends:** IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application - AI, Virtual Reports, voice recognition, Robots, Multimedia Technology.

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- **E-Commerce:** Meaning, its advantages & limitations, Infrastructure for E-commerce, Types of E-Commerce Applications. **Multimedia:** Concepts, Components and Application.

PGDCA-102 Operating Systems

Max Marks: 75

Maximum Time: 3 Hrs.

TILLMST-I

- **Introduction to operating System:** Definition, its need and Operating system services, Early systems, Introduction to various types of operating systems: Batch processing operating system, Multiprogramming operating system, Time Sharing operating system, Multi tasking operating system, Distributed operating system, Network operating system, Real time operating system, Multi processor system and parallel processing.

Assignment-1

- **Process Management:** Process concept, types of Process scheduling, Basic concept of CPU Scheduling, Scheduling criteria, and Scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms, Deadlock definition and its characterization.

TILLMST-II

- **Windows:** GUI, Icon, Toolbar
- Working with files, closing and saving a file
- Mouse Mechanics: Click, double click, Drag and drop method,
- Installation of a new software, Control panel, Explorer, Accessories, Network Neighbour hood, system tools, Recycle bin, Files and directory management under windows, Running programs

Assignment-2

- **Unix:** Structure of Unix, Kernel and shell, Commands of Unix, Unix file system, own file system, Electronic mail.

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- Vi Editor: Editing text, screen controls
- Printing and spooling
- Unix Administration: Superuser, Booting, Backup, Creating and managing new accounts.

Mode of Assessment

Sr. No.	Component	Weightage
1	Mid Semester Test (MST)	40% (Average of 2 MST)
2	Written Assignments	40%
3	Attendance	20%

PGDCA-103 Programming Fundamentals through "C" Language**Max Marks: 75****Maximum Time: 3 Hrs.****TILLMST-I**

- **Programming process:** Problem definition, program design, coding, compilation and debugging.
- **Fundamentals of C:** Identifiers and keywords, data types, input and output, type conversion, operators and expressions: Arithmetic, unary, logical and relational operators, assignment operator, conditional operator, and library functions.
- **Control statements:** branching, looping using for, while and do-while statements, nested control structures, switch, break and continue statement
Assignment-1
- **Functions:** definition, call prototype and passing arguments to a function, recursion versus iteration
- **Storage classes:** automatic, external and static variables.

TILLMST-II

- **Arrays:** Definition, accessing elements, initialization, passing to functions, multi dimensional arrays, strings
- **Pointers:** address and referencing operators, declaration, assignment, passing pointer to functions, pointer arrays
Assignment-2
- **Structures:** variables, accessing members, nested structures, pointer to structures, self referential structures.

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- **Files in C:** Sequential files, random access files, Unformatted files, Text files, binary files.

Mode of Assessment

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1	Mid Semester Test (MST)	40% (Average of 2 MST)
2	Written Assignments	40%
3	Attendance	20%

PGDCA-104 Computer Organization and Architecture

Max Marks: 75

Maximum Time: 3 Hrs.

TILLMST-I

- **Boolean Algebra:** Boolean operations, Truth Tables, Boolean Laws, K-maps (2,3 and 4 variable maps, don't care conditions).
 - **Basic Gates, Combinational logic design:** half-adder, full adder, parallel adder.
 - **Sequential circuits:** concept, flip-flops (D, RS, JK, T), counters (Ripple, Asynchronous, Synchronous).
- Assignment-1**
- Instruction codes, Instruction formats, Instruction cycle, Addressing modes.

TILLMST-II

- Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit
 - **Control Memory:** Design of control unit, Micro programmed and hardwired control unit (overview only), Features of RISC and CISC
- Assignment-2**
- **Memory Organization:** memory hierarchy, Memory types: cache, associative and other types.

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- **I/O organization:** I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA.
- Block diagram depicting architecture of 8085 machine.

Mode of Assessment

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1	Mid Semester Test (MST)	40% (Average of 2 MST)
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PGDCA Sem.-II**PGDCA-201 :Data Structures****Max Marks: 75****Maximum Time: 3 Hrs.****TILLMST-I**

- Basic concept and notations, data structures and data structures operations, mathematical notation and functions, algorithmic complexity, Big 'O' notations and time space trade off.
- **Arrays:** Linear array, representation of linear array in memory, Traversing linear array, insertion and deletion in an array, multi-dimensional array: row-major, column major order, sparse array.
Assignment-1
- **Stacks:** Push and Pop in stack. Representation of stack in memory (linked and sequential) applications of Stack: conversion from infix notation to post fix notations, evolution of postfix notation, matching of Parenthesis, recursion, Tower of Hanoi.

TILLMST-II

- **Linked list:** representation of linked list using static and dynamic data structures, Comparison of Linear and non-linear data structures, Insertion and deletion of a node from a linear linked list,
Assignment-2
- Introduction to doubly and circular linked lists, Application of linked lists.

TILLFINAL EXAM

- **Searching and Sorting:** Linear and binary search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort and Quick Sort comparison of various searching and sorting algorithms

Mode of Assessment

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PGDCA-202 : Object Oriented Programming with C++**Max Marks: 75****Maximum Time: 3 Hrs.****TILLMST-I**

- **Evolution of OOP** :Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming.
 - **Introduction to C++** :Identifier, Keywords, Constants, Operators: Arithmetic, relational, logical, conditional and assignment. Size of operator, Operator precedence and associativity. Type conversion, Variable declaration, expressions, statements, manipulators. Input and Output statements, stream I/O, Conditional and Iterative statements, breaking control statements.
 - Storage Classes, Arrays, Arrays as Character Strings, Structures, Unions, Bit fields, Enumerations and User defined types.
- Assignment-1**
- **Pointers** :Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Multiple indirections, Pointer to functions. Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing: by functions, recursion, function overloading, Default Arguments, Const arguments, Pre-processor, Type casting.
 - **Classes and Objects** :Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control, this pointer, Objects: Object as function arguments, array of objects, functions returning objects, Const member. Static data member and Static member functions, Friend functions and Friend classes.

TILLMST-II

- **Constructors**: Properties, types of constructors, Dynamic constructors, multiple constructors in classes.
 - **Destructors**: Properties, Virtual destructors, Destroying objects, Rules for constructors and destructors. Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes, Scopes: Local, Global, namespace and Class.
- Assignment-2**
- **Inheritance**: Defining derived classes, inheriting private members, single inheritance, types of derivation, function redefining, constructors in derived class, Types of inheritance, Types of base classes, Code Reusability.
 - **Polymorphism**: Methods of achieving polymorphic behavior. Polymorphism with pointers, virtual functions, late binding, pure virtual functions and abstract base class.

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- **Operator overloading:** over loading binary operator, overloading unary operators, rules for operator overloading, operator overloading using friend function. Function overloading: early binding.
- Difference between function overloading, redefining, and overriding.

Mode of Assessment

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PGDCA-203 : Database Management System with MS ACCESS

Max Marks: 75

Maximum Time: 3 Hrs.

TILLMST-I

- **Traditional file processing system** : Characteristics, limitations, Database : Definition, composition.
 - **Database Management System:** Definition, Characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance.
 - DBMS architecture, data independence, mapping between different levels.
 - **Database languages:** DDL, DML, DCL.
- Assignment-1**
- Database utilities, Data Models, Keys: Super, candidate, primary, unique, foreign.
 - **Entity relationship model:** concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, converting ER diagrams to tables.
 - Overview of Network and Hierarchical model.
 - **Relational Data Model:** concepts, constraints. Relational algebra: Basic operations, additional operations.

TILLMST-II

- **Database Design:** Functional dependency, decomposition, problems arising out of bad database design, normalization, multi-valued dependency, Database design process, data base protection, database integrity.
- Assignment-2 Database concurrency:** Defintion and problems arising out of concurrency.
- **Database security:** Authentication, authorization, methods of implementing security.

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- **MS-ACCESS:** Introduction to MS-ACCESS, working with database and tables, queries in Access, Appling integrity constraints, Introduction to forms, sorting and filtering, Controls, Reports and Macro: creating reports, using Macros.

Mode of Assessment

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3	Attendance	20%

PGDCA-204 : Fundamentals of Computer Networks, Internet and Scripting Languages**Max Marks: 75****Maximum Time: 3 Hrs.****TILLMST-I**

- **Computer Networks:** Introduction, Applications, Network hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less), Network structure and architecture - point to point, multicast, broadcast, Classification of networks-LAN, MAN and WAN. Reference models - the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / IP models.

Assignment-1

- **Internet:** Introduction, Relays, Repeaters, Bridges, Routers, Gateways.
- **Internetworking:** How networks differ, concatenated virtual circuits, connectionless internetworking, tunnelling, internetwork Routing, fragmentation, Firewalls, internet architecture.
- **Application layer:** The DNS Name Space, Electronic Mail, The World Wide Web, FTP: introduction, data transfer and distributed computation, Generalised File Transfer, The File Transfer Protocol.

TILLMST-II

- **Network security:** Introduction to cryptography, substitution ciphers, transposition ciphers, one-time pads, two fundamental cryptographic principles.

Assignment-2

- **Scripting languages: HTML:** Introduction to HTML, HTML and the World Wide Web, HTML elements, basic structure elements of HTML, the two categories of body elements – block level and text level, creating HTML pages, viewing pages in different browsers, rule for nesting.

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- HTML tags, colours and fonts, formatting the body section, creating links, creating external links, creating internal links.

Mode of Assessment

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2	Written Assignments	40%
3	Attendance	20%