

**CENTRE FOR DEVELOPMENT OF IMAGING TECHNOLOGY
TECHNOLOGY EXTENSION DIVISION**

SYLLABUS

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS

Sem-I (PGDCA Sem-I)

Course Duration: 12 Months

Semester I-6 Months

Eligibility: Any Degree

SCHEME OF STUDY

PGDCA 101	<u>Introduction to IT</u>
PGDCA 102	<u>Operating System</u>
PGDCA 103	<u>Computer Architecture</u>
PGDCA 104	<u>Object Oriented Programming Using C++</u>
PGDCA 105	Lab I- C++ Programming
PGDCA 106	Lab II-Web Technologies

PAPER I- INTRODUCTION TO IT

Module-I (10 Hrs)

Concepts of Information — Definition of information and examples of information — Difference between data and information with illustration — Features of information — Categories of information — Level of information

Data Concepts — Examples of data, data types — Logical concepts of data: entities, attribute and relationships — Physical concepts: storage and retrieval, organization of data as files

Elements of electronic data processing — Overview of transaction processing — Processing methodologies, Batch, On-Line and Real time processing

Scientific and Business applications — Office automation — Invoicing Transaction processing— Back office systems — Financial Accounting — Payroll — Geographical Information System (GIS) – features and application — Data ware housing and Data marts – features and application

New developments in Information Technology

Multimedia Applications — Education — Entertainment — Edutainment — Information— Dissemination

Single user Network application concepts — Digital Libraries — Information kiosk — Web page — Video on Demand

Module-II (10 Hrs)

Internet — World Wide Web (www) - History, Working — Web Browsers, Its functions — Concept of Search Engines, Searching the Web — HTTP, URLs, Web Servers, Web Protocols.

Html - Concepts of Hypertext, Versions of HTML— Elements of HTML syntax, Head & Body Sections — Building HTML documents — Inserting texts, Images, Hyperlinks, Backgrounds and Color controls, Different HTML tags, Table layout and presentation, Use of font size & Attributes, List types and its tags, Use of Frames and Forms in web pages.

JavaScript — Introduction — Embedding JavaScript into an HTML Document — Variables — Literals — Arrays — Operators — Using JavaScript Objects — Functions — If/Then Statements — Loops — Commenting.

Overview of Macromedia Dream Weaver

Module-III (10 Hrs)

PHP for Beginners

PHP — Introduction — The Basics — Basic Syntax — Code Syntax -Your First Script — Error Messages — Statements — Variables-HTML Forms and PHP — Get versus Post

Arrays — Associative Arrays — Operators: If, Else, Elseif Loops— Comparison and Logical Operators : Comparison Operators, Logical Operators and Arithmetic Operators.

Loops — Functions.

CASE STUDY : Apache Web Server

Module-IV (10 Hrs)

XML

Introduction — XML Format and Structure — XML Elements — XML Attributes — XML Syntax 1 — XML Syntax 2-XML Naming Rules and Practices

XML Using CDATA for Dealing with HTML Tags — Displaying XML into HTML — XML Parser —

XML DOM — XMLHttpRequestObject1 — XMLHttpRequestObject2 —

XMLHttpRequestObject3 — Create an XML File From a Database1 — Create an XML File From a Database2 — Save XML File on Server.

Module-V (10 Hrs)

E-Commerce and Security

Distinguish between B₂B and B₂C—On-line Network and Services—E-Commerce with WWW — E-Commerce in Service Industries — On-Line travel Services — The Electronic Job market — The Electronic real estimate market — On-Line Stock trading — Electronic auctions —On-Line publishing Approach to Safe E-Commerce – Overview —Secure Transport protocols — SHTTP — SSL— Secure Electronic Transaction (SET)

Electronic Cash Electronic payment Schemes — Payment Processing principles— Electronic Fund Transfer (EFT) —Master Card/Visa secure Electronic Transaction

Reasons for Information Security — Attacks, Threats and Trust.

Concepts of Security — Basic Cryptography — Encryption and Decryption — Data Encryption Standards — Authentication Applications — Electronic Mail Security — Digital Signature and Authentication Protocols — Digital Certificates and Certification Authority — Digital Envelops.

Reference Texts:

1. PHP for the WorldWideWeb — Larry Ullman — Peachpit Press
2. JavaScript — Rohit Khurana — A.P.H.Publishing Corporation
3. Fundamentals of Information Technology — Alexis Leon — Vikas Publications
4. Internet for Everyone — Alexis Leon and Mathews Leon — Vikas Publishing House Pvt.Ltd., New Delhi
5. O Level Module — M 1.2 — Internet and Web Page Designing — V.K.Jain—BPB Publications.
6. XML Pocket Reference (2nd Edition) — Robert Eckstein —O' Reilly
7. Pro PHP XML and Web Services —Robert Richards.

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PAPER II - OPERATING SYSTEM

Module-1 (10 Hrs)

Introduction to Operating Systems — Basic concepts — terminology Historical perspective — early system — simple monitor — performance — Types of OS - batch processing — multiprogramming — time sharing — real time system

Protection — different classes of computers functions and components of an operating system — OS structure — Multiprocessor system — Distributed system—

Operating system services.

Information management : File concepts. — File support — file system — Directory structure — Gaining access to files — basic file system calls — Sharing and security — Operation on files — File protection — Allocation methods — implementation issues — case study.

Module- II (10 Hrs)

Threads — Introduction to threads — Benefits of threads — User and Kernel threads — Multithreading Modules.

Concurrent process — precedence graph — hierarchy of process — The Critical- Section problem — Semaphores — process coordination — determinant program — Modularization

Synchronization — concurrent languages — Structured and Modular concurrent programming.

Deadlocks — Introduction to Deadlocks — Deadlock characterization — Methods for Handling Deadlocks — Deadlock Prevention — Deadlock Avoidance — Deadlock Detection — Recovery from Deadlock — Two phase Locking.

Module- III (10 Hrs)

Memory management : Preliminaries — Memory architecture evolution — Bare machine — objectives — Resident monitor Swapping — fixed partitions — variable partitions — Paging — segmentation — combined system — Virtual memory concepts — overlay — demand paging — page replacement — Space allocation policies — segmented paging dynamic linking — caching of secondary storage information.

Module- IV (10 Hrs)

Distributed Systems — Introduction to Distributed Systems — Design Issues — Sockets — Remote Procedure Calls — Remote Method Invocation — Object Registration — Event Ordering — Synchronization — Mutual Exclusion — Deadlock Handling — Election Algorithms.

Protection — Goals of Protection — Domain of Protection — Access Matrix — Revocation of Access Rights — Language-Based Protection.

Security — The Security Problem — Authentication — Program Threats — System Threats — Threat Monitoring — Encryption — Computer-Security Classifications.

Module-V (10 Hrs)

Device Management — Physical characteristics — FCFS— SST — C-SCAN selecting a disk scheduling algorithm — sector queuing — I/O scheduling policies — terminal I/O handling — channels and control units — virtual devices.

Case Study : Typical Operating System Characteristics WINDOWS 2000 — UNIX and LINUX.

Reference Texts:-

1. Operating System Concepts — SilberSchatz, Galvin,Gange(6th Edition)
2. Operating Systems — A.S Tanenbaum

PAPER III - COMPUTER ARCHITECTURE

Module – I (10 Hrs)

Computer abstraction and technology: basic principles, hardware components, Measuring performance: evaluating, comparing and summarizing performance.

Machine Instructions and Programs

Numbers , Arithmetic Operations and Characters — Memory Locations and Addresses — Memory Operations — Instructions and Instruction Sequencing — Addressing Modes — Assembly language — Assembler Directives — Assembly and execution of programs — Basic Input / Output Operations — Stacks and Queues — Subroutines.

Module – II (10 Hrs)

Input / Output Organization

Accessing I/O devices — Interrupts — Interrupt Hardware — Enabling and Disabling Interrupts — Handling Multiple Devices — Controlling Device Requests — Exceptions — Use of Interrupts in Operating — Direct Memory Access — Bus Arbitration — Buses — Synchronous Bus — Asynchronous Bus — Interface Circuits — Parallel Port — serial port — standard I/O Interfaces (PCI)Bus — SCSI Bus — USB.

Memory Organization

Basic Concepts — Semiconductor RAM memories — Read-Only Memories — ROM,PROM,EPROM,EEPROM,Flash Memory — Speed,Size and cost — Cache Memories — Performance Consideration — Interleaving , Hit Rate and Miss Penalty,Caches on the Processor Chip, Other Enhancements ,—Virtual Memory—Address Translation—Memory Management — Requirements — Secondary Storage — Magnetic Hard Disks—Optical Disks and Magnetic Tape Systems.

Module – III (10 Hrs)

Arithmetic

Addition and Subtraction of Signed Numbers — Addition / Subtraction — Logic Unit — Design of Fast Adders — Carry-Lookahead Addition — Multiplication of Positive Numbers — Signed — Operand Multiplication, Booth Algorithm — Fast Multiplication — Bit-Pair recording of Multipliers — Carry-save addition of Summands — Integer Division — Floating –Point Numbers and operations.

Basic Processing Unit

Fundamental Concepts — Register Transfers — Performing an arithmetic or Logic Operation — Fetching a Word from Memory— storing a Word in Memory — Execution of a Complete Instruction — Branch Instructions — Multiple-Bus Organization— hardwired Control— Microprogrammed Control— Microinstructions—Microprogram Sequencing —Wide-Branch Addressing — Microinstructions with Next-Address field — Prefetching Microinstructions.

Module – IV (10 Hrs)

Parallel Organization

Basic Concepts — Evolution of a Computer Processor Family — Types of Parallel processors — Processor Design — Performance considerations — Pipeline Processors — Introduction — Pipeline Structures — Vector Supercomputers.

Multiprocessors

Introduction — Multiprocessor Architecture — Functional Structures, interconnection networks — Parallel memory Organization — Multiprocessor Operating System — interprocess communication mechanisms — system — interprocess deadlock and protection, scheduling strategies, parallel algorithms — Control flow versus data flow computers — fault-tolerant computers.

Module – V (10 Hrs)

Computer System Hardware

Auxiliary Storage Devices :Storage and retrieval methods of Floppy disk — Hard Disk — CD Rom — DVD Rom

Mother boards and Buses — what is mother board — Mother board components —

Memory slots — Chipset — What is chipset — Types of chipset — Expansion Slots

Addon Cards — Purpose, types and Specifications — Display cards — Multi I/O cards — Sound cards — Network interfacing cards

I/O Drives — Functions, uses, types, specifications — Floppy drive — Hard Disk drive — CD Rom drive — DVD drive

Serial parallel and USB ports — SMPS — Features, voltage levels

Reference

www.iiitmk.ac.in/wiki

Reference Texts:-

1. Computer Architecture and Organization – H.P. Hayes, Mc Graw Hill.
2. Computer Organization – V. Carl Hamacher, S. Venko G. Vranesic and Safwat G. Zaky, Mc Graw Hill Publishing Company.
3. Computer Organization and Design – Pal Chaudhuri, Prentice hall of India Pvt. Ltd.
4. Parallel computers – Architecture and Programming — V Rajaraman , C Sivarama Moorthy - Prentice hall of India.

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PAPER IV - OBJECT ORIENTED PROGRAMMING USING C++

Module-I (10 Hrs)

Introduction to object oriented programming — Object Oriented Programming-philosophy — Object oriented approach — General features and advantages of OOP
Object Basis — Objects creation — Objects are grouped in classes — Attributes, Object state and properties — Object behavior and methods — Encapsulation and Information Hiding
Class hierarchy — Inheritance — Multiple inheritance
Polymorphism — Concepts of Polymorphism.

Module-II (10 Hrs)

Basic C++ Programming constructs — Variables — constants — Expressions — Statements — cin and cout — manipulators — type conversion — arithmetic conversion — arithmetic operators — library functions — control structure — storage classes
Objects and classes specifying classes — C++ objects — Constructors — Destructors — Objects as Function arguments — Overloaded constructors — Structures versus classes — Objects and memory — Static class data
Arrays in C++ — Arrays and class member data — Arrays of objects
Strings — String as class member and user defined string type — Operators overloading — Unary operators — Keywords — Return values — Nameless temporary objects — Binary operators — Arithmetic operators — Operators Multiple overloading — Data conversion between basic data types, objects.

Module-III (10 Hrs)

Introduction of class derivation — The Derived class — Derived and base classes — Derived class constructors — Overriding member functions — Class hierarchies — Public and private inheritance — Multiple inheritance — Classes within classes — C++ graphics functions.

Module-IV (10 Hrs)

Address and pointers — & Operator — Pointer Variables — Pointer to void-pointers and arrays — Pointers and functions — Passing simple variables — Passing arrays — Pointers to strings — Memory management — New and delete operators — Pointers to objects referring to members — Arrays of pointers to objects — Printers to pointers
Virtual functions — Late binding — Pure virtual functions — Abstract classes and virtual base class
Friend function — Friend classes — Copy constructor

Module-V (10 Hrs)

Files and streams — Streams — Stream class hierarchy — Stream class — Header files — String I/O — Character I/O — Object I/O — Fstream class — File pointers — Disk I/O with member functions — Redirection — Command line arguments — Overloading the extraction and insertion operators — Class library — Creating class library files — Container class — Container class hierarchy — Function Templates — Class Templates

Text:

1. Object-Oriented Programming in Turbo C++ — Robert Lafore

Reference Texts:

1. Programming with C++ — Schaum's Series — John Hubbard — TMH.
2. C++ Programming — 2nd Edition — Herbert Schildts — Dreamtech.