Syllabus for One Year Post Graduate Diploma in Information Technology .
First Semester Course Structure

Paper Code	Name of the Paper	Periods			Evaluation Scheme		Full Marks
		L	T	P	Sessional	End Sem. Exam.	
PGD - 101	Programming and Problem Solving	4	1	0	MM:25 QM:07	MM:75 QM:23	100
PGD - 102	Data Structure	4	1	0	MM:25 QM:07	MM:75 QM:23	100
PGD - 103	Digital Logic	4	1	0	MM:25 QM:07	MM:75 QM:23	100
PGD - 104	Information Technology	4	1	0	MM:25 QM:07	MM:75 QM:23	100
PGD - 105 (a)	IT Lab - I Programming and Problem Solving	0	0	4	12	MM:37 QM:13	50
PGD - 105(b)	Data Structure	0	0	4	12	MM:37 QM:13	50

Second Semester Course Structure

Paper Code	Name of the Paper	Periods			Evaluation Scheme		Full Marks
		L	T	P	Sessional	End Sem. Exam.	
PGD - 201	System Analysis and Design	4	1	0	MM:25 QM:10	MM:75 QM:30	100
PGD - 202	Web Technology	4	1	0	MM:25 QM:10	MM:75 QM:30	100
PGD - 203	Elective	4	1	0	MM:25 QM:10	MM:75 QM:30	100
PGD - 204	Object Oriented Programming	4	1	0	MM:25 QM:10	MM:75 QM:30	100
PGD - 205(a)	IT Lab - II Object oriented Programming	0	0	4	12	MM:37 QM:13	50
PGD - 205(b)	Project	0	0	4	12	MM:37 QM:13	50

Abbreviations
L- Lecture
T-Tutorial
P-Practical
C-Credit
MM- Maximum Marks
QM-Qualifying Marks

ELECTIVE

a. Database Management System
b. Software Engineering
c. Operating System

L T P
4 1 0

PGD 101 Programming and Problem Solving

Full marks: 100
Pass Marks: 40

Unit 1:-
Notion of an algorithm, tools for design and analysis of algorithms- Flow chart decision table, Pseudo code

Unit 2:-
Major hardware and software components of a digital computer; concept of machine language and high level Language,

Unit3:-
Expressions; data type; conditional statement, Iterative Statements; Array data type and use of arrays; character data type and text processing; functional and procedural abstraction.

Unit 4:-
Pointer Data type and simple applications of pointers. Example algorithms: string processing, root finding, Matrix operations, record processing, searching & sorting.

Unit 5:-
File Handling & Debugging.

Text Books:

1. Programming in C – E. Balaguruswamy, TMH Publication
2. Programming with C- Gottfried B, TMH Publication.
3. Let us C- Y Kanitkar, BPH Publication

Reference Book:

1. How to solve it by Computer- Drommy G, PHI (EEE), 1985
2. Karnigham and Ritchie: The programming Languages.

PGD 102: Data Structure

Full marks: 100
Pass Marks: 40

Unit 1:-
Basic concepts: Data Structures, Algorithms, Complexity of algorithm.

Unit 2:-
Basic data types, List, Stack, Queues. Trees: Definition & implementation ; Binary trees, Tree traversal, Postfix, Prefix notations.

Unit 3-
Sets: Implementation; Dictionary, hash table, Priority queues; Advanced set representation method- Binary search tree, AVL Tree, Balanced Tree.

Unit 4:-
Directed graph: Representation; Single source shortest path problem, all pair shortest path problem, Transitive Closure, Undirected Graph, Minimum Spanning tree.

Unit 5:-
Sorting Algorithm: Quick Sort, Heap sort, selection Sort, Binary Sort. Memory Management, Garbage Collection.

Text Books:

1. Data Structures & algorithm- Addison & Wesley.
2. Fundamentals of Algorithm-Horowitz & Sahni, Narosa Publishing House.
3. The Art of Computer programming-Knuth. D.Vol I & Vol II, Addison Wesley.

Reference Books:

1. Data structure through C- Y. Kanitkar, BPH Publication

PGD 103: Digital Logic

Full marks: 100
Pass Marks: 40

Unit 1:-
Representation of information: Number System: Binary, Octal, Hexadecimal; Positive & negative numbers; Fixed point & floating point quantities.

Unit 2:-
Arithmetic operations: Addition, Subtraction. Character Codes: ASCII and EBCDIC, Redundant coding for error detection and correction: Concept of hamming distance, Parity codes, Hamming Codes.

Unit 3-
Combinational Logic circuits: - AND, OR, NAND, NOR & NOT gates and tristate buffer; Implementation of Boolean functions using logic gates. Logic Design: Boolean Algebra, Boolean Variables and functions- Canonical & standard forms, Truth table & minimization of Boolean functions-Karnaugh map.

Unit 4:-
Combinational circuits: Multiplexer, Decoder; encoder, Simple arithmetic and logic gate.

Unit 5:-
Sequential Circuits- Flip flops, Shift registers and Counters- Synchronous and Asynchronous. Concept of bus and registrar transfer logic.

Text Books:

1. Digital Logic and Computer design- Mano M.M, PHI (EEE) Publication
2. An introduction to Digital Computer and design-Rajaraman, V Radhakrishnan
3. Computer System & architecture- Mano M.M, PHI (EEE) Publication.

Reference Books:

1. Computer organization- Hamacher, Vranesic, Zaky-McGraw Hill.

L T P
4 1 0

PGD 104: Foundation of Information Technology.

Full marks: 100
Pass Marks: 40

Unit 1:-
Information: Concept of information and information processing; Information gathering, storage, processing, retrieval, and dissemination; Evaluation of information processing. Elements of modern information processing system.

Unit 2:-
Hardware: Processor, input/ output devices, storage devices & media. Data communication equipment.
Software: System & Application.
L
Unit 3:-
Machine Language, Assembly Language, High level language, Low level language, Generation of Computer language, Operating System, Major function, Task function.
Unit 4:-
Data communication networks, Computer network LAN, MAN, WAN, Client Server Architecture, Network Structure, Communication service across network, Network Protocol(Telnet, HTTP,SOAP,POP), e-mail, internet, Communication device.
Unit 5:-
Integrity definition, Enduring integrity, Computer and communication security, Concept of security, Preventive measures and treatment

Text and Reference Books:

1. Rajaraman V, "Introduction to Computer"
2. Morris, "Computer organisation"
3. Kanter, " Managing Information System"
4. Hamacher, "Computer organisation"

PGD 105   IT Lab-I

L T P
0 0 4

a.   Programming and Problem Solving (in C)

➢ Writing an algorithm and drawing Flow chart of at least three programs;
➢ Writing programs for:
> computing Expressions; declaration of data type;
➢ Writing programs using:
> Conditional statement; Iterative Statements;
➢ Writing programs for:
> Declaration of Arrays and use of arrays: one and two dimensions; character
> data type and text processing;
➢ Writing programs:
> Declaration and use of functions
➢ Writing programs:
> Declaration and use of pointers
➢ Writing programs for:
> File Handling

L T P
0 0 4

b.   Data Structure (in C)

Write programs for declaration of data types and use of input-output statement:
Write programs for :
> ➢ List: Sequential; Linked
> ➢ Stack and Queues: Implementation, application
> ➢ Tree -   Binary, AVL, Balanced .
> ➢ Search –   Sequential, Binary, Hashing
> ➢ Sort -   Quick Sort, Heap sort, selection Sort, Binary Sort
> ➢ Graph: Breadth First Search, Depth First Search;
>   Implementation of Minimum Spanning tree.
>   Shortest path problem: Single source, all pair
>   Transitive Closure,

PGD 201- System Analysis and Design

Full marks: 100
Pass Marks: 40

Unit-1
Overview of systems analysis and design; Information systems concepts; Systems development life-cycle; Project selection, feasibility analysis, design, implementation, testing and evaluation.

Unit-2

Project selection: Sources of project requests, managing project - review and selection; preliminary investigation.
Feasibility Study: Technical and economical feasibility; cost and benefit analysis.

Unit-3
System requirement specification and analysis: Fact finding techniques; data flow diagrams; data dictionaries; process organization and interactions; Decision analysis-decision trees and tables.
Detailed design: Modularization, module specification; file design; systems development involving databases.

Unit-4
System control and quality assurance: Design objectives; Reliability and maintenance; Software design and documentation tools; Top-down and bottom-up and variants; Units and integration testing; Testing practices and plans; System controls; Audit trails.

Unit-5
System administration and training, conversion, and operation plans.
Hardware and software selection: Hardware acquisition - memory, processors, peripherals, benchmarking, vendor selection; Software selection- Operating system, languages; Performance and acceptance criteria.

Books/References:

1. Senn J.A., Analysis and Design of Information Systems, McGraw Hill.
2. Awad, E.M, Systems Analysis and Design, Irwin series.
3. Lucas, H.C, The Analysis, Design and Implementation of Information Systems, McGGraw Hill.

PGD 202- Web Technology

Unit-1
Basics Of Internet
Client/Server Computing: What is C/S Computing, Middleware, Fat client VS Fat Servers, N-tiered Software Architecture.

Unit-2
Markup Languages And Their Grammers: SGML, DTD Resouce ; HTML, CSS; XML, XSL, Query Languages for XML W3schools xml validator script
Web Browser: Browser Architecture, Configuration of Netscape and IE

Unit-3
Web Server Apache Architecture : Web Server Architecture, Server Features, Configuration of Apache and IIS .
Protocols: HTTP, FTP, SMTP, POP; JAVASCRIPT CGI PROGRAMMING JAVA

Unit-4
Overview of Java, JAVA Applet, JAVA Servlet;
ASP & JSP Search Engines; Web Database Connectivity;
CGI interface to Datatabase, JDBC interface to Database .

Unit-5
Web Security: S-HTTP, Fire Walls, Proxy Servers.
Distributed Object Models: CORBA, DCOM, EJB.

Books/References:
1. Shelly Powers et al., Dynamic Web Publishing , Techmedia, 1998.
2. Jamie Jaworski, Java 1.2 Unleashed , Techmedia, 1998.
3. Robert Niles et.al., CGI by Examples , Que, 1996.
4. Scot Johnson et.al., Using Active Server Pages , Que,, Information Technology.

PGD 203-a Database Management Systems

Unit-1
Overview:Concept of database, data independence, redundancy Control; Database architecture - ANSI model.

Unit-2

Modeling of real world situation: Entity-relationship model; Data models: Network, Hierarchical, Ralational.data model: DDL, DML: relational algebra and calculus; functional dependencies, normal forms, decomposition, integrity rules;

Unit-3

Query languages for relational systems: SQL, QBE, query optimization, embedded SQL.

Unit-4

Database transactions, concurrency control, recovery and security issues in databases. Brief treatment of: Client-server models, distributed databases,

Unit-5

Object-oriented databases, deductive databases, multimedia databases, active databases.

Books/References:

1. Silberschatz and Korth, Database system concepts, McGraw Hill.
2. Elmasri and Navathe, Fundamentals of database systems; Narosa Publishing Co.

PGD 203-b Software Engineering

Unit-1

Introduction to SE, Software Development Life-cycle: Requirements analysis, software design, coding, testing, maintenance, etc.

Unit-2

SE models: Waterfall model, prototyping, interactive enhancement, spiral model. Role of Management in software development. Role of metrics and measurement, SRS: Problem analysis, requirement specification, validation, metrics, monitoring and control.

Unit-3

System Design: Problem partitioning, abstraction, top-down and bottom-up design, Structured approach, Functional versus object-oriented approach, design specification, Coding: Top-down and bottom-up

Unit-4

Testing: Levels of testing functional testing, structural testing, test plane, test cases specification, reliability assessment.

Unit-5

Software Project Management: Cost estimation, Project scheduling, Staffing, Software configuration management, Quality assurance, Project Monitoring, Risk management, etc.

Text Books & References
1. Jalote, Pankaj "Integrated Approach to Software Engineering", Narosa, 1993.
2. Pressman, R. "Software Engineering A Practitioner's Approach", Fourth Edition, McGraw Hill 1997.
3. Rumbaugh, J. Blaha, M. Premeralani, W. Eddy F. and Lorensen, W. "Object- Oriented Modelling and Design", Prentice Hall of India, 1991, (Reprinted 1997)

PGD 203-c Operating System

Full marks: 100
Pass Marks: 40

Unit-1

Operating System objective and function. The Evaluation of Operating Systems. Batch, interactive, time-sharing and real time systems. Protection. System components, operating system service, System structure.

Unit-2

Concurrent Processes: Process concept, Principles of concurrency. The Producer/consumer problem, The critical section problem. Semaphores, Classical problems in concurrency, Inter processes Communication, Process generation, Process Scheduling.

Unit-3

CPU Scheduling: Scheduling concepts. Performance criteria. Scheduling algorithms. Multiprocessor scheduling, Dead locks: System model. Dead lock Prevention, avoidance and detection. Recovery from dead lock.

Unit-4

Memory Management: Base machine, Resident Monitor, Multi programming with fixed partitions. Multiprogramming with variable partitions. Multiple Base Registers. Paging, segmentation. Paged segmentation, Virtual Memory concept, Demand Paging, Performance, Page Replacement algorithms, Allocation of frames, Thrashing, cache memory Organisation impact on performance.

Unit-5

I/O management & Disk Scheduling: I/O Devices and the organisation of the I/O function. I/O Buffering, Disk I/O, Operating System Design issues.

File System: File concept- File organisation and Access mechanism. File Directories, File sharing. Implementation issues.

Text Books & References

1. Milenkovic M.. " Operating System: Concept & Design", McGraw Hill.
2. Tanenbaum. A.S. "Operating System Design & Implementation". Practice Hall NJ.
3. Stalling. William "Operating Systems", Maxwell McMillan International Editions, 1992.
4. Dietel, H.N. "An Introduction to Operating Systems", Addison Wesley.

PGD 204- Object Oriented Programming.

Full marks: 100
Pass Marks: 40

Unit-1
Part I : Object Oriented Programming
Structured Programming and Object Oriented Programming paradigms.

Unit-2
Key Concepts :
Data Abstraction : Class, object, constructors, destructors, memory allocations for objects, member functions, friend functions, templates.

Unit-3
Inheritance : Single & multiple inheritance, virtual base class.
Polymorphism : Compile time polymorphism : operator overloading, function overloading, static binding.
Run-time polymorphism : Virtual function, pure virtual function, abstract class, dynamic binding.

Unit-4
Exception handling.
Part - II Object Oriented Design
Object Oriented Design Approaches: Object Model, Dynamic Model, and Functional Model. (Objet Diagram, State Diagram, and DFD).

Unit-5
Phases of Object Oriented Development: Object Analysis, System Design, Object Design.

Books/References:

1. Herbert Schild : The Complete Reference to C++, Osborne McGrawHill.
1. Rambaugh et al. : Object Oriented Modeling and Design, PHI(EEE).
2. Grady Booch: Object Oriented Analysis and Design, Pearson Education.
3. Bjarne Stroustrup: The C++ Programming Language, Addison Wesley

PGD 205   IT Lab-II

a.   Object Oriented Programming (in C++)

L T P
0 0 4

➢ Writing an algorithm and drawing Flow chart of at least three programs;
➢ Writing programs for:
  computing Expressions; declaration of data type; Input-Output Statements
➢ Writing programs using:
  Class declarations and object
➢ Writing programs for:
  Implementation of Constructor, Destructor, Member function, Friend Function
➢ Writing programs:
  Implementation of Inheritance-single and multiple
➢ Writing programs:
  Polymorphism: Operator overloading, function overloading

L T P
0 0 4

b. PROJECT

To be allotted by the Guide