

INSTITUTE OF ADVANCED STUDIES IN
EDUCATION (DEEMED UNIVERSITY)
GANDHI VIDYA MANDIR
SARDARSHAHR

DETAILED SYLLABUS

FOR DISTANCE EDUCATION

**Post Graduate Diploma
(One Year Semester Scheme)**

Post Graduate Diploma in Computer Application
(PGDCA)

FIRST SEMESTER

COURSE TITLE	Paper Code	MARKS		
		THEORY	PRACTICAL	TOTAL
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	PGDCA-110	50	50	100
INTRODUCTION TO IT	PGDCA-120	50	50	100
COMPUTER PROGRAMMING USING C	PGDCA-130	50	50	100
DATA BASE MANAGEMENT SYSTEM	PGDCA- 140	50	50	100
LAB (PROGRAMMING IN C)	PGDCA- 150 P	00	100	100
LAB (DBMS)	PGDCA- 160 P	00	100	100

SECOND SEMESTER

COURSE TITLE	Paper Code	MARKS		
		THEORY	PRACTICAL	TOTAL
JAVA PROGRAMMING	PGDCA-210	50	50	100
OBJECT ORIENTED PROGRAMMING USING C++	PGDCA-220	50	50	100
DATA STRUCTURE	PGDCA-230	50	50	100
INTERNET & WEB TECHNOLOGY	PGDCA- 240	50	50	100
LAB (JAVA PROGRAMING)	PGDCA- 250 P	00	100	100
PROJECT	PGDCA- 260 P	00	100	100

Note:

Theory Paper : 30% Continuous Internal Assessment and 70% University examination.

Practical Paper : 30% Continuous Internal Assessment and 70% University examination

Continuous Internal Assessment:

- 1) Two or three tests out of which minimum two will be considered for Assessment
60% of Continuous Internal Assessment
- 2) Seminars/Assignments/Quizzes
30% of Continuous Internal Assessment
- 3) Attendance, class participation and behaviour
10% of Continuous Internal Assessment

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Sets and Elements, universal set and Empty set, subsets, Venn Diagrams, Set Operations, Algebra of sets, cartesian product, Relations, mappings, Countable and Uncountable sets, Domain and range, propositional logic, FOPL, Logical equivalences, Quantifiers.

SECTION B

Partially ordered sets, Extremal elements of partial ordered sets, least upper bound and greatest lower bound, Finite Boolean algebra, Functions on Boolean algebra, Lattices, Bounded lattices, Distributive lattices, complemented lattices.

SECTION C

Matrices, Matrix addition and scalar multiplication, Matrix multiplication, Transpose, Inverse, Determinants, Eigen values and Eigen vectors.

Permutations, Combinations, Pigeon hole principle, Elements of Probability, Conditional probability, Baye's Theorem.

SECTION D

Tree, Binary tree, traversals, Huffman's algorithm, Minimum spanning trees, Euler graph, Hamiltonian cycle, Cutsets, Matching, Coloring.

Reference:-

1. C.L.Licu "Elements of Discrete Mathematics", TMH
2. Lipschutz & Seymour "Discrete Mathematics"(2Th Edition), Schaum's outlines,.
3. Trembley Manohar " Discrete Mathematical Structures with Application to computer science" TMH.

Maximum Time : 3 Hrs.**University Examination : 70 Marks****Total Marks : 100****Continuous Internal Assessment : 30 Marks****Minimum Pass Marks : 40%****A) Instructions for paper-setter**

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Definition of Information Technology, Use of IT, Definition of information system, need of information system, definition of knowledge, Range of application : Scientific, business, educational, whether forecasting, and remote sensing, planning, e-commerce, web publishing, Management Information System, Decision Support System, inventory control, medical, industrial control, banks, railways, etc.

SECTION B

Computer Fundamentals: Block structure of computer, Characteristics of computers, Problem solving with computers, Generation of computers, Classification of computers.

Number System : Bit, Byte, Binary, Decimal, Hexadecimal, and Octal system, Conversion from one system to the other, Error detecting codes, Representation of characters, Integers and fractions.

Binary Arithmetic : Addition, Subtraction and Multiplication.

SECTION C

Input and Output units : Their functional characteristics, main memory , cache memory read only memory, overview of storage devices – floppy disk, hard disk, compact disk, tape.

SECTION D

Computer Networks and Communication : Network types, Network topologies, Network communication devices, Physical communication media, TCP/IP.

Internet and its Applications : E-mail, Telnet, FTP, WWW, Internet chatting.

Reference:-

1. D.H.Sanders, “Computers Today”, McGraw Hill, 1988.
2. T.N. Trainer, “Computers” (4th Edition) McGraw Hill, 1994.
3. Kenneth C.Laudon, Jane P. Laudon “Management Information System”(7th Edition),
4. V. Rajaraman, “Fundamentals of Computers” (2nd Edition), Prentice Hall of India, New Delhi, 1996.
5. B. Ram, “Computer Fundamentals”, Wiley, 1997.

Maximum Time : 3 Hrs.**University Examination : 70 Marks****Total Marks : 100****Continuous Internal Assessment : 30 Marks****Minimum Pass Marks : 40%****A) Instructions for paper-setter**

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Data types, constants, Variables, Arithmetic and logical expressions, Data input and output, Assignment statements, Conditional statements.

SECTION B

Iteration, Arrays, String processing, User-defined data types, functions, recursion, Parameter passing by reference & by value.

SECTION C

Structures, Multiple Structure, Array of Structure, Unions, Pointers, Character pointers, Pointers to arrays, Array of pointers, Pointers to structures.

SECTION D

File handling, Open & closing file Binary files, Structured programming concepts, Top down & Bottom-Up design approaches.

Reference:-

1. Rajarman V., “Fundamentals of Computers” (PHI, 1992)
2. D.Dromey “How to solve it by Computer”, Prentice-Hall, 1985
3. E. Balaguruswami “Programming in C” Tata McGraw Hill.
4. Kanetkar, “Let Us C” BPB Publications.

PGDCA-140

DATA BASE MANAGEMENT SYSTEM

Maximum Time : 3 Hrs.

University Examination : 70 Marks

Total Marks : 100

Continuous Internal Assessment : 30 Marks

Minimum Pass Marks : 40%

(A) Instructions for the Paper setter:

The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Database V/s File system, Architecture of DBMS(External, Conceptual, Internal), Data Independence (Logical Physical) DBA and his responsibility, DBMS structure (DDL Compiler, Data manager, File manager, Disk Manager, Query Processor).

SECTION B

Entity, Entity Set, Attributes Keys(Primary, Secondary, Candidate, Super, Alternate), Mapping cardinalities, N-array relationships, E-R- Diagram, Hierarchical Model ,Relational Model, Network Model, Object oriented Model, Mapping of E-R diagrams to tables.

SECTION C

Anomalies in Design, Functional Dependency, Logical implications, Closure of FD, Canonical Form, Full and Partial FD, Prime and Non-prime attributes, 1-NF, 2-NF, 3-NF, BCNF, Decompositions, lossless and Dependency preservice.

SECTION D

Integrity rules (Entity integrity, Referential Integrity) Union, Difference, Intersection, Cartesian product Division, Projection, Selection, Joins.

Type calculus, Type calculus Formula, Domain calculus, SQL, Basic data retrieval, Data manipulation, views.

Recovery techniques, check points, concurrency control, View & conflict serializability, Lock, based concurrency control, strict two phase locking, multiple granularity locking, Time stamp based concurrency control.

References:

1. Bipin C. Desai, "An Introduction to Database Systems", Galgotia Publications Nt. Ltd.
2. Elmasri Navathe, "Fundamental of Database Systems", Pearson Edition.
3. C.J. Date, "An Introduction to Database System"(7th Edition) Pearson Edition.

PGDCA-150 P SOFTWARE LAB (PROGRAMMING IN C)

Maximum Time	: 3 Hrs.	University Examination	: 70 Marks
Total Marks	: 100	Continuous Internal Assessment	: 30 Marks
Minimum Pass Marks	: 40%		

This laboratory course will mainly comprise of exercises on what is learnt under paper :
PGDCA-130 (Computer Programming using C).

PGDCA-160 P SOFTWARE LAB (DBMS)

Maximum Time	: 3 Hrs.	University Examination	: 70 Marks
Total Marks	: 100	Continuous Internal Assessment	: 30 Marks
Minimum Pass Marks	: 40%		

Programming in SQL.

SECOND SEMESTER

PGDCA-210

JAVA PROGRAMMING

Maximum Time	: 3 Hrs.	University Examination	: 70 Marks
Total Marks	: 100	Continuous Internal Assessment	: 30 Marks
Minimum Pass Marks	: 40%		

(A) Instructions for the Paper setter:

The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to Java: Features of Java, difference between Java and C++, data types, variables, arrays, operators-arithmetic, bitwise, relational, Boolean, various control statements.

SECTION B

Introduction to Classes: Class fundamentals, declaring objects, methods, constructors, garbage collection, passing parameters to methods, recursion, access control, static, final and finally method, Array One dimensional array, Two Dimensional array multidimensional, Function, Functions Overloading.

SECTION C

Inheritance, super class, multilevel inheritance, abstract methods and classes. Packages and interfaces, importing packages, exception handling. Exception types, try, catch, finally, throw and throws, creating exception subclasses. Multithread programming, thread priorities, synchronization, messaging, creating multiple threads, Inter thread communication.

SECTION D

Networking, socket overview, client/server, reserved sockets, proxy servers, Internet addressing, Java and the Net, TCP/IP client sockets. An introduction to AWT, GUI graphics, fonts, colours. Introduction to servlet, servlet lifecycle, JSP, JSP lifecycle.

References:

1. Patrick Naughton and Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill, 1999.
2. E. Balaguruswami, "Programming with Java"(2nd Edition), TMH.

Maximum Time : 3 Hrs.**University Examination : 70 Marks****Total Marks : 100****Continuous Internal Assessment : 30 Marks****Minimum Pass Marks : 40%****A) Instructions for paper-setter**

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

OOP paradigm, Advantages of OOP, Comparison between functional programming and OOP approach, characteristics of Object oriented Language objects, Class, Inheritance, Polymorphism, and abstraction, encapsulation, Dynamic Binding, Message passing. Introduction to C++, Identifier and keywords, constants, C++ Operators, Type conversion, variable declaration, Statement, expressions, User defined data types, Conditional expression (For, While, Do-while) loop statements, breaking control statements (Break, Continue)

SECTION B

Defining a function, types of functions, Inline functions, Call by value & Call by reference, Pre-processor, Header files and standard functions, Structures, Pointers and structures, Unions, Enumeration.

SECTION C

Classes, Member functions, Objects, Array of objects, Nested classes, Constructors, Copy constructors, Destructors, Inline member functions, Static class member, friend functions, Dynamic memory allocation. Inheritance, Single inheritance, Multi-level, Hierarchical, Virtual base class, Abstract classes, Constructors in Derived classes, Nesting of classes.

SECTION D

Function overloading, Operator overloading, Polymorphism, Early binding, Polymorphism with pointers, Virtual functions, Late binding, Pure virtual functions, Opening and closing files, Stream state member functions, Binary file operations, Structures and file operations, classes and file operations, Random access file processing.

Reference:-

1. D. Ravichandran, "Programming with C++", TMH, 1996.
2. Robert Lafore, "Object oriented programming in Turbo C++", Galgotia publications, 1994.
3. Bjarne strautrup, "The C++ Programming Language", Addison Welsly publication co. 1995.
4. Yashvant Kanetkar, "Let us C++", BPB.

Maximum Time : 3 Hrs.**University Examination : 70 Marks****Total Marks : 100****Continuous Internal Assessment : 30 Marks****Minimum Pass Marks : 40%****A) Instructions for paper-setter**

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Space and time complexity, Asymptotic notations ($\Omega, \theta, O, \omega, \circ$), Arrays :- One Dimension and two Dimensional Arrays (Storage in Row – major & column major order).

Queue Structures: Insertion, deletion, Priority Queue, D-Queue.

Stack:- Push, Pop operations, Polish notation, Algorithm for Infix to Postfix conversion, Evaluation of Postfix expression.

Link lists , singly link list, Doubly link list, advantage and disadvantage.

SECTION B

Tree basic concept, Tree representation by link list and by arrays, Binary tree, Binary search tree (Operations:- Insertion, Deletion, Traversals),Heap sort, AVL, B-tree.

SECTION C

Graph concepts, Adjacency list and adjacency matrix representation, DFS, BFS, Topological sorting, shortly connected components, Prims & Kruskal's algorithm, Dijkstra's algorithm, Warshall's algorithm.

SECTION D

Linear search, Binary search, Bubble sort, selection sort, Insertion sort, Quick sort, Heap sort, Merge sort, Bucket sort, Radix sort and their Comparison in terms of space & time complexity.

Reference:

1. Sartaj Sahni, "Data structures Algorithms and Applications in C++", TMH.

Maximum Time : 3 Hrs.**University Examination : 70 Marks****Total Marks : 100****Continuous Internal Assessment : 30 Marks****Minimum Pass Marks : 40%****(A) Instructions for the Paper setter:**

The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:

1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Definition of Internet, Internet organisation and committees, Internet, Growth of Internet, Internet- 3, Anatomy of Internet, Internet Application, Portals, Introduction about WWW, Definition of DNS (Domain Name System), IP Addressing.

SECTION B

Definition of Networks, Types of Network, Topologies, PSTN, PSDN, VAN, ISDN, PDNs, Wide Area Network, Introduction about search engines (Mozilla, Netscape, Opra) Email, Introduction about mail protocol (SMTP, MME), X.25, Frame relay, PPP, NNTP, SMTP, etc.

SECTION C

OSI Reference method, TCP/IP model, FTP, HHTP, HTTPS, Addressing in Internet (Class A,B,C,D,E) Definition of Ethernet, Intranet, Telnet, Wireless communication, Virtual Circuits, ISDN model, CSMA/CD, Explanation of all layers of OSI and TCP/IP model.

SECTION D

Introduction about HTML, Tag, Types of Tags, Forms, Tables, Images insertion in web page, Introduction about DMTL, CGI, Introduction about XML.

Reference:-

1. A.S. Tanenbaum, "Computer Networks"(3rd Edition), PHJ,1999
2. D.E.Comer, "Computer Networks and Internet"(2nd Edition), Addison wisely, 2000
3. D.Betsekas and R.Gallagar, "Data Networks"(2nd Edition), PHI, 1992
4. Frougan "Data Communications & Networks"(2nd Edition), TMH

PGDCA-250 P SOFTWARE LAB (JAVA PROGRAMING)

Maximum Time : 3 Hrs. University Examination : 70 Marks
Total Marks : 100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks : 40%

This laboratory course will mainly comprise of exercises on what is learnt under paper : PGDCA-210 (Java Programming).

PGDCA-260 P PROJECT

Maximum Time : 3 Hrs. University Examination : 70 Marks
Total Marks : 100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks : 40%

1. Students are supposed to spend 45-55 hours on the project. The internal teacher must monitor progress of the Project. Students can arrange the project at their own level, however, Institute can also assist in getting the project and can issue necessary letters etc.
2. The external examiner will distribute marks allocated for University examination for viva/project report and for any other activity, which the external examiner thinks to be proper.

Maximum Marks for Project Application	60%
Max marks for Viva	40%

3. Joint projects will be allowed and joint project reports will also be accepted. The students should highlight their contributions in a joint project report.
4. The students have to submit two copies of Project reports. The examiners will evaluate these reports on the spot at the time of examination and will conduct the viva.