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

DETAILED SYLLABUS

FOR DISTANCE EDUCATION

Post Graduate Diploma In Computer Science (One Year Semester Scheme)

Post Graduate Diploma in Computer Science
(PGDCS)

COURSE TITLE : POST GRADUATE DIPLOMA IN COMPUTER SCIENCE

DURATION : 1 YEAR (SEMESTER SYSTEM)

TOTAL MARKS : 1200

FIRST SEMESTER

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

SECOND SEMESTER

COURSE TITLE	PAPER CODE	MARKS		
		THEORY	PRACTICAL	TOTAL
SYSTEM SOFTWARE	PGDCS-210	50	50	100
INTERNET & WEB TECHNOLOGY	PGDCS-220	50	50	100
DATA STRUCTURE	PGDCS-230	50	50	100
OPERATING SYSTEM	PGDCS- 240	50	50	100
LAB (WEB TECHNOLOGY)	PGDCS- 250 P	00	100	100
PROJECT	PGDCS- 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 behavior
10% of Continuous Internal Assessment

PGDCS- 110 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Maximum Time : 3 Hrs. **University Examination : 35 Marks**
Total Marks : 50 **Continuous Internal Assessment : 15 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, prepositional 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"(2nd Edition), Schaum's outlines.
3. Trembley Manohar " Discrete Mathematical Structures with Application to computer science" TMH.

PGDCS-120 INTRODUCTION TO INFORMATION TECHNOLOGY

Maximum Time : 3 Hrs. **University Examination : 35 Marks**
Total Marks : 50 **Continuous Internal Assessment : 15 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, weather 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.

PGDCS-130 COMPUTER PROGRTAMMING USING "C"

Maximum Time : 3 Hrs. University Examination : 35 Marks
Total Marks : 50 Continuous Internal Assessment : 15 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.

PGDCS-140 DATA BASE MANAGEMENT SYSTEM

Maximum Time : 3 Hrs. **University Examination : 35 Marks**
Total Marks : 50 **Continuous Internal Assessment : 15 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 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 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 preservance.

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 Introducation to Database Systems”, Galgotia Publications Nt. Ltd.
2. Elmasri Navathe, “Fundemental of Database Systems”, Pearson Edition.
3. C.J. Date, “An Introduction to Database System”(7^{th} Edition) Pearson Edition.

PGDCS-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 : PGDCS-130 (Computer Programming using C).

PGDCS-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

PGDCS-210 SYSTEM SOFTWARE

Maximum Time : 3 Hrs. **University Examination : 35 Marks**
Total Marks : 50 **Continuous Internal Assessment : 15 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 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 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
Language Processor
Introduction, Language Processing activities, Fundamentals of Language processing fundamentals of language specification.
Data structure for language processing, Search Data Structure of assembler, design of two pass assembler.

SECTION B
Scanning, Parsing, Assembler, Elements of Assembly language programming a simple assembly scheme, pass structure of assembler, design of two pass assembler.

SECTION C
Macro definition and cell, macro expansion, method macro cell, compiler and interpreters aspects of compilation, Memory allocation, completion of Extensions, Compilation of control structures.

SECTION D
Linkers :- Relocation and linking concepts, Design of Linker, Self Relocation program.
Software Tool :- Software Tool for program development, Editors, Debug, Monitors.

References:

1. D. M. Dhamdhere, “System Programming and operating system”(2nd Edition), TMH.
2. Donovan, “System Programming”, TMH 1991
3. Aho and ullman, “Principal of compliers”, Naroja Publishing House.

PGDCS- 220 INTERNET & WEB TECHNOLOGY

Maximum Time : 3 Hrs. **University Examination : 35 Marks**
Total Marks : 50 **Continuous Internal Assessment : 15 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, 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 (Mozila, 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, HTTP, 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 DHTML, 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

PGDCS-230 **DATA STRUCTURES**

Maximum Time : 3 Hrs. **University Examination : 35 Marks**
Total Marks : 50 **Continuous Internal Assessment : 15 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 (Ω,θ, O, ω,○),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, Dijkastra'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.

PGDCS-240 OPERATING SYSTEM

Maximum Time : 3 Hrs. University Examination : 35 Marks
Total Marks : 50 Continuous Internal Assessment : 15 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 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 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
DISK OPERATING SYSTEMS (DOS)
Introduction, History & versions of DOS,DOS basics- Physical structure of disk, drive name, FAT, file &directory structure and naming rules, booting process, DOS System files.
DOS commands: Internal - DIR, MD, CD, RD, COPY, DEL, REN,VOL, DATE, TIME, CLS, PATH, TYPE etc. External - CHKDSK, XCOPY, PRINT, DISKCOPY, DISKCOMP,DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT,
FDISK, BACKUP, EDIT, MODE, ATTRIB, HELP, SYS etc Executable V/s Non executable files in DOS.

SECTION B
WINDOWS XP
Introduction to Windows XP and its features , Hardware requirements of Windows. Windows concepts, Windows Structure, Desktop, Taskbar, Start Menu, My Pictures ,My Music, working with recycle bin-restoring a deleted file, emptying the recycle bin. Managing files ,folders and disk-navigating between folders.

SECTION C
Files and folders , creating new folder, searching files and folders .My computer-exploring hard disk, copying and moving files and folder from one drive to another, formatting floppy drive.
Windows Accessories - Calculator, Notepad, Paint, Word Pad, Character map, paint, command prompt, Windows Explorer - -exploring hard disk ,coping and moving files and folder from one drive to another, formatting floppy drive and other Explorer facilities. Burning CD, Entertainment- CD player, DVD Player, Media Player, Sound Recorder, Volume Control, movie maker.

SECTION D
LINUX History & Features of Linux, Linux Structure, File system of Linux, Hardware requirements of Linux, Various flavours of Linux, Program & Process, Process creation and process identifiers, Functions of profile and login files in Linux, Linux kernel, Login and logout from Linux system, Linux commands - bc, cal, cat, cd, chgrp, chmod, chown, clear, cmp, copy, date, find, ps, kill, ls, mail, mkdir, more, mv, rm, rmdir, tty,wc, who, whois, grep, write, telnet .Pipeline concepts, Using floppy and cdrom in linux.,vi editor

Reference :

1. Rajeev Mathur, “DOS Quick reference”, Galgotia Publications.
2. Peter Norton, “Peter Norton Complete Guide to Linux”, Techmedia Publications.
3. “Windows XP Complete Reference”, BPB Publications.

PGDCS-250 P SOFTWARE LAB (WEB TECHNOLOGY)

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 : PGDCS-220 (Internet & Web Technology).

PGDCS-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.