Courses of Studies for the

P. G. Diploma in Computer Application Examination

(To be Effective from the academic session 2012-13)

Course Structure

First Semester – First August to 31st January.

Second Semester – First February to 31st July.

COURSE STRUCTURE

(Semester-1)

Unit	Course Title	Marks
101	Programming in 'C'	100
102	System Analysis & Design	100
103	Operating System	100
104	Computer Organisation and Architecture	050
105	Basic Mathematics	050
106	Practical	100
	Total	500

(Semester-11)

Unit	Course Title	Marks
201	OOPS With C++	100
202	Database Management System	100
203	Computer Networking & Internet	100
204	Practical	100
205	Project	100
	Total	500

Grand Total-- 1000

Paper-101: Programming in C

Unit I:

Introduction to programming and programming languages:

Evolution of programming language, flowcharts, structured programming, the compilation process, objects code, source code, executable code, operating systems, interpreter, linkers, loaders etc.

Unit II: C language fundamental:

Character set, identifiers, keywords, data types, constants and variables, statements, expressions, operators, precedence of operators, input-output, assignments, Control structures, Decision making and Branching, Decision making and looping, array and function: One dimensional and multidimensional arrays and their applications, declaration, manipulation & string –handling functions.

Unit III: C functions and Pointer:

Monolithic vs. modular programs, user defined vs standard functions, formal vs. actual arguments, functions category, function prototypes, parameter passing, recursion, storage classes: auto, extern, global, static. Pointers variable and its importance, pointer arithmetic, passing parameters by reference

Unit IV: Structure, Union

Declaration of structures, pointers to pointers, pointers to structure, pointer to function, unions.

Text Book:

1. Y. Kanetkar, "Let us C", BPB Publications.

Reference Books:

1. E. Balaguru Swamy "Programming in C", Tata McGraw Hill
2. H. Schildt, "C the Complete Reference", Tata McGraw Hill

Paper-102 System Analysis &Design

Unit-I
Overview of System Analysis & Design:

Business system concept, System development life cycle, project selection, feasibility, design, implementation, testing and evaluation.

Project Selection: Sources of project requests, managing project review and selection, preliminary investigation.

Unit-II
Feasibility Study:

Technical and economical feasibility, cost and benefit analysis. System requirement Specification and Analysis: Fact finding techniques, data flow diagram, data dictionaries, decision analysis, decision trees and tables.

Unit-III

Detail design:

Modularization, module specification, file design ,system development involving data bases. Quality Assurance: Design objectives, reability and maintenance, software design and documentation tools, Unit and integration testing, testing practices and plans.

Unit-IV

System administration and training, Conversion and Operation plans: Hardware & Software Selection: Hardware acquisition, Memory processor, Peripherals, Benchmarking Vendor selection, Software selection.

Text Book:
1. James A. Senn: Analysis & Design of Information. System, Mc, Graw Hill 1986

Reference Books:
1. Richard D : Systems Analysis & Design, Irwin Inc, 1979

103- Operating System

80+20 marks

Unit-I

Overview of operating System, Operating System's objectives & Functions, The Evolution of Operating Systems, Types of Operating System: Mainframe Systems, Desktop Systems, Multiprocessor System , Distributed Systems, Clustered Systems, Real-Time Systems. O/S Structure : System Components, Operating-System Services, System Calls. Process Management: process Concept and Process Scheduling.

Unit-II

CPU Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithm (FCFS, SJF, Priority, Round-Robin). Dead locks : System Model, Dead Lock Characterization, Methods of Handling Dead Locks, Dead Lock Prevention Recovery from Deadlock.

Unit-III

Memory Management: Background (Address binding, Logical Versus Physical Address Space). Swapping, Contiguous memory Allocation, Paging (Basic Method, Hardware Support, protection), Segmentation. Virtual memory: Background, Demand Paging. Page Replacement (Basic Scheme, FIFO page Replacement, Optimal Page Replacement, LRU Page Replacement).

Unit-IV

File System: Access Methods, File – System Implementation : File-System Structure, Allocation methods, Free-Space Management. Mass Storage Structure: Disk Structure, Disk Scheduling.

Text Book

1. Operating System Concepts-Silberschatz Galvin Gagne

Reference Book

1. Operating System (A Practical Approach) By Er. Rajiv Chopra

Paper-104   COMPUTER ORGANISATION AND ARCHITECTURE

Full Marks – 50 (40+10)   Duration :2hours

Unit-I   Introduction to Computer Organization:

Over view of Computer Hardware, Sum of product and product of sum from Karnaugh Maps, Logic gates & Logic diagrams and Truth Tables, Combinational Logic Citcuits (Half Adder, Full Adder, Subtractor) Preliminary idea or encoder, decoder and Multiplexer, Basic Ideas on Flip-Flop; R-S and J-K only.

Unit-II   Introduction to Computer Architecture:

Fundamentals on Registers and Counters (Block diagram representation only). Memory organization: Memory hierarchy, Types of Memory (Main Memory, Auxilliary and Cache memory), CPU Organization (ALU, Control Unit, General Purpose Register only Block diagram and descriptions).

Text Books:

1. **M. Morris Mano:** Computer System Architecture, PHI.
2. **B.Ram:** Computer Fundamentals: Architecture and Organization, New Age International Ltd.

Reference Books:

1. **J.P. Hayes:** Computer Architecture and Organization, McGraw Hill.
2. **V. Carl Hamcher, Zvonko G. Varnesic, Safway G. Zaky:** Computer Organisation, McGraw Hill.

Paper-105   BASIC MATHEMATICS

Full Marks – 50 ($0+10)   Duration :2 hours

Unit-I

A. Introduction to Set Theory:

Basic Ideas on sets, Representation of Sets, Finite & Infinite Sets, Cardinal number of a Set, Equivalent Sets, Subset Empty Set, Disjoint Set, Universal Set, Set Operations: Union, Intersection, Difference and Complement of a Set.

B. Introduction to Number System and Binary:

Arithmatic: Binary, Octal, Decimal and Hexadecimal conversion from one no system to another number system. Addition, Subtraction and simple multiplication of binary no. systems, Signed Binary numbers, r's complement of Binary number system.

Unit-II   Introduction to Matrix Determinants:

Definition of Matrix, Types of Matrices, Operation on Matrices (Addition, Sbutraction & Multiplication) Transpose of a Matrix, Matrix Inversion, Determinants upto 3rd Order, Expansion of Determinants, Minors and Cofactors, Cramer's Rule).

Text Books:

1. **Premchand Roy & Dr. Trilochan Biswal:** A Text Book of +2 Mathematics, Vol.-I, Nalanda Publication.

Paper-106   **Laboratory-1**   **100 marks**

Practical on

. Paper 101

. Some Preliminary Concept of word , Excel & Power Point.

NB: (Each Theory Paper will carry 80 marks semester Exam and 20 marks Internal Exam)

<u>Semester-II</u>

Paper- 201 OOPS With C++

80+20 marks

Unit 1:
Principles of Object-Oriented Programming
Beginning With C++.
Tokens, Expressions and Control Structures

Unit II:
Functions in C++
Classes and Objects
Constructors and Destructors.
Operator Overloading and Type Conversions

Unit III:
Inheritance: Extending Classes.
Pointers, Virtual Functions and Polymorphism.

Unit 1V:
Working with Files.
Exception Handling.

Text Book:
Object –Oriented Programming with C++-E Balagurusamy.

Reference Book:
Object –Oriented Programming with ANSI &TURBO C++-Ashok N. Kamthane.

Paper-202   Database Management System

80+20 marks

Unit-I
Overview of database Management:-

Data, information and knowledge, Increasing use of data as a corporate resource, Data processing Vs. data management, File oriented approach Vs. data base management approach, Data base administrator roles, Different kinds of DBMS users, Types of data base language.(DDL.DML), D B M S architecture.

Unit-II Traditional Data Model:

  3 level architecture and the place of logical data models in this architecture, A brief overview of the 3 traditional models (Network, Hierarchical, Relational), Data definition and data manipulation constructs in each of the three models with example, A comparison of the 3 models.

Unit-III Relational Model:

Definition of relation, Properties of relational model (Codds 12 rule). Concept of keys: candidate key, Primary key, alternate key, foreign key. Fundamental integrity rules: Entity integrity, referential integrity.

Relational Algebra:- Select, Project, cross product, different types of joins (equi join, natural join, outer join) set operation, tuple relational calculus, simple and complex queries using relational algebra.

Unit-IV Database design:

Entity relationship model as a tool for conceptual design, entity attributes relation ship, ER diagram, strong & weak entities, generalisation, specialisation & aggregation, Normalisation concept in logical (Relational model, Update anomalies, normal forms (1NF,2NF,3NF). S Q L concepts (select----- from------where------group by------having------order by---) insert, delete, and update table, nested queries

Text Book:

1. Database System Concepts By: Abrham Silberschatz, H.F.Korth, S.Sudarshan.

Reference Book:-

1. SQL, PL/SQL By Ivan Byross
2. Introduction to Database Management System By Atul Kahate.

Paper-203 Computer Networking & Internet
80+20 marks

Unit –I Computer Network

Introduction:

Computer Network: Data Communication, Network, protocols, The OSI reference model, connection oriented and connection less Services.

The Physical Layer:

Data & Signal: Preliminary concept of analog and digital signals, Transmission impairments, transmission mode, Transmission media(Guided). Preliminary concept of Analog and Digital Transmission and analog to digital conversion.

Analog Transmission: Analog to analog conversion (Amplitude modulation & Frequency modulation) Multiplexing: FDM & TDM. (Preliminary concept)

Switching: Circuit switching vs Packet switching.

Unit-II

The Data Link Layer :

Error detection and correction (parity, LRC, CRC, VRC, check sum, Hamming code).Modem (Preliminary concept), LAN, WAN, MAN, Framing, Flow and Error control protocols (Simplest protocol, Stop and wait protocol, Stop and wait Automatic Repeat Request).

Multiple Access: Random Access (CSMA,CSMA/CD, CSMA/CA),controlled

Access (Reservation, Polling, Token passing)

Unit-III

The Net-Work Layer:

Internetworking: Need for network layer

Idea about hub, repeater, Bridge, Gateway.

IPV4 Addressing: Classful address.

Routing: Routing algorithm (Distance vector and link state Routing)

Transport Layer: TCP, UDP protocols.

Unit-IV

Application Layer protocols: FTP, Telnet, WWW, http, DNS (preliminary idea).
Internet:-
Introduction, Uses, E-mail (SMTP, MIME).

Text Books:-
1. Data Communication & Networking by Behrouz A. Forouzan, 4th Edn, Tata Mc. GrawHill.

Reference Books:-
1. Computer Networking A Top Down Approach Featuring the Internet by James F. Kurose and Keith W. Ross.

2. Computer Network and Internet By Douglas E. Comer.

3. Computer Network: A.S. Tanenbaum, PHI.

Paper-204   Laboratory-II   100 marks

Practical on Paper-201 & 202

Paper-205   Project   100 marks

NB: (Each Theory Paper will carry 80 marks semester Exam and 20 marks Internal Exam)