Out line of PGDCA. Course (1 year)- two semester and scheme of examination. (Effective from 2002 onwards)

**SEMESTER –I**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper</th>
<th>Max. Marks</th>
<th>Internal Assess.</th>
<th>Exams. Duration (Hrs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCS-101</td>
<td>Fundamentals of Programming Using C</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-102</td>
<td>PC Software</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-103</td>
<td>Operating system</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-104</td>
<td>Computer Organization and Architecture</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-105</td>
<td>Practical-I (C Language)</td>
<td>50</td>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td>DCS-106</td>
<td>Practical-I (PC Software)</td>
<td>50</td>
<td>50</td>
<td>3</td>
</tr>
</tbody>
</table>

**SEMESTER –II**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Paper</th>
<th>Max. Marks</th>
<th>Internal Assess.</th>
<th>Exams. Duration (Hrs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCS-201</td>
<td>Data and File Structure</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-202</td>
<td>System Analysis and Design</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-203</td>
<td>Object Oriented Programming &amp; C ++</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-204</td>
<td>Data base Management system</td>
<td>75</td>
<td>25</td>
<td>3</td>
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<tr>
<td>DCS-205</td>
<td>Practical-III (DFS Using C ++)</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>DCS-206</td>
<td>Practical-IV (Data base Management system)</td>
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<tr>
<td>DCS-207</td>
<td>Project Work</td>
<td>200</td>
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</tbody>
</table>

The project should be involve development of application software for some industry/Institute.
Programming Tools: Problem analysis, Program constructs (sequential, decision, loops), Algorithm, Flowchart, Pseudo code, Decision table, Modular programming, Top Down and Bottom up approaches, Concept of High Level Languages, Low Level Languages, Assembly Languages, Compiler, Interpreter, Type of errors.

Overview of C: General structure of C Program.

Data types, Operators and expressions: Constants and Variables, Data types, Declaring Variables, Storage Classes, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Enumerated data type, Redefining/Creating data types, Library functions, Type casting.

Input/Output: Unformatted and formatted I/O Functions (Character and strings I/O, *scanf*(), *printf*())

Control Statements: Decision making using *if, if-else, elseif* and *switch* statements, Looping using *for, while* and *do-while* statements, Transferring Program controlling *break* and *continue* statements, Programming examples to illustrate the use of these control statements.

PART-B

Pointers: Definition, Need of pointers, declaring Pointers, Accessing Values via Pointers, Pointer arithmetic, Types of pointers.

Array & strings: Introduction to arrays, Declaring arrays, Initializing arrays, Processing arrays, Pointers to arrays, Passing arrays as arguments to functions, Introduction to strings, Pointers to strings, Passing strings and Arrays of strings as arguments to a function, Programming examples to illustrate the use of arrays and strings.

Functions: Defining a function, Local variables, *return* statement, invoking a Function, specifying and passing arguments to a function, Functions returning non Integer, External, static, and register variable, block structure, initialization and recursion.

Structures: Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures, arrays of structures, nested structures, Pointers to structures.

Text Books:

1. Mullis Cooper: Spirit of C: Jacob Publications
2. Yashwant Kanetkar: Let us C: BPB

Reference Books:

2. Yashwant Kanetkar: Pointers in C: BPB

Note:

1. Each theory paper shall be of 3 hours duration and shall carry 100 marks (75 marks for written semester examination and 25 for internal assessment).
2. In all 8 question will be set three from PART -A and four from PART - B of the syllabus. Question no. 8 will be compulsory covering the entire syllabus of at least 5 parts.
3. Examinees will attempt five questions in all. Two each from PART-A and PART-B. Question no. 8 will be compulsory.
Operating system concept: Duties, Responsibilities and functions of an Operating system, General understanding of different Operating System Environment (Single user system, Multi user system, Graphical user interface system, character based system).

Disk Operating System: Concept of Files and Directories, Internal commands, External commands, Batch Files, Filters, Redirection, Macros, Wild Card character

Booting Process, Configuration Files (Config.Sys)


Computer Virus: Prevention, Detection, Cure.

PART-B


MS- Office 97:

MS-Word 97:Word processing using MS-WORD, File handling, Editing, Formatting, spell checking, Mail merge & Table handling & Insertion, importing, exporting & object linking embedding, printing operation.

Spreadsheet: features, uses & benefits in general.

MS-Excel 97: Entering data & selecting cells, editing worksheet data, formatting worksheet, creating Formulae, function & charts /graphs, multi operation, data base management.

Presentation Tools: features, uses & benefits in general.

MS Power Point: Creating & saving presentation templates & view (slide view, notes view, outline view, slide show) Formatting text, slides & graphs, animations, slides transition, multi operation.

Text Books:

2. A.L.STEVENS: Teach Yourself DOS.
4. R.K.TAXALLI: Intro to software package, Galgotia publication.
5. RAJIV MATTUS: dos quick reference , Galgotia.
7. RAJIV MATTUS: Learning Excel 97 for windows step by step BPB publication.
8. RAJIV MATTUS: Learning window 98 step by step BPB publication.
11. JOHN WALKEN BACH: Excel 97

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PART-A


Deadlocks: Deadlock Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock.

PART-B

Memory Management: Logical & physical address space, Swapping, Continuous Allocation (single partition, multiple partition), internal, external fragmentation, Paging, Segmentation, Segmentation With Paging, Virtual Memory, Demand Paging, Performance Of Demand Paging, Page Replacement, Page Replacement Algorithms (FIFO, optimal, LRU, LRU approximation algorithms, counting algorithms Thrasing, Demand Segmentation.


Text Books:

Reference Books:

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PART A

Register transfers & micro-operations: Register Transfer Language, Register transfer, Bus & memory transfers, Arithmetic loops, Logic loops, Shift loops, Arithmetic, logic, shift unit.

Basic computer organization & design: Instruction codes, Computer registers, Computer Instructions, Timing & Control, Instruction cycle, memory reference instruction, I-O interrupt, Design of basic computer, Design of accumulator logic.

Micro-programmed Control: Control Memory, Address sequencing, Design of control unit.

Central Processing Unit: General Register Organization, Stack organization, Instruction formats (zero, one, two, three), Address Instructions, Addressing Modes (direct, indirect, Immediate, relative, indexed), Data transfer & manipulation, Program control, RISC.

Computer Arithmetic: Addition & Subtraction, Multiplication algorithms, Division Algorithms, Floating point arithmetic operations.

PART B
I/O Organization: Peripheral devices, I/O interfaces, asynchronous data transfer, Modes of Data transfer, Priority Interrupts, DMA, I-O processors, Serial Communication.

Memory Organization: Memory Hierarchy, Main Memory, Associative Memory, Cache Memory, Virtual Memory, Memory management hardware.

Multiprocessors: Characteristics, Interconnection structures: Time shared, Common bus, Multi-port, Crossbar switch, Multistage, Inter-processor arbitration, Inter-processor communication & synchronization, cache coherence, multiprocessing, vector computation, Fault tolerant systems.

RISC: Instruction execution characteristics, Use of large register files, Computer based Register optimization, Reduced instruction set architecture, RISC pipeline.

Text Books:
1. Morris M. Mano: Computer System & Architecture: PHI.

Reference Books:
1. V.Rajaraman & Radhakrishnan: Introduction to Digital Computer Design: PHI

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PART – A
Preliminaries: Concept & notation, common operation on data structures, algorithm complexity, time-space trade off between algorithm, physical & logical representation of different data structures.

Arrays: Arrays defined, representing arrays in memory. Various operation (traversal, insertion, deletion), Multidimensional arrays, Sequential allocation, Address calculation, Sparse arrays.

Linked List: Definition, type (linear, circular, doubly linked, inverted), representing linked lists in memory, advantages of using linked list over arrays, various operations on Linked list (traversal, insertion, deletion).

Stacks: Definition & concepts of stack structure, Implementation of stacks, Operation on stacks (push & pop), Application of stacks (converting arithmetic expression from infix notation to polish and their subsequent evaluation), quick sort technique to sort an array, recursion).

PART – B
Queue: Definition & concept of queues, implementation of queue, operation on queues (insert & delete), Type of queues (circular queue, priority queue).

Sorting & Searching: Selection sort, Bubble sort, Merge sort, Radix sort, Quick sort, Sequential search, Linear search and their complexity.

Text Books:
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein: Data Structures using C: PHI

Reference Books:
1. Robert L. Kruse: Data Structures & Program Design: PHI
3. T.A. Standish: Introduction to Data Structures.

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PART-A
Overview of system analysis and design, Business systems concepts, systems development life cycle, project selection, feasibility analysis, design, implementation, testing and evaluation.

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

Feasibility Study: Technical and economic feasibilities, cost and benefit analysis.

System requirement specification and analysis: Fact finding techniques, Data flow diagrams, data dictionaries, process organisation and interactions, Decision analysis, decision trees and tables.

PART-B

Systems control and Quality Assurance: Design objectives, reliability and maintenance, software design and documentation tools, topdown, bottomup and variants. Units and integration testing, testing practices and plans. System controls, Audit trails.

System Administration and Training, conversion and Operating Plans.

Hardware and software selection, Hardware acquisition, memory, processes, peripherals, bench-marking, vendor selection, software selection, operating systems, languages processes, performance and acceptance criteria.

Reference Books:

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PART-A

Object oriented programming: Need for OOP, the project oriented approach, characteristics of OOP language-objects, classes, Inheritance, Reusability, Polymorphism, overloading advantage of OOP, the relationship between C and C++.

Programming Basic- Basic program construction, output using cout, preprocessor directive, comments, integer variables, character variables, input with cin type float manipulator, type conversion, arithmetic operators, relational operators, loops and decision: loop- for, while, do, decision-if, if- else, switch, conditional operator, logical operator-AND, OR, NOT, other control statements-break, continue, goto.

Structures and functions: structures, Accessing structure members, structure within a structure, Enumerated Data type, simple functions, passing arguments to functions, Returning values from functions, reference arguments, overloaded functions, variable and storage class.

PART-B

Objects and classes: A simple class, classes and objects, specifying a class, using a class, C++ objects as physical objects, C++ objects as data types. Constructors, objects as function arguments, returning objects from functions.

Arrays: Array fundamental-defining array, array elements, Accessing array elements, Initializing arrays, multidimensional arrays, passing arrays to functions, array of objects, strings-string variables, Avoiding Buffer overflow, string constants, array of strings string as class members.

Operator overloading: Overloading unary operators-the operator keyboard, operator arguments, operator return values nameless temporary objects, limitation of increment operators, overloading Binary operators, data conversion, Pitfalls of operator overloading and conversion.

Inheritance: Derived class and base class, specifying the derived class, accessing base class, members, derived class constructors, overriding member functions, class hierarchies, public and private Inheritance, levels of inheritance, multiple inheritance.

Text Book:


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DATABASE MANAGEMENT SYSTEMS

Basic Concepts, Data Modeling for a Database, Records and Files, Abstraction and Data Integration, The Three-Level Architecture Proposal for DBMS, Components of a DBMS, Advantages and Disadvantages of a DBMS.

Data Models, Data Associations, Data Models Classification, Entity Relationship Model, Relational Data Model, Network Data Model, Hierarchical Model, The Relational Model, Relational Database, Relational Algebra, Relational Calculus.

Relational Database Manipulation, SQL, Data Manipulation, Basic Data Retrieval, Condition Specification, Arithmetic and Aggregate Operators, SQL Join: Multiple Tables Queries, Set Manipulation, Categorization, Updates, Views: SQL, QUEL, Data Definition, Data Manipulation; QUEL, Condition Specification, Renaming, Arithmetic Operators, Multiple Variable Queries, Aggregation Operators in QUEL, Retrieve into Temporary Relation, Updates, Views.

PART-B


Concurrency Management, Serializability, Concurrency Control, Locking Scheme, Timestamp-Based Order, Optimistic Scheduling, Multiversion Techniques, Deadlock and Its Resolution.


Text Books:

Reference Books:

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