POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA)

(SEMESTER SYSTEM)

(Semester 1st and 2nd)

FOR

2014-15 & 2015-16 sessions

MATA GUJRI COLLEGE, FATEHGARH
SAHIB – 140406
SYLLABUS  
OUTLINE OF PAPER AND TESTS  
PGDCA(Post Graduate Diploma in Computer Applications)  
FIRST YEAR-FIRST SEMESTER EXAMINATIONS  
YEAR 2014-15 & 2015-16

<table>
<thead>
<tr>
<th>Code</th>
<th>Title of Paper</th>
<th>Semester Examination</th>
<th>Continuous Assessment</th>
<th>Max. Marks</th>
<th>Exam. Duration Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGDCA-101</td>
<td>Fundamentals of Information Technology</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-102</td>
<td>Operating Systems</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-103</td>
<td>Problem Solving &amp; Programming in C Language</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-104</td>
<td>Computer Organization &amp; Architecture</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-105</td>
<td>Software Lab – I Office Automation and Productivity Tools</td>
<td>60</td>
<td>40</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-106</td>
<td>Software Lab – II Problem Solving &amp; Programming in C Language</td>
<td>60</td>
<td>40</td>
<td>100</td>
<td>3</td>
</tr>
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<td></td>
<td></td>
<td>400</td>
<td>200</td>
<td>600</td>
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</tbody>
</table>

**Note:**

1. The break up of marks for the Continuous assessment for theory papers will be as under:

   i. One or two tests out of which minimum one best will be considered for assessment. 15 Marks  
   ii. Attendance 5 Marks  
   iii. Class participation and behavior 10 Marks  

2. The break up of for the Continuous Assessment for the practical will be as under:

   i. Two or three tests out of which minimum two will be considered for evaluation (60% of Total marks) 24 Marks  
   ii. Lab Assignments (30% of Total marks) 12 Marks  
   iii. Attendance/Class participation and behavior (10 % of Total marks) 4 Marks
## SYLLABUS
### OUTLINE OF PAPER AND TESTS
**PGDCA (Post Graduate Diploma in Computer Applications)**
**FIRST YEAR-SECOND SEMESTER EXAMINATIONS**
**YEAR 2014-15 & 2015-16**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>PGDCA-201</td>
<td>Data Structures</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-202</td>
<td>Object Oriented Programming Using C++</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-203</td>
<td>RDBMS</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-204</td>
<td>Fundamentals of Computer Networks, Internet and Scripting Languages</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>PGDCA-205</td>
<td>Software Lab – III Data Structures and Object Oriented Programming Using C++</td>
<td>60</td>
<td>40</td>
<td>100</td>
<td>3</td>
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<tr>
<td>PGDCA-206</td>
<td>Software Lab – IV RDBMS and Scripting Languages</td>
<td>60</td>
<td>40</td>
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**Note:**
1. The break up of marks for the Continuous assessment for theory papers will be as under:
   
   | i. | One or two tests out of which minimum one best will be considered for assessment. | 15 Marks |
   | ii. | Attendance | 5 Marks |
   | iii. | Class participation and behavior | 10 Marks |

2. The break up of for the Continuous Assessment for the practical will be as under:
   
   | i. | Two or three tests out of which minimum two will be considered for evaluation (60% of Total marks) | 24 Marks |
   | ii. | Lab Assignments (30% of Total marks) | 12 Marks |
   | iii. | Attendance/Class participation and behavior (10 % of Total marks) | 4 Marks |
PGDCA FIRST SEMESTER
PGDCA-101  Fundamentals of Information Technology

Maximum Marks: 100  
Internal Assessment: 30

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-50

External Examination: 70

Minimum Pass Marks: 35%

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

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

Computer Fundamentals: Block diagram of Computer-Input unit, output unit, Central processing Unit, Arithmetic and Logic Unit, Control Unit, Characteristics of computer, Computer Generations, Input Devices(Keyboard, mouse, scanner, light pen, joy stick, bar code reader), Output Devices.

Section-B

Primary memories (RAM, ROM, Cache), Secondary memories (Floppy Disk, Hard Disk, DVD, compact disk), Computer languages (Machine language, Assembly language, High level Language), Translators(Interpreter, Compilers, Assembler), Hardware, Software, Types of Software-System software, Application software.

Section-C

Overview of operating system: Definition, functions of operating system, Types of Operating system, Computer network: Introduction, Transmission Modes, Transmission media (Twisted pair, Coaxial cable, Fiber optics communication system), Network Types( LAN, WAN, MAN), Network Topologies.
Section-D

Internet and its Applications, web browser, E-mail, World Wide Web, searching on the web, video conferencing. E-commerce and its types, Computer Virus: Definition, types of viruses, Characteristics of viruses.

References

For the Session: 2014-15 & 2015-16

PGDCA-102  Operating Systems

Maximum Marks: 100  Maximum Time: 3 Hrs.
Internal Assessment: 30  Lectures to be delivered: 40-50
External Examination: 70

Minimum Pass Marks: 35%

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

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


Section-B

CPU scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms.
Device management: Disk structure, disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Selecting Disk Scheduling Algorithms.

Section-C

Deadlock: Necessary conditions of deadlock, Prevention Avoidance, Detection and Recovery; Memory Management: Logical versus Physical address space, Swapping, Partition, paging, segmentation. Virtual memory: Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing.

Section-D

Basic Synchronization Principles: Interacting processes, Co-coordinating processes, Semaphores.

File Management: Files, implementations, Directories, Directory implementation.

References

PGDCA-103  Problem Solving & Programming in C Language

Maximum Marks: 100  
Internal Assessment: 30

External Examination: 70

Minimum Pass Marks: 35%

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

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

Problem Solving & Program Planning: Need for problem solving and planning a program; program design tools - algorithms, flow charts, pseudo codes and decision tables. Demonstration of problem solving and use of programming tools through extensive illustrative exercises.

Basics of C Language: General structure of a C program; phases in the development of a program, C Character set, Identifiers and keywords, Data types, Declarations, Expressions, Statements and Symbolic Constants, Input-Output, Header Files, Pre processor directives, Operators, variables.

Section- B

Control statements: Branching, looping using for, while and do-while Statements, Nested control structures, switch, break, continue statements, Functions: Definition, Call, prototypes, and passing arguments to functions, Storage classes

Section- C

Arrays-One Dimensional and multidimensional arrays, passing arrays to functions, Pointers, pointer arithmetic, pointers to functions, pointer arrays and pointers to pointers. Dynamic memory management.
Section- D

Structure, structure as function arguments, Arrays of structures, arrays in structures, union,
File processing: opening and closing, data files, creation, processing & unformatted data files, random file access.

References

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

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

Number System and Codes Number systems, Code Conversion, (Binary, Octal, Hexadecimal), Character codes (BCD,ASCII, EBCDIC), Overview of Gray codes and Excess – 3 codes.

Boolean Algebra Basics Laws of Boolean Algebra, Logic Gates( OR Gate, AND Gate, NOT Gate, NAND Gate, NOR Gate, Ex-OR Gate, Ex-NOR Gate), Simplifications of Boolean equations using K-maps

Section B

Arithmetic Circuits Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel binary adder.

Combinational Circuits Multiplexers, De-Multiplexers, decoders( 3 to 8 decoder), encoders(Decimal to Binary Encoder),

Sequential circuits Flip-flops (S-R, D, J-K, T, Clocked Flip -flop, Race around condition, Master slave Flip-Flop), Overview of Registers and Counters.

Section C

Register transfer and Microoperation Register Transfer language & operations, various Arithmetic, Logic & Shift microoperations instructions.

CPU Architecture General register & Stack organization, instruction formats and addressing modes, Program Interrupt and Types of Interrupts, Features of RISC and CISC.
Section D

Memory Organization Memory hierarchy, Main memory, Auxiliary memory, Associative memory, Virtual memory, Cache Memory, I/O Organization Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of data transfer, programmed I/O& interrupt initiated I/O, DMA.

References

1. Morris Mano: Computer System Architecture, PHI.
PGDCA-105: Software Lab – I (Office Automation and Productivity Tools)

Maximum Marks: 100
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-50
Time allowed: 3 Hrs.

This laboratory course will comprise as exercises based on Office Automation and Productivity Tools. Students are required to practice following:

**WINDOWS:** Windows concepts, features, windows structure, desktop, taskbar, start menu, my computer, Recycle Bin, Windows Accessories. System Tools, communication, Sharing Information between Programs.

**MS Word:** Introduction to Word Processing, Interface, Toolbars, Ruler, Menus, Keyboard Shortcut, Editing a Document, Previewing documents, Printing documents, Formatting Documents, Checking the grammar and spelling, Formatting via find and replace, Using the Thesaurus, Using Auto Correct, Auto Complete and Auto Text, word count, Hyphenating, Mail merge, mailing Labels Wizards and Templates, Handling Graphics, tables and charts, Converting a word document into various formats.

**MS-PowerPoint:** Creating slides, Applying transitions and sound effects, setting up slide shows, Animation.

**MS EXCEL:** Creating worksheet, entering data into worksheet, heading information, data, text, dates, alphanumeric, values, saving & quitting worksheet, Opening and moving around in an existing worksheet, Toolbars and Menus, keyboard shortcuts, Working with single and multiple workbook, Working with formulas & cell referencing, Formatting of worksheet.

*Maximum Marks for Continuous assessment:40
Maximum Marks for External examination : 60

The break up of marks for the Semester examination will be as under

i. Lab Record 15 Marks
ii. Viva Voce 30 Marks
iii. Task given in the examination/Program Development and Execution 15 Marks
PGDCA-106: Software Lab – II  
(Problem Solving & Programming in C Language) 

Maximum Marks: 100  
Minimum Pass Marks: 35%

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA-103: Problem Solving & Programming in C Language.

*Maximum Marks for continuous assessment: 40

Maximum Marks for External examination: 60

The break up of marks for the Semester examination will be as under

i. Lab Record 15 Marks

ii. Viva Voce 30 Marks

iii. Task given in the examination/Program Development and Execution 15 Marks
PGDCA SECOND SEMESTER
PGDCA-201  Data Structures

Maximum Marks: 100
Internal Assessment: 30

External Examination: 70

Minimum Pass Marks: 35%

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

Section A

Review of Pointers & Dynamic Memory Management: Understanding pointers, usage of pointers, arithmetic on pointers, memory management functions and operators, debugging pointers - dangling pointers, memory leaks, etc.

Introduction & Overview: Concept of data type, definition and brief description of various data structures, data structures versus data types, operations on data structures, algorithm complexity, Big O notation.

Arrays: Linear and multi-dimensional arrays and their representation, operations on arrays, sparse matrices and their storage.

Linked List: Linear linked list, operations on linear linked list, doubly linked list, operations on doubly linked list, application of linked lists.

Section-B

Stacks: Sequential and linked representations, operations on stacks, application of stacks such as parenthesis checker, evaluation of postfix expressions, conversion from infix to postfix representation, implementing recursive functions.

Queues: Sequential representation of queue, linear queue, circular queue, operations on linear and circular queue, linked representation of a queue and operations on it, applications of queues.

Section-C

Trees: Basic terminology, sequential and linked representations of trees, traversing a binary tree using recursive and non-recursive procedures, inserting a node, deleting a node.

Heaps: Representing a heap in memory, operations on heaps, application of heap in implementing priority queue and heap sort algorithm.

Graphs: Basic terminology, representation of graphs (adjacency matrix, adjacency list), traversal of a graph (breadth-first search and depth-first search), and applications of graphs.
Section-D

Hashing & Hash Tables: hash functions, concept of collision and its resolution.

Searching & Sorting: Searching an element using linear search and binary search techniques, Sorting arrays using bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort.

Complexities of searching & sorting algorithms.

References

2. R. S. Salaria, Data Structures, Khanna Book Publishing Co. (P) Ltd
3. Loomis, “Data and File Structures”,
PGDCA-202   Object Oriented Programming Using C++

Maximum Marks: 100
Internal Assessment: 30
External Examination: 70
Minimum Pass Marks: 35%

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

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

Introduction to C++: Identifier, Keywords, Constants, variables, expressions, manipulators.
Operators: Arithmetic, relational, logical, conditional and assignment.

SECTION B

Input and output statements, stream I/O, Conditional and Iterative statements, breaking control statements. Storage Classes: Automatic, Static, Extern, Register.
Arrays, Arrays as Character Strings, Structures, Unions.

SECTION C

Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, nesting of member functions, friend functions and friend classes.
Constructors: properties, types of constructors (Default, parameterized and copy), Destructors: properties, Rules for constructors and destructors. Dynamic memory allocation using new and delete operators. Inheritance, types of inheritance: Single, Multiple, Multilevel and Hybrid.

SECTION D

Polymorphism: Methods of achieving polymorphic behaviour, Operator overloading: overloading binary operator, overloading unary operators, rules for operator overloading, Function overloading: early binding, late binding.
Files and streams: Classes for file stream operations, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations.

References:

PGDCA-203 RDBMS

Maximum Marks: 100
Internal Assessment: 30
External Examination: 70

Minimum Pass Marks: 35%

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

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

Traditional File Processing System: Characteristics, Limitations.
Database Schema and Instance. DBMS Architecture, Data Independence, Mapping between different levels.
Object Relational Model, Differences between OODB and ORDB.

SECTION B

Relational Data Model: Concepts, Constraints,
Relational Algebra: Basic Operations, Additional Operations.
Relational Calculus: Tuple and Domain Relational Calculus.

SECTION C

Distributed Databases: Concepts, Structure, Tradeoffs in Distributed Databases, Methods of Data Distribution: Fragmentation, Replication.
Overview of Deductive Databases, Data Warehousing and OLAP, and Data Mining, Multimedia Databases, Temporal Database, Spatial Database, Mobile Databases, Client/Server Architecture.
SECTION D

Technical Introduction to Oracle: Structure of Oracle, Background Processes.

References
6. C.J. Date, ” An Introduction to Database Systems”, Pearson Education.
PGDCA-204  Fundamentals of Computer Networks, Internet and Scripting Languages

Maximum Marks: 100
Internal Assessment: 30
External Examination: 70

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-50

Minimum Pass Marks: 35%

A) Instructions for paper-setters

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 10 marks each. Section E will have 10 short answer type questions which will cover the entire syllabus uniformly and will carry 3 marks each.

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

Computer Networks: Introduction, Applications, Network hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less), Network structure and architecture - point to point, multicast, broadcast, Classification of networks-LAN, MAN and WAN. Reference models - the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / IP models.

SECTION –B

Internet: Introduction, Relays, Repeaters, Bridges, Routers, Gateways.
Internet working: How networks differ, concatenated virtual circuits, connectionless internetworking, tunneling, internetwork Routing, fragmentation, Firewalls, internet architecture.

SECTION –C

Network security: Introduction to cryptography, substitution ciphers, transposition ciphers, one-time pads, two fundamental cryptographic principles.

SECTION –D

Scripting languages: HTML: Introduction to HTML, HTML and the World Wide Web, HTML elements, basic structure elements of HTML, the two categories of body elements – block level and text level, creating HTML pages, viewing pages in different browsers, rule for nesting, HTML tags, colours and fonts, formatting the body section, creating links, creating external links, creating internal links.
Text Books:
2. B Forouzan, Introduction to data communication and networking

References:
1. Douglas E. Comer, "Computer Networks and Internets" 2nd Editon, Addison Wesley.
PGDCA-205: Software Lab – III(Data Structures and Object Oriented Programming using C++)

Maximum Marks: **100** *  
Practical Unites to be conducted: **40-50**

Minimum Pass Marks: **35 %**  
Time allowed: **3 Hrs.**

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA-201: Data Structures and 203: Object Oriented Programming using C++.

*Maximum Marks for Continuous assessment: 40

Maximum Marks for External examination : 60

The break up of marks for the Semester examination will be as under

i. Lab Record 15 Marks

ii. Viva Voce 30 Marks

iii. Task given in the examination/Program Development and Execution 15 Marks
PGDCA-206: Software Lab – IV (Oracle and Scripting Languages)

Maximum Marks: **100** *  
Minimum Pass Marks: **35 %**  
Practical Unites to be conducted: **40-50**  
Time allowed: **3 Hrs.**

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA-203: RDBMS and PGDCA-204: Fundamentals of Computer Networks, Internet and Scripting Languages.

*Maximum Marks for continuous assessment: 40*

Maximum Marks for External examination : 60

The break up of marks for the Semester examination will be as under

1. **Lab Record**  
   15 Marks

2. **Viva Voce**  
   30 Marks

3. **Task given in the examination/Program Development and Execution**  
   15 Marks