ORDINANCES,
OUTLINES OF TESTS,
SYLLABI AND COURSES OF READING

FOR

ONE-YEAR POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA)

(SEMESTER FIRST AND SECOND)

FOR

SESSIONS 2018-19 & 2019-20 EXAMINATIONS

PUNJABI UNIVERSITY
PATIALA – 147 002

ORDINANCES FOR
Post Graduate Diploma in Computer Applications (P.G.D.C.A.)
Course Examination

Applicability of Ordinances for the time being in force

Notwithstanding the integrated nature of a course spread over one year, the Ordinances in force at the time a student joins a course shall hold good only for the examination held during or at the end of the year. Nothing in these ordinances shall be deemed to debar the University from amending the ordinances subsequently and the amended ordinances, if any, shall apply to all the students whether old or new.

1. STRUCTURE AND DURATION OF THE PROGRAMME:

- The course for the Degree of PGDCA. (Post Graduate Diploma in Computer Applications) shall be spread over one academic year to be called Semester I and II. The examination for the semester – I shall be held in the month of November/December and for the semester – II in the month of May/June or on such other dates as may be fixed by the Academic Council.
- The course will be considered as a minor course.
- Since it is a minor course, no lodging and boarding facilities will be provided by the University. However, depending upon the availability, the same may be considered.
- The outlines of tests and syllabi shall be such as prescribed by the Academic Council from time to time.
- The course is available in regular/ distance education mode of the University.

2. ELIGIBILITY FOR ADMISSION:

Graduate in any Subject.

3. SCHEDULE FOR EXAMINATION FEES:

- The last date by which admission forms and fees must reach the Registrar shall be as follows:

Semester	Without late fee	With late fee of Rs. 500/-	With late fee of Rs. 1000/-	With late fee of Rs. 5000/-	With late fee of Rs. 10000/-
Semester - I Regular and Re-appear Candidates (Nov/Dec)	Sept. 30	Oct. 15	Oct. 31	Up to 21 days before the commencement of the examination (written or practical whichever is earlier)	Up to ten days before the commencement of the examination (Written or practical whichever is earlier) with the approval of the Vice-Chancellor
Semester-II Regular and Re-appear Candidates (May/June)	Feb. 28	Mar. 15	Mar. 31	-do-	-do-

(a) Candidates will be required to pay examination fees for each semester as prescribed by the University from time to time.

(b) Candidates shall submit their application forms for admission to the examination duly countersigned by Head of the Department/Principal of the concerned College.

4. MEDIUM OF EXAMINATION:

The medium of examination and instructions shall be English only.

5. EVALUATION:

(a) In each theory paper/ practical paper a fixed percentage of the total marks are assigned to the continuous assessment and to the University examination as mentioned in the Syllabus Scheme of the course.

(b) The minimum number of marks required to pass the examination shall be 35% in internal assessment as well as University Examination in each.

(c) When a candidate has failed or placed under "reappear" in the University examination but passes in the continuous assessment, the marks in the continuous assessment shall be carried for subsequent examinations.

(d) If a candidate has failed or placed under "reappear" in the continuous assessment, but passes in the University examination, the marks in the University examination shall be carried for subsequent examination. In that case, the candidate will have to improve his/her score in continuous assessment by taking only a single test. Such candidate will have to inform the Head of the Department/Principal of the College in writing and in turn the test will be scheduled by the Department/ College.

6. MINIMUM REQUIREMENTS TO CONTINUE THE PROGRAMME:

(a) A candidate shall be allowed to join **Second Semester** provided that he/she has undergone a regular course of studies of first semester as provided under the regulations and has paid all the required dues.

(b) A candidate who fails in one or more papers, but not in all papers may be declared 're-appear' in those papers and may be permitted to `re-appear' in those papers at a subsequent examination within two chances.

(c) If a candidate fails in all papers and has taken provisional admission to the next semester before the declaration of the result of the previous semester, his/her admission shall be cancelled immediately on declaration of the result of previous semester. He/She will have to clear the examination as a private candidate along with the regular students as and when the examination for the same is held by the University.

7. ELIGIBILITY FOR FIRST SEMESTER EXAMINATION:

The first semester examination shall be open to a student who satisfies 7(a) and 7(b) below:

(a) Who has passed the Bachelor's degree in any discipline from a statutory University.

(b) Satisfies the following requirements

i. who has been on the rolls of the Department/College throughout the Semester preceding the examination.

ii. Every candidate will be required to attend 75% attendance of the delivered lectures in each paper.

Teaching/Seminars/Tutorial/Guided Library Reading Period of 1 hour's duration *-1 attendance*

Practical one period-may be of 2-3 Hours duration *-1 attendance*

iii. In case of students, whose names are struck off on account of non-payment of fee, their periods, for the time they were not on the rolls, shall not be accounted for.

iv. The ***shortage in attendance*** of lectures by the candidate will be condoned as per rules made by the University from time to time. However it will be compulsory for a candidate that he/she has attended at least 60% prescribed number of periods.

v. has completed the prescribed course of instructions for the examination, but has not appeared or having appeared has failed and has been recommended by the Head of the Department, for admission to such examination as a late Department student without attending a fresh course of instructions (Theory and Practical) within a period of two year from the date of completion of the course.

8. ELIGIBILITY FOR SECOND SEMESTER EXAMINATION:

Semester II examination shall be open to a student who has passed the previous examination or fulfils the conditions provided in ordinance 6 and satisfies the requirements as provided in ordinance 7(b) i. and ii. above.

9. DECLARATION OF RESULTS:

Three weeks after the termination of examination or as soon thereafter as possible, the Registrar shall publish the result of the candidates. Each candidate shall receive a certificate indicating details of marks obtained in each examination. Successful candidates at the end of final examination shall receive a

"Post Graduate Diploma in Computer Applications" stating the division according to ordinance 11.

10. GRACE MARKS:

The grace marks shall be allowed according to the ordinance relating to "Award of Grace Marks" as per University rules.

11. AWARD OF DIVISION AND DISTINCTION:

The successful candidates shall be classified on the basis of aggregate marks secured in Semester I and II taken together as under:

(a) 75% or more in First division with Distinction.
(b) 60% or more but less than 75% in the First division.
(c) 50% or more but less than 60% in the Second division.
(d) 40% or more but less than 50% in the Third division.

There will be no relative ranking system.

SYLLABUS

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS

(2018-19 and 2019-20 EXAMINATIONS)

Paper Code	Title of the Paper	University Examination	Internal Assessment*	Maximum Marks
SEMESTER – I				
PGDCA-101	Fundamentals of Information Technology	70	30	100
PGDCA-102	Operating Systems	70	30	100
PGDCA-103	Problem Solving using C	70	30	100
PGDCA-104	Software Lab – I (Office Automation and Productivity Tools)	40	60	100
PGDCA-105	Software Lab – II (Programming Fundamentals through C Language)	40	60	100
SEMESTER – II				
PGDCA-201	Database Management System	70	30	100
PGDCA-202	Introduction to Computer Network, Internet and E-Commerce	70	30	100
PGDCA-203	Object-oriented Programming using C++	70	30	100
PGDCA-204	Software Lab – III (Web Designing, HTML and RDBMS)	40	60	100
PGDCA-205	Software Lab – IV (C++ Programming)	40	60	100

***NOTE: The break-up of Internal Assessment is as follows:**

1. Two or three tests out of which minimum two will be considered for assessment.	60% of the marks allotted for continuous assessment.
2. Seminars/Assignment/Quizzes	30% of the marks allotted for continuous assessment.
3. Attendance, class participation and behaviour	10% of the marks allotted for continuous assessment.

PGDCA-101 Fundamentals of Information Technology

Maximum Marks for University examination: 70
Maximum Marks for continuous assessment: 30 Lectures to be delivered: **40-50**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 3 T 1 P 0 per week

Objectives of the course
The objective is to make student understand the logical diagram of a digital computer, to identify all important functional parts of it, to have an idea about the I/P, O/P and Secondary Storage devices, graphics, and interactive media. The associated objective is to understand student about the fundamentals, number system and computer applications.

A) INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10 marks for each question (4 X 10 = 40). Section C will consist of 10 short answer type questions covering the entire syllabus uniformly. Each question will carry 3 marks (10 X 3 = 30)
B) INSTRUCTIONS FOR THE CANDIDATES
1. Candidates are required to attempt five questions in all while selecting two questions each from Section A, Section B, and all the short questions from Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction: Historical Evolution of Computer, Block Diagram of computer, characterisation of computers, types of computers, the computer generations.
Basic Anatomy of Computers: memory unit, input-output unit, arithmetic logic unit, control unit, central processing unit, RAM, ROM, PROM, EPROM.
Input-Output Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Voice Recognition Devices, Optical Recognition devices, Dot matrix, Character and Line printer, DeskJet printer, Laser printer, and plotters.
Number System: Non-positional and positional number systems, Base conversion, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other.
Binary Arithmetic: Addition, subtraction and multiplication. Computer Codes: weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode, XS-3, Grey Codes.

SECTION B

Computer Software: Introduction, types of software, systems software, GUI, operating system, high level languages, assemblers, compilers and interpreters, system utilities, application packages
Basic concepts of algorithm and flow charts: Flow charts, algorithm and decision tables, stages in the development of computer program, testing and debugging, program documentation.
Internet Related Concepts: Internet, Uses of Internet, Basic services of Internet, Email, FTP, TELNET, and WWW.
Familiarities with terms: HTTP, HTTPS, URL, Web Browsers, IP Address, Domain Name, ISP, Web Portal, Search Engines, Blog, Surfing, Wiki.
Applications of Information Technology and Trends: IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application - AI, Virtual Reality, Voice Recognition, Robots, Multimedia Technology.
E-Commerce: Meaning, its advantages & limitations, Infrastructure for E-commerce, Types of E-Commerce Applications.

Text Books:
1. P.K. Sinha and P. Sinha, Foundations of Computing, First Edition, 2002, BPB.
Reference Books:
1. Chetan Srivastva, Fundamentals of Information Technology, Kalyani Publishers.
2. Turban Mclean and Wetbrete, Information Technology and Management, Second Edition, 2001, John Wiley & Sons.
3. Satish Jain, Information Technology, BPB, 1999.
4. Sukhmeen Kaur, Vikram Gupta, S. S. Hatia and Navneet Kaur, "Fundamentals of Information Technology", Kalyani Publishers.

PGDCA-102: OPERATING SYSTEMS

Maximum Marks for University examination: 70
Maximum Marks for continuous assessment: 30 Lectures to be delivered: **40-50**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 3 T 1 P 0 per week

Objectives of the course

- To introduce students with basic concepts of Operating System, its functions, services, types and process management.
- To brief the students about functionality of various OS like Linux and Windows

A) INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10 marks for each question (4 X 10 = 40). Section C will consist of 10 short answer type questions covering the entire syllabus uniformly. Each question will carry 3 marks (10 X 3 = 30)

B) INSTRUCTIONS FOR THE CANDIDATES

1. Candidates are required to attempt five questions in all while selecting two questions each from Section A, Section B, and all the short questions from Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to operating System: Definition, its need, services, early systems
Types of operating systems: Batch processing operating system, Multiprogramming operating system, Time Sharing operating system, Multi-tasking operating system, Distributed operating system, Network operating system, Real time operating system, Multi-processor system and parallel processing.
Process Management: Process concept, types of Process scheduling, Basic concept of CPU Scheduling, Scheduling criteria, and Scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms.
Deadlocks: Deadlock definition and its characterization.

SECTION-B

Windows: MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories
Linux: History & Features of Linux, Linux Architecture, File System of Linux, Hardware Requirements of Linux, Various flavours of Linux, Linux Standard Directories, Functions of Profile and Login Files in Linux, Linux Kernel,
Linux Commands: bc, cal, cat, cd, clear, cmp, cp,mv, date, find, ls, pwd, mkdir, more, rm, rmdir, chgrp, chmod, chown, tty, wc, who, whois, grep, telnet, vi editor etc.

Text books:

1. Andy Rathbone, "Windows for dummies", Pustak mahal, 2nd ed. 1996.
2. Stan Kelly-Bootle, "Understanding UNIX", BPB Publications (ed. 1997).
3. Silverschatz , "Operating system concepts", Pearson education India, 5th ed. 1998.

Reference books:

1. Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, Inc., 1st Edition, 2007
2. Harvey M. Deitel, Operating Systems, Prentice Hall, 3rd Edition,2003,
3. Andrew S. Tanenbaum, Modern Operating System, Prentice Hall, 3rd Edition, 2007

PGDCA-103: PROBLEM SOLVING USING C

Maximum Marks for University examination: 70
Maximum Marks for continuous assessment: 30 Lectures to be delivered: **40-50**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 3 T 1 P 0 per week

Objectives of the course
C is a powerful general-purpose programming language. It is fast, portable and available in all platforms. A beginner who is new to programming, C is a good choice to start his/ her programming journey. This course will give an exposure to a student to get started in C programming language. At the end of the course, the students should be able to develop the skills to design/ develop flowchart/ algorithm for a simple programming problem, make use of an Open Source IDE for C/ C++ and understand popular searching/ sorting algorithms.

A) INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10 marks for each question (4 X 10 = 40). Section C will consist of 10 short answer type questions covering the entire syllabus uniformly. Each question will carry 3 marks (10 X 3 = 30)
B) INSTRUCTIONS FOR THE CANDIDATES
1. Candidates are required to attempt five questions in all while selecting two questions each from Section A, Section B, and all the short questions from Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Programming Process: Problem definition, program design, coding, compilation and debugging; Program Development.
Basic Constructs: Identifiers, Keywords, Tokens, Data Types, Constants, Input and Output in C, Type Conversion, Operators and Expressions, Precedence Hierarchy of Operators, Associativity, Library functions.
Control Statements: Branching, Looping
Functions: Definition, Prototype, Different types of functions based on arguments and return type, parameter passing mechanisms, concept of recursive function. **Storage Classes** Different Storage Classes (static, auto, extern, register), global and local variables

SECTION B

Arrays: Definition, accessing elements, initialization, passing to functions, multi-dimensional arrays, String handling, Applications of linear arrays: linear and binary search, Bubble Sort and selection Sort
Pointers: address and dereferencing operators, declaration, assignment, passing addresses to functions, using pointer arrays to sort n strings.
Structure and Union: Variables, Accessing members, Nested structures, pointer to structures, concept of self-referential structures, Difference between a union and structure.
File Handling in C: Processing a text file through C program**;** Concepts of Sequential File and Random File, Text and Binary File, Formatted and Unformatted Files. (File Implementation is left out)

Text Books
1. Byron Gottfried , Jitendra Chhabra, "Programming with C, 3rd Edition, Schaum' s Outline Series, Tata McGraw Hill, 2107
2. Shubhnandan S. Jamwal, Programming in C, Pearson Publications, 2017
Reference books:
1. Ram Kumar and Rakesh Aggarwal: Programming in ANSI C, TMH.
2. Brian W. Kernighan / Dennis Ritchie, The C Programming Language", 2nd edition, PHI.

PGDCA 104 - Software Lab-I (Office Automation and Productivity Tools)

Maximum Marks for University examination: 40*
Maximum Marks for continuous assessment: 60 Practical Session: **40-50 Hrs.**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 0 T 0 P 4 per week

Objectives of the course

This course trains students how to use Office automation tools (open source/ proprietary) applications to carry out work such as creating professional-quality documents; store, organize and analyse information; arithmetic operations and functions; and create slide presentations with animation, narration, images, videos, and much more, digitally and effectively.

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

Word Processor: 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, Drawings, tables and charts, Converting a word document into various formats.

Presentation Tools: Creating slides, Applying transitions and sound effects, setting up slide shows, Animation. Adding Graphics: Inserting Pictures, tables, movies etc. Effects to Presentation: Setting Animation and Transition Effects, Adding Audio and Video.

Spreadsheet: 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, Formatting of worksheet, Working with formulas, Inserting & deleting of data ,cell, row or column, Mathematical operations, cell referencing, Spread Sheet referencing, Creating Charts

***The breakup of marks for the University examination will be as under:**

i.	Lab Record	10 Marks
ii.	Viva Voce	15 Marks
iii.	Task given in the examination/Program Development and Execution	15 Marks

PGDCA 105 - Software Lab – II (Programming Fundamentals through "C" Language)

Maximum Marks for University examination: 40*
Maximum Marks for continuous assessment: 60 Practical Session: **40-50 Hrs.**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 0 T 0 P 4 per week

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA-103: Programming Fundamentals using C Language. Students are required to develop programs based upon:
1. Various data types in C language
2. Various constructs in the C language
3. Reading writing text files.

Suggestive Exercises:

1. Determine the size/ range of values of primitive data types.
2. Simple Programs to swap the values of two numbers, area of triangle, computational of simple interest, temperature conversion.
3. Use of branching control structures and cover simple programs as the number is even or odd, whether a character is Vowel or Consonant, Check Leap Year, find largest number among three numbers, all roots of quadratic equations, find GCD of two numbers
4. Use of looping control structures and cover programs as calculate the sum of natural numbers, find factorial of a number, display Fibonacci series, Count Number of Digits in an integer, sum the digits of a number, reverse a number, calculate power of a number, check whether a number is prime or not.
5. Program to find factorial of number, calculate GCD Using Recursion, reverse a string using recursion.
6. Program to calculate average of numbers using Arrays, find largest and smallest element of an array.
7. Program to add two matrix using multi-dimensional array.
8. Program to access elements of array using pointer.
9. Program to Add two complex Numbers by passing structure to function.
10. Program to calculate Difference between two time periods using structures.
11. Create a text file and read its content.

***The breakup of marks for the University examination will be as under:**

i.	Lab Record	10 Marks
ii.	Viva Voce	15 Marks
iii.	Task given in the examination/Program Development and Execution	15 Marks

PGDCA 201 – Database Management System

Maximum Marks for University examination: 70
Maximum Marks for continuous assessment: 30 Lectures to be delivered: **40-50**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 3 T 1 P 0 per week

Objectives of the course
The objective is to make student understand the role of a database management system in an organization, Understand basic database concepts, including the structure and operation of the relational data model, Construct simple database queries using Structured Query Language (SQL), Understand and successfully apply logical database design principles, including E-R diagrams and database normalization, Understand the role of the database administrator.

A) INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10 marks for each question (4 X 10 = 40). Section C will consist of 10 short answer type questions covering the entire syllabus uniformly. Each question will carry 3 marks (10 X 3 = 30)
B) INSTRUCTIONS FOR THE CANDIDATES
1. Candidates are required to attempt five questions in all while selecting two questions each from Section A, Section B, and all the short questions from Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Database Management System: Characteristics, Database: Definition, components, definition, characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance. DBMS architecture, data independence.
Database languages: DDL, DML, DCL. Database utilities, Data Models, Keys: Super, candidate, primary, unique, foreign.
Entity relationship model: Concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, converting ER diagrams to tables. Overview of Network and Hierarchical model.
Relational Data Model: concepts, constraints. Relational algebra: Basic operations, additional operations.

SECTION B

Database Design: Functional dependency, normalization (upto 3NF), data base recovery, database integrity, Definition and problems arising out of concurrency, Authentication, authorization, methods of implementing security.
SQL: Basic SQL Query, Creating Table and Views

Text Book:
1. C.J. Date, "An Introduction to Data Base Systems", 3rd Ed., Narosa Publishers, 1997

Reference Books:
1. Henry F. Korth, “Database System Concepts”, McGraw Hill. Inc., 1997.
2. Naveen Prakash, “Introduction to Database Management”, TMH, 1993.
3. Elmisry Nawathy, "Introduction to database System", Pearson Education India.

PGDCA-202: Introduction to Computer Network, Internet and E-Commerce

Maximum Marks for University examination: 70
Maximum Marks for continuous assessment: 30 Lectures to be delivered: **40-50**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 3 T 1 P 0 per week

Objectives of the course
1 To provide students with an overview of the concepts and fundamentals of data communication and computer networks
2. To familiarize with the basic taxonomy and terminology of computer networking area.
3 To provide adequate knowledge and understanding about Internet, Web browsers, search engines, E-commerce Technology, Business models and Electronic payment System.

A) INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10 marks for each question (4 X 10 = 40). Section C will consist of 10 short answer type questions covering the entire syllabus uniformly. Each question will carry 3 marks (10 X 3 = 30)
B) INSTRUCTIONS FOR THE CANDIDATES
1. Candidates are required to attempt five questions in all while selecting two questions each from Section A, Section B, and all the short questions from Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Networking: Basic, elements in networking, network topology, different types of network LAN, MAN, WAN, GAN, PAN. Networks connecting devices. Open system interconnection model (OSI) Different layers, TCP/IP model and layers. Introduction to intranet and extranet.
Internet Concepts: History of the internet, advantages and disadvantages of internet, WWW, IP addressing, domain name system, introduction and working of e-mail.
Introduction to Web browser and search engine: Definition features and type internet explorer, Mozilla Firefox and Netscape navigator, search engine (types, features etc.) Electronic meeting system (Audio conferencing, video conferencing, groupware).
Data Communication: Introduction, Relays, Repeaters, Bridges, Routers, Gateways

SECTION-B

Overview of E-Commerce Technologies: Ecommerce: Definition, difference with traditional commerce applications, advantages and disadvantages of e-commerce, types of ecommerce, infrastructure requirements for e-commerce, different ecommerce website and their features.
Business models of E–Commerce: Business to Business, Business to customers, Customers to Customers, Business to Government, Business to Employee
Electronic Payment System: Introduction, Online payment systems –prepaid and postpaid payment systems, e-cash, e-cheque, Smart Card, Credit Card, Debit Card, Electronic purse, Security issues on electronic payment system, Solutions to security issues Biometrics –Types of biometrics
Gateways: Idea of SMS, Email and Payment Gateway Integration

Text books:

1. Tannanbum, A.S.: Computer Networks,Prentice Hall, 1992, 3rd Edition.
2. Stallings, William: Local Networks: An Introduction: Macmillan Publishing Co.
3. Turban, Efraim, and David King, "Electronic Commerce: A Managerial Perspective", 2010, Pearson Education Asia, Delhi.
4. Rayport, Jeffrey F. and Jaworksi, Bernard J, "Introduction to E–Commerce", 2003,Tata McGraw Hill, New Delhi

Reference books:

1. Kalakota, Ravi, "Frontiers of Electronic Commerce", 2004, Addison –Wesley, Delhi.
2. Stallings, William: Data Computer Communication, Macmillan Publishing Co

PGDCA-203: Object Oriented Programming Using C++

Maximum Marks for University examination: 70
Maximum Marks for continuous assessment: 30 Lectures to be delivered: **40-50**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 3 T 1 P 0 per week

Objectives of the course
Students will be able to learn object oriented programming and advanced C++ concepts for writing good programs.

A) INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10 marks for each question (4 X 10 = 40). Section C will consist of 10 short answer type questions covering the entire syllabus uniformly. Each question will carry 3 marks (10 X 3 = 30)

B) INSTRUCTIONS FOR THE CANDIDATES
1. Candidates are required to attempt five questions in all while selecting two questions each from Section A, Section B, and all the short questions from Section C.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming.
Introduction to C++: Identifier, Keywords, Constants. Operators: Arithmetic, relational, logical, conditional and assignment. Size of operator, Operator precedence and associativity. Type conversion, Variable declaration, expressions, statements, manipulators. Input and output statements, stream I/O, Conditional and Iterative statements, breaking control statements. Storage Classes, Arrays, Arrays as Character Strings, Structures, Unions, Bit fields, Enumerations and User defined types.
Pointers: Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Multiple indirections, Pointer to functions. Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing by value, by address and by reference, Functions returning references, Const functions, recursion, function overloading, Default Arguments, Const arguments, Pre-processor, Type casting.

SECTION B

Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control. THIS pointer. Objects: Object as function arguments, array of objects, functions returning objects, Const member. Static data members and Static member functions, Friend functions and Friend classes.
Constructors: properties, types of constructors, Dynamic constructors, multiple constructors in classes. Destructors: Properties, Virtual destructors. Destroying objects, Rules for constructors and destructors. Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes, Scopes: Local, Global, Namespace and Class.
Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, function redefining, constructors in derived class, Types of inheritance, Types of base classes, Code Reusability. Polymorphism: Methods of achieving polymorphic behavior.
Operator overloading: overloading binary operator, overloading unary operators, rules for operator overloading, operator overloading using friend function. Function overloading: early binding, Polymorphism with pointers, virtual functions, late binding, pure virtual functions and abstract base class. Difference between function overloading, redefining, and overriding.
Templates: Generic Functions and Generic Classes, Overloading of template functions. Exception Handling catching class types, handling derived class exceptions, catching exceptions, restricting exception

Text Book:
1. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw-Hill.

Reference Books:
1. Herbert Schildt, "The Complete Reference C++", Tata McGraw-Hill.
2. Deitel and Deitel, "C++ How to Program", Pearson Education.
3. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications.

PGDCA-204: Software Lab – III (Web Designing, HTML and RDBMS)

Maximum Marks for University examination: 40*
Maximum Marks for continuous assessment: 60 Practical Sessions: **40-50 Hrs.**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 0 T 0 P 4 per week

This laboratory course will comprise as exercises to supplement what is learnt under paper PGDCA 201 – Database Management System and PGDCA-202: Introduction to Computer Network, Internet and E-Commerce and Students are required to practices
RDBMS: Introduction, working with database and tables, queries, Appling integrity constraints, Introduction to forms, sorting and filtering, Controls, Reports and Macro: creating reports, using Macros.
HTML: Tables, Forms, Frames and other text formatting tags
DHTML: Cascading style sheets and Document object model, Introduction to JavaScript.

***The breakup of marks for the University examination will be as under:**

i.	Lab Record	10 Marks
ii.	Viva Voce	15 Marks
iii.	Task given in the examination/Program Development and Execution	15 Marks

PGDCA-205: Software Lab – IV (C++ Programming)

Maximum Marks for University examination: 40*
Maximum Marks for continuous assessment: 60 Practical Sessions: **40-50 Hrs.**
Minimum Pass Marks: **35** % Time allowed: **3 Hrs.**
L 0 T 0 P 4 per week

Objectives of the course
Understand fundamentals of object-oriented programming in C++, including defining classes, invoking methods, using class libraries, etc., have the ability to write a computer program to solve specified problems, knowledge of object-oriented paradigm in C++ programming language.

Suggestive Exercises:
Student must cover the programs on features of C++, C++ IDE, Identifiers and Keywords, Data Types in C++ , C++ coding conventions, Expressions in C++, Control structures, decision making statements, Arrays and its methods, Introduction to object and Classes, Exception Handling Concepts.

Programs:
1) Write a Program to check whether a number is even or odd.
2) Write a Program to demonstrate scope and lifetime of variables.
3) Write a Program to implement the concept of ternary operator.

FUNCTIONS
4) Write a Program to implement the concept of recursive function and arrays.
5) Write a Program to implement the concept of constructor.
6) Write a Program to demonstrate the concept of method overloading.
7) Write a Program to implement nesting of methods.
8) Write a Program to implement the concept of destructor

STRINGS
9) Write a Program to implement the concept of abstract class.
10) Write a Program to implement the concept of string methods.

INHERITANCE
11) Write a Program to implement the concept of hierarchical inheritance.
12) Write a Program to implement the concept of multilevel inheritances.
13) Write a Program to define an interface.
14) Write a Program to define final class.
15) Write a Program to implement template.

EXCEPTION HANDLING
16) Write a Program to show the usage of exception handling.
17) Write a Program to show the usage of try and catch block.
18) Write a Program to demonstrate inner class.

***The breakup of marks for the University examination will be as under:**

i.	Lab Record	10 Marks
ii.	Viva Voce	15 Marks
iii.	Task given in the examination/Program Development and Execution	15 Marks