University of Rajasthan
Jaipur

SYLLABUS

Post Graduate Diploma in Computer Application (PGDCA)

2021 – 2022 (I & II Semester)

Raj / Jan

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

UNIVERSITY OF RAJASTHAN, JAIPUR
Post Graduate Diploma in Computer Applications(PGDCA)
PGDCA I/II Semesters

Eligibility :

All the graduate from recognized university situated in Rajasthan having 48% marks of CGPA of 3.0 in the UGC Seven Scale for general category (45% marks or CGPA 2.5 in the UGC Seven Point Scale for SC/ST/Non Creamy layer OBC) in aggregate and minimum 60% marks for non-Rajasthan candidate. Reservation as per the University Rules.

Scheme of Examination of PG DCA for the Academic Session 2019-20 and onwards

1. Each of the semester I and II will consist of **SIX** theory papers and **THREE** practical papers (Laboratories).
2. Each theory paper shall carry **100 MARKS** for the University semester examination of **THREE** hours duration.
3. The University Examination of the theory paper will consist of six questions on the pattern mentioned below :-
   (a) Candidate has to attempt SIX questions in all.
   (b) **Question No. 1** covering whole syllabus will consists of 10 short answer questions carrying 2 marks each taking two questions from each unit.
   (c) **Question No. 2 to 6**, each of 16 marks, will be framed by taking one question from each unit. There will be an internal choice within the unit.
4. Each practical paper shall be of 4 hours duration on one day and carry 100 marks for the practical examination. The practical examination will involve 3 exercises, each of 20 marks, practical record of 15 marks and viva-voce examination of 25 marks.
5. The medium of instruction and examination shall be English only.
6. (a) The minimum marks for passing each theory and practical examination shall be 40% separately in the University semester end examination.
   (b) The candidate may be promoted to the II semester if he/she has cleared at least three theory papers and two practical papers of Semester-I.
7. At the end of the final examination, the candidate eligible for the award of PG DCA degree shall be classified on the basis of marks obtained in semesters I and II examination taken together as follows:
   (a) I division with Honour - 75% or more marks in aggregate provided the candidate has passed all papers and examinations in first attempt.
   (b) I Division - 60% or more marks but falls to satisfy the criterion for being classified distinction as lay in the 7(a).
   (c) II Division - All other than those included in 7(a) and 7(b) above, and marks 48% or more but less than 60% of the aggregate marks.
   (d) All the rest will be declared to have passed the examination, if they obtain a minimum pass marks in each paper, ver., 40%.
8. A candidate must pass the PG DCA Course within Three years of the initial admission to the course.
9. For the award of prizes or ranking, the marks obtained in the first attempt of the examination only will be taken into account.

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PGDCA-First Semester

S.No.	Subject Code	Subject Title	Course Category	Credit	Contact Hours per Week			EoSE Duration (Hrs)	
					L	T	P	Thy	P
1	PGD 701	Computer Fundamentals	CCC	4	3	1	0	3	0
2	PGD 702	Operating System	CCC	4	3	1	0	3	0
3	PGD 703	Programming in C	CCC	4	3	1	0	3	0
4	PGD 704	Office Management Tools	CCC	4	3	1	0	3	0
5	PGD 705	E-Commerce	CCC	4	3	1	0	3	0
6	PGD *	Elective (Any one in Elective Group -I)	ECC	4	3	1	0	3	0
		Practical							
7	PGD 711	Programming in C Lab	CCC	4	0	6		0	4
8	PGD 712	Office Management Lab	CCC	4	0	6		0	4
9	PGD **	Elective Lab (Any one in Elective Group -II)	ECC	4	0	6		0	4

PGDCA-Second Semester

S.No.	Subject Code	Subject Title	Course category	Credit	Contact Hours per Week			EoSE Duration (Hrs)	
					L	T	P	T	P
1	PGD 801	Programming in C++	CCC	4	3	1	0	3	0
2	PGD 802	Web Application Developments	CCC	4	3	1	0	3	0
3	PGD 803	Programming in Java	CCC	4	3	1	0	3	0
4	PGD 804	Data Communication & Computer Networks	ECC	4	3	1	0	3	0
	PGD 805	Computer Architecture	ECC	4	3	1	0	3	0
5	PGD ***	Elective (Any one in Elective Group -III)	ECC	4	3	1	0	3	0
		Practical							
1	PGD 804	Programming in C++ Lab	CCC	4	0	0	6	0	4
2	PGD 805	Web Applications& Java Lab	CCC	4	0	0	6	0	4
3	PGD 806	Mini Project	ECC	4	0	0	6	0	4

Note :

a. The Syllabus of the PG CDA course in the University Campus as well as in the all affiliated colleges is same.

b. The Scheme for the credit based PG CDA course applicable in the University Campus and non-credit based PG DCA course for all affiliated colleges of the University.

Elective Group I(*)		Elective Group II(**)	
PGD A01	DataBase Management System (DBMS)	PGD B01	DataBase Management System (DBMS) Lab
PGD A02	DTP using Pagemaker / Coreldraw	PGD B02	DTP using Pagemaker / Coreldraw Lab

Elective Group III(***)	
PGD C01	Algorithm & Data Structure
PGD C02	System Analysis & Design

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PG DCA First Semester

PGD 701: Computer Fundamentals

Unit- I

Building blocks of computer system: Basic building blocks – I/O, Memory, ALU and its components, Control Unit and its functions, Instruction –word, Instruction and Execution cycle, branch, skip, jump and shift instruction, Operation of control registers; Controlling of arithmetic operations, Classification of Computers (Workstation, Mainframe, Super Computer, Client Server Computer, Notebook, Tablet, PalmTop Computer)

Unit II

Computer and its generations, Programming languages generations - Machine, Assembly and High level and OOPS. Language Translators. Overview of the Digital Computer System – System Software, Application Software.

Unit-III

Representation of Data: Digital versus Analog, Digital number system (binary, octal, decimal and hexadecimal numbers,), Conversion from one form to another, fractional numbers and signed numbers, Complements, Arithmetic operations on binary numbers, Fixed point and floating point representations., Logic Gates (NOT, OR, AND), types Codes (ASCII, EBCDIC, Unicode), encoding and decoding.

Unit-IV

Computer Components (Briefly overview) : Mother Board, Processor, types of RAM, RAM, Flash, Cache,; SDRAM, DDR), System clock, Buses (Data, Address, Control).

Input devices & output Devices –Printers, Scanner, different types of scanner

Storage devices : Storage types , random versus sequential access, formatting, tracks and sectors, speed, storage capacity, Hard Disk structure; Hard Drive Interfaces (IDE, EIDE, SCSI, RAID,SATA,ATA). Optical Disks : pits and lands, CD (ROM,R,R/W), DVD (ROM,R,RAM), Magnetic tapes, Modem (Fax/Data/Voice).

Unit- V

Internet Applications: Internet, Internet Applications, e-Mail, IRC, Web Surfing, Web Browsers,, Search Engines, Internet Service Providers, Downloading, Audio and Video Conferencing. Security issues in Internet- Bugs, Viruses, Anti-viruses, Firewalls, Malwares etc. Internet threats to the society, Cyber laws and Legal issues.

Suggested Reference Books:

[1] M. Morris Mano: Computer System Architecture, 3 Hall of India,2008.
[2] John D. Carpinell: Computer Systems Organization & Architecture,3rd Edn, Pearson Edu. Asia., 2008.
[3] Peter Norton's Introduction to Computers, Third Edition, McGraw Hill
[4] Sinha PK; Computer Fundamentals; BPB, 2002.
[5] Malvino B.; Digital Computer Electronics; III Edn;TMH.
[6] Albert Paul Malvino, Electronic Principles, McGraw Hill
[7] P.Pal Chaudhuri, Computer Organization and Design, Prentice Hall of India.

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PGID702 : Operating Systems

Unit-I

Necessity of an Operating System, Operating system structure, Evolution of Operating System (multiprogramming systems, batch system, timesharing system, distributed systems and Real Time systems). Operating system structure, Operating system components and services, system calls, system programs, Virtual machines.

Unit-II

Process management: process concept, process scheduling, cooperating processes, Threads, Inter-process communication, CPU scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling and Algorithm evaluation.

Process Synchronization and Deadlocks: The Critical section problem, synchronization hardware semaphores, Classic problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

Unit-III

Storage management: Memory management: Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging, Virtual Memory, Demand paging and its performance, page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation

UNIT –IV

File & Disk Management: File system, secondary storage Structure, File concept access methods, directory implementation, Efficiency and performance recovery, Disk structure, Disk scheduling methods, Disk management, Swap-Space management, Disk reliability.

Unit-V

Goals of Protection, Domain of protection, The Security problem, Program threats, Authentication, One Time passwords, program threats, System threats, Threat Monitoring, Encryption, Computer Security Classifications.

Recommended books:

[1] Galvin P.B. Silberschatz, Operating System Principles (Seventh Edition) J. Wiley 2008
[2] Tanenbaum A.S, Modern Operating Systems, 2nd Edn. PHI Pub 2005
[3] William Stalling, Operating Systems: Internal & Design Principles, Sixth Edn, Pearson, 2009.
[4] Gary Nutt: Operating Systems: A Modern Perspective (Second Edition) , Pearson Education, 2000.
[5] D.M. Dhamdhere: Systems Programming and Operating Systems (Second Edition), Tata McGraw Hill Publishing company Limited.
[6] Harvey M. Deitel, Operating Systems, Pearson Education.

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[4] Gary Nutt: Operating Systems: A Modern Perspective (Second Edition) , Pearson Education, 2000.
[5] D.M. Dhamdhere: Systems Programming and Operating Systems (Second Edition), Tata McGraw Hill Publishing company Limited.
[6] Harvey M. Deitel, Operating Systems, Pearson Education.

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PGD 703 : Programming in C

Unit-I

Problem solving Technique with computers, Flow charts, Basic concepts of programming languages, programming domains. Concept of Structured Programming.

Introduction to C-Programming: Basic Structure of C-Program and its execution process. C Character set, variables and constants, keywords, Type checking, Scope and lifetime data types. Operators, Instructions, Comment statements. Input and output statements., Boolean expressions.

Unit-II

Control structures, decision control structure, loop control structure, case control structure. String and character handling, arrays and string processing, data validation examples .

Functions, function prototype, subroutines, scope and lifetime of identifiers parameter passing mechanism, recursion.

Unit-III

Pointer : Definition and uses of pointers, arithmetic , pointers and arrays, pointers and function, pointer to pointer, pointer to structures. Dynamic memory allocation.

Unit IV

User defined data types, enumerated data types. Structure & unions; Declaration, Array of Structures, Pointers of structure. Unions of structures. Storage class specifies, Pre processors header files and standard lib, Functions.

Unit-V

Implementation of simple data structures : Stacks, Queues, Linked Lists, trees, searching and sorting algorithms. Console Input and Output functions, data files, operations on data files, text and binary files, formatted data files.

Recommended reference books:

[1] Gottfried B; Programming with C: Schaum Qutlines; Mc Graw Hill Edition.
[2] Balagurusamy E; Programming in ANSI C;Fifth Edn; Mc Graw Hill,2011.
[3] Kanetkar Y.; LET US C; X Edition, BPB,2010
[4] Deitel HM & Deitel JP; C How to program; 5th Edn; Pearson Pub.

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PGD 704: Office Management Tools

UNIT-I

The Need and Importance of Office Automation, Role of computer in Office automation and management, Office automation software.

Word Processing Software : Creating and Saving documents, Entering, Editing, Moving, Copying and Formatting Text, Page formatting, Finding and replacing text, Spell checking and Grammar checking, enhancing documents, Indexing, Columns, Tables and feature there in, Inserting (Objects, picture, files etc.), Using Graphics, templates and wizard, using mail merge, using WordArt, customizing, MS Word. Designing pages with MS Publisher, Inserting and Manipulating Objects, Editing Fills and re coloring pictures.

UNIT- II

Spreadsheet Software Spreadsheet terminology, organization of the worksheet area, entering information, editing cells using commands and functions, moving copying, Inserting and deleting rows and columns, formatting worksheet, printing worksheet, creating charts, modifying and enhancing charts, using date, time and addressing modes, naming range and using statistical, mathematical and financial functions, database in a worksheet, creating, sorting, querying and maintaining the database, multiple worksheets and Macros, working with objects.

UNIT-III

Data Base Management Software, Planning a database (tables, queries, forms, reports), Creating and editing database, customizing tables, linking tables, designing and using forms, modify database structure, maintaining database, Sorting and Indexing database, Querying a database: and generating Reports, modifying a Report, exporting a Report to another format.

UNIT- IV

Presentation Software Anatomy of a PowerPoint Presentation, Creating and Viewing a presentation, Managing Slide Shows, Navigating through a presentation, Using hyperlinks, advanced navigation with action setting and action buttons, organizing formats with Master Slides, applying and modifying designs, adding graphics, multimedia and special effects, creating presentation for the web.

UNIT V

Office System user interface, Managing security and privacy in the MS Office System, Sharing documents between Office System Components and different versions of the office System.

Office management using Smart Devices

Reference Books:

[1] Microsoft;2007 Microsoft Office System; PHI
[2] Microsoft; Microsoft Office 2003 : Plain & Simple; PHI
[3] Microsoft; Microsoft Office XP: Plain & Simple; PHI
[4] Sanjay Saxena; A First Course in Computers 2003 Edition; Vikas Pub.
[5] Joe Habraken; Microsoft Office 2003;Que; Techmedia.

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PGD 705 :E-Commerce

Unit-I

Basic Concepts: Introduction, Definition, Objectives, Advantages and disadvantages, Forces driving E-Commerce, Traditional commerce Vs, E-Commerce, E-Commerce opportunities for industries, Growth of E-Commerce.

Electronic Data Interchange : Concepts of EDI and Limitation, Application of EDI, Disadvantages of EDI, EDI model; EDI Implementation, MIME and Value- Added Network, Internet-based EDI.

Unit-II

E-Commerce Models: B2C,B2B, C2C, C2B other models- Brokerage Model aggregator Model, Info-mediary Model, Community Model and value chain model Advertise Model.

Electronic Payment Systems: Special features required in payment systems, tapes of E-payment systems, E Cash, E-cheque , credit card, Smart Card, Electronic purses, e-billing, E-e-Micro payments, point of Sales System (POS) – meaning uses structures.

Unit-III

Customer Relationship Management & Technologies : E-Transition Challenges in Indian Corporate, E-Commerce and WWW,.e. Marketing, E-Customer Relationship Management, ECRM Problems and Solutions, CRM Capabilities and Customer life cycle, E-Supply Chain Management , E-Strategy- Planning the E-Commerce Project, E-Commerce Strategy and Knowledge Management, E-Business Strategy and Data Warehousing & Mining. ERP for E-Commerce, Customer effective Web Design – Requirement Strategy and Model.

Unit-IV

m-Commerce : Overview of mobile-commerce, Mobile delivery Technology & Switching Methods, Attributes of m-Commerce, Drivers of m-Commerce, m-Commerce Security issues, model ATM(ICICI Bank Case Study), Application of m-Commerce, Mobile Financial Applications, m-wallet, Mobile Shopping, Advertising and Content provision. Case-Study

Security Issues in E-Commerce: Security risk of E-Commerce, Type of Threats, Security tools and risk management approach, Cyber laws, Business Ethics, IT Acts.

Reference/Text Books:

1. Bharat Bhaskar , Electronic Commerce – Framework Technologies and Application Tata McGraw Hill.
2. Ravi Kalakota & A.B. Whinston, Frontiers of electronic Commerce Pearson Eduction,
3. Ravi Kalakota & A.B. Whinston, electronic Commerce-A Manager's Guide, Pearson Eduction,
4. Agarwala Kamlesh, N and Agarwala Deeksha, Business on the Net_introduction to the E-com.,Macmillan India.
5. P.T. Joseph, E-Commerce: A Managerial Perspective,PHI,2002.

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Practical Labs

1. **Paper PGD 711: Programming in C Lab**
   - Lab Exercise on Theory Paper PGD 703

2. **Paper PGD 712 : Office Management Lab**
   - Lab Exercise on Theory Paper PGD 704

3. **Paper – Elective Lab (Any one of the following)**

   PGD B01 : Data Base Management System (DBMS) Lab
   - Lab Exercise on Theory Paper PGD A01

   PGD B01 : DTP Using PageMaker/CorelDraw.
   - Lab Exercise on Theory Paper PGD A02

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Elective Papers (Theory) : PGDCA Semester –I

PGD A01: Database Management Systems

Unit-I

Overview of DBMS: Basic concepts, Database system architecture, Schemas, Instances, Components, Database users, Three-tier architecture, Centralized, Distributed and Client/Server architecture, Data independence. Database models: Entity relationship model, hierarchical model, relational model, network model, Object-Oriented data model.

Unit II

Data Modeling using ER Model: ER model concepts, ER diagram, mapping constraints, Keys, Generalization, aggregation, reduction of ER diagrams to tables, extended ER model, Relationship of higher degree. Enhanced ER Model : Concepts, Specialization, Generalization, Data abstraction, Knowledge representation and University EER Model as example.

Unit-III

Relational Model : Concepts, Constraints, Languages, Relational database design by ER & EER mapping, Relational algebra relational calculus.

Normalization : Normal forms – First, second, third and BCNF.

Unit-IV

Transaction processing : Transactions atomicity, durability, serializability and isolation. Concurrency control techniques – Two phase locking, timestamp ordering, multiversion,

Granularity locking techniques, Database recovery techniques based on deferred & immediate updates and shadow paging.

Unit-V

SQL: Characteristics of SQL, advantages, data types in SQL, SQL Operators, types of SQL commands, Tables indexes, Views Nulls, Aggregate Functions, Select statement, Sub queries, Insert, Update and Delete operations, Joins, Unions. .

Reference Books:

[1] Korth H F and Silberschataz A, System Concepts, Sixth Edition; McGraw Hill,2006
[2] Leon, and Leon, SQL Tata McGraw Hill Pub. Co. Ltd.
[3] Ivan Bayross; SQL/PL 4th Edn: BPB,2009
[4] Navathe S.B. Elmasri R,; Fundamentals of Database Systems, Fifth Edition, Pearson 2009.
[5] Ramakrishan and Gharke, Database Management Systems, 3rd Edition, Tata Mc Graw Hill, 2003.
[6] Data C J Database Management Systems, Pearson Education Asia.
[7] Singh S.K.; Database Systems; I Edition; Pearson, 2006.

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PGD A02 : DTP using PageMaker / Corel Draw

UNIT I

Page Maker

Creating a New Document: - Setting the Margins, Setting the Page Size, Changing the Page Orientation, Setting the Fage Numbers, Changing the Page size view, Displaying Rulers, Changing the Rulers Measurement System, Using Rulers, Using Guides, Adding Guide lines to Master Pages, Aligning to Guidelines, Displaying Guidelines, Locking Guidelines.

Entering Text: - Changing the font Families, Changing font size, Changing typeface styles, Changing Character Specifications, Changing type leading, Changing character width, Changing tracking.

Saving your document: - Saving a new document, Saving Existing Document, Saving a document as another document, Reverting to a previously saved version.

Developing a Paragraph: - Typing a text, Adding special character to text, Aligning text.

Formatting Paragraph:- Changing Indents, Changing the Space around paragraph, Changing Paragraph Alignment, Controlling How paragraphs break between pages and columns, Adding lines above or below your paragraph.

Creating a Frame: - Converting other objects to Frames, Selecting text & Dragging Text, Editing Text, Cutting, copying and Pasting Text, Using Undo & revert. Inserting & removing pages, Adjusting Hyphenation.

Adjusting Indents and Tabs:- Setting and Changing Tabs, Setting and Changing Indents, Settings the Leader Style, Resetting the Tab Ruler.

UNIT II

Page Maker

Adding Shapes: Changing lines and fill specifications, Changing Round Corner, Creating Header & Footer. Defining Style:- Creating a new style, Editing a style, Removing Style, Copying style, Applying style to text, Changing style. Developing a long Document:- Using Story Editor, Switch between story editor and layout editor, Closing the story editor and placing the story, Checking your spelling, Using find feature. Using Color: - Opening a color palette, Adding color to text, Defining a custom colors. Printing:- Printing your document, Printing a proof copies, Setting paper options.

UNIT III

Photoshop

Introduction of Photoshop. Creating a New File:- Main Selections, Picking color, Filling a selection with color, More ways to choose colors and fill selections, Painting with paintbrush tool, Using the magic wand tool and applying a filter, Saving your document. Color Mode:- Gray Scale Color Mode, RGB Color Mode, CMYK Color Mode, Bitmap Mode, Open a file, Preference.

Foreground & background:- Changing Foreground and Background colors, Using the Large color selection Boxes and small color swathes, Using the Eyedropper tool to sample Image color, Changing the Foreground Color While using a Painting Tool.

Using Brushes:- Millions of Brushes in One, Selecting the Brush Shape, Drawing a vertical and Horizontal Straight lines with any brush, Drawing connecting Straight Lines (at any angle) with any brush, Creating a New Brush, Saving Brushes, Loading Brushes, Creating a Custom Brushes, Using the

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Painting Modes, Fade, Airbrush Options, Pencil Options. Rubber Stamp Options: - Rubber stamps an Aligned Clone, Rubber Stamping, Impressionist Style, Using line tool.

Using the Editing Tool: - The Smudge Tool, The Blur and Sharpen Tool, The Dodge / Burn Tool, Shadows, Mid-tones and Highlights. Selection Tools:- Making Rectangular and Square Selections, Feathering a Selections, Lasso Features, Lasso Options, Making selections by color or Gray Scale value using the Magic Wand, Moving an anchor point or Direction point to change the shape of curve, Adding and Removing Anchor points, Moving Path, Saving, Loading and Creating New Path, Filling & Stroking Path.

UNIT IV

Photoshop

Introduction of layers: - Creating & editing new layers, adding a background.
Creating Layer Mask: - Layer Masks, Adjustment Layers.
Adding Fills and Gradients: - Filling with paint bucket tools, filling type with grading fills.
Applying Filters: - Blur Filters, Render Filters, Sharpen Filters, Sketch Filters, Texture Filters, Other Special Filters
Printing your document, save your file:- Save file as a JPEG, TIFF, GIF, PNG.

UNIT V

Coral draw

Introduction to coral draw, use and importance in designing, various graphic file and file extension, vector image an raster images, introduction to screen and work area. Introduction to tool of coral draw, managing palettes, working with images, patterns and textures, working with shapes, colors and fills, image rasterization and editing, transformation menu.

Coral draw files and supporting documents, import and export of files and file formats, page setup an designing, using styles and templates, working with text, formatting text, text attributes. Designing different page layouts, column layout, working with layers, special effect to objects and texts, contour tool, layout for news paper and magazines.

Preparation of visiting card and invitation cards, Shaping Dockers and logo design, introduction brochure and books, introduction to magazine deigning.

Reference Books

[1] Complete Reference of Page Maker- Tata McGraw Hill
[2] DTP Publishing Mint Page Maker – Springer Pubication.
[3] Photoshop in Easy Steps- Tata McGraw Hill
[4] Coral Draw an Official Guide- Tata McGraw Hill
[5] Cavgage Learning- Bring it Home with Coral Draw
[6] Coral Draw in Simple Steps- Wiley Publication

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PG DCA Second Semester

PGD 801: Programming Using C++

Unit-I

Need of object Oriented Programming, Advantages of OOP, Comparison of Functional Programming and OOP approach, Essentials of OOP (Objects, Classes, Encapsulation, Data abstraction, Inheritance, Reusability, Polymorphism, Delegation, Message Communication).

C++ Basics : Preprocessors, comments, Data types, Operators, Expressions, Loops and Decisions, Arrays and String handling, Modular programming with Functions, Structure and Unions.

Unit II

Pointers and Run time binding, Dynamic memory allocation, Storage class specifies. Classes, Member functions, Objects, Arrays of objects, Nested classes, Constructors, Destructors, Inline member functions, Friend Functions, Static member function.

Inheritance, Single Inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control.

Unit- III

Functions Overloading, Operator Overloading, polymorphism, early binding polymorphism with pointers, Unary and Binary Operator Overloading, Overload Assignment Operator, Copy Constructor, Data Conversion between Objects of different classes. C++ Free Store.

Virtual Function : Virtual Function, late binding, pure virtual functions, abstract classes, Generic Programming with Templates, Friend function, Overloaded Function Templates, Multiple Arguments function Template.

Unit-IV

Stream Computation with Console, Stream Computation with Files, opening and closing of file stream state member function binary file operations structures and file operations, classes and file operations, random access file processing.

Unit V

Templates, Generic Programming Concepts , Exception handling: Exception handling mechanism throwing mechanism, Catching mechanism.

Recommended Books

[1] Herbert Schildt; C++ : The Complete Reference 4th Edn; TMH, 2003.
[2] Robert Lafore; Object Oriented Programming in C++ 4th Edition; Techmedia.
[3] Balagurusamy ; Object Oriented Programming in C++; 4th Edition TMH,2009.
[4] Venugopal, Rajkumar; Mastering C++; Tata Mcgrow Hill, 2006.
[5] Kanetkar Y.: LET US C++; BPB; 2009.
[6] Deitel and deitel; How to program C++, Addison Wesley, Pearson Education Alsa
[7] John R. Hubbard, Programming with C++, McGraw Hill International.

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PGD 802: Web Application and Developments

Unit-I

Creating and Maintaining Web Sites; Planning, Navigation and Themes, Site types and Architecture, Elements of a Web page, publishing and publicizing site/structuring web site. Search Engine Optimization,, Site Maps and other Navigation Aid, Site Delivery and Management.

Unit-II

Introduction of HTML and XHTML : introduction markup language, editing HTML & XHTML: Common tags, headers, text styles linking, images, formatting text, horizontal rules and more line breaks unordered lists nested and ordered lists, basic HTML/XHTML tables: intermediate tables and formatting, forms, more complex forms, internal linking, creating and using image maps.

Unit-III

Java script- introduction to scripting language, memory concepts, arithmetic decision making. Java script control structures, Java script functions, program modules in java script, function definitions duration of identifiers, scope rules, recursion java script global functions.

Array in Java script .

Unit-IV

Cascading Style Sheet : introduction- inline styles, creating style sheets with the style element, conflicting styles, linking external style sheets, positioning elements, background element dimensions, text flow and the box model, user style sheets.

UNIT V

Introduction to PHP: Advantages of PHP, functions, Data types, Arrays, MySQL, Connecting Databases using ODBC, Files, Forms, Images, IMap objects. Handling Form data in a secured manner. Security on Web Pages.

Recommended Books:

[1] M.L. Young; Complete Reference b: Internet; 2nd Edition; Tata McGraw Hill, 2006
[2] Thomas A; Powel: Web Design ; C.R. : Second Edition TMH,2009.
[3] Thomas A. Powel : HTML & XHTML : C.R. Fourth Edition; TMH, 2008
[4] Harely Hahn: the Internet, Tata Mc Graw Hill.
[5] G. Roverston; Hands on HTML., BPB Publication
[6] D.A. Tauber, B. Kienan; Microsoft From Page 2000, BPB Publications.
[7] Joel Sklar: Principles of Web Design BPB Publication

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PGD 803 : Programming in Java

Unit-I

Introduction to OOP: Paradigms of Programming Languages – Basic concepts of Object Oriented Programming , Objects and Classes, Data abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic binding, Message communication: Benefits of OOP; application of OOPs. **Introduction to Java :** History, Java features, Java Environment- JDK, API. Types of Java program, Creating and Executing a Java program; Java tokens: Keywords, Character set, Identifiers, Literals, Separator; Java Virtual Machine (JVM); Command Line Arguments; Comments in Java program.

Unit-II

Elements: Constants Variables, Data types, Scope of variables, Type casting. Operators-Arithmetic, Logical, Bit wise operator, Increment and Decrement, Relational, Assignment , Conditional ,Special operator, Expressions, Evaluation of expressions.**Decision Making and Branching:** If statement and its types, switch statement; Decision making and looping -while loop, do While, for loop, break labeled loop, continue statement. **Arrays:** One Dimensional Array, Multidimensional Array, Vectors, Wrapper classes; String Array, String Methods, String Buffer Class. **Class and Objects :** Defining a class, Methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of Methods, this keyword, command line input.

Unit-III

Inheritance : Define a subclass, deriving a sub class, Single Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Overriding methods, Final variables and methods, final classes, Finalizer methods, Abstract methods and classes, Visibility Control- Public access. Private access, friend, protected. Interface-Multiple Inheritance, Defining interface, Extending interface, Implementing Interface, Accessing interface variables. **Packages:** Java API Packages-System Packages, Naming Conventions, Creating & Accessing a Packages, Finding Packages and CLASSPATH, Adding Class to a Packages, Hiding Classes.

Unit-IV

JAVA Streams : Data Flow with Java Streams, Input Streams, Output Streams. Exception Handling: Limitations of Error handling, Advantages of Exception Handling, Types of Errors, Basics of Exception Handling, try blocks, throwing an exception, catching an exception, finally statement. declaring and throwing custom Exceptions. **Multithreading:** creating treads, life of a thread, defining & running thread, thread methods, thread priority, synchronization, implementing run-able interface, thread scheduling.

Unit V

Collections: The Collection Framework, The Collection Classes, implementation of List, Set and Map interface, Accessing a Collection via an Iterator, object Ordering, The SortedSet and SortedMap Interface, Comparators. **GUI in Java :**applet and it uses; Abstract window tool kit, Event Handlers, Event Listeners. AWT Controls and Event Handling- Labels, Text Component, ActionEvent, Buttons, CheckBoxes, ItemEvent, Choice, Scrollbars, Layout Managers, Input Events, Menus; Introduction to Swing. **Networking:** Java utility for networking, Manipulating URLs, reading a file on a Web server. Establishing simple Client Server.

Reference Books:

[1] Patrick Naughton, Herbert Schildt :, Java, The Complete Reference : 7th Edition.
[2] E. Balagurusamy: Programming with Java- Tata McGrawHill Publishers, II Edition.
[3] Khalid A. Mughal, Rolf W. Rasmussen; A Programmer's Guide to Java Certification (2nd Edn.).
[4] Cay. S Horstmann, Gary Cornell; Core Java Vol I & II; The Sun Micro Systems Press.
[5] Ken Arnold, James Gosling: Core Java Fundamentals(Volume I and Volume 2). 2nd Edition-, Addison Wesley.
[6] Kathy Sierra, Head first Java, 2nd Edition, Orielly.

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PGD 804: Data Communication and Computer Network

Unit-I

Overview of Data Communication and Network: Basic concept –Computer communication methods, Data Transmission modes, Signals, Modulation – Principles of Modulation, AM and FM Modulator Circuits, Demodulation .

Unit II

Network Models: Internet model, OSI seven layer network model, Functions of OSI layers, LAN technologies – protocols and standards, LAN hardware, TCP/IP (Protocols, architecture, layers, services).

Unit-III

Data Transmission: Data Communication Systems, DTE-DCE Interface, Modems, Transmission media (Guided & Unguided), Multiplexing – FDM, WDM, TDM, Digital Subscriber Line (Operation, Layers, Traffic control), Microwave-Electromagnetic spectrum, Characteristics, Satellite- Artificial Satellite, Geosynchronous Satellites, Orbital classification, Spacing and Frequency allocation, Multiple accessing.

Optical fiber communication : Basic concept of light propagation, Fiber Cables, Light sources, Optical Detectors, Fiber cable losses, wave division multiplexing, fiber distributed data interface, the fiber channel

Unit-IV

Internet: Internet Architecture, Internet protocol and datagram, Routing protocols, UDP, Internet standard services, DNS. Networking Technology, ISDN (Services, Channels, Layers, Broadband ISDN), Cable Modem System, SMDS, Frame relay, fast Ethernet, LAN and Gigabit Ethernet, FDDI and CDDI, Asynchronous Transfer, SONET (architecture, Layers, frame, Applications), Switching Techniques

Unit-V

Networking and Internetworking Devices : Repeaters, Bridges, routers, Gateways and roles of these devices in communication.Network Performance, Analytical approaches, simulation, traffic monitoring, Network Management.

Recommended Books:

[1] Behrouz A Foruzan, Data Communication and Networking; 3rd Edition; Tata McGraw Hill., 2004
[2] Behrouz A Foruzan, TCP/IP Protocal Suite; 2nd Edition; Tata McGraw Hill.,2003.
[3] Stalling William; Data and Computer Communication; 8th Edition Pearson,2009.
[4] Tannenbasum; Computer Networks; 4th edition, PHI 2008.
[5] Wayne tomasim electronic Communications Systems, Pearson, Education Asia.
[6] M.A. Miller, Data and Netowork Communications, Thomosn Kearning
[7] Gilbert Held, Understanding Data Communication, Techmedia.
[8] Fred Harshal, Data Communications Communications, Networks, Pearson Education Asia.

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PGD 805: Computer Architecture

Unit-I

Computer System History and Architecture development von Neumann machine, Mother Board, System clock, Bus (Data, Address Control), Bus architecture (ISA, MCA, EISA, PCI, AGP), Expansion slots and cards (Network adapter cards, SCSI card, Sound card, TV tuner card, PC card), Ports (Serial Parallel, AGP, USB Fire Wire), cables (RS 232, BIN), Input devices Output devices , Storage devices, random versus sequential access, formatting, tracks and sectors, speed, storage capacity, Floppy Disk, Hard Disk tracks, cylinders, sectors; Hard Drive Interfaces Optical Disks , Magnetic tape, Modern (Fax/Data/Voice).

Unit II

Logic gates, basic combinational logic, Boolean functions & Expressions, multiplexer, decoders, encoders, comparators, adder and substructures, BCD to 7 segment decoder, sequential circuits, RS, JK, D and T flip flops, counter and shift register, Clock and Timing events.

Unit-III

Addressing methods and machine program sequencing memory location addresses, encoding of information, instructions types, Instruction format and instructions sequencing addressing modes, paging, relative, indirect and indexed addressing.

Basic of Computer organization: System buses and instruction cycles, memory subsystem organization and interfacing, I/O subsystem organization and interfacing, Register transfer languages.

Unit-IV

CPU design: Specifying a CPU, design and implementation of a simple CPU (fetching instructions from memory decoding and executing instructions, establishing required data paths, design of ALU, Number representation, Arithmetic operations, floating point arithmetic. Design of the control unit and design verification),design and implementation of a simple micro-sequencer.

Unit-V

Memory Organization: Main memory concepts, Auxiliary memory, Associative memory, virtual memory & paging and cache memory organization.

Input and Output organization: Asynchronous data transfer, programmed I/O Interrupts (types, processing of interrupts implementing interrupts inside CPU) Direct memory access, I/O processors, serial communication.

Reference Books:

[1] John D. Carpinelli: Computer Systems Organization & Architecture; 3rd Edition; Person Education Asia,2008
[2] M, Morris Mano; Computer System Architectures; III Edition, Prentice Hall of India,2008
[3] Malvino B ; Digital Computer Electronics III Edition; TMHL
[4] John P. Hayes, Computer Architecture and Organization, McGraw Hill, International Edition.
[5] Vincent J P Heuring and Harry f Jordan: Computer Systems Design & Architecture , Addison Wesley, Person Education Asia.

Practical Labs (PGDCA Semester II)

1. **Paper 811 : Programming in C++ Lab**
   - Lab Exercise based on Theory Paper PGD 801
2. **Paper 812 : Web Application and Java Lab**
   - Lab Exercise on Theory Papers PGD 802 & PGD 803
3. **Paper 813 : Mini Project**
   - Details of Project Submission are given in Annexure A

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Elective Paper Group-III for PGDCA Semester- II

PGD C01: Algorithm and Data Structure

Unit-I

Algorithms, pseudo code, efficiency of algorithms, analyzing algorithms and problems, complexity measures, basic time analysis of an algorithm, space complexity. Data abstraction and basic data structures, data types and abstract data types.

Unit-II

Basic data structure – Arrays, Stack, Queues and their applications, linked and sequential representation of arrays, stacks & queue. Linked lists, representation of linked list in memory. insertion, deletion and searching of linked list, two way lists. Arithmetic expressions, Polish notations, dequeue and priority queues.

Unit-III

Trees: Basic concepts, linked representation, representation in continuous memory. Binary and N-ary trees, Searching, insertion and deletion in binary search tree, traversing algorithms using stacks, header nodes threads.

Unit-IV

Graphs and their representations, sequential representation- Adjacent matrix, linked representation of graphs, operations on graph, traversing a graph. DFS and BFS algorithms. Heap structures, heap sort algorithm .

Unit-V

Sorting and Searching: Use various data structures for searching and sorting, Internal and external sorting techniques, linear and binary search, Hash tables & Hashed searching, Bubble sort, Insertion sort, Selection sort, Merge sort, Radix sort, quick sort.

Reference books

[1] S. Lipschutz: Data Structures; Mc Graw Hill International Edition,2008.
[2] A.V. Aho, J.E. Hopcroft, and J.D. Ullman, Data Structures and Algorithms, 3rd Edition; Pearson Education Asia,2008
[3] Salaria R.S.: Data Structure and Algorithms Using C/C++; 4th Edition; Khanna.
[4] Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data structures with applications TMH Publishing Co.Ltd.
[5] Michael Berman: Data Structures via C++ Oxford University Press.
[6] Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with application, TMH Publishing Co. Ltd.

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PGD C02 : System Analysis and Design Concepts

Unit-I

System Concepts and the information systems Environment: The System concept Definition, System Central Objectives, Elements of a system, Environment, Boundaries and interfaces. Types of systems- Physical or Abstract systems, Open or Closed systems, Role, Need and Responsibility of System Analyst, Introduction to system Development approaches- Data Oriented and Object Oriented. System Development Life Cycle : Linear or Waterfall Cycle, Linear cycle, phases of SW Development Life Cycle.

Unit-II

System planning and Analysis : Strategies for determining information requirement, Problem definition & Project initiation, Background analysis, Data and Fact Gathering Techniques, Feasibility Studies- Technical, Operational, economic, cost benefit analysis, Interface design tools, user interface evaluations.

System Design: Process modeling, Physical and logical design. Conceptual Data modeling, Entity Relationship analysis, ER modeling, Context diagram. Tools of structured analysis (DFD, Data dictionary, Decision Tree, Decision tables, Structured English). Structure Charts, Modules, Parameter passing. Execution sequence, Structured Design, Conversion from Data Flow Diagrams to Structure Charts.

Unit-III

Input/Output Forms Design : Requirement of forms design, User Interface Design, Input design, CRT Screen forms design, Output design.Files organization and Database Design : Designing to Fields, Physical records, Physical files, Database design, Data Structures, Normalization, Introduction to CASE Tools, Features, advantages, and limitations of CASE tools.System Implementation, Maintenance and documentation, testing, evaluation, maintenance Activities, Documentation, Document configuration, maintaining a configuration.

Unit-IV

Introduction to MIS : Meaning and Role of MIS, Definition of MIS, System Approach to MIS, MIS Organization within a company. Concept of Balanced MIS, effectiveness and efficiency criteria. MIS Planning : MIS structure and components, MIS features, problem and Derivation of MIS Plans, Prioration and development strategies. Conceptual Design of MIS : Definition of problem, system objectives and system constraints, Analysis of information source, alternative system design and selection optimal system. Detailed System Design and Implementation: Application of basic design concepts of MIS, Involvement of end-user and role of MIS department and System Analyst, Role of Top Management during design and implementation.

Unit-V

System Evaluation : System evaluation review and update, Management and control of MIS function, Advanced MIS concept, Pitfalls in MIS development. Decision Support System: DSS Definition, Characteristics, Application Case Study. Expert System : Concept Structure, Application and Case Study. Applications of MIS : Applications of MIS to E-Business, Applications in Manufacturing sector, Service sector, DSS, Decision Support System, Enterprise Management Systems.

Recommended Books

[1] Awad E.M.; System Analysis and Design; Second Edition; Galgotia Publication.
[2] Igor Hawryzkiewyez, Introduction to System Analysis and Design, 4th edition. Prentice-Hall
[3] Jain Mdhulika, Jain Satish; Strucutred system Analysis and Design;2nd Edition, 2007.
[4] Jeffrey L. Whittren, and Lonnie D. Bentey, Systems analysis and Design Methods 4th edition, Tata McGraw-Hill.
[5] Philip L Weaver, Practical SSADM wer 4+A Complete Tutorial Guider, Pitman Publishing.
[6] Don Yeates, Maura Shields and David Helmy. System Analysis and Design Longman group limited.
[7] Robert Mudrick; Management Information System; PHI.
[8] W.S. Jawadkar; Management Information System; McGraw-Hill.

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Annexure A

Paper: Mini Project

Guidelines for preparing the Project Report

I. Objective: Student should able to develop a small real time application using any Programming Languages which is part of their course curriculum or any new upcoming Programming Language.

II. Guidelines regarding project:

1. Students should work in group. Minimum number of students in one group can be 2. Maximum number of students in one group can be 4.
2. Students will be working under supervision of one teacher.
3. Students will submit a synopsis of the project.
4. Two copies of the report should be submitted.
5. The reports should be spiral bound along with the soft copy of the project.
6. The reports should be submitted with the following guidelines in the prescribed format.
   - Paper size : A4
   - Margins : Left 1.5, Right, Top and Bottom 1 inch
   - Font : Times New Roman
   - Chapter Heading : 16pt
   - Sub Heading : 14, Sub-Sub Headings: 12 Bold
   - Running Matter : 12 pt
   - All topics should be numbered accordingly.
   - Paragraph Gap : 6 Pt Maximum
   - Line Spacing : 1.5

III: Top Page

<Title of Project Work>

Project report submitted in partial fulfillment of the requirement for the award of the Degree of Bachelor of Computer Application

By
<Name of the Candidate>
Roll No.
Enrollment No. :
Session: <Session>

<University Logo>

< Name of the Constituent/ Affiliated College>
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Jaipur

Raj / Jai

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Second Page

Certificate

This is to certify that the project report entitled ..... being submitted by Mr/Mrs..... in partial fulfilment for the award of the Degree of Bachelor of Computer Application to the University of Rajasthan is a record of bonafied work carried out by himself/herself under my guidance and supervision.

The results embodied in this project report have not been submitted to any other University or Institute for the award of any Degree or Diploma.

(HOD/Director) Guide
Name
Designation

Third Page

The third page may include the Certificate given by Organization or Company where candidate has done his/her project.

Fourth Page

The fourth page should contain the declaration by the students (see the sample format)

DECLARATION

This is to certify that the work reported in the present project entitled "**<Title Of The Project Work>**" is a record of work done by me in the <Department Name>, <Name of the College/ Organization>. The reports are based on the project work done entirely by us and not copied from any other source.

Signature of Candidate
<Mr. / Ms. Name of the Student >
Class:
Roll No.
Enrolment No.
Session:

Fifth Page

The fifth page may include the Acknowledgement.

Sixth and Seventh Page

In this page, a table of contents, list of tables, list of figures must be provided.

Eighth Page

The eighth page should contain an abstract of the Project report. The candidate may emphasize here his/her contributions in the project.

NOTE: All the above pages are to be numbered in Roman numerals of lower case. Ex. i, ii, iii, iv, ... except the top page.

The following is suggested format for arranging the project report matter into various chapters:

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1. Introduction
   This chapter must describe introduction about your project.
2. Literature Survey/Review of Literature
3. Define the problem.
   Define the modules and their functionalities
   Hardware / Software requirements
4. System Design and Implementation
   /* Actual Implementation of the problem should be described in this chapter. */

   The design part must include the following items
   - DFDs in case of Database projects
   - UML diagrams. This UML diagrams must include the following
   - Class Diagrams
   - Interaction diagrams-Sequence and Collaboration diagrams
   - Object Diagrams
   - Use case diagrams
   - Control Flow diagrams
   - Database Design
   -

   In Case of a database projects, the report must include the following items.
   - E-R Diagrams
5. Results and Discussions
6. Conclusions & Future Enhancements / Recommendations
7. References / Bibliography
8. Appendices (if any)

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