



आईएफटीएम विश्वविद्यालय, मुरादाबाद, उत्तर प्रदेश  
**IFTM University, Moradabad, Uttar Pradesh**  
**NAAC ACCREDITED**

**IFTM University**  
**Delhi Road, NH-24 Moradabad, Lodhipur Rajput, Uttar Pradesh 244102**  
**<http://iftmuniversity.ac.in/>**

**Study & Evaluation Scheme of**  
Post Graduate Diploma in Computer Application  
[Session: 2019-20]

Program:	Post Graduate Diploma in Computer Application
Course Level:	PG Diploma
Duration:	One Year(Two Semesters) full Time
Medium of Instruction:	English
Minimum Required Attendance:	75%
Maximum Credit:	60

**PROGRAM OUTCOMES (POs) :**

**Students completing this Programme will be able to:**

- PO1:** It will equip the students with skills required for designing, developing applications in Information Technology.
- PO2:** Students will be able to learn the latest trends in various subjects of computers & information technology.
- PO3:** The PG Diploma is aimed at graduates with a computing background and provides a detailed coverage of the key concepts and challenges in data and resource protection and computer software security.
- PO4:** To give hands on to students while developing real life IT application as part of the study.
- PO5:** To train graduate students in basic computer technology concepts and information technology applications.
- PO6:** Design and develop applications to analyze and solve all computer science related problems.
- PO7:** To expose the students to open Source technologies so that they become familiar with it and can seek appropriate opportunity in trade and industry.
- PO8:** Able to provide socially acceptable technical solutions to real world problems with the application of modern and appropriate programming techniques.
- PO9:** Design applications for any desired needs with appropriate considerations for any specific need on societal and industrial aspects.
- PO10:** To develop inter-twining competence in the field of Commerce and Management, Computing Skill and Computational tools.
- PO11:** To develop abilities for data analysis and interpretation Using ICT.
- PO12:** To develop the basic programming skills to enable students to build Utility programs.
- PO13:** To develop the foundation for higher studies in the field of Computer Application.
- PO14:** To provide specialization in Management with technical, professional and communications skills.
- PO15:** To train future industry professionals.

COURSE STRUCTURE AND SYLLABI FOR  
(P.G.D.C.A.)

IFTM UNIVERSITY, MORADABAD

POST GRADUATE DIPLOMA IN COMPUTER APPLICATION

**Course Structure**

**I Semester**

S. No.	SUB CODE	Subject	Periods/week			Evaluation Scheme		Subject Total
			L	T	P	Sessional Exam	End Semester Exam	
1	PGD101	Fundamentals of Information Technology	4	2	0	30	70	100
2	PGD102	“C” Programming & Data Structure	4	2	0	30	70	100
3	PGD103	Operating Systems	4	2	0	30	70	100
4	PGD104	Data Base Technology	4	2	0	30	70	100
5	PGD105	Web Technology & Internet	4	2	0	30	70	100
Practical								
6	PGD151	“C” Programming & Data Structure Lab	0	0	3	-	100	100
7	PGD152	Operating System (Windows & Linux Lab)	0	0	3	-	100	100
8	PGD153	Web Technology Lab	0	0	3	-	100	100
9	PGD154	Minor Project (Based on PGD 104)	0	0	3	-	100	100
Total			20	10	12	150	750	900

**IFTM UNIVERSITY, MORADABAD**

**POST GRADUATE DIPLOMA IN COMPUTER APPLICATION**

**Course Structure**

**II Semester**

S.No.	SUBJECT  CODE	Subject	Periods/week			Evaluation Scheme		Subject  Total
		Theory	L	T	P	Sessional Exam	End Semester Exam	
1.	PGD201	Object Oriented Programming and Java	04	02	00	30	70	100
2.	PGD202	System Analysis and Design	04	02	00	30	70	100
3.	PGD203	Visual Basic	04	02	00	30	70	100
4.	PGD204	Computer Network	04	02	00	30	70	100
Practical								
5.	PGD251	Java Programming Lab	00	00	03	-	100	100
6.	PGD252	Visual Basic Programming Lab	00	00	03	-	100	100
7.	PGD253	Major Project	00	00	09	-	200	200
Total			16	08	15	120	680	800

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**Post Graduate Diploma in Computer Applications (PGDCA) Programme**  
**One Year Program**

**PGDCA**  
**SYLLABUS**  
**IFTM UNIVERSITY, MORADABAD**

I SEMESTER

FUNDAMENTALS OF INFORMATION TECHNOLOGY

PAPER I

**CODE: PGD-101**

**Objectives:**

1. The main objective is to introduce IT in a simple language to all undergraduate students, regardless of their specialization.
2. It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
3. The focus of the subject is on introducing skills relating to IT basics, computer applications, programming, interactive Medias, Internet basics, Numbers Systems, Gates, Computer Languages Basics etc.

**UNIT-I**

An overview of computer system. Organisation of a Computer System-I/O & CPU. Concept of Data Processing, Generation of Computers, Organisation of Computers, Application of Computers, Classification of Computers.

Components of Computer System- Hardware: Input & Output devices, peripherals printers-impact & non-impact Printers. electromagnetic electrostatic thermal, Inkjet and laser -CRTs-displays -graphics and alphanumeric- keyboards, dumb and intelligent terminals.

**UNIT-II**

Definition of information, Data Vs Information, Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Need, Value and Quality of information, Category and Level of Information in Business Organization.

RAM/ROM, Computer Hardware, CPU, Various I/O devices, Peripherals, Storage Media, Software Definition, Role and Categories, Firmware and Humanwer.

**UNIT-III.**

Number System and radix- Binary, octal, Decimal, Hexadecimal. Conversion from one system to another. Fractional numbers. One's and two's Complement Representation. Binary Arithmetic: Addition and subtraction , Representation of signed and unsigned binary numbers.

Binary codes- Weighted and non-weighted code. ASCII, EBCDIC, BCD, GRAY and EXCESS-3 codes. Self-complementary codes. Error detection and correction, Parity bit.

Logic circuits-Logic gates NOT, AND, OR, NAND, NOR, XOR, XNOR gates. Universal operation of NAND and NOR gates.

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**UNIT-IV.**

Computer Languages, Generation of Languages, Translators-Interpreters, Compiler/Interpreters, Compilers, Flow, Charts, Dataflow Diagram, Assemblers, Introduction to 4GLs, Software Development Methodology, Life Cycles, Software Coding, Testing, maintenance, ISO.

**UNIT V**

Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows, MS office Tools, MS WORD, MS EXCEL, MS Power Point, Tools for Data Management, Basics of Database management system, Introduction to basic Commands of Dbase, Foxpro, SQL etc.

**UNIT VI**

Scientific, Business, Educational and Entertainment Application, Industry Automation, Weather Forecasting, Awareness of Ongoing IT projects in India NICNET, BRNET etc. Application of IT to other Areas E Commerce, electronic governance, Multimedia, Entertainment.

**Outcomes:**

At the end of this course, student should be able to

- 1 Understand basic concepts and terminology of information technology used in current era.
2. Have a basic understanding of personal computers and their operations such as MS Word, Excel Operating System.
3. Students are able to identify issues related to information security. Pre-requisites: Preliminary knowledge of computer, their operations and applications used in IT Industry.

**Suggested Readings:**

1. D S Yadav, "Foundations of IT", New Age, Delhi
2. Computer fundamentals-Architecture and Organisation by B. Ram(Wiley Eastern Limited).
3. Fundamentals of Computers by V. Rajaraman (Prentice Hall of India).
4. Computer Fundamentals by P.K Sinha (BPB).
5. Computer Primer by D Rajaraman (Prentice Hall of India).
6. Digital Electronics by Morris Mano.

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://onlinecourses.nptel.ac.in)
- <https://www.programiz.com>

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**‘C’ PROGRAMMING AND DATA STRUCTURE**  
**PAPER II**  
**CODE: PGD-102**

**Objectives:**

1. The objective of this paper is to teach the Programming Language C. However, the process of learning a computer language will also be emphasized. Emphasis is also on semantics and problem solving.
2. Understand and remember algorithms and its analysis procedure.
3. Introduce the concept of data structures through ADT including List, Stack, and Queues.
- 4 To design and implement various data structure algorithms.
5. To introduce various techniques for representation of the data in the real world.
6. To develop application using data structure algorithms.
7. Compute the complexity of various algorithms.

**UNIT I**

**Introduction To ‘C’:** Development of C Special features of C language, Structure of a C program, Constants, Literals reserved words, Identifiers, Data types and their sizes, Expression, Statements, Input and output functions, Formatted Input/ Output, Operator and expressions.

Program Structures: Conditional and unconditional branch control structures, Loop Control structures, Break and Continue in Loop structures, C functions, Library functions, User-defined functions, arguments and parameters, Scope rules for identifiers, C structures and union. Declaration and initialization.

**UNIT II**

Array and Pointers: Array declaration, Multidimensional arrays, String, Rules to initialize arrays, Pointers, declaration of a pointer variable, The address pointers, Pointer arithmetics, Dynamic storage allocation.

**UNIT III**

Files and Graphics in C: File data type, Different file operations, Random access file, Graphics in C, Text mode, Graphics mode, Animation, C processors and command line arguments.

**UNIT IV**

Linear Data Structure: Linear Arrays, Array Storage, Structures, Application of array, Linked Lists, Storage, Structures linked list application, Stacks, Definitions and concepts, Stack application polish notations and expression, Queue operation, Queue implementation and applications .

**UNIT V**

Non Linear Data Structure: Trees, Basic terminology, Binary Trees, Inorder, Postorder, preorder traversals, Binary Search Trees (BST), Operations on a BST – Insertion, Deletion, Search for a key in BST, Sorting and Searching.

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**Outcomes:**

**Students will able to:**

1. Learn a C Programming language will also be emphasized. Emphasis is also on semantics and problem solving.
2. Also know the data structures as applied to specified problem definition.
3. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
4. Students will be able to implement Linear and Non-Linear data structures.
5. Implement appropriate sorting/searching technique for given problem.
6. Design advance data structure using Non-Linear data structure.
7. Determine and analyze the complexity of given Algorithms.

**Suggested Readings:**

1. C Programming: Schaum Outline Series.
2. Let us C by Y.P.Kanetkar.
3. Introduction of data structures with application by P.G. Sorenson.
4. “Magic with C” AB Publication

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://www.onlinecourses.nptel.ac.in)
- <https://www.programiz.com>

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**OPERATING SYSTEM**  
**PAPER III**  
**CODE: PGD-103**

**Objective:**

Students will try to learn:

1. To understand the main components of an OS & their functions.
2. To study the process management and scheduling.
3. To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
4. To understand the concepts and implementation Memory management policies and virtual memory.
5. To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS
6. To study the need for special purpose operating system with the advent of new emerging technologies

**UNIT-I.**

Historical view, Process management and scheduling –state model, process view of OS, job Scheduling, process scheduling, Types of OS- Batch processing, multiprogramming, multitasking, Time sharing & real time system, Function of an OS, structure of OS layered ,kernel based ,microkernel based Structure, Memory management-segmentation , paging and virtual Memory.

**UNIT-II**

File Organization and accessing techniques: Indirect, Line, Sequential , Hashed.

**UNIT-III**

Introduction , Evolution of Unix OS ,Features & Structure of Unix OS , Difference from Other OS.

Fundamental concepts of Unix System security ,Login, file permissions, home directory, Super user Login/Logout .Unix file system, Special files, Hierarchical file system, use of special files, Introduction to V I Editor. Basic commands of Unix.

**UNIT-IV**

**Windows 98 & Windows XP**

Overview of Windows 98 & Windows XP: GUI, Menu and Menu Bar, Dialogue box, Icons, Control Panel, File system, Managing files and folders, Managing User Accounts, Managing Disks, Managing Desktop, Program Files, Accessories: Word Pad, Note Pad, Paint, etc.

**Outcomes:**

**Students will able to:**

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand the process management policies and scheduling of processes by CPU .
3. Evaluate the requirement for process synchronization and coordination handled by operating system
4. Describe and analyze the memory management and its allocation policies.
5. Identify use and evaluate the storage management policies with respect to different storage management technologies.
6. Identify the need to create the special purpose operating system.



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**Suggested Readings:**

1. Operating systems - Colin Ritchie (BPB).
2. Concepts of operating Systems incorporating UNIX & WINDOWS - D. M. Dhamdhare .
3. Inside Windows 95-A. King (Microsoft Press).
4. Introduction to the X windows system -O. Jones (prentice Hall).
5. A User Guide to the UNIX system - Dr. Rebecca Thomas , Jeans Yates (TMH).

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://onlinecourses.nptel.ac.in)
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DATABASE TECHNOLOGY  
PAPER IV  
**CODE: PGD-104**

**Objectives**

- It aims at acquainting students better with the basics of DBMS, different IT Industry.
- Models for DBMS, Normalization of data, Concurrency control problems and its management, Protection, Security and recovery aspects of databases along with practical knowledge's of databases using SQL and PL/SQL.
- The key goal is to prepare students for a professional career in the field of data. Administration and database design. To get acquaint students with good knowledge of DBMS. During the course, students will learn about database design and database handling activities.
- Learn how to identify an organization's information processing requirements.
- Learn how to develop a detailed specification for an information system that can fulfil these requirements.
- Understand that the successful systems analyst needs to have a broad understanding of organizations, organizational culture, organizational change, organizational operations, and business processes

**Unit I.**

What is database. Traditional file system and Database approach, Advantages of using Databases, types of Databases, concept of data items , fields , records and files, data models, SCHEMEANDINSTANCES, DATAINDEPENDENCE DATA BASE LANGUAGES AND INTERFACESE-R Model Concepts, Notations & Examples ForE-R Diagrams, Architecture And Concepts Of Relational Databases. .

**Unit II.**

Introduction and features , SQLplus oracle data types .

Table :- creation , insertion , updation , deletion of data contents , modification of Structure , removing deleting , dropping of tables , select of commands , alter table Command .

Data constraints:- null value , unique key , primary key , foreign key , logical operator, Range searching , pattern matching , oracle functions.

**Unit III.**

Joins:- joining multiple tables , equi joins , self join, union , intersect and minus clause. Indexes views:-

Creation , updation , destroying , selection of data, granting permissions , permissions on The object created by user , grant statement.

**Unit IV.**

Cursors, procedure and function , concepts creation , execution, syntax.

Triggers:-concept , use, how to apply database triggers syntax.

**Unit V.**

setting up MS Access , designing a database , Add & editing data , tables , queries , forms & Reports.

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**Outcomes:**

Students will able to:

1. Knowledge & Understanding: Databases and their design & development for real life applications and also construct queries in Relational Algebra.
2. Create and populate a RDBMS for a real life application, with constraints and keys, using SQL.
3. Retrieve any type of information from a data base by formulating complex queries in SQL.
4. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
5. Build indexing mechanisms for efficient retrieval of information from a database.
6. Intellectual Cognitive/ analytical skills: Normalization of Databases.
7. Practical Skills: Using SQL and PL/SQL.

**Suggested Readings:**

1. Data Base Management : Objectives , System Function & Administration - Everest (TMH)
2. Access 2002 The Complete Reference -Anderson(TMh).
3. How to do Everything with Access 2002 -Anderson(TMh)
4. C.J. Date, "An introduction to Database system: Vol. 1, Addison Weseley.
5. Bipin Desai, "An introduction to Database system", Galgotia Publications, New Delhi.
6. Korth, "Database and its Concept", TMH.

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://onlinecourses.nptel.ac.in)
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**WEB TECHNOLOGY AND INTERNET**  
**PAPER V**  
**CODE: PGD-105**

**Objectives**

Students will try to learn:

1. To get familiar with basics of the Internet Programming.
2. To acquire knowledge and skills for creation of web site considering both client and server side Using JSP and JDBC programming
3. To gain ability to develop responsive web applications
4. To explore different web extensions and web services standards
5. To learn characteristics of HTML,DHTML,Java Script

**UNIT I**

**Internet Principals:** Introduction to Internet, Clients Server Model, Protocol, Internet IP Address, DomainName, Internet Services, Electronic Mail, World Wide Web, Internet Security, Electronic Commerce (E-Commerce) and Electronic Data Interchange(EDI)

**UNIT II**

**Introduction to HTML:** A brief History, HTML Tag, HTML Documents, Header Documents, Body Sections,Heading, Link Document using Anchor Tag, Formatting Characters, Font Tag, Images Characters, Listing, Tables in HTML

**UNIT III**

**Frames and Forms:** Frames Definitions, Frames, Nested Frames, Elements of a Form

**UNIT IV**

**Elements of JavaScript:** Data Types, Variables, Operators, Conditional Statements, Array Objects, StringObjects

**UNIT V**

**Server Side Script with JSP:** Clients Responsibilities, Server Responsibilities, Introduction to JSP, JSPArchitecture, JSP Servers, JSP Tags, Request Object, Response Objects

**UNIT VI**

**JSP with JDBC:** Creating JDBC Data Source Name, Introduction to JDBC, Prepared Statement Class (SQLStatement).

**Outcomes:**

**Students will able to:**

1. Implement interactive web page(s) using HTML, CSS and JavaScript.
2. Design a responsive web site using HTML5 and CSS
3. Demonstrate Rich Internet Application.
4. Build Dynamic web site using server side Programming and Database connectivity.
5. Describe and differentiate different Web Extensions and Web Services.

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6. Demonstrate web application using JDK.

**Suggested Readings:**

1. The internet complete reference – Hahn, TMH
2. Internet book – Comer, PHI
3. Web Technology & Design B – C. Xavier, New Age International
4. Advance Programming in WEB Design By – V.K. Jain, Cyber Tech. Publication.
5. “Web Technology”, Laxmi Publication.
6. DOT NET Framework with ASP.NET & C#”, Dhanpat Rai Publication
7. Magic with HTML, DHTML and Javascript”, Laxmi Publication.

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
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SYLLABI—PGDCA 2019-20

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**‘C’ PROGRAMMING AND DATA STRUCTURE LAB**  
**CODE: PGD-151**

**Lab Objectives:** Students will try to learn:

1. The objective of this paper is to teach the Programming Language C. However, the process of learning a computer language will also be emphasized. Emphasis is also on semantics and problem solving.
2. Understand and remember algorithms and its analysis procedure.
3. Introduce the concept of data structures through ADT including List, Stack, and Queues.
- 4 To design and implement various data structure algorithms.
5. To introduce various techniques for representation of the data in the real world.
6. To develop application using data structure algorithms.

**Laboratory Practices**

1. Simple hands on computers and DOS Commands e.g. CD, MD, RD, COPY, TYPE etc.
2. Simple Problems Using READ / READLN & WRITE / WRITELN Statement.
3. Formula Based Problems using Variables declaration and Constants.
4. Assignment Statement with INTEGER, REAL, CHARACTER and BOOLEAN type variable and use of operators.
5. Use of Library Functions e.g. SQRT, SIN, COS, LOG, SUCC, PRED, ORD etc.
6. Conditional Checking Using IF-THEN, IF-THEN –ELSE, Nested IF-THEN statement.
7. Use of Conditional and Unconditional CASE-OF & GOTO statement
8. Loop Statement using WHILE-DO statement
9. Loop Statement using REPEAT-UNTIL statement
10. Loop Statement using FOR-DO statement for Series, Pattern generation etc.
11. Problems on One Dimensional Array.
12. Declaration, Reading, Writing, Insertion, Deletion, Arithmetic Operations (total, maximum, minimum, average etc)
13. Problems on one Dimensional Array Searching (Linear, Binary), Sorting (Bubble, Selection, Insertion), Merging
14. Problems on two Dimensional Array Reading, Writing, Matrix Operation: Addition, Subtraction, Multiplication etc
15. Problems based on STRING and PACKED ARRAY data types eg. Vowel/C onsonants Checking, Length, Reverse, Palindrome etc.
16. PROCEDURE: declaration and use (All relevant problems should be done with FUNCTION/PROCEDURE)
17. Introduction to Recursive Problems, (Eg. Factorial, Power, GCD etc.)

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18. Declaration, Reading, Writing and manipulation on RECORD type
19. Declaration and use of Operators on SET data Type
20. Reading, Writing and Appending data Into Text and Binary Files
21. Problems based on Pointer implementation

**Hardware requirement:** PC i3 and above.

**Software requirement:** Turbo/Borland C complier

**Outcomes:**

**Students will able to:**

1. Learn a C Programming language will also be emphasized. Emphasis is also on semantics and problem solving.
2. Also know the data structures as applied to specified problem definition.
3. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
4. Students will be able to implement Linear and Non-Linear data structures.
5. Implement appropriate sorting/searching technique for given problem.
6. Design advance data structure using Non-Linear data structure.
7. Determine and analyze the complexity of given Algorithms.

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**OPERATING SYSTEM (WINDOWS & LINUX LAB)**  
**CODE: PGD-152**

**Lab Objectives:** Students will try to learn:

This LAB introduces basic understanding of UNIX OS, UNIX commands and File system and to familiarize students with the Linux environment. To make student learn fundamentals of shell script and shell programming. Emphases are on making student familiar with UNIX OS environment and issues related to it.

**Laboratory Practices**

1. Introduction to Unix Operating System and comparing it with Windows OS. Overview to Open Source Software. Writing and studying about how to execute C program in Unix environment using GCC compiler along with phases of compilation. Executing simple Hello World C program in UNIX environment using ed / nano / pico editor.
2. Working with the vi editor: Creating and editing a text file with the vi text editor using the standard vi editor commands
3. UNIX for Beginners: Getting hands-on on basic UNIX commands
4. Some more UNIX commands: Working with directories, input-output redirection, Pipes, Processes
5. The UNIX file system.
6. Using the Shell 7 Working with filters: grep, sed and awk 8 UNIX Shell Programming.
9. Programming with standard I/O.
10. UNIX System Calls.

**Outcomes:**

Students will able to: 1. Students will be able to run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system). 2. You will be able to run C / C++ programs on UNIX. 3. You will be able to do shell programming on UNIX OS. 4. You will be able to understand and handle UNIX system calls.

**Suggested Readings:**

1. Brian W. Kernighan and Rob Pike, “The UNIX Programming Environment” Prentice Hall India (Edition available in LRC and in the form of E Book on student resource)
2. Sumitabha Das, “UNIX: Concepts and Applications” Tata McGraw Hill (Latest Edition)
3. Yashwant Kanetkar, “UNIX Shell Programming” BPB Publications (First Edition)
4. Jerry Peek and others, “Unix Power Tools” O’Reilly Publishers



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**WEB TECHNOLOGY LAB**  
**CODE: PGD-153**

**Lab Objectives:** Students will try to learn:

This lab is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, DHTML, Java Script the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing

**Laboratory Practices**

1. Create a form by using various attributes of the input tags.
2. Create a web page multiple types of style sheet used in a single page.
3. Write a CGI sample program to send output back to the user.
4. Write a Java Script program by using variables.
5. Write a java script program to multiply two numbers and display the result in separate text box.
6. Write a java script program on Form Validations.
7. Write a AJAX program checking the presence of XMLHttpRequest object.
8. Write a program to create a report for our books by using HTML, CSS, DHTML.
9. Create an XML document template to describe the result of students in an examination. The description should include the student's roll number, name, three subject names and marks, total marks, percentage and results.
10. Write an XSLT code to only retrieve the book titles and their prices.
11. Design a basic elements of a home page.
12. . Create a table in HTML to the following details

<b>Book Name Author</b>	<b>Book Name Author</b>
Operating Systems Godbole	Operating Systems Godbole
Data Communications and Networks Godbole	Data Communications and Networks Godbole
Computer Networks Rajkumar	Computer Networks Rajkumar
OOPs R.Nageswara Rao	OOPs R.Nageswara Rao

13. Write a java program to connect to a database server using JDBC and insert students information of user choice in to student table.
14. Write a java program to display all records in the student table.
15. Develop a simple Servlet to display Welcome to Servlet.
16. Develop a Servlet to validate user name and password with the data stored in Servlet configuration file. Display authorized user if she/he is authorized else display unauthorized user.
17. Develop a Servlet to validate user name and password stored in database. Display authorized user is she/he is authorized else display unauthorized user.
18. Write a Servlet program to store student details sent from registration form in to database table.
19. Write JSP Program to store student information sent from registration page into database table

**Outcomes:**

At the end of the course, students should be able to:

1. Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
2. Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
3. Get introduced in the area of Online programming.

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4. Analyze a web page and identify its elements and attributes. · Create web pages using HTML,DHTML and Cascading Style Sheets.
- 5..Build dynamic web pages using JavaScript (Client side programming). · Create XML documents and Schema.

**Suggested Readings:**

1. Achyut Godbole,Atul Kahate"Web Technologies:TCP/IP,Web/Java Programming, and Cloud Computing”,Third Edition,McGraw Hill Education.
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education, 2006.
3. Raj Kamal, “Internet and Web Technologies”, Tata McGraw-Hill.

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**MINOR PROJECT (BASED ON PGD-104)**  
**CODE: PGD-154**

**Lab Objectives:** Students will try to learn:

1. To provide students for knowledge of software applications Components and OOPs techniques and its package information for software development.
2. Knowledge for the development of software with based on programming language.
3. Design and development of Small software project based on hardware and software

**Course Contents:** Mini project may be carried out in one or more form of following: Product preparations, working/non-working models, prototype development, fabrication of setups, laboratory experiment development, process modification/development, simulation, software development, integration of software and hardware, statistical data analysis, survey, creating awareness in society. The student is required to submit a report based on the work. The evaluation of the project shall be on continuous basis.

**Course Guidelines:** 1. Students should select a problem which addresses some basic home, office or other real life applications.

2. The software applications for the selected problem.
3. Students should understand testing of various components.
4. Students should see that final project submitted by them is in working condition.
6. 25-50 pages report to be submitted by students.
7. Group of maximum three students can be permitted to work on a single mini project.
8. The mini project must have hardware part. The software part is optional.
9. Department may arrange demonstration with poster presentation of all mini projects developed by the students at the end of semester.
10. It is desirable that the Project/systems developed by the students have some novel features.

**Course Outcome:** At the end of this course, students will be able to:

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.
2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.
3. Reproduce, improve and refine technical aspects for software engineering projects.
4. Work as an individual or in a team in development of technical projects.
5. Communicate and report effectively project related activities and findings.

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II SEMESTER

OBJECT ORIENTED PROGRAMMING AND JAVA  
PAPER I  
CODE: PGD-201

**Objectives**

Students will try to learn:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and Applet & AWT that respond to different user events.
6. To understand Java Applet for designing GUI applications.

**Unit I**

Abstract data types Introduction , model of real world , attributes , autonomy , generation of correct Application , reusability , classes , instance values , methods and messages , Creating and destroying objects , constraints on object and instance variables , Pre and post conditions methods.

**Unit II**

Inheritance:-Inheritance , inheritance with subtyping , redefining instance variables , hiding instance Variables , inheriting methods , overriding , invoking super class methods ,including super class methods – metaclasses , different types of inheritance:- single inheritance , Multiple inheritance , hierarchical inheritance , multilevel inheritance , hybrid inheritance , Defining derived class , visibility modes , protected : to make a private member inheritable.

**Unit III**

Object Oriented :Concepts and implementation Introduction , polymorphism , object identity , modeling , abstraction , object modeling Technique(OMT) , object modeling concepts , object oriented design , why OOD, object Oriented programming languages , object oriented languages , object oriented database Object oriented user interface.

**UNIT IV**

Overview of Java language

C++ Vs Java , Java and internet , Java and WWW, Java support systems , Java environment , Java program structure , tokens, statements , Java virtual machine , Constants and variables , data types , declaration of variables , scope of variables , Symbolic constants, type casting. Operators:-arithmetic , relational , logical ,

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assignment , increment and decrement ,Conditional , bitwise , special , expression and its evaluation.  
Decision making and Branching :-If statement , if ...else ...statement , nesting of if ..else. Statement , else ...if ladder , switch ,?operators, Loops, while , do , for , jumps in loops ,Labeled loops.

#### **UNIT V**

Classes objects and methods Defining a class , adding variables and methods , creating object , accessing class members , constructions methods , overloading static methods , nesting of methods.

#### **UNIT VI**

Arrays: one dimensional & two dimensional arrays , strings , vectors , wrapper classes , defining interfaces, extending interfaces , implementing interfaces , accessing interface variables , system packages , using system packages , naming conventions , creating packages , accessing a package , using package , adding a class to a package ,hiding classes.

Creating Threads, Extending the Thread class , stopping and blocking a Thread , life cycle of Thread , Using Thread method , Thread Exceptions , Thread priority, Synchronization.

#### **Applet programming :**

Local and remote applet , applet Vs application , writing applet , applet life cycle , creating an executable applet , designing a web page , applet tag , adding applet to HTML file , running applet , passing parameters(arguments) to applet , getting input from user.

#### **Outcomes:**

##### **Students will able to:**

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem.
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.
6. Identify, Design & develop Graphical user interfaces using principal Java Applet and AWT.

#### **Suggested Readings:**

1. Learn Java Now -Davis , R , Stephen(Microsoft Press).
2. Java 2 : The Complete Reference - Herbert Schildt(TMh).

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3. JAVA Elements :Principals of programming in Java - Bailey(TMh).
4. The Java programming language - Ken Arnold , James Gosling(Pearson Education).
- 5.Programming with Java- E. Balagurusami (TMH)
6. Object Oriented Analysis and Design with Examples, Grady Booch (Benjamin/Cumm-ings 2nd ed).
7. Object Oriented Modelling and Design , James Rumbaugh et al (Prentice Hall).

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://onlinecourses.nptel.ac.in)
- <https://www.programiz.com>

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SYSTEM ANALYSIS AND DESIGN

PAPER II

**CODE: PGD-202**

**Objectives:** The students should be able to:

1. To introduce to students the various methodologies, processes, techniques, and tools in Systems Analysis and Design.
2. Understand both the nature of 'information systems analysis and design' and its various components.
3. Demonstrate knowledge on the different phases of Systems Development Life Cycle (SDLC).
4. Appreciate the use of systems design techniques, methodologies, and tools.

### **UNIT I**

Overview: The system concept, Elements of system, Types of system, System Development life cycle - Recognition of need –problem identification, Feasibility study, Analysis, Design, Implementation, Post implementation and Maintenance, Consideration for candidate system, Prototyping, Choice of design methodologies, Fact finding techniques, Auditing trail.

### **UNIT II**

The Role of the system Analyst: Introduction, Definition & Historical Perspective, Academic; and Personal Qualifications, The Multifaceted Role of the Analyst: Change Agent, Investigator and Monitor, Architect,

Psychologist, Salesperson, Motivator, Politician, The Analyst/User Interface: Behavioral issues, Conflict resolution, The Place of the Analyst in the MIS organization: The MIS organization, Rising Positions in System development, The Paraprofessional.

### **UNIT III**

Feasibility Study: Introduction, System Performance, Definition, Statement of constraints, Identification of specific system objectives, Description of outputs, Feasibility study: Feasibility considerations, steps in Feasibility Analysis, Feasibility Report, Oral Presentation-walk through.

### **UNIT IV**

Input/ Output and forms Design: Introduction, Input design-Input data, Input Media & Devices output design: Categories of output, Selection of output media & equipment, Design principle, Output design, documentation and its use, Output packaging, Form design: What is a form? Classification of forms, requirements of form design, Carbon paper as a forms copier, Types of forms, layout consideration, Form control, Procedures.

### **UNIT V**

File organization & data base design: Introduction, File structure, File organization:- Sequential, Indexed, Indexed sequential organization, Inverted list organization, Direct access organization, Data base design objectives of data base key, terms, Logical and physical views of data, Data structure normalization, The role of data base administrator.

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## **UNIT VI**

Hardware /Software Selection and The Computer Contract: Introduction, The Computer Industry:- Hardware suppliers, Software suppliers, Service suppliers, The Software industries, types of software, A procedure for Hardware/Software selection:- Major phases in selection, software selection:- The evaluation process, Financial consideration in selection, The rental option, The lease option, The purchase option, The used Computer, The Computer Contract: The art of Negotiation, Contract checklist.

## **UNIT VII**

Organizational Adjustment, Testing and Conversion: Introduction, Task identification, Training Orientation, Organization change and resistance, Conversion, Activity network for conversion, System testing, Activity network for system testing, System quality assurance, Software maintenance, Setting maintenance, priorities, Maintenance management, Maintenance guidelines.

### **Outcomes:**

The students should be able to:

1. Identify various types of information systems concepts and terminologies.
2. Explain the types of business needs that can be addressed using information technology based solutions.
3. Discuss the initial phases of the System Development Life Cycle (SDLC) using analytical tools and quantitative techniques used to identify problems.
4. Define problems and opportunities that initiate projects.
5. Evaluate information systems projects to identify various aspects of feasibility of these projects
6. Apply at least one specific methodology or tool for analyzing a business situation (a problem or opportunity) by modeling it using a formal technique.
7. Evaluate a wide range of problems related to the analysis and design of information systems.
8. Examine the different issues related to systems analysis and design.
9. Develop team-building and communication and interviewing skills, which are essential to successful systems projects.

### **Suggested Readings:**

1. Systems Analysis and Design by Elias Awad
2. Introducing Systems Analysis and Design by Lee
3. Systems Analysis & Design by Perry Edwards (McGraw Hill)

### **Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://onlinecourses.nptel.ac.in)
- <https://www.programiz.com>



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VISUAL BASIC  
PAPER III  
**CODE: PGD-203**

**Objectives:**

Students will try to learn:

1. This course introduces computer programming using the Visual BASIC programming language with object-oriented programming principles and Continue to develop and improve skills in object-oriented analysis, design, programming, and testing.
2. Learn to use the VB IDE, .NET CLR, CLS, and class libraries to develop **Windows** desktop applications.
3. Learn the Visual Basic syntax, program structure, properties, modules, collections, XML data, multi-tier applications with the event-driven programming model.
4. Windows Forms, common controls, design-view, code view, class diagram view.
5. Exceptions and exception handling.

**UNIT I**

Introduction to Visual BASIC: Introduction to Visual Basic, Features of VB, The controls, The Properties, Events, Methods, Developing an Application, Design the User Interface, Write code to Respond to User Input/Events

**UNITII**

Creating an Application: The objective, The tool box, Project Explorer, The Properties Window, The Form Window, Understanding Projects, Customizing the Toolbar, what is on the Toolbar, Text Control Bar, The Picture Box, Label Box, Option Button, Frame, List Box, Combo Box, Data, Command Button, Check Box etc.

**UNIT III**

Programming Fundamental: Declaring variables, Data Types, The Null Value, The Error Value, The Empty Value, Scope of Variable, Modules, Modules level Properties, Constants, Creating your own Constants, Arrays, Multidimensional Arrays, Declaring Fixed Size Arrays, Procedures, Subroutine &Functions, Split Bar, The Loops.

**UNIT IV**

Menus & MDI: Objectives, Building the User Interface, Overcrowding, Consistency, All about Menus, The Menu Systems, Menu Conventions, The Menu Editor, Using the Menu Editor, Writing Code for Menu Controls, Dialog Boxes, MDI Applications, Menu in MDI Applications, Adding Status Bar, Adding Tool Bar, Adding Data File.

**UNIT V**

Graphics in Visual Basic Form , picture box , image box , sizing images , coordinate system ,scale properties And methods , drawing curves , drawing pixels ,drawing boxes , fillings . timer control MDI form and their properties , interfacing with other packages .

VB interfacing with office 97, VB interfacing with MS Access, VB interfacing with Oracle, Creation of setup files.

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**Outcomes**

Students who complete this course should be able to do the following things.

1. Design, create, build, and debug Visual Basic applications.
2. Explore Visual Basic's Integrated Development Environment (IDE).
3. Implement syntax rules in Visual Basic programs.
4. Explain variables and data types used in program development.
5. Apply arithmetic operations for displaying numeric output.
6. Write and apply decision structures for determining different operations.
7. Write and apply loop structures to perform repetitive tasks.
8. Write and apply procedures, sub-procedures, and functions to create manageable code

**Suggested Readings:**

1. Programming in Visual Basic 6.0 , Bradly (TMH).
2. Visual Basic 6:Forms and Groundup , Cornell(TMh).
3. Mastering Visual Basic 6 (BPB).
4. Beginning Visual Basic 6 & SQL Server 7 , Cornell (SPD)

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://onlinecourses.nptel.ac.in)
- <https://www.programiz.com>

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**COMPUTER NETWORK**  
**PAPER IV**  
**SUBJECT CODE: PGD-204**

**Objectives:**

Students will try to learn:

1. Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
2. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
3. Study Session layer design issues, Transport layer services, and protocols.
4. Gain core knowledge of Network layer routing protocols and IP addressing.
5. Study data link layer concepts, design issues, and protocols.
6. Read the fundamentals and basics of Physical layer, and will apply them in real time applications

**UNIT I**

Introduction to Computer Networks: Definition of Computer networks, Applications of Computer Networks, Kinds of Computer Networks-Local Area Network, Metropolitan Area Network, Wide Area Network, topologies of networks, Layered architecture of networks.

**UNIT II**

Fundamentals of Data Communication: Types of signals, Types of Transmission, Modes of Transmission, Serial transmission (Asynchronous Transmission, Synchronous Transmission and Isochronous ) Parallel transmission, Basic Transmission Categories – Simplex, Half Duplex, Full Duplex.

**UNIT III**

Fundamentals of Networks: Point to Point Networks, Broadcast Networks, Multicast Networks, Physical Layer Coding Techniques-RZ, NRZ, Differential NRZ, Manchester, Differential Manchester coding, Switching-Circuit Switching, Message Switching, Packet Switching, Confirm and unconfirm services, Framing-Time Based, Character Based, BIT Based, violation of encoding technique & combined approach, Error detection & correction codes – Hamming code , CRC.

**UNIT IV**

Layered Architectures, TCP/IP model, OSI model. Overview of Physical layer, Data Link Layer, MAC, Network Layer, and Transport Layer functions.

**UNIT V**

LAN Technologies: CSMA/CD or Ethernet & IEEE 802.3 Standard, Token Bus and IEEE 802.4 Standard, Token Ring and IEEE 802.5 Standard.

Overview of DNS, FTP, TELNET, HTTP, SMTP and client/server computing.

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**Outcomes:**

The students should be able to:

1. Describe the functions of each layer in OSI and TCP/IP model.
2. Explain the functions of Application layer and Presentation layer paradigms and Protocols.
3. Describe the Session layer design issues and Transport layer services.
4. Classify the routing protocols and analyze how to assign the IP addresses for the given network.
5. Describe the functions of data link layer and explain the protocols.
6. Explain the types of transmission media with real time applications

**Suggested Readings:**

1. Computer Networks by Tanenbaum (PHI)
2. Computer Communication and Networking by Forozan (PHI)

**Website Sources:**

- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com>
- [onlinecourses.nptel.ac.in](https://onlinecourses.nptel.ac.in)
- <https://www.programiz.com>

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**JAVA PROGRAMMING LAB**  
**CODE: PGD-251**

**Objectives:**

1. To introduce the object oriented programming concepts.
2. To understand object oriented programming concepts, and apply them in solving Problems.
3. To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
4. To introduce the implementation of packages and interfaces
5. To introduce the concepts of exception handling and multithreading.
6. To introduce the concepts of Collection Framework.
7. To introduce the design of Graphical User Interface using applets and swing controls.

**Laboratory Practices**

1. Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use String Tokenizer class of java. util)
2. Write a Java program to illustrate the concept of class with method overloading.
3. Write a Java program to illustrate the concept of Single level and Multi level Inheritance.
4. Write a Java program to illustrate the concept of Dynamic Polymorphism.
5. Write a Java program to demonstrate the Interfaces & Abstract Classes.
6. Write a Java program to implement the concept of exception handling.
7. Write a Java program to illustrate the concept of threading using Thread Class and runnable Interface.
8. Write a Java program to illustrate the concept of multi-threading that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
9. Write a Java program to implement serialization concept
10. Write a Java program to illustrate the concept of Thread synchronization.
11. Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
12. Write a Java program that reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
13. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
14. Write a Java program that displays the number of characters, lines and words in a text file.
15. Write a Java program to change a specific character in a file. Note: Filename, number of the byte in the file to be changed and the new character are specified on the command line.
16. Write a Java program to illustrate collection classes like Array List, Iterator, Hash map etc.
17. Write a Java program for handling mouse & key events. 18. A program to illustrate the concept of I/O Streams 19. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result.

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**Outcomes:**

After completing this course the student must demonstrate the knowledge and ability to:

1. Able to understand the use of OOPs concepts.
2. Able to solve real world problems using OOP techniques.
3. Able to understand the use of abstraction.
4. Able to understand the use of Packages and Interface in java.
5. Able to develop and understand exception handling, multithreaded applications with synchronization.
6. Able to understand the use of Collection Framework.
7. Able to design GUI based applications and develop applets for web applications.

**Suggested Readings:**

1. Learn Java Now -Davis , R , Stephen(Microsoft Press).
2. Java 2 : The Complete Reference - Herbert Schildt(TMh).
3. JAVA Elements :Principals of programming in Java - Bailey(TMh).
4. The Java programming language - Ken Arnold , James Gosling(Pearson Education).
5. Programming with Java- E. Balagurusami (TMh)
8. Object Oriented Analysis and Design with Examples, Grady Booch (Benjamin/Cumm-ings 2nd ed).
9. Object Oriented Modelling and Design , James Rumbaugh et al (Prentice Hall).

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**VISUAL BASIC LAB**  
**CODE: PGD-252**

**Objectives:**

Students will try to learn:

1. This course introduces computer programming using the Visual BASIC programming language with object-oriented programming principles and Continue to develop and improve skills in object-oriented analysis, design, programming, and testing.
2. Learn to use the VB IDE, .NET CLR, CLS, and class libraries to develop **Windows** desktop applications.
3. Learn the Visual Basic syntax, program structure, properties, modules, collections, XML data, multi-tier applications with the event-driven programming model.
4. Windows Forms, common controls, design-view, code view, class diagram view.
5. Exceptions and exception handling.

**Laboratory Practices**

1. Design an application to validate the user name and password and display message.
2. Design an application to change font style, size, color using a combo box.
3. Design a calculator.
4. Design an application to show usage of timer.
5. Design an application to calculate the area and circumference of a circle.
6. Design an application to find the sum of numbers.
7. Design an application to authenticate travel system using list and combo box.
8. Design an application to add and remove item from list box.
9. Design an application to demonstrate sequential file .
10. Design an application to find the area and perimeter of a square using subroutine.
11. Design an application to create front end and back to implement ADO connection.
12. Design an application to implement crystal report.
13. Design an application to implement arithmetic operation using subroutine.
14. Design an application to implement scroll bar to the change the font size of the label.
15. Design an application to implement Menu Editor.
16. Design an application to move image using timer.
17. Design an application to implement shapes/ images/ pictures.
18. Design an application to implement message box and input box.
19. Design an application to implement if then, if then else conditions.

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20. Design an application to implement while, do while.

**Outcomes**

Students who complete this course should be able to do the following things.

1. Design, create, build, and debug Visual Basic applications.
2. Explore Visual Basic's Integrated Development Environment (IDE).
3. Implement syntax rules in Visual Basic programs.
4. Explain variables and data types used in program development.
5. Apply arithmetic operations for displaying numeric output.
6. Write and apply decision structures for determining different operations.
7. Write and apply loop structures to perform repetitive tasks.
8. Write and apply procedures, sub-procedures, and functions to create manageable code

**Suggested Readings:**

1. Programming in Visual Basic 6.0 , Bradly (TMH).
2. Visual Basic 6:Forms and Groundup , Cornell(TMh).
3. Mastering Visual Basic 6 (BPB).
4. Begining Visual Basic 6 & SQL Server 7 ,Cornell (SPD)



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**MAJOR PROJECT**  
**CODE: PGD-253**

**Course Objective:**

The PGDCA students are encouraged to involve themselves completely on the project work in their final semester. It is advised to students to develop their project for solving problems of software industry or any research organization. Doing this will give more exposure to handle real life problems of project development.

The courses studied by you during your PGDCA programme provide you the basic background to work on diverse application domains. The theoretical background of various courses provides you the necessary foundation, principles, and practices to develop effective ways to solve computing problems. The hands on experience gained from the practical courses provide you the knowledge to work with various operating systems, programming languages, and software tools.

This project work is kept in PGDCA program to give you opportunity to develop quality software solution. During the development of the project you should involve in all the stages of the software development life cycle (SDLC) like requirements analysis, systems design, software development/coding, testing and documentation, with an overall emphasis on the development of reliable software systems. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, and develops good understanding of SDLC.

**List of Projects:**

1. university management system project in php
2. college management system project in vb
3. online examination system in php
4. student information system project in java
5. online job portal project in php
6. airline reservation system project in asp net
7. online doctor appointment system project
8. vehicle management system project in java
9. online examination system project in php
10. hospital management system project in php
11. online recruitment system project in java with source code
12. mobile shopping project
13. blood bank management system project
14. social networking scripts
15. online voting system project
16. college admission system project
17. institute management system project
18. attendance management system project