Curriculum for

POST GRADUATE DIPLOMA COURSE
In COMPUTER APPLICATION
For the State of Uttar Pradesh

Prepared by:

IRDT, Kanpur

March, 2020

STUDY AND EVALUATION SCHEME FOR PG DIPLOMA PROGRAMME IN COMPUTER APPLICATION

FIRST SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		L	**T**	**P**		*Th*	**Pr**	**Tot**	**Th**	**Hrs**	**Pr**	**Hrs**	**Tot**	
1.1	BASICS OF COMPUTER AND INFORMATION TECHNOLOGY *	4	-	4	4	20	10	30	50	2 ½	20	3	70	100
1.2	COMPUTER PROGRAMMING USING PYTHON*	4	-	6	5	20	30	50	50	2 ½	50	3	100	150
1.3	DATA COMMUNICATION & COMPUTER NETWORK *	5	-	4	6	20	30	50	50	2 ½	50	3	100	150
1.4	OFFICE AUTOMATION TOOLS*	-	-	8	2	-	30	30	-	-	50	3	50	80
1.5	INTERNET AND WEB TECHNOLOGY*	4	-	4	6	20	30	50	50	2 ½	50	3	100	150
#Student Centered Activities		-	-	2	1	-	30	30	-	-	-	-	-	30
Total		**17**	**-**	**28**	**24**	**80**	**160**	**240**	**200**	**-**	**220**	**-**	**420**	**660**

* Common course Content with CS/IT diploma programmes

^ Common course Content with Web designing PG diploma programme

Student Centered Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities, self study etc.

SECOND SEMESTER (PG DIPLOMA PROGRAMME IN COMPUTER APPLICATION)

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		L	**T**	**P**		*Th*	**Pr**	**Tot**	**Th**	**Hrs**	**Pr**	**Hrs**	**Tot**	
2.1	OPERATING SYSTEM*	4	-	5	5	20	30	50	50	2 ½	50	3	100	150
2.2	WEB DESIGNING TOOLS^	4	-	4	3	-	30	30	-	-	50	3	50	80
2.3	DATA STRUCTURE USING PYTHON	5	-	6	5	20	30	50	50	2 ½	50	3	100	150
2.4	SOFTWARE ENGINEERING*	4	-	2	3	20	30	50	50	2 ½	50	3	100	150
2.5	DATABASE MANAGEMENT SYSTEM*	5	-	5	6	20	30	50	50	2 ½	50	3	100	150
#Student Centred Activities		-	-	2	1	-	30	30	-	-	-	-	-	30
Total		**22**	**-**	**24**	**23**	**80**	**180**	**260**	**200**	**-**	**250**	**-**	**450**	**710**

*Common course Content with CS/IT diploma programmes

^ Common course Content with Web designing PG diploma programme

Student Centred Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and self study etc.

Note: ** Four Weeks of Industrial Training to be assessed in third Semester. ** Student will be required to complete four week industrial training after the completion of 2nd semester.

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

It was discussed and decided that the maximum marks for SCA should be 30 as it involves a lot of subjectivity in the evaluation. The marks may be distributed as follows:

A) i. 10 Marks for general behavior and discipline
(by HODs in consultation with all the teachers of the department)

ii. 5 Marks for attendance as per following:
(by HODs in consultation with all the teachers of the department)

a)	75 - 80%	2 Marks
b)	80 - 85%	4 Marks
c)	Above 85%	5 Marks

iii. 15 Marks maximum for Sports/NCC/Cultural/Co-curricular/ NSS activities as per following:
(by In-charge Sports/NCC/Cultural/Co-curricular/NSS)

a)	15	-	State/National Level participation
b)	10	-	Participation in two of above activities
c)	5	-	Inter-Polytechnic level participation

Note: There should be no marks for attendance in the internal sessional of different subjects.

1.1 BASICS OF COMPUTER AND INFORMATION TECHNOLOGY

L	T	P
4	-	4

RATIONALE

The PG diploma holders in Computer Application needs to understand computer fundamentals and information technology. They should be able to operate basic software related to computer. Hence this subject is introduced in the curriculum.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Understand a computer system that has hardware and software components, which controls and makes them useful.
- Understand the operating system as the interface to the computer system.
- Outline various application of IT
- Differentiate between assembly and high-level language
- Identify various web browser
- Use the Internet to send mail and surf the World Wide Web

DETAILED CONTENTS

1. Fundamentals of Computer (12 Periods)

   Historical evolution of computers, Generations of computers, Classification of computers – based on size, processor, Usefulness of Computers. Applications of computers, Block Diagram along its components and characteristics, Interaction between the CPU, Memory Input/output devices, function of CPU and major functional parts of CPU. State the relevance of speed and word length for CPU Performance, Recognize the current family of CPUs used in Computers, Types of Memory- RAM ROM, Monitor, Mouse, Keyboard, Disk, joysticks, Storage Devices, floppy disk, CD, DVD, Pen drive, trackballs, Printers Types of printers, Scanner, Modem, Video, Sound cards, Speakers

2. Data Representation (08 Periods)

   Definition Of Information, difference between data and information ,importance of Binary Number System, various number systems, Conversion from Decimal to Binary, Conversion from Binary to Decimal, binary number into hexadecimal number, hexadecimal number into binary number System, Memory Addressing and its Importance, ASCII and EBCDIC coding System

3. DOS & Windows Operating Systems (12 Periods)

   Hardware and Software, Types of Software, Introduction and need of operating system, Types of operating system, dos operating system, Types of dos Commands, operating system as a resource manager; BIOS; System utilities – Editor, Loader, Linker, File Manager. Concept of GUI and CUI standards. Directories and files , wild cards, autoexec.bat, config.sys, features

of Window desktop, components of Window, function of each component of Window, method of starting a program using start button, Understand maximize, minimize, restore down and close button, uses of file and folder, method of viewing the contents of hard disk drive using explore option, control panel,disk defragmentation installation and un installation of the application software.

4. Linux Operating System (12 Periods)

Structure, Kernel and Shell, Basic command, File system, VI editor, LINUX Installation

5. Fundamentals of Internet (12 Periods)

Concepts of computer Network, Client Server Model, Peer to Peer Model, Networking Devices: Switch, Router, Hub, Bridge, Gateway, LAN, MAN, WAN, Topology, Internet, Intranet, Extranet, internet service provider and its relevance, role of the modem in accessing the internet, installation procedure of a modem using control panel, purpose of web browser software, URL,URI, URN, WWW, FTP,HTTP,RDC(Remote Desktop Connection), Telnet, Email, process of sending and receiving e-mail, transmission modes, IP address and its format, MAC Address, DNS, search engines, social network sites, internet security, Firewall, Cloud Computing and its services

LIST OF PRACTICALS

1. Familiarization with Computer System and its peripheral devices
2. Familiarization with Operating System
3. Practice of internal and external commands of DOS
4. Working practice on windows operating system : creating file, folder. Copying, moving, deleting file, folder
5. Installing and uninstalling of new software using control panel.
6. Installation and uninstallation of new hardware drivers using control panel.
7. Disk defragmentation using system tool
8. Procedure of disk partition and its operation (Shrinking, Extending, Delete, Format).
9. Installation of Operating Systems
10. Practice of Basic Linux Commands
11. Changing System Date and Time.
12. User Account creation and its feature on Windows Operating System
13. Email Account creation, reading, writing and sending emails with attachments.
14. Internet browsing using browsers.
15. Using of Search Engine to get information from internet

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connectors etc. and proficient in making use of operating system functionalities in addition to working on internet. The student should be made capable of working on computers independently

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Fundamentals of Computer by E Balagurusamy,Tata McGraw Hill EducationPvt. Ltd, New Delhi
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Computer Fundamentals by RS Salaria; Khanna Book Publishing Co. (P) Ltd., New Delhi
4. Computers Today by SK Basandara, Galgotia publication Pvtltd. Daryaganj, New Delhi.
5. Computer Fundamentals and Programming in C by ReemaThareja; Oxford University Press, New Delhi
6. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
7. e-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in
http://spoken-tutorial.orgs

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	12	20
2	08	20
3	12	20
4	12	20
5	12	20
Total	**56**	**100**

1.2 COMPUTER PROGRAMMING USING PYTHON

L	T	P
4	-	6

RATIONALE

This course introduces to the students the Python language. Upon completion of this course, the student will be able to write non trivial Python programs dealing with a wide variety of subject matter domains. Topics include language components, the IDLE/IDE environment, control flow constructs, strings, I/O, collections, classes, modules, and regular expressions.

LEARNING OUTCOMES

After undergoing the course, the students will be able to:

- Execute Python code in a variety of environments
- Use correct Python syntax in Python programs
- Use the correct Python control flow construct
- Write Python programs using various collection data types
- Write home grown Python functions
- Use standard Python modules such as os, sys, math, and time
- Trap various errors via the Python Exception Handling model
- Use the IO model in Python to read and write disk files
- Create their own classes and use existing Python classes.
- Understand and use the Object Oriented paradigm in Python programs
- Use the Python Regular Expression capabilities for data verification

DETAILED CONTENTS

1. Introduction (04 Periods)

    - Brief History of Python
    - Python Versions
    - Installing Python
    - Environment Variables
    - Executing Python from the Command Line
    - IDLE
    - Editing Python Files
    - Python Documentation
    - Getting Help
    - Dynamic Types
    - Python Reserved Words
    - Naming Conventions

2. Basic Python Syntax (04 Periods)

- Basic Syntax
- Comments
- String Values
- String Methods
- The format Method
- String Operators
- Numeric Data Types
- Conversion Functions
- Simple Output
- Simple Input
- The % Method
- The print Function

3. Language Components (06 Periods)

- Indenting Requirements
- The if Statement
- Relational and Logical Operators
- Bit Wise Operators
- The while Loop
- break and continue
- The for Loop

4. Collections (10 Periods)

- Introduction
- Lists
- Tuples
- Sets
- Dictionaries
- Sorting Dictionaries
- Copying Collections
- Summary

5. Functions (08 Periods)

- Introduction
- Defining Your Own Functions
- Parameters
- Function Documentation
- Keyword and Optional Parameters
- Passing Collections to a Function
- Variable Number of Arguments

- Scope
- Functions - "First Class Citizens"
- Passing Functions to a Function
- map
- filter
- Mapping Functions in a Dictionary
- Lambda
- Inner Functions
- Closures

6. Modules (04 Periods)

- Modules
- Standard Modules - sys
- Standard Modules - math
- Standard Modules - time
- The dir Function

7. Exceptions (04 Periods)

- Errors
- Runtime Errors
- The Exception Model
- Exception Hierarchy
- Handling Multiple Exceptions
- Raise
- assert

8. Input and Output (04 Periods)

- Introduction
- Data Streams
- Creating Your Own Data Streams
- Access Modes
- Writing Data to a File
- Reading Data From a File
- Additional File Methods
- Using Pipes as Data Streams
- Handling IO Exceptions

9. Classes in Python (06 Periods)

- Classes in Python
- Principles of Object Orientation

- Creating Classes
- Instance Methods
- File Organization
- Special Methods
- Class Variables
- Inheritance
- Polymorphism

10. Regular Expressions (06 Periods)

- Introduction
- Simple Character Matches
- Special Characters
- Character Classes
- Quantifiers
- The Dot Character
- Greedy Matches
- Grouping
- Matching at Beginning or End
- Match Objects
- Substituting
- Splitting a String
- Compiling Regular Expressions
- Flags

LIST OF PRACTICALS

1. Getting started with Python and IDLE in interactive and batch modes
2. What do the following string methods do?
   - lower
   - count
   - replace
3. Write instructions to perform each of the steps below
   (a) Create a string containing at least five words and store it in a variable.
   (b) Print out the string.
   (c) Convert the string to a list of words using the string split method.
   (d) Sort the list into reverse alphabetical order using some of the list methods (you might need to use dir(list) or help(list) to find appropriate methods).
   (e) Print out the sorted, reversed list of words.
4. Write a program that determines whether the number is prime.
   What is your favorite number? 24
   24 is not prime
   What is your favorite number? 31
   31 is prime
5. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and

2500?

6. Swap two integer numbers using a temporary variable. Repeat the exercise using the code format: a, b = b, a. Verify your results in both the cases.
7. Find the largest of n numbers, using a user defined function largest().
8. Write a function myReverse() which receives a string as an input and returns the reverse of the string.
9. Check if a given string is palindrome or not.
10. WAP to convert Celsius to Fahrenheit
11. Find the ASCII value of charades
12. WAP for simple calculator

INSTRUCTIONAL STRATEGY

Teachers should put emphasis on practicals and experts from industries may be invited to deliver lectures and share experiences with the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Software installation, operation, development
- Actual laboratory and practical work exercises
- Viva-voce

RECOMMENDED BOOKS

1. Learning Python by Mark Lutz; Pratham Books, Bangalore
2. Foundations of Python Network Programming by John Goerzen and Brandeu Rhodes; Apress-eBook distributed by Springer Science and Business Media, New York
3. Dive Into Python by Mark Pilgrim; Pratham Books, Bangalore
4. Think Python by Allen B. Downey; O'Reily Media
5. Python Programming For Beginners: A Must Read Introduction to Python Programming by Robert Richards; Pratham Books, Bangalore
6. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	04	06
2.	04	06
3.	06	10
4.	10	20
5.	08	14
6.	04	06
7.	04	06

8.	04	08
9.	06	12
10.	06	12
Total	**56**	**100**

1.3 DATA COMMUNICATION AND COMPUTER NETWORKS

L	T	P
5	-	4

RATIONALE

The future of computer technology is in Data Communication and Computer Networks. Global connectivity can be achieved through computer networks. A PG diploma holder in Computer Application should therefore understand the function of networks and get exposure to different existing and upcoming communication technologies. Knowledge about hardware and software requirements of networks is essential.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Know about signal types, transmission media
- Know about different communication methodologies
- Setup computer networks
- Setup basic wireless network
- Diagnose & solve network problems
- Diagnose & solve network problems remotely
- Provide security to networks
- Manage & handle wan
- Prevent external network attacks
- Identify network troubleshooting methods.

DETAILED CONTENTS

1. Introduction to Data Communication (07 Periods)

   1.1 Basics of the Communications
   1.2 Direction of the Data flow(simplex, half-duplex, full-duplex)
   1.3 Network Topologies, signals and transmission (analog and digital)
   1.4 Transmission media (guided and unguided)
   1.5 Concept of digital signals, Bit rate, Bit length, Transmission impairment (attenuation, distortion, noise, Signal to Noise Ratio)

2. Communication Methodologies (10 Periods)

   2.1 Need for modulation in communication system
   2.2 Concepts AM, FM, PM, FSK, TSK, PCM (No Mathematical model)
   2.3 Concept of bandwidth and channel capacity of different communication systems such as radio, microwave etc.
   2.4 Multiplexing techniques (TDM, FDM, WDM, CDMA)

3. Networks Basics (14 Periods)

3.1 Concept of network
3.2 Models of network computing
3.3 Networking models
3.4 Peer-to –peer Network
3.5 Client-Server Network
3.6 LAN, MAN and WAN
3.7 Network Services
3.8 Switching Techniques

4. Networking Models (05 Periods)

4.1 OSI model: Definition, Layered Architecture
Functions of various layers
4.2 TCP/IP Model: Definition, Functions of various layers
4.3 Comparison between OSI and TCP/IP model

5. TCP/IP Addressing (10 Periods)

5.1 Concept of physical and logical addressing
5.2 IPV4 addresses – Address space, Notations
5.3 Classful Addressing- Different IP address classes, Classes & Blocks, Net-id & Host-Id, Masks, Address depletion
5.4 Classless Addressing – Address blocks, Masks
5.5 Special IP Addresses
5.6 Subnetting and Supernetting
5.7 Loop back concept
5.8 Network Address Translation
5.9 IPV4 Header
5.10 IPV6 Header
5.11 Comparison between IPV4 and IPV6

6. Network Architecture (04 Periods)

Ethernet specification and standardization: 10 Mbps (Traditional Ethernet), 10 Mbps (Fast Ethernet) and 1000 Mbps (Gigabit Ethernet)

7. Network Connectivity (05 Periods)
7.1 Network connectivity Devices
7.2 NICs
7.3 Hubs, Switches, Routers, Repeaters, Modem, Gateway
7.4 Configuration of Routers & Switches

8. Network Administration (10 Periods)

8.1 Network Security Principles, Cryptography, using secure protocols
8.2 Trouble Shooting Tools: PING,IPCONFIG, IFCONFIG, NETSTAT, TRACEROOT, Wireshark, Nmap, TCPDUMP, ROUTEPRINT
8.3 DHCP Server
8.4 Workgroup/Domain Networking

9. Introduction to Wireless Networks. (05 Periods)

9.1 Introduction to wireless LAN IEEE 802.11, WiMax and Li-Fi
9.2 Wireless Security
9.3 Introduction to bluetooth - architecture, application
9.4 Comparison between bluetooth and Wifi

LIST OF PRACTICALS

1. Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.
2. Recognition and use of various types of connectors RJ-45, RJ-11,BNC and SCST
3. Making of cross cable and straight cable
4. Install and configure a network interface card in a workstation.
5. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation
6. Managing user accounts in windows and LINUX
7. Sharing of Hardware resources in the network.
8. Use of Netstat and its options.
9. Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG
10. Installation of Network Operating System(NOS)
11. Visit to nearby industry for latest networking techniques
12. Create a network of at least 6 computers.

Required Software

- Windows Server/Linux Server

Required Tools and Supplies

1) Crimping tool, Cable tester,
2) RJ 45 connectors, RJ-11, BNC, SCST
3) Coaxial Cable, UTP, STP, OFC cable
4) Screw Driver Kit
5) Switch/Hub
6) Manageable Switch

INSTRUCTIONAL STRATEGY

Since the facilities are not available in the polytechnic, students need exposure to various security systems and software available in some organisations, universities and engineering colleges. For

this, visits may be organized for students. The teachers should also be exposed in this area. Some practicals can be conducted in the laboratory.

MEANS OF ASSESSMENT

– Assignments and quiz/class tests, mid-term and end-term written tests
– Actual laboratory and practical work exercises and viva-voce
– Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Computer Networks by Tanenbaum, Prentice Hall of India, New Delhi
2. Data Communications and Networking by Forouzan, (Edition 2nd and 4th), Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Data and Computer Communication by William Stallings, Pearson Education, New Delhi
4. Local Area Networks by Peter Hudson
5. Network+ Lab manual,- BPB Publications -by Tami Evanson
6. Networking Essentials – BPB Publications New Delhi
7. Computer Network and Communications By V.K. Jain and Narija Bajaj, Cyber Tech Publications, New Delhi.
8. Cloud Computing Bible by BerrieSarinby
9. E-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	07	10
2.	10	15
3.	14	20
4.	05	07
5.	10	15
6.	04	05
7	05	06
8.	10	15
9.	05	07
Total	**70**	**100**

1.4 OFFICE AUTOMATION TOOLS

L	T	P
-	-	8

RATIONALE

This subject aims to cover the handling of word processing software. It also involves various clerical tasks, such as organizing customer data or creating reports. It enables people with lower skill levels to perform higher-level tasks. In Today's commercial world, automation helps the users with a sophisticated set of commands to format, edit, and print text documents. It is used as valuable and important tools in the creation of applications such as newsletters, brochures, charts, presentation, documents, drawings and graphic images. This will make the students proficient in office automation applications.

LEAR NING OUTCOMES

After undergoing the subject, the students will be able to:

- Use file mangers, word processors, spreadsheets, presentation software's
- Describe the features and functions of the categories of application software.
- Present conclusions effectively, orally and in writing.
- Understand the dynamics of an office environment.
- Demonstrate the ability to apply application software in an office environment.
- Use Google Suite for office data management tasks.

DETAILED CONTENTS

1. Word Processing

MS Word concepts : Creating, saving, closing, Opening an existing document, Using Featured Word Templates, Exploring Template and Formation of Documents, Selecting text, Editing text, Finding and replacing text, Character and Paragraph Formatting, Automatic Formatting And Styles, Inserting and removing page breaks, Header and footers, Page No, Border & Shading, Change Case, Checking Spelling, Working With Tables, Insert Table, Delete Cells, Merge Cell, Graphics And Frames , Page Design and Layout, Creating and Printing Merged Documents, Encrypting document with a password, Printing documents

2. Spread Sheet

MS Excel Concept: Creating, Saving, closing, editing a Workbook, Inserting, Deleting Work Sheets, entering data in a cell, Copying and Moving from selected cells, entering formula, handling operators in Formula, Functions: Mathematical, Logical, statistical, text, financial, Date and Time functions, Using Function Wizard. Formatting a Worksheet: Formatting Cells – changing data alignment, changing date, number, character or currency format, changing font, adding borders and colors, Printing worksheets, Charts and Graphs – Creating, Previewing, Modifying Charts, LOOKUP/VLOOKUP

3. Presentation

MS Power Point Concept : Creating, Opening and Saving Presentations, Working in Different Views, Working with Slides, Adding and Formatting Text, Formatting Paragraphs, Checking Spelling and Correcting Typing Mistakes, Making Notes Pages and Handouts, Drawing and Working with Objects, Adding Clip Art and other pictures, Designing Slide Shows using templates, Rehearse timing, Narration, Multimedia effects- Apply Transitions between Slides, Animate Slide Content, Set Timing for Transitions and Animations, Insert and Format Media, Encrypting presentations with a password, Running and Controlling a Slide Show, Printing Presentations

4. Database

MS Access Concepts: Database, Relational Database, Integrity. Operations: Creating, dropping, manipulating table structure. Manipulation of Data: Query, Data Entry Form, Reports

5. Google Office Tools

Creating, saving , downloading , sharing files/folders from Google drive , creating and sharing Google docs, import and export docs, creating and sharing Google sheet, import and export Google sheet, Google forms and form responses ,creating Google slides to present your ideas

LIST OF PRACTICALS

Tools to be used: Microsoft office/ Libre Office / Open Office / G Suite

1. Creating a document using different font, changing font size and color, changing the appearance through bold/italic/underline.
2. Creating a document using subscript and superscript, justification of the document.
3. Create a document using Bullets and Numbering.
4. Create a document using page number, header and footer.
5. Create a document using inserting page breaks and column break, line spacing.
6. How to use mail merge and macro in MS Word.
7. Creating table, formatting cells, use of different border styles, shading in tables, merging of cells, and partition of cells, inserting and deleting a row in a table in MS word document.
8. Apply spelling checker, grammar mistakes, thesaurus in a document.
9. Create a Boucher using templates, page setup and print preview, and then print that document.
10. Working on spreadsheet like adding, deleting, merging cells, layout and style.
11. Create a table and perform operation using predefined function on it.
12. In MS Excel procedure to switching between different spreadsheets and workbook.
13. Create a spreadsheet and print selected as well as full workbook.
14. Create a spreadsheet with LOOKUP/VLOOKUP features.
15. Create different charts in excel and implement formulas(automatic and use defined).
16. Create a Power Point presentation using slide template.
17. Create a Power Point presentation using animation.
18. Create a Power Point presentation using transition
19. Create a Power Point Presentation with Adding movie and sound.
20. Create a Power Point Presentation with Adding tables and chart etc.
21. Changing slide color scheme in presentation.
22. Viewing the presentation using slide navigator.
23. Create, Save, Run and Print the Power Point Presentation.
24. Create a database table using predefined template.
25. Create a database form using form wizard.

26. Create and share files/folders in Google drive
27. Create and share Google docs.
28. Create and share Google sheets.
29. Create and share Google Forms.
30. Create and share Google slides.

INSTRUCTIONAL STRATEGY

As the subject is practice oriented, more stress should be given to students to do the work practically. The features of software packages MS Office/ Libre Office to be demonstrated in class using LCD projector.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

- Microsoft Office 2010 For Dummies By Wallace Wang
- 2007 Microsoft Office System Plain & Simple by Jerry Joyce Microsoft Press
- Office XP : The Complete Reference- Stephen L. Selson - Tata McGraw Hill Education.
- Working in Microsoft Office - Richard Mansfield - Tata McGraw Hill Education.
- Websites for Reference

• http://office.microsoft.com/en-us/training/CR010047968.aspx

- https://gsuite.google.com/learning-center
- http://spoken-tutorial.org

1.5 INTERNET AND WEB TECHNOLOGY

L	T	P
4	-	4

RATIONALE

It is important for P.G. diploma holders in Computer Application s to understand about Internet, Web Space and how to develop static website. They should be able to develop basic static websites by using different platform independent front-end Technologies which can run on mobile browsers as well. Hence this subject is introduced in the curriculum.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Understand working of Internet/ Websites, Client Server Model and Internet Tools.
- Understand and develop HTML Web pages.
- Provide logics on the web pages by using JavaScript
- Use Bootstrapto develop responsive website
- Control the Look and feel of web pages by using CSS
- Use JQuery for developing the Web Pages
- Develop Static webpage/web portal

DETAILED CONTENTS

1. Web Development Introduction (04 Periods)

   Internet, WWW, Browser, Search engine Client Server Model, URL, Web Pages, Website and Web Services, Types of Websites (Static, Dynamic and Responsive), Developer options of Browser (View page source, Developer Tools, Inspect Element etc)

2. HTML (10 Periods)

   Basics:

   HTML Document, Basic Structure of HTML, Syntax, HTML Tags and Attributes, Types of HTML Tags, Rules of nesting, Basic Tags (HTML Tag. Head Tag, Title Tag, Body Tags).

   Page Formatting:

   Adding a new Paragraph, Adding a line break, Inserting a blank space , changing page background , Divand Span tags

   Text Formatting:

   Html Headings, Formatting elements (<b> Bold text , Important text ,<i> Italic text , Emphasized text , <mark> Marked text, <small> Small text, <del> Deleted text, <ins> Inserted text, <sub> Subscript text, <sup> Superscript text), Comments, Horizontal Lines

   Creating Lists:Ordered List, Unordered Lists, Definition Lists

   Others:

   Images, Text Links, Image Links, opening a page in New Window or Tab, Linking to an area of same page, Introduction to Table Tags, Advantages and limitations of tables, Frames &IFrame, HTML Forms , XHTML

3. Cascading Style Sheets (08 Periods)

Introduction, Benefits of CSS, CSS Syntax, CSS Implementation (inline, internal and external), CSS Selectors (ID Selectors, Class Selectors, Grouping Selectors, Universal Selectors, CSS Pseudo-classes), CSS properties (background-color, background-image, border-style, height, width, color, text-align, font-family, font-style, font-size, font-weight), Box Model in CSS(margin, border, padding)

4. Java Scripts (10Periods)
   Java Script Introduction , variables , data types , operators, control flow (if-else, for loop , while loop , do-while loop) , Declaring Functions , Calling functions with parameters, Adding JavaScript to Web Documents, JavaScript Objects , Document Object Models, HTML Events and calling Java Script functions on Events.

5. JQUERY (09 Periods)
   JQuery Concept, Adding JQuery to Web Page, JQuery Selectors, JQuery Event Methods, JQuery Effects (Hide/Show, Fade, Slide), Insertion of header /footer in HTML Pages using JQuery

6. Bootstrap (09 Periods)
   Color Management, Buttons, Table, drop-down, navigation-bar, images, pagination, jumbotron, alerts, forms, progress bar, grid, utilities & filters

7. XML & JSON (06 Periods)
   Introduction and use of XML, Difference between XML and HTML, XML Elements, Attribute, Name space, Syntax Rules, XML DTD and XML Schema, RSS FEED, JSON Introduction and uses, JSON v/s XML, JSON Syntax.

LIST OF PRACTICALS

1. Install, configure and start using developer tools /Code Editor/Browser
2. Creating web pages using different HTML tags and design the look & feel of web page by using CSS.
3. Write JavaScript functions and control the different companonets of Web page by predeifned javascript objects
4. Validation of Formfields using Java Script
5. Use jQuery rylibrato apply different features on web .pages
6. Use Bootstrap library and icons to develop a responsive websites

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of websites/WebPages to students while doing practical exercises. The students should be made familiar with developing web pages by code editor/browsers, working on internet. The student should be made capable of developing static websites by using HTML, JavaScript, CSS and jQueryotstrapand Bo

MEANS OF ASSESSMENT

– Assignments and quiz/class tests, mid-term and end-term written tests

- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Head First HTML and CSS: A Learner's Guide to Creating Standards-Based Web Pages , O Reilly Publications by Elisabeth Robson Eric Freeman
2. Head First JavaScriptProgramming, O Reilly Publications by Eric FREEMAN
3. Head First jQuery, O Reilly by Ryan Benedetti, Ronan Cranley
4. Web Technologies, Black Book ,Kogent Learning Solutions Inc
5. Developing Web Applications, 2ed ,Wiley Publications, M.T.Savaliya
6. Mastering Bootstrap 4 ,by Benjamin Jakobus and Jason Marah, Packt Publishing
7. e-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR, Chandigarh.

Websites for Reference:

1. http://swayam.gov.in
2. http://spoken-tutorial.org

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	04	7
2	10	18
3	08	15
4	10	18
5	09	16
6	09	16
7	06	10
Total	**56**	**100**

II Semester

2.1 OPERATING SYSTEMS

L	T	P
4	-	5

RATIONALE

This course provides the students with an understanding of human computer interface existing in computer system and the basic concepts of operating system and its working. The students will also get hands-on experience and good working knowledge to work in windows and Linux environments. The aim is to gain proficiency in using various operating systems after undergoing this course. While imparting instructions, the teachers are expected to put more emphasis on concepts and principles of operating systems, its features and practical utility.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

- Describe various types and services of operating system
- Identify the concept of process, various states in the process and their scheduling.
- Classify different types of schedulers and scheduling algorithms.
- Identify the significance of inter-process communication and synchronization.
- Describe deadlock and the various ways to recover from deadlock
- Identify memory management techniques
- Describe virtual memory and its underlying concepts.
- Describe the features and brief history of Linux
- Use General purpose commands and filters of Linux
- Use of shell scripts in Linux

DETAILED CONTENTS

1. Overview of Operating Systems (10 Periods)

   Definition of Operating Systems, Types of Operating Systems, Operating System Services, User operating system interface, System Calls, Types of System Calls, System Programs, Operating System Structure, Virtual Machine, Benefits of Virtual Machine

2. Process Management (Principles and Brief Concept) (10 Periods)

   Process concept, Process State, Process Control Block, Scheduling Queues, Scheduler, Job Scheduler, Process Scheduler, Context Switch, Operations on Processes, Interprocess Communication, Shared Memory Systems, Message-Passing Systems, CPU Scheduler,

Scheduling Criteria, Scheduling Algorithms, Preemptive and Non Preemptive, First come first serve (FCFS), Shortest Job first
(SJF), Round Robin (RR), Multiprocessor scheduling, Process Synchronization.

3. Deadlocks (Principles and Brief Concept) (06 periods)

Deadlock, Conditions for Dead lock, Methods for handling deadlocks, Dead Prevention, Deadlock Avoidance, Deadlock detection, Recovery from deadlock.

4. Memory Management Function (Principles and Brief Concept) (10 periods)

Definition – Logical and Physical address Space, Swapping, Memory allocation, Contiguous Memory allocation, Fixed and variable partition, Internal and External fragmentation and Compaction, Paging – Principle of operation, Page allocation, Hardware support for paging, Protection and sharing, Disadvantages of paging, Segmentation, Virtual Memory.

5. I/O Management Functions (Principles and Brief Concept) (04 periods)

Dedicated Devices, Shared Devices, I/O Devices, Storage Devices, Buffering, Spooling.

6. File Management (Principles and Brief Concept) (06 periods)

Types of File System; Simple file system, Basic file system, Logical file system, Physical file system, Various Methods of Allocating Disk Space

7. Linux Operating System (10 Periods)

History of Linux and Unix, Linux Overview, Structure of Linux, Linux releases, Open Linux, Linux System Requirements, Linux Commands and Filters: mkdir, cd, rmdir, pwd, ls, who, whoami, date, cat, chmod, cp, mv, rm, pg, more, pr, tail, head, cut, paste, nl, grep, wc, sort, kill, write, talk, mseg, wall, merge, mail, news Shell: concepts of command options, input, output, redirection, pipes, redirecting and piping with standard errors, Shell scripts, vi editing commands

LIST OF PRACTICALS

- Demonstration of all the controls provided in windows control panel.
- Exercise on Basics of windows.
- Installation of Linux Operating System
- Usage of directory management commands of Linux: ls, cd, pwd, mkdir, rmdir
- Usage of File Management commands of Linux: cat, chmod, cp, mv, rm, pg, more, find
- Use the general purpose commands of Linux: wc, od, lp, cal , date, who, whoami
- Using the simple filters: pr, head, tail, cut, paste, nl, sort
- Communication Commands: news, write, talk, mseg, mail, wall
- Write a shell program that finds the factorial of a number.
- Write a shell program that finds whether a given number is prime or not.
- Write a shell program to find the average of three numbers.
- Write a shell program that will convert all the text of the file from lowercase to uppercase.

INSTRUCTIONAL STRATEGY

This subject is both theory and practical oriental. Therefore, stress must be given on particulars along with theory. Laboratory must have windows as well as Linux operating system. Concepts of O.S. must be taught practically.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Operating System Concepts by Silberschatz, Galvin; Wiley Publication
2. Operating Systems by Stallings; Tata McGraw Hill.
3. Operating Systems- A Concept Based Approach by DhamDhare; Tata McGraw Hill Education Pvt Ltd , New Delhi
4. Operating Systems by Achyut S Godbole and AtulKahate; Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Unleashed Linux by Tech Media Publishers, New Delhi
6. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

- http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	10	18
2.	10	18
3.	06	10
4	10	18
5	04	8
6	06	10
7	10	18

Total	**56**	**100**

2.2 WEB DESIGNING TOOLS

L	T	P
4	-	4

RATIONALE

This subject aims to cover the study of various tools related to development of websites and blogs with adequate knowledge of web development technology. Student can work on tools related to content management or learning management system to develop/build website with focus on designing aspects of websites.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Use Image editing tools for editing and enhancing the images
- Use Animation tools for creating 2D & 3D Animation.
- Differentiate various type of websites
- Prepare presentation for explaining/ demonstrating the required topic.
- Differentiate between CMS and LMS
- Develop Content Management & Learning Management websites.

DETAILED CONTENTS

1. Image Editing Tools (16 Periods)

File formats, Raster Vs. Vector images, an overview of menus, work area, tool bars, tool box usages, Starting and opening document, getting image, Exploring basic features of like palettes, using context menu, using rulers and guidelines, closing files and quitting color modes of images, working with layers, transparency.

2. Animation Tools (06 Periods)

Concept of Timeline, 2D & 3D animation, morphing, text effects, creating giff animation. Creating slideshows for websites.

3. Blogging & Social Networking Web designing (08 Periods)

Introduction, Advantages, creating a blog using different open source tools like Wordpress, Ghost, Anchor CMS etc., Adobe Spark, Google sites, Principles for designing a social networking website.

4. Presentation Tools (10 Periods)

4.1 Presentation Concept : Creating, Opening and Saving Presentations, Working in Different Views, Working with Slides, Adding and Formatting Text, Formatting Paragraphs, Checking Spelling and Correcting Typing Mistakes, Making Notes Pages and Handouts, Drawing and Working with Objects, Adding Clip Art and other pictures, Designing Slide Shows using templates, Rehearse timing, Narration, Multimedia effects- Apply Transitions between Slides, Animate Slide Content, Set Timing for Transitions and Animations, Insert and Format Media, Encrypting presentations with a password, Running and Controlling a Slide Show, Printing Presentations

4.2 Designing slides: Web-based slides (such as Google Slides), Prezi or other open source tools.

5. CMS & LMS (16 Periods)

5.1 Introduction, difference between CMS & LMS

5.2 Applications and Advantages of using CMS & LMS

5.3 Drupal-An Open source Content Management System: Installation, Architecture, User interface, Themes management, creating a sub-theme, Activate & Deactivate default modules, Install & configure new modules, Get familiar with blocks, Manage existing blocks, create new blocks, Menu management, User management, Setting up the Home page, working with CSS in Drupal, Website backup & upgradation.

5.4 Moodle- An Open Source Learning Management System: Installation, Architecture, User interface, Themes management, managing courses & categories, Activities, Resources & blocks, User Management: Authentication & Enrollment, File management, Setting up the Home page, Roles & Permissions, Security, Performance & backup, Server settings.

LIST OF PRACTICALS

31. Designing a Webpage using photoshop/gimp
32. Design a Website logo and header image.
33. Create a slideshow for your website.
34. Create an animated giff. file.
35. Create a presentation with animation and zoom-in effects.
36. Create a blog using any open source tool.
37. Create a website using Drupal.
38. Create a website using Moodle.

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of tools mentioned in detailed contents of syllabus to students while doing practical exercises. The students should be made familiar with developing web pages by using these tools, working on internet.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce

– Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

- Drupal-7 First look by Mark Noble (http://www.allitebooks.org/drupal-7-first-look/)
- Moodle 3 Administration, Third Edition By Alex Buchner (http://www.allitebooks.org/moodle-3-administration-third-edition/)
- GIMP 2.6 cookbook by Juan Manuel Ferreyra (http://www.allitebooks.org/gimp-2-6-cookbook/)

Websites for Reference

- http://office.microsoft.com/en-us/training/CR010047968.aspx
- https://gsuite.google.com/learning-center
- http://spoken-tutorial.org

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	16	20
2	06	10
3	08	10
4	10	25
5	16	35
Total	**56**	**100**

2.3 DATA STRUCTURE USING PYTHON

L	T	P
5	-	6

RATIONALE

Data structures are the techniques of designing the basic algorithms for real-life projects. Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming. The knowledge of Python language and data structures will be reinforced by practical exercises during the course of study. This course will help students to develop the capability of selecting a particular data structure.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Identify the problem and formulate an algorithm for it.
- Identify the best data structures to solve the problem
- Store data, process data using appropriate data structures
- Sort the data in ascending or descending order.
- Implement trees and various traversing techniques.
- Implement various searching and sorting algorithms and to compare them for checking efficiency.

DETAILED CONTENTS

1. Data Structures: Data Structures in Python, Introduction to Built-in Data Structures, Introduction to User-defined Data Structures, Algorithms, Elements of a Good Algorithm, Basic algorithmic analysis: input size, asymptotic complexity, O() notation (10 Periods)

2. Strings: Working with series of characters that can represent plaintext messages, passwords, and more, including all the complexities of combining human language with programming code. (08 Periods)

3.List-Based Collections: definitions and examples of list-based data structures, arrays, linked lists, stacks, queues, Examine the efficiency of common list methods, Arrays vs lists (10 Periods)

4. Searching and Sorting: search and sort with list-based data structures, binary search and insertion sort, bubble sort, merge sort, quick sort, use of recursion in searching and sorting. (10 Periods)

5. Maps and Hashing: concepts of sets, maps (dictionaries), hashing, common problems and approaches to hashing, hash tables and hash maps. (10 Periods)

6. Trees: concepts and terminology associated with tree data structures, common tree types, binary search trees, heaps, self-balancing trees, efficiency of traversals and common tree functions.

(12 Periods)

7. Graph: concept of a graph and understand common graph terms, coded representations, properties, traversals and paths.

(10 Periods)

MEANS OF ASSESSMENT

– Assignments and quiz/class tests, mid-term and end-term written tests
– Software installation, operation, development and viva-voce

LIST OF PRACTICALS

1. Write a Python program to create an array contains six integers. Also print all the members of the array
2. Given a two list. Create a third list by picking an odd-index element from the first list and even index elements from second.
3. Given an input list removes the element at index 4 and add it to the 2nd position and also, at the end of the list
4. Given a list iterate it and count the occurrence of each element and create a dictionary to show the count of each element
5. Given a two list of equal size create a set such that it shows the element from both lists in the pair
6. Given a following two sets find the intersection and remove those elements from the first set
7. Iterate a given list and Check if a given element already exists in a dictionary as a key's value if not delete it from the list
8. Remove duplicate from a list and create a tuple and find the minimum and maximum number
9. Swapping of two tuples.
10. Perform Insertion sort
11. Exercise based on Bubble sort
12. Binary Search exercise
13. Exercise based on merge & quick sort
14. Use of recursion in sorting
15. Use of recursion in searching
16. Write a Python program to triple all numbers of a given list of integers. Use Python map
17. Write a Python program to square the elements of a list using map() function.
18. Write a Python program to compute the square of first N Fibonacci numbers, using map function and generate a list of the numbers.

19. Using two Arrays of equal length, create a Hash object where the elements from one array (the keys) are associated with the elements of the other (the values)
20. Exercise based on Build in Hash Functions
21. Write a Python program to create a Balanced Binary Search Tree (BST) using an array (given) elements where array elements are sorted in ascending order.
22. Write a Python program to check whether a given a binary tree is a valid binary search tree (BST) or not.
23. Write a Python program to convert a given array elements to a height balanced Binary Search Tree (BST).
24. Exercise based on graph traversal

RECOMMENDED BOOKS

1. Data Structures and Algorithms in Python, Publisher(s): Wiley
2. Programming and Problem Solving with Python by Ashok Namdev Kamthane and Amit Ashok Kamthane, McGraw Hill.
3. Problem Solving with Algorithms and Data Structures Using Python By Bradley N. Miller, David L. Ranum
4. Data Structures and Algorithms with Python by Kent D. Lee, Steve Hubbard
5. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

- http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	10	15
2	08	10
3	10	15
4	10	20
5	10	15
6	12	15
7	10	10
Total	**70**	**100**

2.4 SOFTWARE ENGINEERING

L	T	P
4	-	2

RATIONALE

The system analysis and design is the backbone of Application software development. After studying this subject the students will be able to develop and design the system according to given requirements. It involves various steps in analysis and design of the system. It includes the knowledge of preparing project systematically. It is important to know about various aspects of the system analysis and design so that the students will be able to understand the responsibilities while designing and implementation of software project.

LEARNING OUTCOMES

After undergoing this subject, the students will be able to:

- Understanding the problem and corresponding requirement for development of software.
- Describe the various phases of the system development life cycle.
- Identify the expected benefits and scope of the projects.
- Prepare and develop data flow diagrams and decision tables.
- Perform a feasibility study of the system.
- Write detailed design specifications for programmes and database.
- Select methods for evaluating the effectiveness and efficiency of a system.
- Apply different testing techniques on simple programme.

DETAILED CONTENTS

1. Introduction to Software Engineering (10 periods)

System Concepts: Types of systems : (open, closed, static and dynamic systems).
Introduction, Programmes v/s Software Products
Emergence of Software Engineering- Early Computer Programming, High-level Language Programming, Control flow based Design, Data Structure Oriented Design, Object Oriented Design

2. Software Life Cycle Models (12 periods)

Requirement of Life Cycle Model, Classic Waterfall Model, Prototyping Model, Evolutionary Model, Spiral Model, introduction to agile methodology.
Comparison of different Life Cycle Models

3. Software Planning (10 periods)

Responsibilities of Software Project Manager
- Metrics for Project Size Estimation- LOC(Lines of Code), Function Point Metric
- Project estimation Techniques- Using COCOMO Model.

4. Requirement Analysis and Specification (06 periods)

Requirement gathering and Analysis, Software Requirement Specifications(SRS), Characteristics of good SRS

5. Software Design and Implementation (10 periods)

Characteristics and features of good Software Design Cohesion and Cupling, Software design Approaches- Function Oriented Design (Data flow diagrams, Data dictionary, Decision Trees and tables), Object Oriented Design, Structured Coding Techniques, Coding Styles, and documentation

6. Software Testing (08 periods)

Concept of Testing, Testing type cycle (V-Model), Verification v/s Validations, Unit Testing, Black Box Testing, White Box Testing, Integration testing, System testing, Configuration management, Overview of test cases.

MEANS OF ASSESSMENT

– Assignments and quiz/class tests, mid-term and end-term written tests
– Software installation, operation, development and viva-voce

LIST OF PRACTICALS

25. Develop a SRS on a given topic/project/problem.
26. Develop DFD Model (level 0 and level 1 DFD) of the problem.
27. Develop sequence diagram
28. Develop class diagrams
29. Use testing tools such as J-meter, Canoo Web Test
30. Use a project management tool such as Microsoft project or Gantt project etc (Team week, Target process, Gantt project)
31. Write test cases for any known application
32. Take any system and study its system specification and report the various bugs.

RECOMMENDED BOOKS

1. Software Engineering by Rajib Mall, PHI Publishers, New Delhi
2. An Integrated Approach to Software Engineering by Pankaj Jalote, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002
3. Software Engineering, Sangeeta Sabharwal, New Age International, Delhi

4. Software Engineering by KK Aggarwal and Yogesh Singh
5. Software Engineering – A Practitioner's Approach by RS Pressman, Tata McGraw Hill Publishers, New Delhi
6. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

- http://swayam.gov.in
- www.emetechnologies.com/UP-SE-Sheets.zip

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	10	18
2	12	24
3	10	18
4	06	10
5	10	18
6	08	12
Total	**56**	**100**

2.5 DATABASE MANAGEMENT SYSTEM

L	T	P
5	-	4

RATIONALE

The PG diploma holders in Computer Application need to understand about Relational Database to manage the data at backend for different applications. They should be able to develop basic table and write query to fetch the required data. Hence this subject will remain the part of this curriculum.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Understand the concept of Database system and Client Server Architecture
- Understand and develop the concepts of Data Modeling, Security and Integrity.
- Convert and compare the designs and differentiate between the keys
- Understand and execute different SQL queries and PL / SQL programs
- Convert database in the form of table
- Normalize the database using normal forms.
- Understand the concept of query processing and Transaction processing

DETAILED CONTENTS

1. Database System Concept & Data Modeling (10 Periods)

   Basic concepts, Advantages of a DBMS over file processing system, Data Abstraction, Database Languages, Data Independence. , Components of a DBMS and overall structure of a DBMS. ,Three views of Data (External View, Conceptual View, Internal View), Three level architecture of DBMS, Data Independence, , Client Server Architecture

2. Data Model (10 Periods)

   Define data model, Data Models : Network Model Hierarchical Model, E-R Model, Advantage & Disadvantages of each Data Model

   ER Model :
   Entity sets and relationship sets- Attributes - Keys in entity and relationship sets : (a) Super Key (b) Candidate Key (c) Primary Key (e) Unique Key - Mapping constraints, Participation Constraint, E-R diagram, Notations. Strong Entity Set and Weak Entity Set

3. Relation Model (10 Periods)

   Advantages, Disadvantages, Codd's 12 rules , Definition of Relations, Schema, Sub schema. Relational Model Constraints (Domain, Tuple Uniqueness, Key Constraints, Integrity Constraints, Entity constraints).

Relations algebra (Basic operation: Union intersection difference and Cartesian product), Additional Relational Algebraic Operations (Projection, Selection rows, Division, rename and join) , Converting ER Model to Relational Model.

4. Relational Database Design (11 Periods)

Purpose of Normalization, Data redundancy and updating anomalies, Functional Dependencies and Decomposition, Process of Normalization using 1NF, 2NF, 3NF, multivalued dependencies and BCNF , Forth Normal Form, Fifth Normal Form,

5. MYSQL/SQL (11 Periods)

Data definition language, Data manipulation language, SQL, Object naming conventions, Object naming guidelines, Data types, Tables (Creating , Inserting, Updating and deleting tables and using constraints), Views, Indexes,

SQL Command :- DESCRIBE, SELECT, WHERE CLAUSE, DISTINCT CLAUSE, ORDER BY,HAVING, LOGICAL OPERATIONS, SQL OPERATORS, JOIN

Aggregate functions, String functions and date time functions, Null values

6. PL-SQL (10 Periods)

User defined function, Control of flow statement of PL/SQL, Procedures/Stored procedures, transaction, triggers, cursors, granting and revoking.

7. NO-SQL: Inroducton ,Usages,And Application. (03 Periods)

8. SECURITY (05 Periods)

Authorization and View- Security constraints - Integrity Constraints- Encryption

LIST OF PRACTICALS

1**.**Installation of MYSQL

STRUCTURED QUERY LANGUAGE

2. Creating Database
   - Creating a database
   - Creating a table
   - Specifying relational data types
   - Specifying constraints
   - Creating indexes

3. Table and Record Handling
   - INSERT statement
   - Using SELECT and INSERT together
   - DELETE, UPDATE, TRUNCATE Statement.
   - DROP, ALTER statement

4. Retrieving Data From a Database
   The SELECT statement
   - Using the WHERE clause
   - Using Logical Operators in the WHERE clause
   - Using In, BETWEEN, LIKE, ORDER BY, GROUP BY & HAVING clause
   - Using Aggregate Functions
   - Combining Tables Using JOINS

5. Design of database for any application.

INSTRUCTIONAL STRATEGY

Explanation of concepts using real time examples, diagrams etc. For practical sessions books along with CDs or learning materials with specified activities are required. Various exercises and small applications should be given along with theoretical explanation of concepts.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. An Introduction to Database System - C. J. Date
2. Database System Concepts - A. Silberschatz, S. Sudarshan& H. F. Korth
3. Database Concepts and Systems - LvanBayroos/SPD
4. Fundamental of Database System - R. Elmashri& S. B. Navathee-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	10	15
2	10	15
3	10	15
4	11	17
5	11	17
6	10	10
7	03	04
8	05	07
Total	**70**	**100**