

JAVA PROGRAMMING

L T P C

5 0 0 4

COURSE OBJECTIVES:

- ✓ To learn Object Oriented Programming language.
- ✓ To learn about Networking and event handling concepts.
- ✓ To handle abnormal termination of a program using exception handling.
- ✓ To design user Interface using AWT.

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

CO1: To get knowledge of the structure and model of the Java programming language.

CO2: To understand how to design applications with threads in Java.

CO3: To get Knowledge for developing software in the Java programming language.

CO4: To learn how to use exception handling in Java applications.

CO5: To use the Java programming language for various programming technologies.

COURSE OUTLINE:

UNIT – 1 HISTORY, DATA TYPES AND OPERATORS

(12 Hours)

History & Evolution of Java: Creation of Java – The java Buzz words – An overview of Java Object Oriented Programming. **Data types:** A closer Look at Literals – Variables – Type conversion and casting – Automatic type promotion in Expressions. **Arrays:** One Dimensional Array – Multi Dimensional Arrays. **Operators:** Arithmetic Operators – Bitwise operators – Relational operators – Boolean Logical operators – Assignment operators – Conditional operators—Operator Precedence—Control statements.

UNIT - 2 CLASSES, METHODS AND INHERITANCE AND ABSTRACT CLASS

(12 Hours)

Class Fundamentals – Declaring objects – Assigning object Reference variables – Introducing Methods – Constructors – This Keyword - Garbage collection. **A Closer Look at Methods and Classes:** Overloading Methods – Overloading Constructors –Using object as parameters – Returning objects – Recursion – Introducing Access control – understanding static – Introducing final – Nested and Inner classes – String class –String Buffer Class – Using command line arguments. **Inheritance:** Basics – Using super – creating Multilevel Hierarchy – Method overriding – Dynamic Method Dispatch – Using Abstract class – Using final with inheritance.

UNIT-3PACKAGES, INTERFACES, EXCEPTION HANDLING AND MULTITHREADING (12 Hours)

Packages –Access Protection -Importing packages – Interfaces. **Exception Handling:** Fundamentals – Exception Types – Uncaught Exceptions – Using try and catch – Multiple catch clauses – Nested try statements – throw-throws- finally – Java's Built – in Exception – creating your own Exception subclasses. **Multithreaded Programming:** Java Thread Model – Main Thread – Creating a Thread - Creating Multiple Threads–Using is Alive () and join () – Thread priorities – Synchronization – Interthread Communication – Suspending Resuming: and stopping Threads.

UNIT – 4 NETWORKING, APPLET AND EVENT HANDLING**(12 Hours)**

Networking Basics – Networking Classes and Interfaces – Inet Address – Inet4 Address and Inet6 Address – TCP/IP client Sockets – URL – URL Connection – HTTP URL Connection – Cookies. **The Applet Class:** An Applet skeleton – Simple Applet Display Methods – Example programs. **Event Handling:** Two Event handling Mechanisms – Delegation Event Model – Event classes – Sources of Events – Event Listener Interfaces Handling Mouse events – Handling Keyboard events.

UNIT - 5 AWT AND AWT CONTROLS**(12 Hours)**

AWT Classes – Window fundamentals – working with Frame Windows - working with Graphic and color.

Using AWT controls: Controls fundamentals – Labels – using Buttons – Applying check Boxes – Check Box group – Choice controls – Using a Text field – Using a Text Area – Understanding Layout Managers (Flow Layout only) – Menu Bars and Menus.

(Total:60 Hours)**Mapping of COs to POs and PSOs**

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K2
CO3	PO1, PO2, PO5	H/M/M	PSO4	M	K3
CO4	PO1, PO5	H/M	PSO4	H	K4
CO5	PO3, PO4	H/M	PSO4, PSO5	H/M	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

JAVA - The Complete Reference -Herbert Schildt, Eleventh Edition, Oracle Press, 2019.

REFERENCE BOOKS:

1. Core and Advanced Java Programming – Black Book, Dreamtech Press, 2018
2. Programming with Java - A Primer, E. Balaguruswamy, Sixth Edition, 2016.

FINANCIAL ACCOUNTING

L T P C

4 0 0 4

COURSE OBJECTIVES:

- ✓ To impart basic accounting knowledge.
- ✓ To provide knowledge on the fundamental of financial accounting.
- ✓ To expose the student to various financial transaction and its current applications.

COURSE OUTLINE:

UNIT -1 BASIC CONCEPTS OF ACCOUNTING

Introduction to Accounting : Need for Accounting –Accounting as the language of business – Attributes and steps of Accounting –Book keeping Vs Accounting – Branches of Accounting – Methods of Accounting – Types of Accounting – Accounting Rules - Bases of Accounting – Accounting terminology. Basic Accounting Concepts: Meaning and classification of Accounting- Accounting Concepts – Accounting Conversion – Accounting equations.

(10 L)

UNIT – 2 JOURNAL AND LEDGER

Recording a Financial Data: Memorandum Book, business transaction, Journal, Rules for Debit and Credit, Compound Journal entry, Advantages of Journal, Ledger, Ledger Account, Ledger Posting, Process of Posting, Balancing of An Account, Significance of Balances, Relation between Journal and Ledger-Subsidiary Books.

(15 L)

UNIT – 3 PREPARING TRIAL BALANCE

Trial Balance: Objects, Methods of Preparing Trial balance, how to locate errors, hints for the preparation of trial balance & problems.

(11 L)

UNIT -4 FINAL ACCOUNTS

Trading account – individual items posted to the debit of trading account – individual items credited to trading account – advantages of trading account – profit & loss account - advantages of profit & loss account- manufacturing account- balance sheet- classification of assets & liabilities.

(12L)

UNIT – 5 ACCOUNTS FOR NON PROFIT ORGANISATION

Introduction – Final accounts of no trading concern- receipts and payments account – features- income & expenditure account – feature- distinction between the two – treatment of special items – some important adjustments – types of problems – Distinction between income and expenditure account and profit and loss account – accounts of professional men.

(12 L)

(Total: 60 Hours)

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

- To acquire knowledge about general aspects of business operations.
- To explain the concepts and procedures of financial reporting, including income and expenditure statement, balance sheet etc.
- To locate and analyze financial data from annual reports of corporations.

TEXT BOOKS:

1. Financial Accounting - T.S.Reddy, A.Murthy – Margham Publications, 2012.
2. Fundamentals of Advanced Accounting - R.S.N.Pillai, Bagavathi, S.Uma, 5th Edition, S.Chand Publication, 2012.

REFERENCE BOOKS:

1. Essentials of Financial Accounting – Asish K.Bhattacharayya, PHI, 2020.
2. Advanced Accountancy - S.P.Jain and Narang – Kalyani Publications, 2017.

INTRODUCTION TO OPERATING SYSTEMS

L T P C

4 0 0 4

COURSE OBJECTIVES

- ✓ To understand design issues related to process management and various related algorithms.
- ✓ To understand design issues related to memory management and various related algorithms.
- ✓ To understand design issues related to file management and various related algorithms.

COURSE OUTCOMES:

Upon completion of the course, the students should be able to:

CO1: Master functions, structures and history of operating systems.

CO2: Master various process management concepts including scheduling, synchronization, and deadlocks.

CO3: Be familiar with multithreading.

CO4: Master concepts of memory management including virtual memory & File Management.

COURSE OUTLINE:

UNIT - 1 INTRODUCTION

What is an Operating System: Mainframe Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – handheld Systems. **(10 L)**

UNIT – 2 PROCESS CONCEPT

Process Concept – Process Scheduling – Operations on Process – Co-operating processes – Inter Processes - Inter Process communication. **CPU Scheduling:** Basic Concepts –Scheduling Criteria - Scheduling algorithms – Multi processor Scheduling - Real time Scheduling – Algorithms evaluation. **(12 L)**

UNIT - 3 PROCESS SYNCHRONIZATION & DEADLOCKS

Process Synchronization: Background – The critical section problem – Synchronization hardware – Semaphores – Classical problems of Synchronization – critical regions – Monitors – Atomic transaction. **Deadlocks:** System model – Deadlock Characterization – methods for handling Deadlocks – Deadlock prevention – Deadlock Avoidance – Deadlock detection – recovery from Deadlock. **(14 L)**

UNIT IV MEMORY MANAGEMENT

Memory management: Background – Swapping – Contiguous memory allocation – paging – segmentation – segmentation with paging. **Virtual Memory:** Background – Demand paging – Page replacement – Allocation of frames. (12 L)

UNIT V FILE MANAGEMENT

File System Interface: File concept – Access methods – File system structure – File system implementation – Directories structure - Directory implementation – Allocation methods – Free space management – Efficiency and performance – Recovery. **Mass Storage Structure:** Disk Structure – Disk Scheduling – Disk management – Swap space management – RAID structure – Disk attachment– Stable Storage. (12 L)

(Total: 60 Hours)

Mapping of COs to POs and PSOs :

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K2
CO3	PO1, PO2, PO5	H/M/M	PSO4	M	K3
CO4	PO1, PO5	H/M	PSO4, PSO5	H/M	K4

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

Operating System Concepts – Abraham Silberschatz and Peter Baer Galvin, Addition Wesley publishing company – 9th Edition, 2018.

REFERENCE BOOKS:

1. Operating System: Intel and Design Principles, 7th Edition, William Stallings, PHI, 2012
2. Understanding Operating System, Ida M.Flynn, Ann McIver McHoes, PWS Publishing.
3. Operating Systems – Second Edition, Achyuts.Godbole, TMH.

JAVA PROGRAMMING LAB

L T P C

0 0 4 2

PRACTICAL LIST

1. Design a class called student with data members name, Roll Number and three subject marks. include methods to assign initial values, find total and average and to display total and average marks .
2. Write a java program to find the area of Square, Rectangle, and Triangle by (a) Overloading Constructor Method (b) Overloading Method
3. Write a java program using Multilevel Inheritance.
4. Write a java program using Overriding Methods
5. Write a java program to create and Implement an Interface.
6. Write a java program to Create and Import Package (Minimum Three Classes)
7. Write a java program to throw the following Exception: (a) Negative Array Size (b) Array Index out of Bounds
8. Write a java program to Create your Own Exception
9. Write a java program to create a thread Using Thread Class.
10. Write a java program Display a Simple Banner Applet.
11. Write a java program using Applet to Design a Web Page
12. Write a java program to illustrate Mouse and keyboard Event Handling.
13. Write a java program to Design a calculator to perform arithmetic operations.
14. Write a java program, which creates a window with a checkbox group with boxes for the colors, violet, indigo, yellow, orange, red, blue and green. When the button is selected the background color must change accordingly.
15. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste.

DATA STRUCTURES

L T P C
3 0 0 3

COURSE OBJECTIVES:

- ✓ To understand different methods of organizing large amounts of data.
- ✓ To efficiently implement different data structure.
- ✓ To efficiently implement solution for different problems.

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

CO1: An understanding of the basic data structures.

CO2: To describe Data structures like stack, queue, tree and graph.

CO3: An understanding of the basic search and sort algorithms.

CO4: The appropriate use of a particular data structure and algorithm to solve a problem.

COURSE OUTLINE:

UNIT – 1 DATATYPES INTRODUCTION

Introduction: Pseudo code – The Abstract Data Type – A Model for an Abstract Data Type – Algorithms Efficiency.

Searching: List Searches – Hashed List Searches – Collision Resolution. (10 L)

UNIT – 2 LINKED LISTS

Linear List Concepts – Linked List Concepts – linked List Algorithms – Processing a Linked List – Complex Linked List Structures. (10 L)

UNIT – 3 STACKS AND QUEUES

Basic Stacks Operations – Stack Linked List Implementation – Stack Applications – Queue operations – Queue Linked List Design. (10 L)

UNIT – 4 TREES

Basic Tree Concepts – Binary Tree - Binary Tree Traversals – Expression Trees- General Trees – Binary Search Trees – Heap definition – Heap Structure – Basic Heap Algorithm. (8 L)

UNIT - 5 INTRODUCTION TO GRAPHS

Sorting And Graphs: General Sort Concepts – Quick sort – External sorts.

Graphs: Terminology - Operations–Graph storage Structure–Networks. (7 L)
(Total: 45 Hours)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K2
CO3	PO1, PO2, PO4	H/M/M	PSO4	M	K3
CO4	PO1, PO5	H/M	PSO4, PSO5	H/M	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

1.Data Structures a Pseudo Code Approach with C++, Richard F. Gilberg & Behrouz A Forouzan, Brooks/Cole (Thomson Learning) 2001. Chapters: 1,2.1,2.3,2.4,3.1-3.4,3.6,4.1-4.3,5.1,5.2,7.1-7.5,8.1,9.1- 9.5,11.1,11.4 (Quick Sort only) 11.6, 12.1-12.5.

REFERENCE BOOKS:

1. Fundamentals of Data Structures - Eilis Horowitz & Sartaj, Galgotia Publications 2008

2. Data Structures - Seymour Lipschutz, Tata McGrawHill, 2014

DATA STRUCTURES LAB

L T P C

0 0 4 2

PRACTICAL LAB

1. Write a C++ program to implement sequential search and Binary search in array.
2. Write a C++ program to implement linked list and perform the following operations
 - (a) Add a node as first node.
 - (b) Add a node as last node.
3. Write a C++ program to implement linked list and implement the following Objects.
 - (a) Delete the first node.
 - (b) Delete the last node.
4. Write a C++ program to implement a stack linear list perform the push and pop Operations.
5. Write a C++ program to implement binary tree using Linked and Perform the following traversal:
 - (a) Inorder traversal.
 - (b) Preorder traversal.
 - (c) Postorder traversal.
6. Write a C++ program to implement merge sort.
7. Write a C++ program to implement quick sort.

PROGRAMMING WITH PHP & MYSQL

L T P C

4 0 0 4

COURSE OBJECTIVES:

- ✓ To understand the concepts of open sources.
- ✓ To learn and use open-source database management system MySQL
- ✓ To create dynamic web pages and websites.
- ✓ To connect webpages with database.

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

CO1: To observe and understand the role, structure, control flow, classes and concepts in PHP and tables in MySQL

CO2: To implement the concepts in PHP and queries in MySQL.

CO3: To analyze functions for data and file handling in PHP and data management in MySQL

CO4: To evaluate the programming concepts in PHP to develop interfaces and manipulate data using MySQL.

CO5: To create applications using PHP and MySQL.

COURSE OUTLINE:

UNIT-1

Introduction: Introduction- Open-source PHP – PHP history- features-variables- statements operators' conditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops-while-do-for – loop iteration with break and continue. **(12 L)**

UNIT – 2

Arrays and Functions: Arrays: Creating an array- modifying array-processing array-grouping form with arrays-using array functions- creating user defined functions- using files- sessions cookies- executing external programs – Creating sample applications using PHP. **(12 L)**

UNIT – 3

File Handling Opening files using fopen - looping over a files content with feof- reading text from a file using fgets - closing a file- reading character with fgetc- reading whole file with file_get_contents reading a file into an array with file-checking if a file exists- fscan fparse_ini_file- Getting file information with stat-fseek- copying files with copy- deleting files writing to a file-reading and writing binary files – locking files. **(12 L)**

UNIT - 4 MySQL:

Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connection Databases and tables- MySQL data types-Creating and manipulating tables-Insertion- updation and deletion of rows in tables -Retrieving data- Sorting and filtering retrieved data -Advanced data filtering Data manipulation functions-Aggregate functions -Grouping Data-Subqueries Joining Tables- Set Operators-Full text searching. **(12 L)**

UNIT- 5 PHP with MySQL:

Working MySQL with PHP-database connectivity- usage of MYSQL commands in PHP processing result sets of queries- handling errors-debugging and diagnostic functions validating user input through Database layer and Application layer formatting query output with Character- Numeric- Date and time – sample database applications.

(12 L)

(Total: 60 Hours)

Mapping of COs to POs and PSOs :

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K2
CO3	PO1, PO2, PO5	H/M/M	PSO4	M	K3
CO4	PO1, PO5	H/M	PSO4	H	K4
CO5	PO3, PO4	H/M	PSO4, PSO5	H/M	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOKS

1. VIKRAM VASWANI- “PHP and MySQL”- Tata McGraw-Hill- 2005.
2. BEN FORTA – “MySQL Crash course”, SAMS- 2006.
3. Steven Holzner – “The Complete reference PHP”, Tata McGraw Hill,2008

REFERENCE BOOKS:

1. Tim Converse- Joyce Park and Clark Morgan- “PHP 5 and MySQL” -Wiley India reprint - 2008.
2. Robert Sheldon- Geoff Moes- “Beginning MySQL”-Wrox- 2005

**MSU/ 2021-22 / UG-Colleges / Part-III (B.C.A) / Semester – III / NON-MAJOR
ELECTIVE**

[CHOOSE ANY ONE]

**INTRODUCTION TO INFORMATION TECHNOLOGY /
INTRODUCTION TO COMPUTERS**

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INTRODUCTION TO INFORMATION TECHNOLOGY

COURSE OBJECTIVES:

- ✓ To understand the principles of digital devices, computer hardware, software, telecommunications, networking and multimedia.
- ✓ This course provides a sound foundation on the basic theoretical and practical principles behind the technologies.
- ✓ To discuss up to date issues surrounding them including social aspects and how they impact everyday life.

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

CO1: To understand the architecture of the computer.

CO2: To know about internet & its applications.

CO3: To understand and define about the current trends in IT.

COURSE OUTLINE:

UNIT - 1 INFORMATION TECHNOLOGY BASICS

Introduction, Information, Technology, Information Technology, Present Scenario, Role of Information Technology, Information Technology and internet, Careers in IT Industry. Computer Organization and Architecture: Central Processing Unit, inside a computer, Data representation in Computer, Coding Schemes.

(6 L)

UNIT – 2 COMPUTER STORAGE AND MEMORY

Introduction, Memory Hierarchy, Random Access Memory (RAM), Read Only Memory (ROM), RAM, ROM and CPU interaction, Types of Secondary storage devices, Magnetic tape, Magnetic disk, types of magnetic disk, optical disk, type of optional disks.

(6 L)

UNIT – 3 INPUT & OUTPUT DEVICES

Input, Output Media: Introduction, types of input devices, types of output devices, **Multimedia Essentials:** Introduction, Multimedia definition, Building blocks of Multimedia, Multimedia system, Multimedia applications, Virtual reality. **(6 L)**

UNIT – 4 ABOUT INTERNET

The Internet: Introduction, Evolution of Internet – Basic Internet terms – Getting Connected to Internet – Internet Applications – Data over Internet. **Internet tools:** Introduction – Web Browser – Browsing Internet using Internet Explorer – E-Mail – Search engines – Instant messaging. **(6 L)**

UNIT V CURRENT TRENDS IN IT

Emerging trends in IT: Introduction, E-Commerce – Electronic Data Interchange – Mobile Communication – Bluetooth – Global Positioning System – Infrared Communication – Smart Card – Imminent Technologies.

(6 L)

(Total: 30 Hours)

Mapping of COs to POs and PSOs :

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2	H	K2
CO3	PO1, PO2, PO5	H/M/M	PSO4, PSO6	H /M	K4

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

- Introduction to Computer and Information Technology - D.GloryRatha Mary, S.Selvanayahi, Shekina Publications.

REFERENCE BOOKS:

1. Fundamentals of Information Technology - Anshuman Sharma, Vishal Sharma, Hardeep Singh & S.K.Kakkar, 5th Edition, Punjab University, 2020
2. Fundamentals of Information Technology - Anoop Mathew, S.Kavitha Murugesan, Narosa , 2013
3. Introduction to Information Technology - V.Rajaraman, PHI, 2018.

INTRODUCTION TO COMPUTERS

L T P C

2 0 0 2

COURSE OBJECTIVES:

- ✓ To learn about basic components of the computer.
- ✓ To study functions and types of operating system.
- ✓ To study about software Installation.

COURSE OUTCOMES:

Upon completion of the course, the students should be able:

CO1: To understand the meaning and basic components of a computer system.

CO2: To define and distinguish Hardware and Software components of computer system.

CO3: To understand the memory and storage devices and types of Operating system.

COURSE OUTLINE:

UNIT – 1 COMPUTER BASICS

Introduction, Characteristics of Computers – Evolution of Computers, Generation of Computers, Classification of Computers, the Computer System, Application of Computers. **(6 L)**

UNIT – 2 COMPUTER ORGANIZATION AND ARCHITECTURE

Central Processing Unit, Inside a computer, Data representation in Computer, Coding Schemes. **(6 L)**

UNIT - 3 INPUT & OUTPUT UNITS

Computer input units, Computer output units. **(6 L)**

UNIT – 4 MEMORY & STORAGE DEVICES

Computer Memory and Storage: Introduction, Memory Hierarchy, Random Access Memory (RAM), Read Only Memory (ROM), RAM, ROM and CPU interaction, Types of Secondary storage devices, Magnetic tape, Magnetic disk, types of magnetic disk, optical disk, type of optional disks. **(6 L)**

UNIT – 5 OPERATING SYSTEM

Introduction, Operating System, Definition, Evolution of Operating System, Types of Operating System, Functions of Operating System. Computer Software: Introduction, Computer Software, Definition, Categories of Software, Installing and Uninstalling software, Software piracy, Software terminologies. **(6 L)**

(Total: 30 Hours)

Mapping of COs to POs and PSOs :

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K2
CO3	PO1, PO2, PO5	H/M/M	PSO4, PSO5	M/H	K4

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

- Introduction to Computer and Information Technology - D.GloryRatha Mary, S.Selvanayahi, Shekina Publications.

REFERENCE BOOKS:

1. Introduction to Computer - Peter Norton, Tata McGraw Hill, 2002.
2. Fundamental of Information Technology - Alex Leon& Mathews Leon Vikas Publication – New Delhi, 2009.

PYTHON Programming

Course Code: -----

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Course Objectives:

The main objectives of this course are to:

- To introduce the fundamentals of Python Programming.
- To teach about the concept of Functions in Python.
- To impart the knowledge of Lists, Tuples, Files and Directories.
- To learn about dictionaries in python.
- To explore the object-oriented programming concepts, Graphical programming aspects of Python with help of built-in modules.

Course Outcomes:

- Remembering the concept of operators, data types, looping statements in Python programming.
- Understanding the concepts of Input / Output operations in file.
- Applying the concept of functions and exception handling
- Analyzing the structures of list, tuples and maintaining dictionaries

UNIT I

Introduction to Python: Features of Python – Execution of a Python program – Flavors of Python – Python Virtual machine (PVM) – Memory Management in Python – Garbage Collection – Comparison of Python with C and Java.

Datatypes in Python: Built in Data types: None Type - Numeric types: int, float, complex - datatype conversion - booldatatype.

Sequences : string , bytes , bytearray , list , tuple , range - set datatype – mapping datatype - literals. **Operators:** Arithmetic operators – Assignment operators – Unary minus operator – Relational operators – Logical operators – Boolean operators – Bitwise operators - Membership operators – Identity operators - Operator precedence - Mathematical functions. (12 L)

UNIT II

Input and Output: print() - input() - command line arguments.

Conditionals and Loops: if statement - if...else statement - if...elif statement - while loop - for loop - the else suite - break statement - continue statement - pass statement - assert statement - return statement.

Arrays in Python: Creating array – Importing the array module – Indexing and slicing on arrays – Types of arrays – Working with arrays using numpy – Mathematical operations on arrays – Working with multidimensional array – Matrices in numpy. (12 L)

UNIT III

Strings and characters: Slicing the strings – String functions and methods – working with characters. Functions: Defining a function – Calling a function – Pass by object reference – Recursive functions – lambda functions – Function decorators – Generators.

Lists: list operations – list slices – aliasing and cloning list - Methods to process lists – Nested list – list comprehension.

Tuples: Creating tuples - Basic operations on tuples – Functions to process tuples. (12 L)

UNIT IV

Dictionaries: Operations on dictionary – Dictionary methods – Using loops with dictionaries – Converting lists, strings into dictionary – Passing dictionary to functions – Ordered dictionaries. **Exceptions:** Errors in Python program

- Exception - Types of exceptions - except Block - assert statement - user defined exceptions - logging the exception.

Files: text files - binary files - opening a file - closing a file - working with text file - working with binary files - pickle in Python - seek() and tell() methods - random accessing of binary files - zipping and unzipping files - working with directories.

(12 L)

UNIT V

Classes and objects: Creating a class - the self variable - constructor – instance variables - class variables - namespaces - Instance methods - class methods - static methods - passing members of one class to another class - inner class.

Inheritance: Constructors in inheritance - overriding super class constructors and methods - super() method - types of inheritance - Method Resolution Order (MRO).

Polymorphism: Duck Typing Philosophy of Python - Operator overloading - Method overloading - Method overriding.

(12 L)

(Total: 60 Hours)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	M	PSO1, PSO5	M/M	K1
CO2	PO2, PO3	H/M	PSO2, PSO3	H/M	K2
CO3	PO4	H	PSO4, PSO6	H/M	K5
CO4	PO5, PO6	M/H	PSO5	M	K6

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

Text Book

R. NageswaraRao, “Core Python Programming”, Second Edition, Dreamtech Press, 2019.

Reference Books

1. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 2nd edition, O’REILLY, 2012.
2. Wesley J Chun, “Core Python Applications Programming”, Prentice Hall, 2012.
3. Martin C. Brown, “PYTHON: The Complete Reference”, McGraw-Hill, 2001.
4. E. Balagurusamy, “Problem Solving and Python Programming”, McGraw-Hill, First Edition, 2017.

SOFTWARE ENGINEERING

Course Code: -----

L	T	P	C
4	0	0	4

COURSE OBJECTIVES:

- To understand the nature of software & software engineering.
- To introduce principles of software development
- To learn about planning, developing, designing testing and validating a project.

COURSE OUTCOMES:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- An ability to identify, formulate, and solve engineering problems.

UNIT – 1 SOFTWARE AND SOFTWARE ENGINEERING

The Nature of Software – What is Software Engineering? - Software engineering as a branch of the engineering profession – Stack holders in Software engineering - Software quality - Software engineering projects – Activities common to Software projects – Difficult and risk in software engineering as a whole. Review of Object Orientation: What is object orientation - Classes and objects – Instance variables – Methods, Operations and Polymorphism – Concepts best define object orientation – Difficulties and risks in programming language choice and object – oriented programming. (12L)

UNIT – 2 DEVELOPING REQUIREMENTS

Domain analysis – The starting point for software projects – Defining the problem and the scope – What is a requirement? – Types of requirements – Some techniques for gathering and analyzing requirements – Managing changing requirements – Difficulties and risks in domain and requirements analysis. (12L)

UNIT – 3 MODELING WITH CLASSES

What is UML? – Essentials of UML class diagrams – Associations and Multiplicity – Generalization – Instance diagrams – More advanced features of class diagrams. Modeling Interactions and Behavior: Interaction diagram – State diagrams – Activity diagrams. (12L)

UNIT - 4 ARCHITECTING AND DESIGNING SOFTWARE

The process of design – Principles leading to good design – Techniques for making good design decisions – Software architecture – Architectural patterns – Writing a good designing document. (12L)

UNIT – 5 TESTING AND INSPECTING TO ENSURE HIGH QUALITY

Basic definitions – Effective and efficient testing – Defects in ordinary Algorithms – Defects in numerical algorithms – Defects in timing and co-ordination. Managing the Software Process: What is project management? – Software process models – Cost estimation – building software engineering teams – Project scheduling and tracking. (12L)

(Total: 60 Hours)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	M	PS04	M	K2
CO2	PO2, PO4	M/H	PS01,PS05	M/H	K4
CO3	PO3,PO5	H/H	PS02	M	K3
CO4	PO6	H	PS03, PS06	H/M	K5

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOK:

Object Oriented Software Engineering - Timothy C.Lethbridge and Robert Laganieri,2nd Edition, McGraw Hill Education, 2005.

REFERENCE BOOKS:

1. Object Oriented and classical Software Engineering - Stephen, R. Schach, 5th Edition, McGraw-Hill Education, 2011.
2. Fundamentals of Software Engineering - Carlo Ghezzi, MedhiJazayeri, Dino Mandrioli, 2nd Edition, Pearson, 2015.

RESOURCE MANAGEMENT TECHNIQUES**Course Code: -----****COURSE OBJECTIVES**

- To solve optimization problems using simplex method.
- To learn to solve problems in linear programming and Integer programming.
- To use PERT and CPM for problems in project management.

L	T	P	C
4	0	0	4

COURSE OUTCOMES:

- Make use of simplex method to solve optimization problems.
- To find solution for various shortest route problems.
- Utilize PERT and CPM in project management.

UNIT – 1 LINEAR PROGRAMMING I

Introduction – Advantages and disadvantages of LP – Basic characteristics of LP – General linear Programming problem – Algebraic solution of a LP (Simplex Method). (12 L)

UNIT - 2 ASSIGNMENT PROBLEM

Introduction – Definition and Mathematical formulation – Methods of solutions – Application area of AP – Comparison between AP and TP – Basic theorems – Hungarian method – Exceptional cases of AP – AP with restrictions – Multiple optimal solution of an AP. (12 L)

UNIT – 3 JOB SEQUENCING & NETWORK MODEL PROBLEMS

Introduction, Basic terms and Notations used in Sequencing – Priority sequencing rules – Gantt Chart – Types of Job sequencing problems. Network models: Introduction – Basic features of Network models – Main advantages of Network models – Network models – Minimum spanning tree algorithm – Shortest route problem – Maximum flow and minimum cost flow problems – Travelling salesman problem as a network model – Unifying model: Minimum cost flow network – Linear programming approach to a network model. (12 L)

UNIT – 4 PROJECT MANAGEMENT

Introduction – Basic concepts – Project planning techniques – CPM & PERT techniques – Critical path method – The PERT approach – Expected length of a project - Probability of project completion by due date – cost consideration in project scheduling – similarities and differences in CPM & PERT. (12 L)

UNIT – 5 GAME THEORY

Introduction – Definitions and Terminology – Basic game theory models – Fundamental Principles of game theory – Assumptions underlying game theory – Pure strategies: Games with saddle point – The rules of Dominance – mixed strategies: Games without saddle point – Solution of 2xn and mx2 Games(graphical approach) – Linear programming solutions of Games. Inventory control: Fundamentals of Inventory theory – Basic terminology – Advantages &disadvantages of Inventory – formula for the quantity to order and lead time – EOQ with price-breaks. (12 L)

(Total : 60 Hours)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	H	PS05	H	K1
CO2	PO2, PO6	M/H	PS03, PS02	M/M	K5
CO3	PO4	H	PS06	H	K6

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOK:

Operations Research Models & Methods – Chandrasekhar Salimath, Bhupenderparashar – Universities press 2014.

REFERENCE BOOKS:

1. Operations Research – Nita H.Shah , Ravi M. Gor, HardikSoni – PHI Learning Private Limited, New Delhi, 2009.
2. Operations Research – P.K.Gupta, Dshira, Schand, 2015.
3. Operations Research – H. A Taha, 9th Edition, Pearson, 2014

PYTHON Programming LAB**Course Code:** -----

L	T	P	C
4	0	0	2

OBJECTIVES:

- To implement the python programming features in practical applications.
- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries, turtles, Files and modules.

OUTCOMES:

- Understand the numeric or real life application problems and solve them.
- Apply a solution clearly and accurately in a program using Python.
- Apply the best features available in Python to solve the situational problems.

LIST OF EXERCISES:

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:

Grade A: Percentage ≥ 80 Grade B: Percentage ≥ 70 and < 80

Grade C: Percentage ≥ 60 and < 70 Grade D: Percentage ≥ 40 and < 60 .

Grade E: Percentage < 40

3. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Program to display the first n terms of Fibonacci series.
5. Program to find factorial of the given number using recursive function.
6. Write a Python program to count the number of even and odd numbers from array of N numbers.
7. Python function that accepts a string and calculate the number of upper case letters and lower case letters.
8. Python program to reverse a given string and check whether the give string is palindrome or not.
9. Write a program to find sum of all items in a dictionary.
10. Write a Python program to construct the following pattern, using a nested loop

```

1
22
333
4444
55555
666666
7777777
88888888
999999999

```

11. Read a file content and copy only the contents at odd lines into a new file.
12. Create a Turtle graphics window with specific size.
13. Write a Python program for Towers of Hanoi using recursion
14. Create a menu driven Python program with a dictionary for words and their meanings.
15. Devise a Python program to implement the Hangman Game.

ACCOUNTING SOFTWARE – TALLY

Course Code: -----

L	T	P	C
3	0	0	3

Course Objectives:

- This course is designed to impart knowledge regarding concepts of Financial Accounting Tally is an accounting package which is used for learning to maintain accounts.
- As this course is useful for Commerce and computer students to get placements in different offices as well as companies in Accounts departments.

COURSE OUTCOMES:

- Company Setup & Configurations.
- Charts of Accounts Setup.
- Recording Financial Transactions.
- Financial Reports Analysis.

Unit –I Introduction to Tally

Features of Tally – Enhancement in Tally – Opening Tally – Components of the Tally – Creating a company.

Stock and Godwon in Tally: Stock Groups- Stock Categories – Stock Items – Units of Measures – Godwons. **(7 L)**

Unit – II Groups, Ledgers, Vouchers and Orders

Introducing Groups –Introducing Ledgers –Introducing Vouchers- Introducing Purchase Orders – Introducing a Sales order – Introducing Invoices. **(8 L)**

Unit- III Reports in Tally

Working with Balance sheet – Working with Profit & Loss A/c report – Working with stock summary report – Understanding ratio analysis – working with Trial Balance Report – Working with Day Book report. **(10 L)**

Unit –IV Payroll

Exploring payroll in Tally – Working with Payroll vouchers – Defining Payroll reports – working with statements of Payroll report – Describing salary disbursement. **(10 L)**

Unit –V Taxation

Indian Tax structure – Tax Deducted at Source in Tally – Creating a Tax Ledger – TDS Vouchers – Tax Collected at Source in Tally – TCS Reports in Tally – VAT Classification – VAT vouchers – VAT reports – Service Tax – GST – CGST – SGST – IGST. **(10 L)**

(Total: 45 Hours)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO4	M	PS01,PS05	M/H	K5
CO2	PO2	H	PS03,PS04	M/H	K4
CO3	PO1,PO5	M/H	PS02	M	K6
CO4	PO3,PO6	H/H	PS03, PS06	H/M	K3

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

Text Book:

Tally.ERP 9 in Simple Steps - DT Editorial Services, DreamTech Press.

Reference Books:

S. Palanivel – Tally Accounting Software – Margham Publications

ACCOUNTING SOFTWARE – TALLY Lab

Course Code: -----

PRACTICAL LIST

L	T	P	C
4	0	0	2

1(a).Develop a purchase day book as your own data

(b).Create a sales daybook as your imaginary figures

(c).Give a format of a petty cash book with your own figure

(d). Prepare

2. With the balance:

1	Capital	50,000
2	Sales	5,50,000
3	Purchases	5,60,000
4	Salaries	2,200
5	Carriage inwards	400
6	Lightings	300
7	Rates & insurance	400
8	Discount earned	500
9	Buildings	30,850
10	Furnitures	6,000
11	Carriage Outwards	500
12	Sundry Debtors	8,000
13	Sundry Creditors	20,000
14	Cash at Bank	12,850

an invoice book with your own figure

following particulars, prepare a trail

3.Prepare a proper Subsidiary book and do the transactions with your own data

4.Prepare a Petty Cash bool with your own data

5.Prepare a Balance Sheet of a Software company with your own data

6.Prepare Sales invoice of a medical store with your own data

MICRO PROCESSOR

Course Code: -----

L	T	P	C
4	0	0	4

COURSE OBJECTIVES:

- To study about microprocessor Architecture.
- To learn about basic 8085 microprocessor and its operations and applications.
- To do arithmetic manipulations using 8085 processor.

COURSE OUTCOMES:

- To write programs to run on 8086 microprocessor-based systems.
- Design system using memory chips and peripheral chips for 16-bit 8086 microprocessor.
- Understand and devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.

UNIT – 1 MICROPROCESSORS, MICROCOMPUTER AND ASSEMBLY LANGUAGE

Microprocessors – Microprocessors Instruction set and Computer Languages – Computers to single chip microcontrollers. Mention to 8085 assembly language Programming – The 8085 Programming model action Classification – Instruction, data format and storage – How to write, store and execute simple program, Overview of 8085 instruction set.

(12 L)

UNIT – 2 MICROPROCESSOR ARCHITECTURE AND MICRO COMPUTER SYSTEMS

Microprocessor Architecture and its operations – Memory – Input and Output (I/O) – Example of a Micro Computer System. Microprocessor Architecture and Memory interfacing: The 8085 MPU – Example 8085 based microcomputer - Memory interfacing - Interfacing the 8155 memory.

(12 L)

UNIT – 3 DATA TRANSFER OPERATION

Arithmetic operations – Logic operations – Branch operations - Writing assembling Language programs – Debugging a program. Programming techniques with additional Instruction: Programming techniques – Counting and Indexing – Additional data transfer and 16-bit arithmetic operations – Arithmetic operations related to memory - Logic operations related to memory - Logic operations – Rotate – Dynamic debugging.

(12 L)

UNIT - 4 COUNTERS AND TIME DELAYS

Counters Time Delays – Hexa decimal counter. Modulo ten counter – Pulse Wave forms – Debugging counter and time Delay programs. Subroutine: Stack – Subroutine – Restart – Conditional call and Return subroutine concepts.

(12 L)

UNIT-5 CONVERSIONS

BCD to Binary conversion – Binary to BCD conversion - BCD to seven segment.LED code conversion – BCD addition – BCD Subtraction – Multiplication- Subtraction with carry.

(12 L)

(Total: 60 Hours)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	M	PS01,PS03	M	K2
CO2	PO1, PO4	M/M	PS05	M/H	K3
CO3	PO5	H	PS06	H	K5

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOKS:

- Ramesh S. Goanker - Microprocessor Architecture Programming and Applications with the 8085 – 5th Edition, Penram International Publisher 2000.
- Microprocessor and Microcontrollers N. Senthil Kumar, M. Saravanan, S. Jeevananthan. Oxford University Press, 2016

REFERENCE BOOK:

1.8085 Microprocessor Programming and Interfacing - N.K.Srinath, PHI Publication, 2005.

**MSU/ 2021-22 / UG-Colleges / Part-III (B.C.A) / Semester – IV / Non Major
Elective - 1**

INTRODUCTION TO INTERNET WITH HTML

Course Code: -----

COURSE OBJECTIVES

- To learn the principle of Web page design.
- To visualize the basic concept of HTML.
- To recognize the elements of HTML.

COURSE OUTCOMES:

- Understand basic concepts in HTML.
- Create basic web pages.
- Implement a variety of hyperlinks to connect pages and communicate with users via email link.

L	T	P	C
2	0	0	2

UNIT – 1 INTRODUCTION TO INTERNET

Computer is business – networking – internet - e-mail-gopher-world wide web, Internet Technologies – Internet Browsers.

UNIT – 2 INTRODUCTION TO HTML

History of HTML - HTML generation and Documents – Tags and Links, Head and Body Section.

UNIT - 3 DESIGNING

Body Section – Ordered and Unordered List – Table Handling.

UNIT - 4 INTRODUCTION TO DHTML

Features of DHTML – Defining styles – Working with Colors – Text and Fonts with Style.

UNIT - 5 FRAMES

Frame set Definition – Nested frames – A web design project – forms.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1,PO2	H/H	PS01	H	K1
CO2	PO5	H	PS02, PSO5	H/M	K2
CO3	PO3,PO6	H/H	PS04	H	K3

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOK:

World Wide Web Design with HTML - C.XAVIER, McGraw Hill Education, 2017

REFERENCE BOOK:

1. The Complete Reference HTML & CSS - Thomas A.Powell, McGraw Hill Education, 2017
2. Fundamental of the internet and the World Wide Web - Greenlaw and Hepp, TMH Publications. 2008

**MSU/ 2021-22 / UG-Colleges / Part-III (B.C.A) / Semester – IV / Non Major
Elective-2**

OFFICE AUTOMATION

L	T	P	C
2	0	0	2

Course Code: -----

Course Objectives:

- To identify word processing terminology and concepts, create technical documents, format and edit documents, use simple tools and utilities, and print documents.
- To do Mail merging process.
- To Create and edit a Word document.

Course Outcomes:

- Demonstrate fundamental knowledge of MSWord.
- Relate real-life MS Word applications for professional or personal use.
- Develop an informal business letter.
- Apply MS Word techniques to create promotional hand-outs.

UNIT I

Microsoft Word 2007: Introduction - MS Word 2007 – Getting started MS Word 2007 - Microsoft Office Button – Quick Access Toolbar – Working with Documents – Page Formatting. **(6 L)**

UNIT II

Microsoft Excel 2007: Introduction – Getting started MS Excel 2007 – Spreadsheets – Microsoft Office Button – Ribbon – Quick Access Toolbar – Creating a Workbook – Data – Modifying a Worksheet – Calculations – Formatting Worksheet – Page properties and printing.

UNIT III

Microsoft Access 2007: Getting started with Microsoft Access 2007 – Microsoft Office Button – Navigation Pane – Tabbed Document Window Viewing – Ribbon – Quick Access Toolbar – Customize – Database terms – Creating a New Database – Create a Table – Data types – Manage Table - Primary keys – Table Relationships – Managing data – Querying a Database – Query wizard – Calculated Fields – Create a Form – Generating Reports – Print a report.

UNIT IV

Microsoft PowerPoint 2007: Introduction – Microsoft PowerPoint 2007 - Getting started with Microsoft PowerPoint 2007 – Microsoft Office Button – Ribbon – Quick Access Toolbar – Customize – Creating a Presentation – Slide Effects - Transition – Animation – Printing.

UNIT V

Internet: Introduction – Web – Navigating the Web – Web Browsers – Top Level Domains – HTTP – FTP – CGI Programming.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	M	PS05	M	K1
CO2	PO2	M	PS01,PS03	M/H	K4
CO3	PO4,PO5	H/H	PS02	M	K2
CO4	PO3,PO6	H/M	PS04, PS06	H/M	K5

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

Text book

1. MS Office 2007 in a Nutshell by Sanjay Saxena, Vikas Publishing House Pvt Ltd, 2011

Reference books

1. Ms-Office 2007 Training Guide, Prof Satish Jain, M Geetha, Krathika, BPB publications, 2010
2. Microsoft Office 2007: Brief Concepts and Techniques, Gary B. Shelly, Thomas J. Cashman, Misty E. Vermaat, Cengage Learning publisher, 2007
3. First Look 2007 Microsoft Office System eBook -
<https://download.microsoft.com/download/3/5/a/35a8cb9f-1349-4645-ac2a-49ba61834826/first-look-2007-microsoft-office-system.pdf>