

ACHARYA NAGARJUNA UNIVERSITY:: NAGARJUNA NAGAR
BCA Under CBCS with effect from Academic Year 2015-2016 Course of Study

SEMESTER I

S.No	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans...)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	Foundation Course -1 Human Values & Professional Ethics	50	0	50	2	2
4	Foundation Course -2 Communication and Soft Skills -1	50	0	50	2	2
5	Elementary Mathematics	100	25	75	6	5
6	Computer Fundamentals	100	25	75	4	3
7	PC Hardware and Software Lab	50	0	50	2	2
8	Programming using C	100	25	75	4	3
9	Programming using C Lab	50	0	50	2	2
Total		700			30	25

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SEMESTER II

S.No	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans...)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	Foundation Course -3 Environmental Science	50	0	50	2	2
4	Foundation Course -4 A ICT (Information and Communication Technology)-1	50	0	50	2	2
5	Statistical Methods and their Applications	100	25	75	6	5
6	Microsoft Office	100	25	75	4	3
7	Microsoft Office Lab	50	0	50	2	2
8	Object Oriented Programming using C++	100	25	75	4	3
9	Object Oriented Programming using C++ Lab	50	0	50	2	2
Total		700			30	25

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SEMESTER III

S.No	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans...)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	Foundation Course -5 Entrepreneurship	50	0	50	2	2
4	Foundation Course -2 B Communication and Soft Skills-2	50	0	50	2	2
5	Discrete Mathematical Structures	100	25	75	6	5
6	Data Structures	100	25	75	4	3
7	Data Structures using C++ Lab	50	0	50	2	2
8	Object Oriented Programming using Java	100	25	75	4	3
9	Object Oriented Programming using Java Lab	50	0	50	2	2
Total		700			30	25

ACHARYA NAGARJUNA UNIVERSITY:: NAGARJUNA NAGAR
BCA Under CBCS with effect from Academic Year 2015-2016 Course of Study

SEMESTER IV

S.No	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	Foundation Course -2C* Communication and Soft Skills-3	50	0	75	2	2
2	Foundation Course -6* Analytical Skills	50	0	75	2	2
3	Foundation Course -5** CE(Citizenship Education)	50	0	50	2	2
4	Foundation Course -4 B ICT (Information and Communication Technology)-2	50	0	50	2	2
5	Operations Research	100	25	75	6	5
6	Database Management Systems	100	25	75	4	3
7	Relational Database Management Systems Lab	50	0	50	2	2
8	Data Communications and Computer Networks	100	25	75	4	3
9	Data Communications and Computer Networks Lab	50	0	50	2	2
Total		600			26	23

I YEAR - I SEMESTER

BCA106P: PC HARDWARE & SOFTWARE – LAB

1. Identifying external ports and interfacing of peripherals such as monitor, keyboard, mouse, speakers, printers, modem, mother board, memory board, display card, NIC card, sound blaster card, interfacing floppy drives, Hard disk, CDROMs.
2. Disassembling and assembling of a Personal Computer.
3. Preventive maintenance of PC.
4. Understand the basic CMOS setup features
5. Prepare a patch card by crimping RJ-45 connector.
6. Partitioning and formatting a Hard Disk.
7. Loading Windows operating system and device drivers.
8. Control Panel settings and features
9. Installation of modem / router and setting up dial network
10. Setting up the properties of network neighborhood and copying files from another system.
11. Installation of MS Office application software.

C PROGRAMMING LAB

1. Find the biggest of three numbers using C.
2. Write a C program to find the sum of individual digits of a positive integer.
3. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
4. Write a C program to check whether a number is Armstrong or not
5. Write a program to perform various string operations
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C program that uses functions to perform the following:
 - a. Addition of Two Matrices
 - b. Multiplication of Two Matrices
8. Write C program that implements searching of given item in given list
9. Write a C program to sort a given list of integers in ascending order
10. Write a C program to perform various operations using pointers?
11. Write a C program to read data of 10 employees with a structure of 1. Employee id, 2. Aadar no., 3. Title, 4. Joined date, 5. Salary, 6. Date of Birth, 7. Gender, 8. Department

I YEAR - II SEMESTER
STATISTICAL METHODS AND THEIR APPLICATIONS

UNIT I: Introduction - Scope and Limitations of Statistical methods - Classification of data – Tabulation of data – Preparation of frequency distribution – Presentation of data through histogram, frequency polygon, frequency curve

UNIT II: Measures of Central Tendency: Computation of Arithmetic Mean, Median, Mode and Geometric Mean and Harmonic Mean with properties for ungrouped data and grouped data

UNIT III: Measures of dispersion: Computation of Range, Quartile deviation, Mean deviation and Standard deviation - Coefficient of variation.(Numerical Applications Only)

UNIT IV: Concept of Skewness, Karl Pearson's and Bowley's Coefficients of Skewness (Numerical Applications Only)

UNIT V: Meaning of Correlation, Types of correlation, Correlation coefficient- Karl Pearson- Spearman's rank Correlation Coefficient. (Numerical Applications Only)

TEXT BOOKS

1. Statistical Methods - Dr. S.P. Gupta- Sultan Chand & Sons.
2. Quantitative Techniques by C. Sathyadevi- S. Chand.

REFERENCE BOOKS

1. Fundamental of Mathematical Statistics- S.C. Gupta & V.K. Kapoor- Sultan Chand
2. Statistical Methods - Snedecor G.W. & Cochran W.G. oxford & +DII
3. Elements of Statistics - Mode. E.B.- Prentice Hall

Acharya Nagarjuna University
BCA - CBCS from 2015 - 1st Year – 2nd Semester
Paper 1: Statistical Methods and Their Applications

Time: 3 Hours

Max. Marks: 75

Section – A

Short Answer Questions

Answer only FIVE Questions

5 x 5 = 25 Marks

1. Explain about frequency distribution?
2. What are the advantages of Histogram?
3. Explain the difference between Mean and Median with an example?
4. Write the equation of Coefficient of variation and give an example of usage?
5. Define the properties of Harmonic Mean for ungrouped data?
6. What is Correlation Coefficient?
7. What is Karl Pearson's Coefficients of Skewness and give two uses?
8. Define three types of correlation?

Section – B

Essay Questions

Answer All the Questions

5 x 10 = 50 Marks

- 9 a) What is primary data? State the various methods of collecting primary data and their relative merits?
OR b) Explain the scope and limitations of Statistics?
- 10 a) What are various measures of Central Tendency? Give its merits and demerits?
OR b) Find the Standard Deviation to the following data?
Class Interval: 30-40 40-50 50-60 60-70 70-80 80-90
10 21 25 23 15 6
- 11 a) What are the various measures of dispersion and explain with an example?
OR b) Find the Quartile Deviation to the following data?
Class Interval: 0-4 4-8 8-12 12-16 16-20
10 20 30 15 5
- 12 a) Explain various measures of Skewness?
OR b) Find out Karl Pearson's coefficient of skewness from the following table?
Wage: 0-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80
No. of persons: 12 18 35 42 50 45 20 8
13. a) Find the correlation coefficient for the following data?

S. No.	1	2	3	4	5	6	7	8	9	10
X	50	50	50	40	30	20	20	15	10	5
Y	700	650	600	450	400	300	200	150	100	50

- OR** b) Determine the Spearman's rank correlation for the following data?

Students No.	1	2	3	4	5	6	7	8	9	10
Maths	60	70	40	90	80	30	45	55	95	85
Physics	70	65	30	95	85	40	50	60	90	80

I YEAR - II SEMESTER
MICROSOFT OFFICE

UNIT-I

Microsoft Office 365: Office on demand, Office Web Apps, SkyDrive and SkyDrive Pro, Most Used Office Applications, Creating a Microsoft Account, Managing Account Settings.

UNIT -II

Microsoft Skydrive and SkyDrive Pro: Getting Started with SkyDrive, Creating a Document, Sharing a Document, Using SkyDrive App, Uploading Files from Your Computer, Uploading Files on the Web, Getting Started with SkyDrive Pro, Creating a Document, Sharing a Document, Uploading Files on the Web, Checking Your E-mail.

UNIT –III

Microsoft Word 2013: Starting Word, Basics of Word processing, The Ribbon, Text and Paragraph Formatting Tools, Adding Tables, Adding Images, Saving Work, Printing Work.

UNIT –IV

PowerPoint 2013: Starting PowerPoint, The Ribbon, Designing a Slide, Saving Work, Printing Work, Preparing and Giving Presentations.

UNIT –V

Microsoft Excel 2013: Starting Excel, Spreadsheet functions and features - The Ribbon, Entering Data, Formatting Data, Using Formulas, Adding Chart, Saving Work, Printing Work.

TEXT BOOK

1. Kevin Wilson, Using Office 365: With windows 8, 2014, Apress, 978-1430266853

REFERENCE BOOKS

1. Joe Habraken, Microsoft Office 2000, 8 in 1 by, Prentice Hall of India
2. Matthew Katzer and Don Crawford, Office 365: Migrating and Managing Your Business in the Cloud, Apress; 2013, 978-1430265269
2. Julian Soh and Anthony Puca, Microsoft Office 365 Administration Inside Out, Microsoft Press US, 2013, 978-0735678231

I YEAR - II SEMESTER
MICROSOFT OFFICE - LAB

1. Prepare a bio-data using various features of Word processing
2. Prepare Class time table for BSc Course using different Text formatting in table.
3. Type a document or an English prose lesson and check for Spelling
4. Use Mathematical Equations to compute averages and standard deviations using 1st semester marks in group subjects for each student
5. Create chart using line and bar graphs for internet and mobile users for each state
Create a pie chart for mobile users in each state in India You have download the data
6. Types some numbers and words to practice various functions such as COUTN, MAX, MIN, MOD, ROUND, SQRT, UPPER, LOWER, LENGTH, LTRIM, RTRIM, LEFT, RIGHT, VAL, MID and REPEAT.
7. Create a file to present in a Powerpoint the features of Word processing and Spreadsheet applications
8. Create a text, animation sound effects and images with effects to explain the usage of Internet
9. Create a table of courses available at Acharya Nagarjuna University in B.Sc., B.Com. and BA with subjects
10. Create a table of college offering various subjects in lab 7 and generate reports for B.Sc. B.Com. and BA
11. Create a pay roll details of employees, a minimum of 10 using MS Access and use features to import external data, sort and filter

Acharya Nagarjuna University
BCA - CBCS from 2015 - 1st Year – 2nd Semester
MICROSOFT OFFICE

Time: 3 Hours

Max. Marks: 75

Section – A

Short Answer Questions

Answer only FIVE Questions 5 x 5 = 25 Marks

1. What is the difference between SkyDrive Pro and SkyDrive?
2. Describe the mechanism to create a Microsoft Account using cloud?
3. Explain the procedure to upload MS Office 365 documents on the Web?
4. Explain the table creating in MS Word 2013?
5. What are the basic features of word processing?
6. How does one save a presentation file in MS Power Point 2013?
7. What are differences between absolute and relative addressing in MS Excel 2013?
8. How many types of data can be entered into a cell of MS Excel 2013?

Section – B

Essay Questions

Answer All the Questions 5 x 10 = 50 Marks

- 9 a) Describe the various Office Web Apps?
OR b) What are the 5 basic features of Microsoft Office 365?
- 10 a) Describe the features of SkyDrive Pro?
OR b) Explain how to check and use email with SkyDrive?
- 11 a) What are the basic features of MS Word 2013?
OR b) Explain the Text and Paragraph formatting tools in MS Word 2013?
- 12 a) What are the basic aspects of designing a slide in MS Power Point 2013?
OR b) Discuss the features of giving a presentation of a file from MS Power Point 2013?
- 13 a) Describe the mechanism to create a pie chart in MS Excel 2013?
OR b) Explain any five functions with an example in MS Excel 2013?

I YEAR - II SEMESTER
OBJECT ORIENTED PROGRAMMING USING C++

UNIT I: Principles of OOP: Software Crisis. Software Evolution- Programming Paradigms. Object Oriented Technology- Basic concepts and benefits of OOP - Application of OOP, OOP languages

Introduction to C++: History of C++, Structure of C++, Application of C++, tokens, keywords, identifiers, basic data types, derived data types, derived data types, symbolic constant, dynamic initialization, reference variables, scope resolution operator, type modifiers, type casting operators and control statements, input and output statements in C++, Function prototyping and components, Passing parameters: Call by reference, Return by reference, Inline function, Default arguments, Over loaded function

UNIT II: Classes and Objects: Class specification, Member function definition - nested member function, access qualifiers, static data members and, member functions. Instance creation - Array of objects - Dynamic objects - Static Objects – Objects as arguments - Returning objects

Constructors and Destructors: Constructors- Parameterized constructors, Overloaded Constructors, Constructors with default arguments, copy constructors, Dynamic Constructors, dynamic initialization using Constructors. Destructors.

UNIT III: Operator Overloading: Operator function-overloading unary and binary operators, overloading the operator using Friend function, Stream operator overloading, Data conversion.

Inheritance: Defining derived classes. Single Inheritance - Protected data with private inheritance - Multiple Inheritances - Multi Level Inheritance - Hierarchical Inheritance. Hybrid Inheritance - Multi path Inheritance - Constructors in derived and base Class - Template in Inheritance - Abstract classes - Virtual function and Dynamic polymorphism. - Virtual destructor - Nested Classes

UNIT- IV: Functions in C++ :Virtual functions- need for Virtual function, Pointer to derived class objects, Definition of virtual functions, Array of Pointer to base class objects, Pure Virtual functions, Abstract classes, virtual Destructors, Generic Programming with Templates. Introduction, function templates, overloaded function templates, user defined templates arguments, class templates, Inheritance of class templates.

UNIT-V: Stream: Streams in C++, Stream classes, formatted and unformatted data, Manipulators, User defined Manipulators, file stream, file pointer and manipulation, file open and close, sequential and random access.

Exception Handling: Principle of Exception handling, Exception handling mechanism , Multiple catch, Nested try, rethrowing the Exception.

TEXT BOOK:

1. The Complete Reference C++, Herb Schildt, Tata McGraw-Hill, Fourth Edition.

REFERENCE BOOKS:

1. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publication Pvt. Ltd, 4th edition, New Delhi, 2002
2. Object Oriented Programming With C++ By Sourav Sahay Form Oxford University Press
3. Ashok N Kamathane, "Object Oriented Programming with ANSI & Turbo C++", Pearson Education, New Delhi, 2003.
4. Bjarne Stroustrup, "C++ Programming language", Pearson Education, New Delhi, 2001.
5. Stanley B Lippman and Josee Lajoie, "C++ Primer", Pearson Education, ND, 2001.
6. Venugopal K R, Rajkumar Buyya and Ravishankar T, "Mastering C++", TMH, ND, 2006

I YEAR - II SEMESTER
OBJECT ORIENTED PROGRAMMING USING C++ LAB

1. Write a C++ program to find the sum of individual digits of a positive integer.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C++ program to generate the first n terms of the sequence.
3. Write a C++ program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
4. Write a C++ program to find the factorial of a given integer
5. Write a C++ program to find the GCD of two given integers
6. Write a C++ program that uses a recursive function for solving Towers of Hanoi problem.
7. Write a C++ program to implement call by value and call by reference parameters passing
8. Write a C++ program to implement function templates
9. Write a program to implement Overloading and Overriding
10. Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:
 - a. Reading a matrix.
 - b. Printing a matrix
 - c. Addition of matrices
 - d. Subtraction of matrices
 - e. Multiplication of matrices
11. Write C++ programs that illustrate how the Single inheritance, Multiple inheritance Multi level inheritance and Hierarchical inheritance forms of inheritance are supported
12. Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class
13. Write a C++ program that illustrates how run time polymorphism is achieved using virtual functions

Acharya Nagarjuna University
BCA - CBCS from 2015 - 1st Year – 2nd Semester
Object Oriented Programming Using C Applications

Time: 3 Hours

Max. Marks: 75

Section – A

Short Answer Questions

Answer only FIVE Questions

5 x 5 = 25 Marks

1. Explain the difference between the structure in C with structure in C++?
2. What is a constructor?
3. Explain about dynamic object?
4. What are the difference between Overloading and Overriding?
5. What is Dynamic polymorphism and given an example?
6. Give a real time example of multi - level inheritance?
7. What is a pure virtual Function?
8. Define exception handling with an example?

Section – B

Answer All the Questions

5 x 10 = 50 Marks

- 9 a) What are the difference between procedure oriented programming and Object Oriented programming?
OR b) Explain different data types in C++?

- 10 a) What is a Class? How can we define it? Explain with an example?
OR b) Write a C++ program to multiply two complex numbers using constructor?

- 11 a) Write a C++ program to perform string concatenation and string copy operations by using Operator Overloading.
OR b) Define Inheritance? Explain different types of inheritance with examples.

- 12 a) Define Generic Programming and how is it implemented in C++?.
OR b) Write a C++ program to implement a function template?

- 13 a) Explain in detail in C++ about I/O Streams?
OR b) Discuss Exception handling mechanism in C++?

II YEAR III SEMESTER
DISCRETE MATHEMATICAL STRUCTURES

UNIT I: Mathematical Logic: Propositions - Compound Propositions - Propositions and Truth Tables - Logical equivalence - algebra of propositions - conditional proposition - converse- contra positive and inverse - biconditional statement - negation of compound statements - tautologies and contradictions – Normal Forms – Logic and Proof – Methods of Proof – Predicate Calculus

UNIT II: Boolean Algebra: Basic Operations – Boolean Function – De-Morgan’s theorem – Sum of Products and Products of Sums Form – Expression of a Boolean Function as a Canonical Form

Set Theory: Basic concepts- Terminology and Notation - operations on sets - Algebra of sets – Ordered Pairs and Cartesian Product - Computer Representation of Sets

UNIT III: Relations: Relations on sets - Some operations on sets - Types of Relations in a set - Properties of relations - Representation of Relations – Composition of Relations – Closure of Relations

Functions: Function - Classification of Functions - Types of Functions - Composition of Functions – Recursive Functions

UNIT IV: Posets and Lattices: Partially Orderly Sets – Lattice – Lattice as Algebraic System – Sublattice - Some Special Lattices

Mathematical Induction: Introduction- proving summation formula examples- proving inequalities examples - proving divisibility examples - principles of strong mathematical induction.

UNIT V: Combinatorics: The Fundamental Principle – Factorial Notations – Permutations – Combinations – Pigeonhole Principle -Recurrence Relation - Order of a Recurrence Relation - Recurrence Relation Models- Modelling Problems on Compound Index- Linear Recurrence Relations with Constant Coefficient- Solution of Recurrence Relation- Method of Characteristics Roots - Homogeneous Recurrence Relation - Non Homogeneous Recurrence Relation

TEXT BOOK

1. A Text Book of Discrete Mathematics by Dr. Swapan Kumar Sarkar, S. Chand Publishers.

REFERENCE BOOKS

1. Discrete structures and graph theory by T.V. Rajani Kanth, K. Vijayalakshmi, Hi – Tech Publishers.
2. Discrete Mathematical Structures with applications to computer Science, by Jean-Paul Tremblay and R Manohar, McGraw Hill, 2001, 978-0074631133

II YEAR III SEMESTER
DATA STRUCTURES

UNIT I

Concept of Abstract Data Types (ADTs)- Data Types, Data Structures, Storage Structures, and File Structures, Primitive and Non-primitive Data Structures, Linear and Non-linear Structures.

Linear Lists - ADT, Array and Linked representations, Pointers.

Arrays - ADT, Mappings, Representations, Sparse Matrices, Sets - ADT, Operations

UNIT II

Stacks: Definition, ADT, Array and Linked representations, Implementations and Applications

Queues: Definition, ADT, Array and Linked representations, Circular Queues, Dequeues, Implementations and Applications.

UNIT III

Trees: Binary Tree, Definition, Properties, ADT, Array and Linked representations, Implementations and Applications.

Priority Queues: Definition, ADT, Heaps and Applications, Binary Search Trees (BST) - Definition, ADT, Operations and Implementations, BST with Duplicates and Applications.

Balanced Search Tress: AVL, Red-Black and Splay Trees.

UNIT IV

Graphs – Graph and its Representation, Graph Traversals, Connected Components, Basic Searching Techniques, Minimal Spanning Trees

UNIT- V

Sorting and Searching: Selection, Insertion, Bubble, Merge, Quick, Heap, Sequential and Binary Searching.

TEXT BOOKS

1. D S Malik, Data Structures Using C++, Thomson, India Edition 2006.

REFERENCE BOOKS

1. SamanthaD, Classic Data Structures, Prentice-Hall of India, 2001.
2. Heilman G I,. Data Structures, Algorithms and Object-Oriented Programming, Tata McGraw-Hill. 2002. (Chapters I and 14).
3. Tremblay .1 P, and Sorenson P G, Introduction to Data Structures and Applications, Tata McGraw-Hill,
4. Drozdek A, Data Structures and Algorithms in C++), 2nd edition, Vikas Publishing House, 2002.
5. Kanetkar Y P, Data Structures through C ++, BPB Publications. 2003.

II YEAR III SEMESTER

DATA STRUCTURES USING C++ LAB

1. Write Programs to implement the Stack using an array.
2. Write Programs to implement the Queue operations using an array.
3. Write a program to implement Single Linked List operations.
4. Write a program to implement double Linked List operations.
5. Write Programs to implement the Stack operations using a singly linked list.
6. Write Programs to implement the Queue operations using a singly linked list.
7. Write a program for arithmetic expression evaluation
8. Write a program to implement deque using a doubly linked list.
9. Write a program to search an item in a given list using Linear Search and Binary Search
10. Write a program for sorting n items using Selection Sort method
11. Write a program for sorting n items using Quick Sort method
12. Write a program for sorting n items using Merge Sort method

II YEAR III SEMESTER

OBJECT ORIENTED PROGRAMMING USING JAVA

UNIT I: Introduction to Java: Features of Java, Java Virtual Machine, Parts Of Java

First step towards Java programming: API Document, Starting a Java Program, Formatting the Output Naming Conventional in Java, Data types In Java, Literals - Operators

UNIT II: Control Statements in Java: if..else Statement, do...while Loop, While Loop, Switch Statement, break Statement, Continue Statement, return Statement - **Input and**

Output: Accepting Input from the keyword, Reading Input with java.util.Scanner Class , Displaying Output with System.out.printf(), Displaying Formatted Output with

String.format() - **Arrays:** Types of Arrays, Three dimensional arrays(3D array), array name.length, Command Line Arguments - **Strings:** Creating Strings, String Class Methods, String Comparison, Immutability of Strings

UNIT III: StringBuffer and StringBuilder: Creating StringBuffer Objects, StringBuffer Class Methods, StringBuilder Class, StringBuilder Class Methods - **Introduction to OOPs:**

Problem in procedure Oriented Approach, Features of Object Oriented programming System (OOPs) - **Classes and Objects:** Object Creation, Initializing the Instance Variables, Access

Specifies, Constructors

Methods in Java: method Header or Method Prototype, Method Body, Understanding methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing

Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods - **Relationship Between Objects:** Relating Objects Using

References, Inner Class, Anonymous Inner class

UNIT IV: Inheritance: Inheritance ,The keyword 'super', The protected Specifier, Types of Inheritance **Polymorphism:** Polymorphism with Variables, Polymorphism Using Methods,

Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final methods, Final Class - **Type Casting:** Types of Data Types, Casting Primitive Data Types, The Object Class **Abstract classes:** Abstract Method and Abstract Class

UNIT V: Interfaces: Interface, Multiple Inheritance Using Interfaces - **Packages:** Package, Different Types of Packages, The Jar Files, Interfaces in a Package, Creating Sub Package in

a package, Access Specifiers in Java, Creating API Document

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re-throwing an **Exception:** Single Tasking, Multi Tasking, Uses of

Threads, Creating a Thread and Running it , Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread

Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, Thread Group, Daemon Threads, Application of Threads, Thread Life Cycle

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A simple Applet, An Applet with Swing Components, Animation in Applets, A simple Game with an Applet, Applet Parameters

TEXT BOOKS

1. H.M.Deitel, P.J.Deitel, "Java How to Program", Sixth Edition, Pearson Education, 2007
2. E. Balagurusamy, "Programming with Java", TMH, 2014, 978-9351343202, 480 pages

REFERENCE BOOKS

1. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)
2. Programming In Java By Sachin Malhotra And Saurabh Choudhary From Oxford University Press
3. James Gosling, Bill Joy, Guy Steele, Gilad Bracha, and Alex Buckley, The Java Language Specification, March 2014
4. Timothy Budd, "Understanding Object-Oriented Programming with Java", Pearson Education, 2007

II YEAR III SEMESTER
OBJECT ORIENTED PROGRAMMING USING JAVA – LAB

1. Write a program to perform various String Operations
2. Write a program to perform various Operations on Array
3. Write a program to illustrate Overloading & Overriding methods in Java
4. Write a program to illustrate the implementation of abstract class
5. Write a program to implement Exception handling
6. Write a program to create packages in Java
7. Write a program to Create Multiple Threads in Java
8. Write a program to Write Applets to draw the various polygons
9. Write a program which illustrates the implementation of multiple Inheritance using interfaces in Java
10. Write a program to store book record details in a file using streams and performs all operations such as search, delete and modify a record

II YEAR IV SEMESTER
OPERATION RESEARCH

UNIT I: Introduction to Operations Research: Origin and Development of OR, Definition of OR, Applications of OR, Models and their classifications, Advantages and Limitations of OR

UNIT II: Linear Programming Problem (LPP): Formulation of LPP, Solution of LPP using graphical method and simplex method – Big-M Method

UNIT III: Transportation problem: Mathematical formulation, IBFS of transportation problem using north-west corner rule, least-cost rule and Vogels approximation Method – Optimal Solution of Transportation Problem.

UNIT IV: Assignment Problem: Definition, Mathematical Formulation of Assignment Problem, Solution of Assignment Problem using Hungarian Algorithm - Simple Problems

UNIT V: Job Sequencing Problem: Definition - Terminology and Notations Principal Assumptions, Problems with n Jobs through Two Machines - Problems with n Jobs through Three Machines

TEXT BOOKS

1. Operations Research (2nd Edition) by S.Kalavathi, Vikas Publications Towers Pvt. Ltd.
2. Operations Research by Kanthi Swaroop, P.K.Gupta, Manmohan by Sultan Chand & Sons

REFERENCE BOOKS

1. Operations Research by Paneerselvam by Prentice Hall of India
2. Operations Research by S.D.Sarma
3. Operations Research by Taha, H.A., Ninth Edition

II YEAR IV SEMESTER
DATABASE MANAGEMENT SYSTEMS

UNIT I: Overview of Database Management System: Introduction, Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management System, Classification of Database Management System, file-based system, Drawbacks of file-Based System ,DBMS Approach,, advantages of DBMS, Anis/spark Data Model, data models, Components and Interfaces of Database Management System. Database Architecture, Situations where DBMS is not Necessary, DBMS Vendors and Their Products.

UNIT II: Entity-Relationship Model: Introduction, the building blocks of an entity-relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, ISA relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition, entity clusters, connection types, advantages of ER modelling.

UNIT III : Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, domain relational calculus(DRC). QBE

UNIT IV: Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operation, View, Sub Query, Embedded SQL,

UNIT V: PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

TEXT BOOK

1. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010, 9780073523323
2. "Database Management Systems" by Raghu Ramakrishnan, McGrawhill, 2002, 9780072465631

Reference Books

1. Fundamentals of Relational Database Management Systems by S. Sumathi, S. Esakkirajan, Springer Publications
2. "An Introduction to Database Systems" by Bipin Desai
3. "Principles of Database Systems" by J. D. Ullman
4. "Fundamentals of Database Systems" by R. Elmasri and S. Navathe

II YEAR IV SEMESTER

RELATIONAL DATABASE MANAGEMENT SYSTEM LAB

1. Creation of a college database which maintains College, Department, Staff, Students, Attendance, Marks, Fee details and establish relationships between tables
2. Write a view to extract details from two or more tables
3. Write a stored procedure to process students results
4. Demonstration of a function
5. Demonstration of cursors
6. Demonstration of database triggers.
7. Demonstration of a Joins
8. Demonstration of a Aggregate functions
9. Creation of Reports based on different queries
10. Usage of file locking table locking, facilities in applications.

II YEAR IV SEMESTER

DATA COMMUNICATIONS AND COMPUTER NETWORKS

UNIT I: Computer Networks and the Internet: Evolution of Internet, The Network Edge, The Network Core, Network Access and Physical Media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, Protocol Layers and Their Service Models, History of Computer Networking and the Internet.

UNIT II: Application Layer: Principles of Application Layer Protocols, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, DNS-The Internet's Directory Service, Socket Programming with TCP, Socket Programming with UDP, Building a Simple Web Server, Content Distribution.

UNIT III: Transport Layer: Introduction and Transport-Layer Services, Multiplexing and Demultiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control.

UNIT IV: Network Layer and Routing: Introduction and Network Service Models, Routing Principles, Hierarchical Routing, The Internet Protocol (IP), Routing in the Internet, What's Inside a Router, IPv6, Multicast Routing, Mobility and the Network Layer.

UNIT V: Link Layer and Local Area Networks: Data Link Layer: Introduction and Services, Error-Detection and –Correction Techniques, Multiple Access Protocols, LAN Addresses and ARP, Ethernet, Hubs, Bridges, and Switches, Wireless Links, PPP: The Point-to-Point Protocol, Asynchronous Transfer Mode (ATM), Frame Relay.

TEXT BOOK

1. Computer Networking: A Top-Down Approach Featuring the Internet by James F Kurose, Keith W. Ross, Second Edition, Addison Wesley Publication
2. Data and Computer Communications by William Stallings, Pearson, 2013, 978-0133506488
3. Computer Networks by Andrew S. Tanenbaum and David J. Wetherall, 5th Edition, PHI, 978-0132126953
4. Data Communications and Networking, 5/e, Behrouz A. Forouzan, McGraw Hill, 2013, 0073376221

II YEAR IV SEMESTER

DATA COMMUNICATIONS AND COMPUTER NETWORKS LAB

1. Write a program to implement RSA algorithm.
2. Write a program of Encryption using Subscription method.
3. Write a program of Encryption using Transaction method.
4. Write a program for selective report ARQ.
5. write a program using Go Back NARQ method
6. Write a program One to One Chat application
7. Write a program Data Retrieval From a Remote Database
8. Write a program Simple Mail Transfer Protocol
9. Write a program Trivial File Transfer Protocol
10. Write a Java program using Simulation of Sliding Window Protocol
11. Write a program MAC of physical address of the system using address resolution protocol
12. Write a Java program Simulate the implementing Routing protocols using border gateway protocol(BGP)