

# Acharya Nagarjuna University ::

## B.Sc. - 1<sup>st</sup> Year - 2<sup>nd</sup> Semester

### PROGRAMMING IN C

**UNIT I: Introduction to Algorithms and Programming Languages:** Algorithm – Key features of Algorithms – Some more Algorithms – Flow Charts – Pseudo code – Programming Languages – Generations – Structured Programming Language- Design and Implementation of Correct, Efficient and Maintainable Programs.

**Introduction to C:** Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting

**UNIT II: Decision Control and Looping Statements:** Introduction to Decision Control Statements – Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement

**Functions:** Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions – Type of recursion – Towers of Hanoi – Recursion vs Iteration

**UNIT III: Arrays:** Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Calculating the length of the Array – Operations that can be performed on Array – one dimensional array for inter-function communication – Two dimensional Arrays – Operations on Two Dimensional Arrays - Two Dimensional Arrays for inter-function communication – Multidimensional Arrays – Sparse Matrices

**Strings:** Introduction –Suppressive Input – String Taxonomy – String Operations – Miscellaneous String and Character functions

**UNIT IV: Pointers:** Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers – Generic Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Passing Array to Function – Difference between Array Name and Pointer – Pointers and Strings – Array of pointers – Pointer and 2D Arrays – Pointer and 3D Arrays – Function Pointers – Array Of Function Pointer – Pointers to Pointers – Memory Allocation in C Programs – Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers

**Structure, Union, and Enumerated Data Types:** Introduction – Nested Structures – Arrays of Structures – Structures and Functions – Self referential Structures – Union – Arrays of Unions Variables – Unions inside Structures – Enumerated Data Types

**UNIT V: Files:** Introduction to Files – Using Files in C – Reading Data from Files – Writing Data from Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments – Functions for Selecting a Record Randomly - Remove() – Renaming a File – Creating a Temporary File

#### TEXT BOOK

1. E Balagurusamy, Programming in ANSI C, McGraw-Hill, Six Ed 2012, ISBN 978-1259004612, 572 pages
2. Y Kanetkar, Let us C BPB, 13<sup>th</sup> Edition-2013, ISBN: 978-8183331630, 656 pages
3. Dennis M. Ritchie and Brian W. Kernighan, “The C Programming Language PHI; 2 edition, 1990 ISBN: 978-8120305960, 284 pages

#### REFERENCE BOOKS

4. Computer Fundamentals and Programming in C by Reema Thareja, Oxford University Press
5. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
6. Henry Mullish & Huubert L.Cooper: The Sprit of C, Jaico Pub. House,1996.

## **Acharya Nagarjuna University :: B.Sc. 1<sup>st</sup> Year – 2<sup>nd</sup> Semester**

### **PROGRAMMING IN C 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

# Acharya Nagarjuna University ::

## B.Sc. 2<sup>nd</sup> Year

### 3<sup>rd</sup> Semester: OBJECT ORIENTED PROGRAMMING USING JAVA

**UNIT I: Object Oriented Programming:** Introduction to OOP, Objects and Classes, Characteristics of OOP, Difference between OOP and Procedure Oriented Programming, Summary

**Introduction to Java Programming:** Introduction, Features of Java, Comparing Java and other languages, Applications and Applets, Java Development Kit, Prerequisites for Compiling and Running Java Programs.

**UNIT II: Java Language Fundamentals:** The building Blocks of Java, Data types, Variable declarations, Wrapper classes, Operators and Assignment, Control Structures, Arrays, Strings, The String Buffer Class.

**Java as an OOP Language:** Defining classes, Modifiers, Packages, Interfaces.

**UNIT III: Exception Handling:** Basics of Exception Handling in Java, Exception Hierarchy, Constructors and Methods in Throw class, Unchecked and Checked exceptions, Exception Handling with Method Overriding, Custom Exception

**Multithreading:** An Overview of Threads, Creating Threads, Thread Life cycle, Thread priorities and Thread scheduling, Thread synchronization, Thread groups, Communication of Threads.

**UNIT IV: Files and I/O Streams:** An Overview of I/O streams, Java I/O, File streams, File Input stream and File output stream, Filter streams, Random Access File, Serialization.

**Applets:** Introduction, Java applications versus Java Applets, Applet Life cycle, working with Applets, The HTML Applet Tag.

**UNIT V: Database Handling using JDBC:** An Overview of DBMS, JDBC Architecture, working with JDBC, Processing Queries, The Transactions commit and Rollback, Handling Exceptions, Mapping Database types to java, Accessing Metadata, Sample Programs to Handle Database.

**The Abstract window Toolkit:** Introduction, Drawing with crystals class, class Hierarchy of AWT, Event Handling, AWT controls, Layout Managers, The Java2D, Java2d Shapes.

#### 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

3. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)
4. Programming In Java By Sachin Malhotra And Saurabh Choudhary From Oxford University Press
5. James Gosling, Bill Joy, Guy Steele, Gilad Bracha, and Alex Buckley, The Java Language Specification, March 2014, Download PDF: <http://docs.oracle.com/javase/specs/jls/se8/jls8.pdf>
6. Timothy Budd, "Understanding Object-Oriented Programming with Java", Pearson Education, 2007

**Acharya Nagarjuna University ::**  
**B.Sc. 2<sup>nd</sup> Year - 3<sup>rd</sup> Semester**

**OBJECT ORIENTED PROGRAMMING USING JAVA LAB**

1. Write a program to perform various String Operations
  - a) Sort given strings in alphabetical order.
  - b) Check whether one string is sub string of another string or not.
  - c) Convert the strings to uppercase
2. Write a program to illustrate Overloading & Overriding methods in Java
3. Write a program to illustrate the implementation of abstract class
4. Write a program to implement Exception handling
5. Write an interactive program to accept name of a person and validate it. If the name contains any numeric value throw an exception "InvalidName".
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. Illustrate the method overriding in JAVA.
10. Write a program which illustrates the implementation of multiple Inheritance using interfaces in Java

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## B.Sc. 2<sup>nd</sup> Year

### IV Semester: DATA STRUCTURES with JAVA

**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. Hubbard John R. and Huray Anita, Data Structures with Java Paperback Prentice-Hall 2005 ISBN-10: 8120327454
2. David Cousins, Introducing Data Structures with Java Kindle Edition, Pearson Education; First edition, 2011, ISBN-10: 8131758648, 464 pages

#### REFERENCE BOOKS

1. SamanthaD, Classic Data Structures, Prentice-Hall of India, 2001.
2. Tremblay .1 P, and Sorenson P G, Introduction to Data Structures and Applications, Tata McGraw-Hill,
3. Sahani S, Data Structures, Algorithms and Applications in C++, McGraw-Hill, 2002

#### 2<sup>nd</sup> Year: 4<sup>th</sup> Semester - DATA STRUCTURES USING JAVA LAB

1. Write Program to implement the Stack operations using an array and a singly linked list
2. Write Programs to implement the Queue operations using an array and a singly linked list
3. Write a program to implement queue using a doubly linked list
4. Write a program to evaluate postfix expression by using Stack?
5. Write a program to implement insert and delete operations on Priority Queue
6. Write a program to construct Binary Search Tree and implement tree traversing techniques
7. Write a program to search an item in a given list using Linear Search and Binary Search
8. Write a program to Find number of Leaf nodes and Non-Leaf nodes in a Binary Search Tree.
9. Write a program with any Algorithm to Find the Minimum Spanning Tree of a Graph
10. Write programs for Selection Sort, Bubble Sort, Quick Sort, Selection Sort, Merge Sort