ADITYA COLLEGE OF ENGINEERING & TECHNOLOGY(A)
(An AUTONOMOUS Institution)
Approved by AICTE, New Delhi * Permanently Affiliated to JNTUK, Kakinada
Accredited by NBA* Accredited by NAAC A+ Grade with CGPA of 3.40
Recognized by UGC Under Sections 2(f) and 12(B) of the UGC Act, 1956
Aditya Nagar, ADB Road, Surampalem, Gandepalli Mandal, Kakinada District - 533437, A.P
Ph. 99591 76665, Email: office@acet.ac.in, www.acet.ac.in

Department of Computer Science and Engineering
List of Board of Studies Members

S.no	Name	Designation	Position in BoS
1	Dr. M Anil Kumar	Professor & HoD	Chairperson
2	Dr. D Haritha	Professor,Controller of Examinations PG JNTUK – Kakinada	University Nominee
3	Dr. U S N Raju	Associate Professor Dept. of Computer Science & Engineering NIT - Warangal	Subject Expert
4	Dr. K Hima Bindu	Assistant Professor & HoD Dept. of Computer Science & Engineering NIT – Andhra Pradesh	Subject Expert
5	Mr. B Surya Ayyappa Raju	Assistant Manager US Health Care Synergy Solutions Hyderabad	Alumni Member
6	Mr. P Naga Siva Ganga	Manager Qalibre Sofware Solutions, Cuttak	Industry Expert
7	Dr. R V S Lalitha	Professor	Member
8	Dr.Rayi Sailaja	Associate Professor	Member
9	Mr.Chakka Svvsn Murty	Assistant Professor	Member
10	Mr.Chakka Svvsn Murty	Assistant Professor	Member
11	Ms.T J Lsarwani	Assistant Professor	Member
12	Mr.Munaga Masthan Siva Krishna	Assistant Professor	Member
13	Mr.Nadella Sunil	Assistant Professor	Member
14	Mr. Gara Jaya Raju	Assistant Professor	Member
15	Mr. U L Nagendra Kumar	Assistant Professor	Member
16	Ms.J Divya Lalitha Sri	Assistant Professor	Member
17	Mr. Venkatesh Karnasula	Assistant Professor	Member
18	Mr.J Satya Narendra Kumar	Assistant Professor	Member
19	Mr.Amanulla Mohammad	Assistant Professor	Member
20	Mr.N Veerendra Kumar Reddy	Assistant Professor	Member
21	Mr.Dune Satyanarayana	Assistant Professor	Member

3/10/23

S.no	Name	Designation	Position in BoS
22	Ms.Gadi Mounica	Assistant Professor	Member
23	Ms.Rayavarapu Sri Divya	Assistant Professor	Member
24	Ms.Vinti Surya Lakshmi Kantham	Assistant Professor	Member
25	Mrs Challapalli Sujana	Assistant Professor	Member
26	Mr.Rasool Mohammad	Assistant Professor	Member
27	Mr. G Parameswarakumar	Assistant Professor	Member

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Department of Computer Science & Engineering

Meeting Agenda of 1st Board of Studies

13 – 09 – 2023

1.1 Welcome Address by Chairperson

1.2 Discussion Items

- 1.2.1 Vision, Mission, PSOs & PEOs
- 1.2.2 ACETR23 Regulation (UG)
- 1.2.3 Undergraduate Program Structure
- 1.2.4 1st Year Syllabus
- 1.2.5 Evaluation Process
- 1.2.6 Post Graduate Program Structure

1.3 Reporting Items

- 1.3.1 Student Admissions, Success Rate & Student Outcomes

1.4 Other Items

- 1.4.1 Skill Oriented Courses (UG)
- 1.4.2 MOOCs Courses (UG)
- 1.4.3 Internship (UG)
- 1.4.4 Project (UG)
- 1.4.5 Professional Elective / Open Elective (UG)

1.5 Schedule of next BoS meeting

1.6 Vote of Thanks

Resolutions of 1st Board of Studies Meeting

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3/10/23.

1.1 Welcome Address by Chairperson

The chairperson welcomed all the members of the BoS who are present online and offline, and started the meeting with the introduction of the members and presented the highlights of the department and achievements of both the faculty and the students

- Undergraduate program was started in the year 2004 with an initial intake of 60
- Postgraduate program was started in the year 2009 with an initial intake of 18
- Department was recognized as Research Centre by JNTUK in the year 2018
- From AY 2023 – 24 onwards an increase in the intake of UG program from 180 to 240 and PG program from 18 to 30
- The department was accredited by NBA in the year 2022 for 3 years with a score of 645
- 7 faculty members have cleared NET / APSET / GATE examination
- 19 patents were published by our faculty
- 8 faculty members are registered for Ph.D
- 40+ research papers were published in various journals and conferences
- Nearly 68.23 lakhs grant received from funding agencies under various schemes
- 20+ NPTEL certifications were completed by our faculty
- 2 start-ups were incubated
- 4 students have participated in University Innovation Fellowship, Stanford University – USA
- 651 students have completed certifications from NPTEL, Coursera, Cisco, Redhat, Microsoft & AWS
- 7 active MoUs are initiated for industry interaction

1.2 Discussion Items

1.2.1 Vision, Mission, PSOs & PEOs

The BoS chairperson has presented the department Vision, Mission, Program Specific Outcomes & Program Educational Objectives to the expert members of BoS

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Vision

To be a department with high repute and focused on quality education

Mission

- To provide an environment for the development of professionals with knowledge and skills
- To promote innovative learning
- To promote innovative ideas towards society
- To foster trainings with institutional collaborations
- To involve in the development of software applications for societal needs

Program Specific Outcomes

PSO – 1 : Apply mathematical foundations, algorithmic and latest computing tools and techniques to design computer based system to solve engineering problems

PSO – 2 : Apply knowledge of engineering and develop software based applications for research and development in the areas of relevance under realistic constraints

PSO – 3 : Apply standard practices and strategies in software project development using open ended programming environments to deliver a quality product

Program Educational Objectives

PEO – 1 : Prepare graduates with skills in Mathematics, Science & Modern Engineering tools to solve real life problems

PEO – 2 : Excel in the IT industry with the attained knowledge and skills or pursue higher studies to acquire emerging technologies and become an entrepreneur

PEO – 3 : Accomplish a successful career and nurture as a responsible professional with ethics and human values

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1.2.2 ACET R23 Regulation (UG)Undergraduate Program Structure

The BoS chairperson has presented the ACETR23 Regulations of the Undergraduate program to the expert members

1.2.3 Undergraduate Program Structure

The undergraduate program structure which was designed exclusively for first year 1st semester & 2nd semester was presented to the expert members as the syllabus of the first year courses is common of all the branches of CSE, IT, CSE – AI & ML, CSE – DS

1.2.4 1st Year Syllabus

The BoS chairperson has presented the detailed syllabus designed for 5 courses in the first year i) Introduction to Programming ii) Computer Programming Lab iii) Data Structures iv) Data Structures Lab v) IT Workshop

1.2.4.1 The expert members suggested to incorporate the concept of functions before the strings concept in Introduction to Programming course

1.2.4.2 The expert members suggested to give the detail curriculum for the concept related to structures in Introduction to Programming course

1.2.4.3 The expert members suggested to include the latest text books in the syllabus of Introduction to Programming course

1.2.4.4 The BoS chairperson presented that the teaching methodology for the Computer Programming Lab course will be implemented using the online compilers

1.2.4.5 The expert members suggested to include the concept of graphs in the syllabus of Data Structures course

1.2.4.6 The expert members suggested to include the concept of breadth first search and depth first search in the syllabus of Data Structures Lab course

1.2.4.7 The expert members suggested to include Quick Sort and Merge Sort techniques in the Data Structures course

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1.2.5 Evaluation Process

The BoS chairperson has presented the examination pattern, weightage of marks and distribution of marks both for the internal and external examinations of theory and lab courses

1.2.6 Post Graduate Program Structure

The Chairperson briefed about Post Graduate Program in Computer Science & Engineering i.e., M.Tech., (CSE) follows R19 regulation, Syllabus and Evaluation process follows JNTUK, Kakinada

1.3 Reporting Items

1.3.1 Student Admissions, Success Rate & Student Outcomes

The chairperson of BoS has presented the comparison of student admissions, number of students graduated and student outcomes of the last 3 academic years and last 3 batches

1.4 Other Items

1.4.1 Skill Oriented Courses (UG)

1.4.2 MOOCs Courses (UG)

1.4.3 Internship (UG)

1.4.4 Project (UG)

1.4.5 Professional Elective / Open Elective (UG)

The BoS chairperson said that the above mentioned items 1.4.1, 1.4.2, 1.4.3, 1.4.4, 1.4.5 shall be discussed in detail in the next BoS meeting

1.5 Schedule of next BoS meeting

The chairperson of the BoS proposed that the next BoS (i.e. 2nd Board of Studies meeting) will be scheduled in the month of March 2024

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1.6 Vote of Thanks

One of the senior faculty member of the department has given the vote of thanks to all the members of the BoS who are present online and offline

Resolutions of 1st Board of Studies Meeting

Res No. 1.2.2

The expert members have agreed to the regulations ACETR23 as those are already approved in the Academic Council conducted on 5-8-2023

Res No. 1.2.3

The expert members have agreed to the program structure of first year 1st semester & 2nd semester of CSE, IT, CSE – AI & ML, CSE – DS

Res No. 1.2.4.1

The BoS chairperson and the members of BoS agreed to make the change suggested by the expert members

Res No. 1.2.4.2

The BoS chairperson and the members of the BoS agreed to incorporate the details related to structures

Res No. 1.2.4.3

The BoS chairperson and the members have agreed with the suggestion given by the expert members

Res No. 1.2.4.4

The expert members and the other members of the BoS agreed to the proposal of using online compilers

Res No. 1.2.4.5

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The BoS chairperson and other members of the BoS agreed to include the concept of graphs in Data Structures syllabus

Res No. 1.2.4.6

The BoS chairperson and other members of the BoS agreed to include breadth first search and depth first search in Data Structures syllabus

Res No. 1.2.4.7

The BoS chairperson and other members of the BoS agreed to include the sorting techniques Quick Sort and Merge Sort in Data Structures Lab course

Res No. 1.2.5

The expert members and the other members of BoS accepted the examination pattern, weightage and distribution of marks in internal and external examination both for the theory and lab courses

Res No. 1.3.1

The expert members suggested to encourage the students towards higher education

Res No. 1.4

The expert members agreed with the statement given by the BoS chairperson

Res No. 1.5

All the members agreed to the schedule of next BoS meeting

Note: 1. The list of courses offered to 1st Year BTech Computer Science & Engineering is given in

Annexure – 1

2. The detailed syllabus is given in **Annexure – 2**

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Annexure – 1

List of 1st Semester & 2nd Semester Courses

S No	Program	Semester	Course Name
1	B Tech – CSE	I	Introduction to Programming
2	B Tech – CSE	I	Computer Programming Lab
3	B Tech – CSE	II	Data Structures
4	B Tech – CSE	II	Data Structures Lab
5	B Tech – CSE	II	IT Workshop

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Annexure – 2

INTRODUCTION TO PROGRAMMING

(Common for all branches)

Semester: I	**L**	**T**	**P**	**C**
Course code:	**3**	**0**	**0**	**3**

Course Objectives:

- To introduce fundamentals of computer programming.
- To foster logical thinking and problem – solving skills.
- To familiarize students with datatypes, control structures, functions, arrays, pointers and structures.

Course Outcomes (COs): At the end of the course, the student will be able to:

CO1:	Develop optimal problem-solving skills by understanding the computer basics, algorithms and flowcharts.
CO2:	Make use of an appropriate control statement to optimize a program.
CO3:	Develop modular programming using functions and dynamic memory allocation using pointers.
CO4:	Solve complex problems using Arrays and Strings.
CO5:	Utilize structure, union and file operations to handle heterogeneous data and files.

Unit – I Introduction to Programming and Problem Solving

Introduction to Programming: History of Computers, Basic organization of a computer, ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program – Algorithms, Flowcharts (Using Dia Tool), Pseudocode Program Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.

Problem Solving Techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

Unit – II Control Structures

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

Unit – III Functions & Pointers

Functions: Introduction to Functions, Built-in Functions, User defined Function - Declaration and Definition, Function call Return Types and Arguments, Scope and Lifetime of Variables, Recursive functions.

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Pointers: Introduction to Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, modifying parameters inside functions using pointers, Command line Arguments.

Unit – IV Arrays and Strings

Arrays: Arrays indexing, memory model, programs with array of integers, two dimensional arrays, arrays as parameters to function, malloc( ), calloc( ), realloc( ), free( )

Strings: Introduction to Strings, String handling functions.

Unit – V User Defined Data types & File Handling

Structures, Unions, Bit Fields: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type – enum variables, Using Typedef keyword, Bit Fields.

Data Files: Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

Text Books:

1. Programming for problem solving using C Behrouz A.Forouzan. Richard F.Gilberg. Cengage Learning India
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition

Reference Books:

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
3. Let Us C Yashwanth Kanetkar, Eighth edition, BPB Publications.
4. Programming in C A-Practial Approach Ajay Mittal. Pearson Education
5. Head First C: A Brain-Friendly Guide (Greyscale Indian Edition), David Griffiths, Dawn Griffiths

Web Links:

1. https://www.hackerrank.com/
2. https://www.codechef.com/
3. https://www.topcoder.com/

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4. https://code-cracker.github.io/
5. https://raptor.martincarlisle.com/
6. https://nptel.ac.in/courses/106105085/2

COMPUTER PROGRAMMING LAB

(Common for all branches)

Semester: I	**L**	**T**	**P**	**C**
Course code:	**0**	**0**	**3**	**1.5**

Course Objectives:

- To provide hands on experience with coding and debugging.
- To encourage collaborative learning and teamwork in coding.

Course Outcomes (COs): At the end of the course, the student will be able to:

CO1:	Develop the basic C programs in different environments.
CO2:	Utilize appropriate control structures, arrays and strings for problem solving.
CO3:	Develop modular programming skill.
CO4:	Apply pointers for dynamic memory allocation and file operations for file handling.
CO5:	Make use of structures and unions to handle heterogeneous data.

1. **Exercise – 1 : Explore different platforms**
   a. Basic Linux environment and its editors like Vi, Vim & Emacs etc.
   b. Exposure to Turbo C, gcc
   c. Explore to Hacker Rank or any other Online coding platform and compiler environment.
   d. "Hello World" in C
   Objective: Learn about the syntax of reading from stdin and writing to stdout.
   https://www.hackerrank.com/challenges/hello-world-c/problem?isFullScreen=true
   e Write a simple program to read int, float, char and string using scanf() and display using printf() in all the above given platforms.

2. **Exercise – 2 : Basics and Operators**
   a. Sum and Difference of 2 numbers
   Objective: Understand int and float data types.
   https://www.hackerrank.com/challenges/sum-numbers-c/problem?isFullScreen=true
   b. Playing with Characters
   Objective: Learn how to take a character, a string and a sentence as input in C.
   https://www.hackerrank.com/challenges/playing-with-characters/problem?isFullScreen=true
   c. Bitwise Operators
   Objective: Learn how to work with bits (0,1) and bitwise operators.
   https://www.hackerrank.com/challenges/bitwise-operators-in-c/problem?isFullScreen=true
   d. Conversion of Fahrenheit to Celsius and vice versa.
   e. Distance travelled by an object.

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f. Calculate Simple interest and compound interest.

3. Exercise – 3 : Operators and Expressions, Variables and Type conversions

a. Evaluate the following expressions a, b integers, c float, d double, i, j intergers
   i. a/b*c-b+a*d/3
   ii. j = (i++) + (++i)
b. Square root of a given number.
c. Find the area of circle, square, rectangle and triangle.
d. Find the maximum of three numbers using conditional operator.
e. Take marks of 5 subjects in integers, find the total in integer and average in float.

4. Exercise – 4 : Conditional Statements

a. Conditional statements in C.
   Objective: Understand *if* and *else*.
   https://www.hackerrank.com/challenges/conditional-statements-in-c/problem?isFullScreen=true
b. Roots of a Quadratic Equation.
c. Generate electricity bill.
d. Simulate a calculator using switch case.
e. Find the given year is a leap year or not, year should be YYYY.

5. Exercise – 5 : Loops

a. "for" Loop in C.
   Objective: Learn the usage of the *for* loop.
   https://www.hackerrank.com/challenges/for-loop-in-c/problem?isFullScreen=true
b. Sum of the digits of a 5-digit number.
   Objective: Learn the usage of while loop and usage of operators - % and /.
   https://www.hackerrank.com/challenges/sum-of-digits-of-a-five-digit-number/problem?isFullScreen=true
c. Given number is a prime or not. (Also Prime numbers between a given range.)
d. Armstrong Number or not.
e. Palindrome or not.
f. Printing patterns using Loops.
   Objective: Print a pattern of numbers.
   https://www.hackerrank.com/challenges/printing-pattern-2/problem?isFullScreen=true
g. Construct a Pascal triangle

6. Exercise – 6 : Arrays

a. One dimensional Arrays in C
   Objective: Print the sum and free the memory where the array is stored.
   https://www.hackerrank.com/challenges/1d-arrays-in-c/problem?isFullScreen=true
b. Array reversal
   Objective: Working with indices in array
   https://www.hackerrank.com/challenges/reverse-array-c/problem?isFullScreen=true
c. Search an element in array (Linear Search)

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d. Find min and max elements in array
e. Replace an element into array at a given index
f. Identify duplicate elements from array
g. Sorting of elements in an array using Bubble sort

7. Exercise – 7 : 2-D Arrays

a. Addition of two matrices
b. Multiplication of two matrices
c. Transpose of a Matrix
d. Trace of a Matrix
e. Lower Triangular in a Matrix

8. Exercise – 8 : Strings

a. Printing Tokens
Objective: print each word of the sentence in a new line
https://www.hackerrank.com/challenges/printing-tokens-/problem?isFullScreen=true
b. Count number of alphabets (lowercase, uppercase, consonants, vowels) and digits
c. Lowercase to Uppercase, Uppercase to Lowercase, Toggle case, Sentential case
d. Digit Frequency
Objective: find the frequency of each digit in the given string.
https://www.hackerrank.com/challenges/frequency-of-digits-1/problem?isFullScreen=true
e. Find string length, concatenate two strings, reverse a string using built-in and without built-in string functions.

9. Exercise – 9 : Functions and Recursion

a. Functions in C
Objective: Learn simple usage of functions.
https://www.hackerrank.com/challenges/functions-in-c/problem?isFullScreen=true
b. Fibonacci Numbers using recursion
Objective: Complete the recursive function.
https://www.hackerrank.com/challenges/ctci-fibonacci-numbers/problem
c. Factorial
Objective: N! (N factorial) using recursion.
https://www.hackerrank.com/contests/ccc-veltech-practice-set-ende/challenges/factorial-using-recursion-1
d. Digit Sum
Objective: find the *super digit* of the integer.
https://www.hackerrank.com/challenges/recursive-digit-sum/problem
e. LCM
f. Calculate the Nth term

$$S(n) = \begin{cases} a & n = 1, \\ b & n = 2, \\ c & n = 3, \\ S(n-1) + S(n-2) + S(n-3) & otherwise \end{cases}$$

Objective: Find the Nth term.
https://www.hackerrank.com/challenges/recursion-in-c/problem?isFullScreen=true

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10. Exercise – 10 : Pointers

a. Pointers in C
Objective: learn to implement the basic functionalities of pointers in C.
https://www.hackerrank.com/challenges/pointer-in-c/problem?isFullScreen=true

b. Students Marks Sum
Objective: Learn using Pointers with Arrays and Functions
https://www.hackerrank.com/challenges/students-marks-sum/problem?isFullScreen=true

c. Sorting Array of Strings
Objective: sort a given array of strings into lexicographically increasing order or into an order in which the string with the lowest length appears first.
https://www.hackerrank.com/challenges/sorting-array-of-strings/problem?isFullScreen=true

d. Find the sum of a 1D array using malloc()

e. Swap two numbers using functions and pointers - call by value and reference.

f. Dynamic Array in C
Objective: Handling requests by a Librarian to place the books in the shelves.
https://www.hackerrank.com/challenges/dynamic-array-in-c/problem?isFullScreen=true

11. Exercise – 11 : Structure, Union, typedef, bit-fields and enum

a. Write a C program to find the total, average of n students using structures

b. Boxes through a Tunnel
Objective: Using a structure for transporting some boxes through a tunnel
https://www.hackerrank.com/challenges/too-high-boxes/problem?isFullScreen=true

c. Post Transition
Objective: Storing and transferring packages using pointers in structures.
https://www.hackerrank.com/challenges/post-transition/problem?isFullScreen=true

d. Copy one structure variable to another structure of the same type.

e. Read student name and marks from the command line and display the student details along with the total.

f. Shift/rotate using bitfields.

12. Exercise – 12 : Files

a. Write text into and read text from a file

b. Write into text and read text from a binary file using fread( ) and fwrite( )

c. Copy the contents of one file to another file.

d. Merge two files into the third file using command-line arguments.

13. Exercise – 13 – 16 : Logic Building – Augmented Experiments (Complete any 2)

a. Variadic functions in C
Objective: Understanding variable number of arguments
https://www.hackerrank.com/challenges/variadic-functions-in-c/problem?isFullScreen=true

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b. Querying the Document
Objective: representing the words, sentences, paragraphs, and documents using pointers.
https://www.hackerrank.com/challenges/querying-the-document/problem?isFullScreen=true

c. Structuring the Document
Objective: Using structure with pointers
https://www.hackerrank.com/challenges/structuring-the-document/problem?isFullScreen=true

d. Small Triangles, Large Triangles
Objective: Print sorted by their areas
https://www.hackerrank.com/challenges/small-triangles-large-triangles/problem?isFullScreen=true

e. Permutations of Strings
Objective: print all strings permutations in strict lexicographical order
https://www.hackerrank.com/challenges/permutations-of-strings/problem?isFullScreen=true

Textbooks:

1. Programming for problem solving using C Behrouz A.Forouzan. Richard F.Gilberg.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. Unix Shell Programming, Kanetkar Yeshvant P, BPB Publications

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IT WORKSHOP

(Common for all branches)

Semester: II	**L**	**T**	**P**	**C**
Course code:	**0**	**0**	**2**	**1**

Course Objectives:

- To introduce the internal parts of a computer
- To demonstrate configurating the system as dual boot
- To teach the usage of internet for productivity and self paced learning
- To introduce office tools

Course Outcomes (COs): At the end of the course, the student will be able to:

CO1:	Experiment with assembling, disassembling hardware components of a computer.
CO2:	Explain the process of safeguarding a computer system or network from virus/worm.
CO3:	Demonstrate virtual machine and software installation.
CO4:	Develop a Document, Spreadsheet and Presentation using MS-Office and AI Tools.
CO5:	Make use of GIT for version control and LaTeX for document preparation.

1. **Exercise – 1 : Identification of peripherals of a computer**
   a. Block diagram of the CPU along with the configuration of the each peripheral and its functions.

2. **Exercise – 2 : System Assembling and Disassembling**
   a. Disassembling the components of a PC.
   b. Assembling the components back to working condition.

3. **Exercise – 3 : Virtual Machine setup**
   a. Setting up and configuring a new virtual machine.

4. **Exercise – 4 : Installation of Software**
   a. Install LINUX in the personal computer.
   b. Install Microsoft Windows in the personal computer.

5. **Exercise – 5 : Networking and Internet**
   a. Networking commands.
   b. Exploring Internet and World Wide Web.
   c. Exploring Search Engines, Cyber hygiene.

6. **Exercise – 6 : Text Editors**
   a. Demonstration and Practice on Text Editors like Notepad++, Sublime Text, Atom, Brackets, VS Code

7. **Exercise – 7 : Word**
   a. Demonstration and practice on Microsoft Word- Formatting, Page Borders, Reviewing, Equations, symbols.

8. **Exercise – 8 : Excel**
   a. Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text
   b. Calculating GPA - Features to be covered: Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

9. **Exercise – 9 : Powerpoint**
   a. Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.
   b. Interactive presentations - Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts.

10. **Exercise – 10 : AI TOOLS – Chat GPT and Version Control - GITHUB**
   a. Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas • Ex: Prompt: In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality.
   b. Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are. • Ex:Prompt: Translate the following English sentence to French: 'Hello, how are you doing today?'
   c. GIT Commands and GITHUB: config, init, clone, status, add, commit, push, branch, checkout, merge, pull, log

11. **Exercise – 11 : LaTeX**
   a. Installation of LaTeX and related Software's.
   b. Basic formatting using LaTeX.
   c. Handling the equations in LaTeX.
   d. Inserting the Tables in LaTeX.

12. **Exercise – 12 : Internet & World Wide Web (WWW)**
   a. Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
   b. Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active downloads to avoid viruses and/or worms.

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13. **Exercise – 13 : List of Augmented Experiments: (Complete any 2)**
    a. Prepare a power point presentation for college information (Include 10 slides).
    b. List the common computer hardware problem and write down the solutions.
    c. Prepare your resume using MS-Word and LaTeX.
    d. Upload all your documents into GIT and work with access permissions.

Reference Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003.
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition.
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft).
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr.N.B.Vekateswarlu, S.Chand.

Web Links:

1. https://assembleyourpc.net/
2. https://www.latex-tutorial.com/tutorials
3. http://www.teachmsoffice.com/
4. https://www.geeksforgeeks.org/top-12-most-used-git-commands-for-developers/

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DATA STRUCTURES

(Common for CSE, IT, CSE(AI & ML), CSE(DS))

Semester: II
Course code:

L	T	P	C
3	0	0	3

Course Objectives:

- To provide knowledge of basic data structures and implementation
- To develop skills of applying data structures in problem solving

Course Outcomes (COs): At the end of the course, the student will be able to:

CO1:	Illustrate Time and Space complexities for different searching and sorting algorithms.
CO2:	Demonstrate various operations on Linked Lists.
CO3:	Explain different operations on Stack and its applications.
CO4:	Illustrate different operations on queue and its applications
CO5:	Demonstrate the importance and various operation on non-linear data structures and hashing.

Unit – I Introduction to Linear Data Structures

Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures.

Searching & Sorting Techniques: Linear Search & Binary Search, Sorting, Bubble sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort

Unit – II Linked Lists

Singly linked lists representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

Unit – III Stacks

Introduction to stacks, properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list.

Unit – IV Queues

Introduction to queues, properties and operations, implementing queues using arrays and linked lists, Applications of queues, double ended queues.

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Unit – V Trees, Graphs & Hashing

Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal

Graphs: Introduction to Graph Terminology, Representation of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFS & DFS)

Hashing: Introduction to hashing and hash functions, Collision resolution techniques, chaining and open addressing.

Text Books:

1. Data Structures Using C, Reema Thareja, Oxford University Press, 2nd Edition

2. "The Algorithm Design Manual", Steven S. Skiena, Second Edition, Springer Publication

Reference Books:

1. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

2. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders

3. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft

4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein.

Web Links:

1. https://nptel.ac.in/courses/106102064
2. https://archive.nptel.ac.in/courses/106/105/106105225/
3. https://www.udemy.com/topic/data-structures/
4. https://www.coursera.org/specializations/data-structures-algorithms
5. https://www.coursera.org/specializations/boulder-data-structures-algorithms?trk_location=query-summary-list-link

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DATA STRUCTURES LAB

(Common for CSE, IT, CSE(AI & ML), CSE(DS))

Semester: II	**L**	**T**	**P**	**C**
Course code:	**0**	**0**	**3**	**1.5**

Course Objectives:

- To enable and gain knowledge in practical applications of data structures

Course Outcomes (COs): At the end of the course, the student will be able to:

CO1:	Make use of iterative and recursive procedures for problem solving.
CO2:	Utilize appropriate searching and sorting techniques to search and sort elements.
CO3:	Implement various operations in linear data structures.
CO4:	Implement various operations in non-linear data structures.
CO5:	Apply the appropriate data structure to solve different types of applications.

1. **Exercise – 1 : Array Manipulation and Searching Techniques**
   a. Arrays – DS
      Objective: Reverse array elements
      https://www.hackerrank.com/challenges/arrays-ds/problem?isFullScreen=true
   b. Linear Search
      Objective: Find the position of number K in the given list
      https://www.hackerrank.com/contests/17cs1102/challenges/1-a-linear-search
      Write a simple program to read int, float, char and string using scanf() and display using printf() in all the above given platforms.
   c. Binary Search – Basic
      Objective: find index (0-based) of a given key in a sorted array
      https://www.hackerrank.com/contests/launchpad-1-winter-challenge/challenges/binary-search-basic
   d. Binary Search – Iterative
      Objective: Given queries found in array elements or not.
      https://www.hackerrank.com/contests/17cs1102/challenges/1-b-binary-search-iterative
   e. Binary Search – Recursion
      Objective: Given queries found in array elements or not.
      https://www.hackerrank.com/contests/17cs1102/challenges/1-c-binary-search-recursion

2. **Exercise – 2 : Sorting Techniques**
   a. Bubble Sort
      Objective: Sort the array in ascending order
      https://www.hackerrank.com/challenges/ctci-bubble-sort/problem
   b. Insertion Sort
      Objective: Implement insertion sort on array

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https://www.hackerrank.com/contests/17cs1102/challenges/3-a-implement-insertion-sort

c. Selection Sort
Objective: Implement insertion sort on array.
https://www.hackerrank.com/contests/17cs1102/challenges/3c-implement-selection-sort

3. Exercise – 3 : Sorting Techniques – Divide and Conquer

a. Merge Sort
Objective: Implement merge sort using array.
https://www.hackerrank.com/contests/17cs1102/challenges/merge-sort-6

b. Quick Sort
Objective: Implement quick sort using array.
https://www.hackerrank.com/contests/17cs1102/challenges/4a-quick-sort

4. Exercise – 4 : Linked List

a. Single Linked List
Objective: Perform different operations in single linked list.
https://www.hackerrank.com/contests/17cs1102/challenges/5a-single-linked-list

b. Double Linked List
Objective: Perform different operations in double linked list.
https://www.hackerrank.com/contests/17cs1102/challenges/5b-doubly-linked-list

5. Exercise – 5 : Linked List Continued

a. Circular Linked List
Objective: Perform different operations in circular linked list.
https://www.hackerrank.com/contests/17cs1102/challenges/5c-circular-linked-list

b. Reverse a linked list
Objective: Reversing a single linked list
https://www.hackerrank.com/challenges/reverse-a-linked-list/problem?isFullScreen=true

c. Compare two linked list
Objective: Compare the data in the nodes of the linked lists to check if they are equal.
https://www.hackerrank.com/challenges/compare-two-linked-lists/problem?isFullScreen=true

6. Exercise – 6 : Linked List - Applications

a. Implement a linked list to represent polynomials and perform addition.

b. Delete duplicate-value nodes from a sorted linked list.
Objective: Delete nodes and return a sorted list with each distinct value in the original list.
https://www.hackerrank.com/challenges/delete-duplicate-value-nodes-from-a-sorted-linked-list/problem?isFullScreen=true

7. Exercise – 7 : Stack

a. Stack and its operations using arrays

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b. Stack Using Linked List
Objective: Implement Stack using Linked List
https://www.hackerrank.com/contests/17cs1102/challenges/6a-stack-using-linked-list

c. Stack using two Queues
Objective: Implement Stack using two Queues
https://www.hackerrank.com/contests/17cs1102/challenges/6b-implement-stack-using-two-queues-

8. Exercise – 8 : Queue

a. Queue and its operations using arrays

b. Queue Using Linked List
Objective: Implement a queue using Linked List
https://www.hackerrank.com/contests/17cs1102/challenges/7b-implement-a-queue-using-linked-list

c. Queue using two Stacks
Objective: Implement Queue using two Stacks
https://www.hackerrank.com/contests/17cs1102/challenges/queue-using-two-stacks

d. Circular Queues
Objective: Implement Circular Queue using Arrays
https://www.hackerrank.com/contests/17cs1102/challenges/7a-circular-queue-using-arrays

9. Exercise – 9 : Stacks - Applications

a. Towers of Hanoi
Objective: Implement Towers of Hanoi using Stack
https://www.hackerrank.com/contests/17cs1102/challenges/6c-towers-of-hanoi-using-stack

b. Balanced Brackets
Objective: Given strings of brackets, determine whether each sequence of brackets is balanced.
https://www.hackerrank.com/contests/17cs1102/challenges/balanced-brackets

10. Week 10: Stacks - Applications

c. Infix to Postfix
Objective: Convert an infix expression into postfix expression.
https://www.hackerrank.com/contests/17cs1102/challenges/8b-infix-to-postfix

d. Postfix Expression Evaluation
Objective: Implement a program to evaluate a postfix expression.
https://www.hackerrank.com/contests/17cs1102/challenges/8-c-postfix-expression-evaluation

11. Exercise – 11 : Tree

a. Binary Search Tree (BST)
Objective: Implement Binary search tree (BST).
https://www.hackerrank.com/contests/17cs1102/challenges/9a-implement-binary-search-tree

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b. Binary Search Tree (BST) Traversals
Objective: Implement Binary search Tree (BST) Traversals.
https://www.hackerrank.com/contests/17cs1102/challenges/9b-implement-binary-search-tree

12. Exercise – 12 : Graphs and Hashing – Collision Resolution

a. BFS
Objective: Graph Traversal using BFS
https://www.hackerrank.com/contests/17cs1102/challenges/13-a-breadth-first-search
b. DFS
c. Open Hashing - Separate Chaining
d. Closed Hashing - Open Addressing – Linear Probing

13. Exercise – 13 – 16 : List of Augmented Experiments (Complete any 2)

a. DeQueue Implementation
b. Fibonacci Search
c. Radix Sort
d. Quadratic Probing

Text Books:

1. Data Structures Using C,Reema Thareja, Oxford University Press,2nd Edition

2. "The Algorithm Design Manual", Steven S. Skiena, Second Edition, Springer Publication

Web Links:

1. https://nptel.ac.in/courses/106102064
2. https://archive.nptel.ac.in/courses/106/105/106105225/
3. https://www.udemy.com/topic/data-structures/
4. https://www.coursera.org/specializations/data-structures-algorithms
5. https://www.coursera.org/specializations/boulder-data-structures-algorithms?trk_location=query-summary-list-link
6. https://www.hackerrank.com/contests/17cs1102/challenges

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Ph. 99591 76665, Email: office@acet.ac.in, www.acet.ac.in

Department of Computer Science and Engineering

1st BoS Meeting

Date: 13-09-2023

The following members are present in the meeting :

S.no	Name	Designation	Position in BoS	Signature
1	Dr. M Anil Kumar	Professor & HoD	Chairperson	
2	Dr. D Haritha	Professor,Controller of Examinations PG JNTUK – Kakinada	University Nominee	
3	Dr. U S N Raju	Associate Professor Dept. of Computer Science & Engineering NIT - Warangal	Subject Expert	
4	Dr. K Hima Bindu	Assistant Professor & HoD Dept. of Computer Science & Engineering NIT – Andhra Pradesh	Subject Expert	
5	Mr. B Surya Ayyappa Raju	Assistant Manager US Health Care Synergy Solutions Hyderabad	Alumni Member	
6	Mr. P Naga Siva Ganga	Manager Qalibre Sofware Solutions, Cuttak	Industry Expert	
7	Dr. R V S Lalitha	Professor	Member	
8	Dr.Rayi Sailaja	Associate Professor	Member	
9	Mr.Chakka Svvsn Murty	Assistant Professor	Member	
10	Mr.Chakka Svvsn Murty	Assistant Professor	Member	
11	Ms.T J Lsarwani	Assistant Professor	Member	
12	Mr.Munaga Masthan Siva Krishna	Assistant Professor	Member	
13	Mr.Nadella Sunil	Assistant Professor	Member	
14	Mr. Gara Jaya Raju	Assistant Professor	Member	
15	Mr. U L Nagendra Kumar	Assistant Professor	Member	
16	Ms.J Divya Lalitha Sri	Assistant Professor	Member	
17	Mr. Venkatesh Karnasula	Assistant Professor	Member	
18	Mr.J Satya Narendra Kumar	Assistant Professor	Member	
19	Mr.Amanulla Mohammad	Assistant Professor	Member	
20	Mr.N Veerendra Kumar Reddy	Assistant Professor	Member	
21	Mr.Dune Satyanarayana	Assistant Professor	Member	

S.no	Name	Designation	Position in BoS	Signature
22	Ms.Gadi Mounica	Assistant Professor	Member	G. Mounica
23	Ms.Rayavarapu Sri Divya	Assistant Professor	Member	
24	Ms.Vinti Surya Lakshmi Kantham	Assistant Professor	Member	
25	Mrs Challapalli Sujana	Assistant Professor	Member	
26	Mr.Rasool Mohammad	Assistant Professor	Member	
27	Mr. G Parameswarakumar	Assistant Professor	Member	