POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology & Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-III

Course Code	DCSA-301
Course Title	Computer Programming
Number of Credits	2 (L:2; T:0; P:0)

Course Objectives:

To enable student, develop structured solutions to problems and implementing them using computers.
This involves two parts:
(i) Formulating a solution for a given problem as a well-defined sequence of actions.
(ii) Expressing solution in a machine readable form or a programming language. For the second part, we will learn the common units of programming languages. The first part can only be learned through the repeated practice of solving problems.

Course outcomes:

Student should be able to computationally formulate basic problems and write code snippets to execute them. The focus of the course as mentioned above should be on example based learning. The basic nitty gritties can be skipped, however, the application part should be clear. For instance, when to use an array, when to use loop and when to use conditional statements. The main focus of the class will to take examples of problems where these ideas can be employed.

UNIT 1

Introduction to Problem Solving (computational way of thinking); Variables and Representation

UNIT 2

Arithmetic, Relational, Logical and Bitwise Operators; Input, Output, Formatting and File I/O

UNIT 3

Conditional Statements, Repeat Statements, Loops and Nested Loops

UNIT 4

Arrays and Memory Organization, Strings, Multidimensional Arrays, Functions and Parameter Passing

UNIT 5

Recursion and Recursive solutions

Reference Books:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.
7. Outline of Programming with C, Byron Gottfried, Schaum, McGraw-Hill

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Semester-III

Course Code	DCSA-301
Course Title	Computer Programming Lab
Number of Credits	2 (L:0; T:0; P:4)

List of practical to be performed:

1 Familiarization with programming environment (Editor, Compiler, etc.)
2 Programs using I/O statements and various operators
3 Programs using expression evaluation and precedence
4 Programs using decision making statements and branching statements
5 Programs using loop statements
6 Programs to demonstrate applications of n dimensional arrays
7 Programs to demonstrate use of string manipulation functions
8 Programs to demonstrate parameter passing mechanism
9 Programs to demonstrate recursion
10 Programs to demonstrate use of pointers
11 Programs to demonstrate command line arguments and dynamic memory allocation

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Department of Computer Science and Engineering

Semester-III

Course Code	DCSA-302
Course Title	Scripting Languages Python
Number of Credits	3 (L:3; T:0; P:0)

Course Objectives:

To learn how to work with a scripting language like Python.

Course outcomes:

At the end of the course student will be able to build program with a scripting language and will be able to learn any other scripting language on their own..

UNIT 1: Introduction, Variables and Data Types

History, Features, Setting up path, Installation and Working with Python, Basic Syntax Understanding Python variables, Numeric data types, Using string data type and string operations, Basic Operators, Understanding coding blocks, Defining list andlist slicing, Other Data Types (Tuples, List, Dictionary -Python, Arrays, Associative Arrays/Hashes)

UNIT 2: Control Structures

Conditional blocks using if, else and elif, For loops and iterations, while loops, Loop manipulation using continue, break and else (and pass in Python), Programming using conditional and loops block

UNIT 3: Functions, Modules and Packages

Organizing Python codes using functions, Organizing python projects into modules, Importing own module as well as external modules, Understanding Packages

UNIT 4: File I/O, Text Processing, Regular Expressions

Understanding read functions, Understanding write functions, Programming using file operations, Powerful pattern matching and searching, Power of pattern searching using regex

UNIT 5: Frameworks

Frameworks - Web2Py, Django, Ruby on Rails, Struts (any one of these or any other)

Reference Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.
6. Beginning Python using Python 2.6 and Python 3, James Payne, Wrox publishing
7. Practical Programming: An Introduction to Computer Science using Python 3, Paul Gries, The Pragmatic Bookshelf

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Semester-III

Course Code	DCSA-302
Course Title	Scripting Languages Python lab
Number of Credits	1 (L:0; T:0; P:2)

List of practical to be performed:

1 Practice basic coding syntax
2 Write and execute scripts based on data types
3 Write and execute Python scripts with conditionals and loops
4 Write and execute Scripts based on Functions and Modules
5 File Processing scripts
6 Write and execute Regular Expressions
7 Write and execute SQL Queries
8 Write and execute scripts using DBI
9 Develop a simple web application

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Semester-III

Course Code	DCSA-303
Course Title	Data Structures
Number of Credits	3 (L:3; T:0; P:0)

Course Objectives:

To provide strong foundation for implementing programming language to formulate, analyze and develop solutions related to various data structures problems.

Course outcomes:

Have a good understanding of Data Structures and its applications in algorithms.

UNIT 1

Introduction to Data Structures: Basic Terminology, Classification of Data Structures, Operations on Data Structures.

UNIT 2

Linear Data Structures- Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on a Stack, Applications of Stacks-Infix-to-Postfix Transformation, evaluating Postfix Expressions. Queues: Introduction to Queues, Array Representation of Queues, Operations on a Queue, Types of Queues-DeQueue, Circular Queue, Applications of Queues-Round Robin Algorithm.

UNIT 3

Linked Lists: Singly Linked List, Representation in Memory, Operations on a Single Linked List, Circular Linked Lists, Doubly Linked Lists, Linked List Representation and Operations of Stack, Linked List Representation and Operations of Queue.

UNIT 4

Non Linear Data Structures - Trees: Basic Terminologies, Definition and Concepts of Binary Trees, Representations of a Binary Tree using Arrays and Linked Lists, Operations on a Binary Tree-Insertion, Deletion, Traversals, Types of Binary Trees.

UNIT 5

GRAPHS: Graph Terminologies, Representation of Graphs- Set, Linked, Matrix, Graph Traversals

Reference Books:

1. Data Structures, R.S. Salaria, Khanna Book Publishing, New Delhi
2. Data Structures Using C, Reema Thareja, Oxford University Press India.
3. Classic Data Structures, Samanta Debasis, Prentice Hall of India.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications, G. A. V. Pai, McGraw-Hill Education, India.

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Semester-III

Course Code	DCSA-303
Course Title	Data Structures Lab
Number of Credits	1 (L:0; T:0; P:2)

List of practical to be performed:

1 Write a program using recursive and non-recursive functions to perform search operation in a given list of integers using linear search technique
2 Search operation in a given list of integers using binary search technique
3 Write a program to implement insertion sorting for a given random data
4 Write a program to implement bubble sorting for a given random data
5 Write a program to implement quick sorting for a given random data
6 Write a program to implement selection sorting for a given random data
7 Write a program to implement heap sorting for a given random data
8 Write a program to implement Hashing tables
9 Write a program to implement single and double linked list
10 Write a program to implement circular linked list
11 Write a program to Implement Stack operations using array and linked list
12 Write a program to implement Breadth First Search (BFS)
13. Write a program to implement Depth First Search (DFS)
14 Write a program to implement a binary tree of integers
15 Write a program to find the minimum depth of a binary tree

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Semester-III

Course Code	DCSA-304
Course Title	Computer System Organisation
Number of Credits	4 (L:3: T:1: P:0)

Course Objectives:

To have a thorough understanding of the basic structure and operation of a digital computer, its architectures and computational designs.

Course outcomes:

Have a good understanding of functioning of computer system as such and its various subcomponents. Student will be able to understand computing requirement for a specific purpose, analyse performance bottlenecks of the computing device and choose appropriate computing device for a given use case.

UNIT 1:

Structure of Computers: Computer Functional units, Von-Neumann architecture, Bus structures, Basic Operational Concepts, Data representation (Fixed and Floating point), Error detecting codes. Register Transfer and Micro Operations: Register transfer, Bus and memory transfers, Arithmetic micro-operations, Logic micro-operations, Shift micro-operations, and Arithmetic logic shift unit.

UNIT 2:

Micro Programmed Control: Control memory, Address sequencing, and design of control unit. Computer Arithmetic: Addition and Subtraction, Multiplication and Division algorithms, Floating- point arithmetic operation, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT 3:

Introduction to Microproccessor Architecture: Instruction Set Architecture design principles from programmer's perspective. One example microprocessor (Intel, ARM, etc).

UNIT 4:

Assembly Language Programming: Simple programs, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation, assembler directives, procedures and macros.

UNIT 5:

Memory and Digital Interfacing: addressing and address decoding, interfacing RAM, ROM, EPROM, programmable peripheral interface, various modes of operation and interfacing to processor, interfacing keyboard, displays, etc.

Reference Books:

1. Computer System Architecture, M. Moris Mano, Pearson/PHI, India.
2. Microprocessors Interface, Douglas V.Hall, Tata McGraw-Hill.
3. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZaky, McGraw-Hill
4. Advanced Microprocessors and Peripherals- Architecture, Programming and interfacing, A.K.Ray, K.M.Bhurchandi, Tata McGraw-Hill, New Delhi, India.
5. Computer Organization and Design: A Hardwar/Software Interface (MIPS Edition) by Patterson and Hennessy

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Semester-III

Course Code	DCSA-305
Course Title	Multimedia Technologies
Number of Credits	4 (L:3: T:1: P:0)

Course Objectives:

To introduce students to the domain of Multimedia Technologies, which explain the technologies underlying digital images, videos and audio contents, including various compression techniques and standards, and the issues to deliver multimedia content over the Internet.

Course outcomes:

Student will understand various aspects of Multimedia and related standards. Student will be able to build multimedia content and applications and also multimedia enable Web applications and mobile applications.

UNIT 1:

Introduction to Multimedia Multimedia Foundation and Concepts: Multimedia Hardware, Multimedia Software , Multimedia operating systems , Multimedia communication system.

UNIT 2:

Basic Compression Techniques Video and Audio Data Compression Techniques – Lossy and Lossless. Example algorithms/standards: Huffman, RLE, JPEG, MPEG, MP3, MP4, LZMA, FLAC, ALAC, ITU G.722, H.261, H.265.

UNIT 3:

Content Development and Distribution Desktop publishing (Coral Draw, Photoshop, Page maker) Multimedia Animation & Special effects (2D/3D animation, Flash)

UNIT 4:

Introduction to Digital Imaging Basics of Graphic Design and use of Digital technology, Definition of Digital images, Digital imaging in multimedia.

UNIT 5:

Introduction to Multimedia Programming and Applications.

Reference Books:

1. An Introduction to Multimedia Authoring, A. Eliens
2. Fundamentals of Multimedia, Prentice Hall/Pearson, Ze-Nian Li & Mark S. Drew.
3. Multimedia and Animation, V.K. Jain, Khanna Publishing House, Edition 2018
4. Fundamentals of Multimedia, Ramesh Bangia, Khanna Book Publishing Co., N. Delhi (2007)

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Semester-III

Course Code	DCSA-306
Course Title	Summer Internship-1
Number of Credits	2 (L:0: T:0: P:0)

Course Outcomes:

At the end of this course students will gain the ability to

- Analyze the response application software used in industries
- Learn about various measures , and techniques for different operation performed in application software
- Understand statistical data analysis
- Understand computerized data acquisition.
- Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
- Learn design, implement and test the prototype/algorithm in order to solve the conceived problem.
- Write comprehensive report on training work.

Guidelines:

- The industrial training is also a kind of team activity. Here development and design work with a focus on learning application environment.
- The software analysis in industries should be 50% of the total work.
- Industrial training cater a system required in laboratory or real life.
- Student is expected to learn out specifications, methodology, resources required, critical issues involved in design and implementation of software.
- The student is expected to exert on testing of the proposed results as per the industry

THE END