

**SEMESTER 2nd  
MAJOR COURSE**

**CAP222M: COMPUTER APPLICATIONS (PROGRAMMING FUNDAMENTALS THROUGH C)**

**CREDITS: 4 + 2**

**COURSE OBJECTIVES:**

1. *To demonstrate the use of flowcharts and algorithms for problem solving*
2. *To introduce the concepts of structured programming*
3. *To familiarize the student with the syntactic constructs of C*
4. *To enable to the students to translate algorithms into C programs*

**THEORY (4 CREDITS)**

**UNIT – I**

**(15 Lectures)**

**Programming Languages:** History and Role of Programming Languages, Syntax and semantics, source code and object code, datatypes, variables, constants, declaration, Structured Data Types. Sequence Control: Implicit and Explicit. Sequence control between Statements. Subprogram Control: Simple call return and recursive subprogram. Language Paradigms: Simple Procedural Languages, Block Structured Programming Languages, Object Based Languages, Functional Languages, Logic Programming Languages. Flowcharts, Flowchart Elements, Problem Solving Through Flowcharts. Algorithms, Characteristics of an Algorithm, Algorithms for basic problems.

**UNIT – II**

**Introduction to C Programming**

**(15 Lectures)**

History and overview of C, Basic structure of a C Program, Compilation, Execution and Debugging of programs in C.

Keywords, Identifiers and Datatypes. Variables and Constants. Comments. Console I/O using printf() and scanf(). Typecasting.

Operators – Arithmetic, Logical, Relational, Increment Decrement and Assignment Operators. Expressions. Operator Precedence.

Conditional Statements (If, If-Else, If-Else If, Nested If, Switch).

**UNIT – III**

**(15 Lectures)**

**Looping, Functions and Pointers.**

Loops (while, do-while, for). Break and Continue. Nested Loops.

Functions: Declaring, Defining and Calling. Call by Value, Call by Reference. Function Arguments and Return Values.

Pointers: Declaring and Initializing. Accessing value of a pointer variable. Pointer Expressions. Pointer Increments and Scale Factors. Pointers and Arrays. Passing Pointers to Functions.

**UNIT – IV**

**Arrays, Strings, Structures and Unions**

Declaring, Initializing 1-D arrays and 2-D arrays. Accessing Elements of an Array, Memory Layout of Arrays. Passing Arrays to Functions, Command Line Arguments.

Character Arrays and String. Declaring and Initializing Strings, Reading and Writing Strings, String Handling Function (strlen, strcat, strcmp, strcpy).

Structures and Unions: Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of structures, Passing structures to functions.

Dynamic Memory Allocation using malloc and free.

**TEXTBOOKS:**

1. Terence Pratt, Programming Languages Design and Implementation (Pearson/Prentice Hall)
2. Balagurusamy, Programming in ANSI C, 8<sup>th</sup> Edition (McGraw Hill)

**REFERENCES:**

1. Kanetkar - Let us C (BPB Publications)
2. Ghezzi, Jazayeri - Programming Language Concepts (Wiley)
3. Srivastava – C in Depth (BPB Publications)
4. Beej's Guide to C Programming
5. Byron Gottfried - Schaum's Outline of Programming with C (McGraw-Hill)

## LABORATORY COURSE (02 CREDITS):

1. WAP to print the sum of digits of an integer.
2. WAP to print the product of digits of an integer.
3. WAP to reverse a number.
4. WAP to compute the sum of the first n terms of the following series  $S = 1 + 1/2 + 1/3 + 1/4 + \dots$ .
5. WAP to compute the sum of the first n terms of the following series  $S = 1 - 2 + 3 - 4 + 5 - \dots$ .
6. Write a program to check whether a given string is Palindrome or not. Convert this program into to a function that checks if a given string is a palindrome.
7. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
8. WAP to compute the factors of a given number.
9. Write a macro that swaps two numbers. WAP to use it.
10. WAP to print a triangle of stars as follows (take number of lines from user):

```
*
***
*****
*****
*****
```

11. WAP to perform following actions on an array entered by the user:
  - i) Print the even-valued elements
  - ii) Print the odd-valued elements
  - iii) Calculate and print the sum and average of the elements of the arrayThe program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.
12. Write a program that swaps two numbers using pointers.
13. Write a program in which a function is passed address of two variables and then alter its contents.
14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
15. Write a program to create an array of user-defined size dynamically using malloc() function. Display the sum of values entered in it and use free() to release its memory.
16. Write a program to perform following operations on strings:
  - a) Show address of each character in string
  - b) Concatenate two strings without using strcat function.
  - c) Concatenate two strings using strcat function.
  - d) Compare two strings
  - e) Reverse the string

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**SEMESTER 2<sup>nd</sup>**  
**MINOR COURSE**

**ACP222N: APPLIED COMPUTING (WEB DESIGNING)**

**CREDITS: 4 + 2**

**Unit-I**

Markup Languages, Introduction to HTML5, Development Environment Setup, Anatomy of an HTML Tag, Basic Structure of HTML Document, HTML Content Models, Meta-Tags, Formatting Tags, Text Level Formatting, Lists, Hyperlinks, Image and Image Maps, Table Tags, HTML Comment tag. Block and inline elements, redirecting to another URL, creating division-based layouts. Forms: creating basic form, using check boxes, textboxes and option buttons, input validation and additional input types in HTML5, HTML multimedia basics. HTML DOM structure.

**Unit II:**

Need for CSS. Different approaches to style sheets, Anatomy of a CSS Rule. Element, Class, and ID Selectors. Combining Selectors, Pseudo-Class Selectors. Style Placement, Conflict Resolution, Styling Text. Wildcard Selectors (\*, ^ and \$) in CSS. Web fonts. Working with Browser Developer Tools. CSS Box Model:- background, margin, padding, Float and z-index properties, Relative and Absolute Element Positioning. Basic Introduction to Bootstrap Framework.

**Unit-III**

Introduction to Javascript, Different approaches to place Javascript code in an HTML File. JS identifiers, Reserved Words, Optional Semicolons, Comments, Literals. Types, Values and Variables: Numbers, Text, Booleans. Nulls and undefined. Type Conversions. Variable Declaration and Assignment. Const, let and var. Expressions and Operators: Arithmetic, Relational, Logical, Assignment and Evaluation Expressions. Conditionals: if, else if and switch. Loops: while and for. Break, continue, return and yield. Functions: Defining, Invoking, Function Arguments and Parameters. Functions as Values.

**Unit-IV**

Objects: Creating Objects, Querying and setting Properties, Deleting and Testing Properties. Serializing Objects. Arrays: Creating, Reading, Writing arrays. Array length. Iterating Arrays, Strings as Arrays. The Document Object Model, Program Input and Output, Browser Events and Event Handling.

**Recommended Books:**

1. Jennifer Robbins - Learning Web Design : A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics (5e, 2018, O'Reilly Media)
2. Terry Felke-Morris - Web Development & Design Foundations with HTML5 (8e, 2017, Pearson)
3. Eric Meyer, Estelle Weyl - CSS The Definitive Guide (4e, 2018, O'Reilly Media)
4. David Sawyer McFarland - CSS The Missing Manual (4e, 2015, O'Reilly Media)
5. David Flanagan - JavaScript\_ The Definitive Guide (7e, 2020, O'Reilly Media)
6. Cay S. Horstmann - Modern JavaScript for the Impatient (Addison-Wesley Professional, 2020)

**WEB DESIGNING LAB**

1. Design a Home page for your college
2. Design a web page with links to different pages and allow navigation between web pages.
3. Design a web page using Images
4. Use a HTML table to design a page with a header, sidebar, main content and footer.
5. Design a user registration form using different HTML form controls
6. Design a web page with buttons that can handle different page events using JS event handlers.
7. Use Java Script to change the image displayed in an img tag when a button on the page is clicked.
8. Use bootstrap to add formatting to your home page.
9. Write a JavaScript program with proper GUI to perform unit conversion using the onChange event.
10. Design the interface of a login page using HTML and CSS.
11. Design a simple "To Do" Application using HTML/CSS/JavaScript.
12. Design Basic Calculator using HTML/CSS/JavaScript.
13. Design and develop a simple "Tic-Tac-Toe Game" using HTML/CSS/JavaScript.
14. Remove a specific table row using Java Script.
15. Set value in input text using Java Script.
16. Set a value in a span using Java Script.

**2<sup>nd</sup> SEMESTER**  
**COMPUTER APPLICATIONS**  
**(WEB DEVELOPER)**  
**SKILL ENHANCEMENT COURSE (SEC)**

**WDP222S: JAVA SCRIPT AND CSS BASICS**

**CREDITS: THEORY: 2, PRACTICAL: 2**

**THEORY (2 CREDITS)**

**UNIT 1 – JAVA SCRIPT (15 LECTURES)**

Introduction, Script Tag, Data Types, Variables, Literals, Expressions, Operators, Conditional Statements (if, if-else, if-else-if-else), switch-case, Looping Statements (while, for, do-while), Array, Associative Arrays, Functions, Event Handling, Javascript Objects (Browser, Document, Window etc.)

**UNIT 2 – CSS (15 LECTURES)**

DHTML introduction, Style Sheets-Embedded Styles, Inline Styles, External Style Sheets, Using Classes, Style Sheet Properties- Fonts Properties, Background and Colour Properties, Text Properties, Box Properties, Classification Properties-Display Property, Whitespace Property, , CSS Units, URL's , DIV and SPAN Tags, Dynamic Positioning, Layering, DHTML Events.

**REFERENCE BOOKS:**

1. Java Script Bible Wrox Publications
2. DHTML BPB Publications

**PRACTICAL (2 CREDITS)**

**LAB SHEET- JAVA SCRIPT AND CSS BASICS**

1. Write a JavaScript program to display the current day and time in the following format
2. Write a JavaScript program to get the current date
3. Write a JavaScript program that accept two integers and display the larger
4. Write a JavaScript conditional statement to sort three numbers. Display an alert box to show the result
5. Write JavaScript to demonstrate loops: while, for, do-while
6. Write a JavaScript for loop that will iterate from 0 to 15. For each iteration, it will check if the current number is odd or even, and display a message to the screen
7. Write a JavaScript function to check whether an `input` is an array or not
8. Write a JavaScript program to sort the items of an array
9. WAP to show blinking effect on a web page using JavaScript.
10. Write CSS for *Fonts, Background, Color, Text*
11. Design a digital clock using JavaScript and CSS.
12. Design a calculator using HTML & JavaScript.
13. Write a JavaScript program to demonstrate Event Handling.
14. WAP to validate Email Address in JavaScript.
15. Write a program to demonstrate exception handling in JS.

**SEMESTER 1<sup>st</sup> to 3<sup>rd</sup>**  
**MULTI-DISCIPLINARY COURSE**  
**CAP022I COMPUTER APPLICATIONS (INTRODUCTION TO COMPUTERS)**

**CREDITS: 3**

***COURSE OBJECTIVES***

1. *To introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.*
2. *To provide hands-on use of Microsoft Office 2013 applications Word, Excel, Access and PowerPoint. Completion of the assignments will result in MS Office applications knowledge and skills.*
3. *To describe the organization and operation of a computer processor, primary and secondary memory, peripheral devices and to give computer specifications*

**UNIT – I: COMPUTER BASICS**

Introduction: Characteristics of Computer, Classification of Computers, Architecture and Chronology, Applications of Computer. Block Diagram of Computer.

Commonly used Terms: Hardware, Software, Firmware, Units of Measurement of Storage, Input/ Output Devices, Types of Memory, Generation of Computer Languages, and Introduction to Internet & E-Mail.

**UNIT – II: OPERATING SYSTEM BASICS & GUI USING MS-WINDOWS.**

Application Software and System Software, Open-Source Software and Proprietary Software.

Computer Languages and its types (Machine Language, Assembly Language, High Level Language) Translators, Compiler, Interpreter. Operating System and its functions.

**UNIT –III: INTRODUCTION TO MS OFFICE**

**MS Word Basics:** Basics of Word Processing, Text Selection, Opening Documents and Creating Documents, Saving Documents/Quitting Documents, Printing Documents. Using the Interface (Menu Toolbars), Editing Text (Copy, Delete, Move Etc.). Finding and replacing text. Special check Feature/ Auto correct Feature, Grammar check Facility, Formatting and Editing. Mail Merge, Bullets & Numbering, Borders and Shadings.

**MS EXCEL BASIC:**

Worksheet Workbook, Workspace Basics, Data Entry in cell, Entry of Numbers, Text and Formulate, Moving Data in the Worksheet, Selecting Data Range, Using the Interface (Toolbars, Menus), Editing basics, working with Workbooks Saving and Quitting, Cell Reference, Formatting, Editing.

**MS POWER POINT BASICS:**

Use of existing templates, fonts and drawing. Hands of MS PowerPoint, Creation of animated slides.

**REFERENCE BOOKS:**

1. Computer today, Donald H. Sanders, McGraw Hill Publishing Company.
2. Microcomputers Software and Applications, Dennis P. Curtin and Leslie R. Portel, PHI.
3. Data Processing: An Introduction, Donald P. Spencer and Charles R. Merrill Pub. And Co.
4. Computers and Their Applications, Larry Joel Goldestein, PHI.
5. Windows-2000, kethy, Tata McGraw Hill Publishing Company.

**SEMESTER – 1<sup>st</sup> to 3<sup>rd</sup>**  
**VALUE ADDED COURSE**

**DTS223V DIGITAL AND TECHNOLOGICAL SOLUTIONS**

**CREDITS: 02**

**Course Objectives:**

- *To gain familiarity with digital paradigms;*
- *To sensitize about role & significance of digital technology;*
- *To provide know how of communications & networks;*
- *To bring awareness about the e-governance and Digital India initiatives;*
- *To provide a flavor of emerging technologies - Cloud, Big Data, AI, 3D printing.*

**Course Outcome:**

1. *Knowledge about digital paradigm;*
2. *Realization of importance of digital technology, digital financial tools, e-commerce;*
3. *Know-how of communication and networks;*
4. *Familiarity with the e-governance and Digital India initiatives;*
5. *An understanding of use & applications of digital technology;*
6. *Basic knowledge of machine learning and big data.*

**COURSE CONTENTS:**

**UNIT I**

Introduction & Evolution of Digital Systems. Role & Significance of Digital Technology. Information & Communication Technology & Tools. Computer System & its working, Software and its types. Operating Systems: Types and Functions. Problem Solving: Algorithms and Flowcharts.

Communication Systems: Principles, Model & Transmission Media. Computer Networks & Internet: Concepts & Applications, WWW, Web Browsers, Search Engines, Messaging, Email, Social Networking. Computer Based Information System: Significance & Types. E-commerce & Digital Marketing: Basic Concepts, Benefits & Challenges.

**UNIT II**

Digital India & e-Governance: Initiatives, Infrastructure, Services and Empowerment. Digital Financial Tools: Unified Payment Interface, Aadhar Enabled Payment System, USSD, Credit / Debit Cards, e-Wallets, Internet Banking, NEFT/RTGS and IMPS, Online Bill Payments and PoS. Cyber Security: Threats, Significance, Challenges, Precautions, Safety Measures, & Tools, legal and ethical perspectives.

Emerging Technologies & their applications: Overview of Cloud Computing, Big Data, Internet of Things, Virtual Reality, Blockchain & Cryptocurrency, Robotics, Machine Learning & Artificial Intelligence, 3-D Printing. Digital Signatures.

**BOOKS**

1. V. Rajaraman, Introduction to Information Technology, 3rd Edition, PHI;
2. E Balagurusamy, Fundamentals of Computers, Tata Mc GrawHill;
3. Behrouz A. Forouzan, Data Communications and Networking, McGraw Hill;
4. Pramod Kumar, Anuradha Tomar, R. Sharmila, Emerging Technologies in Computing Theory, Practice, and Advances, Edition 2021, Chapman and Hall/CRC Imprint;
5. Buyya, Broberg, and Goscinski, Cloud Computing- Principals and Paradigms, Wiley
6. Russel and Norving, Artificial Intelligence- A Modern Approach, Pearson Education;
7. Samuel Greengard, Internet of Things, MIT Press;
8. C.S.V. Murthy, E-commerce Concepts, Models, Strategies;
9. Hurwith, Nugent Halper, Kaufman, Big Data for dummies, Wiley & Sons - Wiley.