



**Charotar University of Science  
and Technology, Gujarat  
B.E./B.Tech IT Sem 1 syllabus**

## **Computer Concepts & Programming**

### **COMPUTER CONCEPTS & PROGRAMMING**

#### **1. Introduction to 'C' language**

1.1 Program, Software, Instruction, debugging, compilation and execution of C Program, Difference between Header files & library files, Compiler and Interpreter, Procedure Oriented Language, Importance of C, Basic structure of C.

#### **2. Constants, Variables & Data Types in 'C'**

2.1 Character set, C tokens, Keywords & Identifiers , Data types , Constants,  
2.2 Variables, Declaration of Variables, Assigning Values to Variables, Declaring a variable as Constant, Defining Symbolic constants

#### **3. Operators and Expression in 'C'**

3.1 Classification of operators: Arithmetic, Relational, Logical, Assignment, Increment / Decrement, Conditional, Bitwise, Special Operators. Unary, Binary and Ternary Operators.

3.2 Arithmetic expression, Evaluation, Type conversion: Implicit & Explicit, Precedence and Associativity, Various library functions from maths.h

#### **4. Managing Input & Output Operations**

4.1 Reading a Character, Writing a Character, Various library functions from ctype.h  
4.2 Formatted Input, Formatted Output

#### **5. Decision Making & Branching**

5.1 Decision making using simple if, if...else statement, nesting of if...else, else...if Ladder.  
5.2 Switch statements, conditional operator, goto statement.

## **6. Looping**

6.1 Need of looping, (pre-test) entry-controlled loop: while, for, (post-test) exit-controlled loop: do...while, difference, between Counter-Controlled loops and Sentinel - controlled loops

6.2 Nesting of looping statements, use of break & continue, use of if...else in loop, infinite loop.

## **7. Arrays**

7.1 Need of array, Declaration & Initialization 1D array, Programs of 1D.

7.2 2D array, Memory allocation of 1D and 2D array, 2D array basic programs.

## **8.Character Arrays and Strings**

8.1 Difference of character array with numeric array and importance of NULL character.

8.2 Declaration, Initialization and various input and output methods of string, formatted output of string, arithmetic operations on characters.

8.3 Various functions of string.h: strlen, strcat, strcmp, strcpy, strrev, strstr, etc.

8.4 Two dimensional character array (table of strings).

## **9.User-Defined Function in 'C'**

9.1 Need of modularization, advantages, Introduction to user-defined function, Function Prototype, Function Call, Function Body.

9.2 Call by value, Actual & Formal Arguments, return value, Categories of functions, Nesting of Functions, Recursion.

9.3 Array as Function arguments, Storage Classes: Scope, Life of a variable in 'C'.

## **10.Structures and Union**

10.1 Need of user-defined data type, Structure definition, Declaration and Initialization of variables, Array as member, Array of structure variables.

10.2 Structure within structure, Structure as function arguments, Union

## **11.Pointers**

11.1 Introduction to pointer, declaration & initialization, access value using pointer, indirection (\*) operator.

11.2 Pointers in expressions, scale factor, 1D-array and pointer,

pointer with strings, Array of pointers.

11.3 Pointer as arguments in function, Call by address, Functions returning pointers, Pointers and structures, Chain of Pointers

## **12. File Management in 'C'**

12.1 Introduction, Defining and Opening a file, closing a file, modes of file, read & write single character and integer to file, use of fprintf and fscanf functions.

12.2 Error handling functions, random access of files using ftell, rewind, fseek, command line argument.

## **13. Dynamic Memory Allocation**

13.1 Introduction, memory allocation process

13.2 Use of functions: malloc ( ), calloc ( ), realloc ( ) and free ( ).

# **Basics of Electronics & Electrical Engineering**

## **BASICS OF ELECTRONICS & ELECTRICAL ENGINEERING**

### **1 Basic Electrical Terms and Units**

1.1 Ohm's law, resistor and its coding, properties, temperature coefficient of resistance, resistance variation with temperature, examples

### **2 Electrical Circuit Analysis**

2.1 Kirchoff's current and voltage law, mesh and nodal analysis, Examples

2.2 Series parallel circuits, star-delta transformation

### **3 Electrostatic**

3.1 Capacitors, charge and voltage, capacitance, electric fields, electric field strength and electric flux density, relative permittivity, dielectric strength, Examples

3.2 Capacitors in parallel and series, Calculation of capacitance of parallel plate and multi plate capacitor, examples.

### **4 Electromagnetism**

4.1 Magnetic field, its direction and characteristics, magnetic flux and flux density, magneto motive force and magnetic field strength, examples

4.2 Faraday's law of electromagnetic induction, Fleming's left hand and right hand rule, Lenz law, force on a current carrying conductor,

examples

4.3 Self and mutual inductance

## **5 AC Fundamentals**

5.1 AC Waveform and definition of its terms, relation between speed and frequency

5.2 Average and RMS value and its determination for sinusoidal wave shapes, examples

## **6 Single Phase AC Series Circuits**

6.1 R-L and R-C series circuit, power in ac circuits, examples

6.2 R-L-C series circuit, resonance in R-L-C series circuit, relevant examples

## **7 Polyphase Circuits**

7.1 Phase sequence, voltage and current relations in star and delta connected system

## **8 Basics of Electronics**

8.1 Electronic Systems: Basic amplifier, voltage, current and power gain, Basic attenuators, CRO

8.2 Transmission and Signals: Analog and digital signals, bandwidth,

8.3 Forward and reverse bias of PN junction diode, zener diode

8.4 Rectifiers: Half Wave, Full Wave - Centre Tap, Bridge

8.4 Transistor: Bipolar junction transistor, construction and biasing, configuration

# **Engineering Mathematics - I**

## **1 Higher order derivatives and applications**

1.1 Set theory and Function

1.2 Limit, Continuity, Differentiability for function of single variable and its uses. Mean Value Theorem, Local Maxima and Minima

1.3 Successive differentiation: nth derivative of elementary functions: rational, logarithmic, trigonometric, exponential and hyperbolic etc.

1.4 Leibnitz rule for the nth order derivatives of product of two functions

1.5 Tests of convergence of series viz., comparison test, ratio test, root test, Leibnitz test. Power series expansion of a function:

Maclaurin's and Taylor's series expansion (one and two variables),

1.6 L'Hospital's rule and related applications, Indeterminate forms

## **2 Complex numbers and Roots of polynomial Equations**

- 2.1 Complex numbers and their geometric representation
- 2.2 Complex numbers in polar and exponential forms
- 2.3 De Moivre's theorem and its applications
- 2.4 Exponential, Logarithmic, Trigonometric and hyperbolic functions.
- 2.5 Statement of fundamental theorem of Algebra, Analytical solution of cubic equation by Cardan's method
- 2.6 Analytic solution of Biquadratic equations by Ferrari's method with their applications.

### **3. Matrix Algebra- I**

- 3.1 Definition of Matrix, types of matrices and their properties
- 3.2 Determinant and their properties
- 3.3 Rank and nullity of a matrix
- 3.4 Determination of rank
- 3.5 The inverse of a matrix by Gauss Jordan method.
- 3.6 Solution of a system of linear equations by Gauss elimination and Gauss Jordan Methods.

### **4. Partial differentiations: 08**

- 4.1 Partial derivative and geometrical interpretation
- 4.2 Euler's theorem with corollaries and their applications
- 4.3 Chain rule
- 4.4 Implicit functions
- 4.5 Total differentials

### **5. Applications of Partial differentiations**

- 5.1 Tangent plane and normal line to a surface
- 5.2 Maxima and Minima
- 5.3 Lagrange's method of multiplier
- 5.4 Jacobian
- 5.5 Errors and approximations

