Bhagwan Mahvir University

Syllabus for Master of Computer Applications (2 years),

Bridge Course -MCA SEM 1

- Duration of Bridge Course: 2 Weeks (30 Hours)
- **Target Audience:** B.Com, BCA, B.Sc Graduates
- **Total Duration:** 2 Weeks | **Total Hours:** 30–40 | **Daily Schedule:** 3–4 Hours

Objective:

To bridge the knowledge gap for students entering MCA from various academic backgrounds (B.Com, BCA, B.Sc), ensuring foundational readiness in mathematics, computing, programming logic, communication, and professional skills. The pre-requisites are provided in the following three areas:

- **Computer Fundamentals**
- **Basics of Mathematics**
- **Website Design using HTML and CSS**

Program Outcome: Upon successful completion of this bridge course, students will be able to demonstrate a foundational understanding of computer operations, apply basic mathematical concepts in problem-solving, and design simple static web pages using HTML and CSS. These outcomes will prepare students for more advanced subjects in computer applications and help them transition smoothly into the core curriculum.

Course Modules & Detailed Syllabus:

Part –I Computer Fundamentals (Total Hours: 10)

Sr.No	Course Content
1	**Introduction to Computers and Computer Hardware** • Characteristics and applications in daily life, business, education • Types of computers (Micro, Mini, Mainframe, Supercomputers) • Generations of computers • I**nput devices**: Keyboard, mouse, scanner, etc. • **Output devices**: Monitor, printer, speaker • **CPU Components**: ALU, CU, registers • **Memory**: RAM, ROM, cache, virtual memory • **Storage Devices**: HDD, SSD, CD/DVD, Flash drives • Block diagram of computer system

	• Number systems: Binary, Decimal, Octal, Hexadecimal :Conversions between systems ,Binary arithmetic: Addition, subtraction, Importance in programming and machine-level operations
2	**Software Concepts & OS Basics & Introduction to C Language :** • **Types of software:** System software, application software, utility software • Operating systems: Functions, types (batch, real-time, multitasking) • Booting process and system startup • File systems (FAT, NTFS basics • Importance of problem-solving , Symbols in flowcharts • Writing pseudo code for basic algorithms (e.g., factorial, sum of numbers) • Origin and features of C, Structure of a C program • Compilation, execution, and basic syntax • IDEs and online compilers (Turbo C, GCC, Code::Blocks
3	**Data Types, Variables & Operators** • Keywords and identifiers • Variable declaration and initialization • Constants and symbolic constants • Data types: int, float, char, double • Operators: Arithmetic, relational, logical, assignment, increment/decrement • Basic I/O: scanf(), printf() • Escape sequences ,Format specifiers • Simple programs using I/O **Conditional Statements** • if, if-else, nested if, if-else-if ladder • switch-case • Examples: Check even/odd, maximum of numbers, simple calculator **Loops and Iteration (for, while, do-while loops** • break, continue, and goto statements • Programs: Factorial, Fibonacci, prime numbers
4	**Functions in C &Arrays and Strings** • Function definition, declaration, and call • Types: user-defined, standard library, return statement, call by value • Recursion: Simple examples (factorial, Fibonacci)

	• One-dimensional arrays: Declaration, initialization • Array operations: sum, max/min, reverse • String basics: gets(), puts(), string handling functions (strlen, strcpy)
5	**Introduction to OOP :** • Limitations of procedural programming • Features of OOP (Encapsulation, Inheritance, Polymorphism, Abstraction) • Real-life examples of OOP • Classes and Objects, Inheritance, Polymorphism, Encapsulation and Abstraction **Networking and the Internet:** • What is a network? LAN, WAN, MAN • Internet basics: IP address, DNS, URL, protocols (HTTP/HTTPS) • Email, browsers, search engines • Basics of cybersecurity: Viruses, malware, phishing, firewalls

Part – II Basics of Mathematics (Total Hours: 10)

Sr#	Course Content
1	**Set Theory** • Definition of sets • Types of sets: finite, infinite, universal, null, etc. • Operations: Union, Intersection, Difference, Complement • Venn diagrams • Power sets, subsets **Logic and Propositions** • Statements, propositions, truth values • Logical operators: AND, OR, NOT • Truth tables • Tautology and contradiction
2	**Number Systems and Arithmetic Fundamentals** • **Number Theory** o Natural numbers, whole numbers, integers o Prime and composite numbers

	○ Factorization, multiples, divisors ○ GCD, LCM • **Permutations and Combinations** ○ Counting principles ○ Factorial notation ○ Simple arrangements and selections
3	**Functions, Relations & Graphs (2 Hours)** **Topics:** • **Relations** ○ Ordered pairs, Cartesian product ○ Domain and range ○ Types of relations: reflexive, symmetric, transitive • **Functions** ○ Definition, types of functions (one-one, onto) ○ Graphs of simple functions (e.g., $y = x$, $y = x^2$) • **Graphs** ○ Graphs as visual representations of relations ○ Nodes, edges, loops ○ Adjacency matrix
4	**Algebraic Structures: Matrices and Sequences (2 Hours)** **Topics:** • **Matrices** ○ Types: row, column, square ○ Matrix addition and multiplication ○ Real-world examples (e.g., tables, 2D arrays) • **Sequences and Series** ○ Definition of sequences ○ Arithmetic and geometric progressions ○ Real-life examples (days, months, etc.)
5	**Tree Structures and Hierarchies (2 Hours)** **Topics:** • **Trees** ○ Definition and types (rooted, binary) ○ Terminology: root, leaf, parent, child ○ Real-life examples: family tree, organizational structure

	• **Hierarchical Classification**
	  ○ Vehicles (2W, 4W), class-object relationships
	  ○ Concepts of superclass, subclass, inheritance

Part – III Website Design using HTML and CSS(Total Hours: 10)

Sr	Course Content
1	**Introduction to Web and HTML5 (2 Hours)** • What is a website and how it works (client/server model) • Structure of a basic HTML document (<!DOCTYPE html>, <html>, <head>, <body>) • Creating your first HTML page • Using tags: Headings, paragraphs, line breaks, horizontal rules, comments
2	**Links, Images, Lists & Tables (2 Hours)** • Hyperlinks: Relative vs. absolute links, internal page navigation • Embedding images with <img> and attributes (alt, width, height) • Lists: Ordered ( ), unordered ( ), and definition lists • Tables: Structure, headers, rows, cells, merging (colspan, rowspan) • HTML special characters
3	**Forms and Inputs (1.5 Hours)** • Form structure: <form>, <input>, <label>, <textarea>, <select>, <button> • HTML5 input types: email, date, number, color, range, etc. • Attributes: placeholder, required, autocomplete • Validation basics and form submission
4	**Introduction to CSS (2 Hours)** • What is CSS and why use it • Types of CSS: Inline, Internal, External • CSS Syntax: Selectors, properties, and values • Styling text, colors, backgrounds, margins, borders, padding • Box model concept
5	**Layout and Responsive Design (2.5 Hours)** • Positioning: static, relative, absolute, fixed • Float and clear • Flexbox and Grid basics (intro only)

	• Media queries: Making pages responsive • Drop-down menu (optional) • Linking external stylesheets