

Bachelor of Science (Computer Science Hons.)

Semester-wise Distribution of Courses and Credits

<i>SEMESTER I</i>		
Course Code	Course Title	Credits
CS101	Problem Solving through C Programming	06
	Total	06
<i>SEMESTER II</i>		
Course Code	Course Title	Credits
CS102	Digital Logic and Circuits	06
	Minor Elective I (Non CS-stream Students)	02
	Total	06
<i>SEMESTER III</i>		
Course Code	Course Title	Credits
CS103	Numerical Computing	06
	Total	06
<i>SEMESTER IV</i>		
Course Code	Course Title	Credits
CS104	Computer Organization and Architecture	06
	Minor Elective II (Non CS-stream Students)	02
	Total	06
<i>SEMESTER V</i>		
Course Code	Course Title	Credits
CS106	Operating System Concepts	04
CS107	Database Management Systems	06
CS108	Data Structures and Algorithms	06
CS110	System Analysis and Design	04
	Total	20
<i>SEMESTER VI</i>		
Course Code	Course Title	Credits
CS105	Discrete Mathematics	04
CS109	Data Communication	04
CS502	UG Project	12
	Total	20
	Grand Total	64

CS101	Problem Solving through C Programming	L	T	P
		4	0	2

Introduction to Programming: Program development phases, Algorithms, Flow-charts, Types of Programming Languages, Interpreter, Compiler and Linker.

Constants, Variables, Data Types, Operators and Expressions: Character set, C Tokens, Identifiers and Keywords, Constants, Variables, Data types. Arithmetic operators, Relational operators, Logical operators, assignment operator, increment and decrement operators, Conditional operators, Arithmetic expressions, Operator precedence and associativity, Mathematical functions.

Managing Input & output operations: Reading a character, writing a character, Formatted input, and Formatted output.

Control Statements and Decision Making: if statement, if-else statement, Nesting of if statements, Conditional expression, switch case statement, while loop, do while loop, for loop, nesting of for loops, break statement and continue statement.

Functions, Array and String: User defined functions, Standard library functions, Passing values between functions, Calling convention, Return type of functions, Call by value and Call by reference, Recursive functions. One-dimensional array, Passing array to function, Two-dimensional array and Multidimensional array. String, declaring and initializing string variables, reading string from terminal, writing string to screen, implementation of string handling functions, array of strings.

Pointers and Storage Classes: Basics of Pointers, Pointers and One-dimensional Arrays, Pointer Arithmetic, Similarities between Pointers and One-dimensional Arrays, Null pointers, Pointers as Function Arguments, Pointers and Strings, Pointers and two-dimensional arrays, Arrays of Pointers. Storage Classes and Visibility, Automatic or local variables, Global variables, Static variables, External variables.

Structures, Unions and Pre-processor: Basics of Structures, Structures and Functions, Arrays of Structures, Pointers to Structures, Self-referential Structures, Unions. Preprocessor, File Inclusion, Macro Definition and Substitution, Macros with Arguments, Nesting of Macros, Conditional Compilation.

Dynamic Memory Allocation and File Management: Dynamic Memory Allocation, Allocating Memory with malloc and calloc functions, Freeing Memory, Reallocating Memory Blocks. File Management, Defining and Opening a file, Closing Files, Input/output Operations on Files, Predefined Streams, Error Handling during I/O Operations, Random Access to Files, Command Line Arguments.

Suggested Readings:

1. B. W. Kernighan and D. M. Ritchie, the C Programming Language, PHI.
2. Y. Kanetkar, Let Us C, BPB Publications.
3. E. Balagurusamy, Programming in ANSI C, McGraw-Hill.

CS102	Digital Logic and Circuits	L	T	P
		4	0	2

Number System: Weighted and Unweighted Codes, Binary, Octal, and Hexadecimal numbers; Fixed and Floating Point Number Representations, number base conversion, Complements, Binary Arithmetic: Addition, Subtraction, Multiplication and Division, BCD Code.

Boolean algebra and Logic Gates: Introduction to Boolean algebra, laws of Boolean algebra, logic gates, universal logic gates, POS and SOP notations, Canonical logic forms, Logic families.

Simplification of Boolean Functions: Laws of Boolean algebra and K-Maps, Tabulation Method.

Combinational Circuits: Design Procedure of Combinational Circuits, Adders, Subtractors, Code Converters, Magnitude Comparator, Encoder, Decoder, Multiplexer, Demultiplexer, ROM, PLAs, PALs.

Sequential Circuits: Flip-Flops: SR, D, JK, T, Master/Slave F/F, Edge-triggered F/F, Excitation Tables; Registers, Counters: synchronous and asynchronous, Design of Counters, Shift Registers, RAM.

Suggested Readings:

1. M. M. Mano, Digital Logic and Computer Design, PHI.
2. M. M. Mano and C. R. Kime, Logic and Computer Design Fundamentals," Pearson.
3. A. Malvino, D. Leach, Digital Principles and Applications, McGraw-Hill
4. T. C. Bartee, Digital Computer Fundamentals, McGraw-Hill.

CS103	Numerical Computing	L	T	P
		4	0	2

Errors in Computer Arithmetic, Normalization.

Bisection, False position and Newton-Raphson methods for solution of nonlinear equations.

Errors in the solutions, Convergence of Solutions.

Gauss, Gauss-Siedel and Iterative methods for system of linear equations. Ill conditioned system, Pivotal Condensation, Matrix Inversion, Eigen-values, Eigen-vector, Diagonalization of Real Symmetric Matrix by Jacobi's Method.

Introduction to Finite Differences.