



B. P. PODDAR INSTITUTE OF MANAGEMENT & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
ACADEMIC YEAR: 2024-2025 EVEN SEMESTER
PROGRAMMING FOR PROBLEM SOLVING (ES-CS201)

COURSE STRUCTURE:

| Sl No | Paper Code | Theory | Contact hours/week | | | | Cr. Pts |
|-------|------------|---------------------------------|--------------------|---|---|-------|---------|
| | | | L | T | P | TOTAL | |
| 1 | ES-CS 201 | Programming for Problem Solving | 3 | 0 | 0 | 3 | 3 |

SYLLABUS:

| UNIT | DETAILS | HOURS |
|--------------------|---|-----------------------|
| I | Introduction to Programming (4 lectures) Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) - (1 lecture). Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. (1 lecture) From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code- (2 lectures) | 4 |
| II | Arithmetic expressions and precedence (2 lectures) | 2 |
| III | Conditional Branching and Loops (6 lectures) Writing and evaluation of conditionals and consequent branching (3 lectures) Iteration and loops (3 lectures) | 6 |
| IV | Arrays (6 lectures) Arrays (1-D, 2-D), Character arrays and String | 6 |
| V | Basic Algorithms (6 lectures) Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) | 6 |
| VI | Function (5 lectures) Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference | 5 |
| VII | Recursion (4 -5 lectures) Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort. | 5 |
| VIII | Structure (4 lectures) Structures, Defining structures and Array of Structure | 4 |
| IX | Pointers (2 lectures) Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation) | 2 |
| X | File handling (only if time is available, otherwise should be done as part of the lab) | 2 (if time available) |
| TOTAL HOURS | | 42 |



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Lesson Plan

Required Text Books:

- B1. Let Us C, Yashavant Kanetkar
B2. Introduction To Computing (WBUT Series), E. Balagurusamy

Required Reference Books:

- B 3. The C Programming Language, Brian W. Kernighan, Dennis Ritchie**

Web resources

- W1. https://onlinecourses.nptel.ac.in/noc17_cs43/preview
W2. <https://www.slideshare.net/dwivedi2512/introduction-to-c-programming>

| Lecture No. | Topics to be covered | Ref | Teaching Aid | Testing Method |
|-------------|--|--------|-----------------|----------------|
| 1 | Basic structure of C Language (source code, variables (with data types) variables and memory locations) | B1 | Board work | Discussion |
| 2 | Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) | B1 | Board work | Discussion |
| 3. | Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. | B1 | Board work, PPT | Discussion |
| 4. | Arithmetic expressions and precedence | B1 | Board work | Discussion |
| 5. | Arithmetic expressions and precedence(cont.) & Associativity | B1 | Board work | Discussion |
| 6. | Conditional Branching: SELECTION STATEMENTS (DECISION MAKING) – if with all case study | B1 | Board work, PPT | Discussion |
| 7. | Conditional Branching: SELECTION STATEMENTS (DECISION MAKING) – switch, break, continue, go to statement | B1 | Board work | Discussion |
| 8. | Loops: while, do-while with examples | B1, B3 | Board work | Discussion |
| 9. | Loops: for with examples | B1 | Board work | Discussion |
| 10 | Introduction to Array: 1D with examples | B1 | Board work | Discussion |

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|-----------|---|---------------|------------------------|---|
| 12 | Character arrays and Strings | B1 | Board work | Discussion |
| 13 | Introduction of function: declaration of a function, call of a function, define body of function. | B1 | Board work | Discussion |
| 14 | Parameter passing in functions: call by value, call by reference | B1 | Board work | Discussion |
| 15 | Function (cont.) with example | B2 | Board work | Discussion |
| 16 | Searching, Basic Sorting Algorithms (Bubble, Insertion) | B1, B2 | Board work, PPT | Discussion |
| 17 | Searching, Basic Sorting Algorithms (Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) | B1, B2 | Board work | Discussion |
| 18 | Recursion, as a different way of solving problems. Example programs | B2 | Board work | Discussion, Assignments |
| 19 | Recursion, as a different way of solving problems. Example programs (contd.) | B2, B3 | Board work, PPT | Discussion Assignments |
| 20 | Introduction to Structures with examples | B1 | Board work | Discussion |
| 21 | Array of Structures with examples | B1,B2 | Board work, PPT | Group discussion |
| 22 | Introduction to pointers | B1 | Board work | Group discussion |
| 23 | Pointers in self-referential structures, notion of linked list (no implementation) | B1 | Board work | Group discussion |
| 24 | Pointer (cont.) with example | B1 | Board work | Group discussion |
| 25 | Introduction to File Handling with examples | B1,B 3 | Board work | Discussion |
| 26 | Previous year Question Paper discussion | | Board work | Illustration by example, Problem Solving, Flip Class |
| 27 | Previous year Question Paper discussion (Contd.) | | | Illustration by example, Problem Solving |
| 28 | Previous year Question Paper discussion (Contd.) | | | Problem Solving |
| 29 | Introduction to Number system | B2, B3 | Board work | Problem Solving, Quiz |