



BRILLIANT INSTITUTE OF ENGINEERING AND TECHNOLOGY
Abdullapurmet Met (V), Abdullapur Met(M) R.R Dist.– 501505



COURSE FILE

For

PROGRAMMING FOR PROBLEM SOLVING / 151AC
(AY 2019-20 I B.TECH ECE, CIVIL AND MECH I Semester)

Prepared by

Mrs. A. SARALA DEVI

Assistant Professor

Department of
COMPUTER SCIENCE AND ENGINEERING

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PROGRAMMING FOR PROBLEM SOLVING
B.Tech. I Year I Sem.

UNIT – I :

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.Command line arguments

UNIT—II:

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

UNIT- III:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef
Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

UNIT- IV:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and



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return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive

functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

UNIT V:

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc. Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

SUGGESTED BOOKS:

TEXT BOOKS:

1. **T1.** Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. **T2.** B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).

REFERENCE BOOKS:

1. **R1.** Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
2. **R2.** Hall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
4. **R3.** Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
5. **R4.** Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

NPTEL Web Course:

- nptel.ac.in/courses/106105085/4
- nptel.ac.in/courses/106105085/2

NPTEL Video Course:

- https://onlinecourses.nptel.ac.in/noc18_cs31/preview
- https://onlinecourses.nptel.ac.in/noc18_cs33/preview

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE PLAN – PROGRAMMING FOR PROBLEM SOLVING / 151AC (AY 2019-20)

Faculty Name : A SARALA DEVI Subject Name with code: PPS/151AC	Course: B.Tech Semester/ Branch : I Year – I Sem. / ECE
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Course Type: ~~Mathematics/ Science/ Humanities/ Computing/ Professional Core/ Elective/ Interdisciplinary-~~

COURSE OBJECTIVE:

1 Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes:

The student will learn

• To write algorithms and to draw flowcharts for solving problems.
• To convert the algorithms/flowcharts to C programs
• To code and test a given logic in C programming language
• To decompose a problem into functions and to develop modular reusable code
• To use arrays, pointers, strings and structures to write C programs
• Searching and sorting problems

SYLLABUS:

UNIT – I :

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming

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UNIT- IV:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

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Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc. Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

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PO Mapping with Course Outcomes:

CO1- 1, 2, 3, 4, 5, 8, 9, 11

CO2- 1, 2, 3, 4, 5, 8, 9, 11

CO3 – 1, 2, 3, 4, 8, 9, 10, 11

CO4 – 1, 2, 3, 4, 5, 6, 8, 11

Assignments: 05

Missing Topics	Teaching Methodology	Mapping to PO
	Class Lecture	
Topics Beyond the Syllabus	Teaching Methodology	Mapping to PO
	Class Lecture	

Seminar Topics:

1.
2.

Course Assessment:

1. 25 Marks for Internal + 75 Marks for University Examination.
2. Student feedback on the course (Scale of 1-5).

(HOD NAME)

HOD



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OBJECTIVES, COURSE OUTCOMES

SUBJECT: PPS (151AC)

OBJECTIVES:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.

LEARNING OUTCOMES:

The student will learn

Sno	Course Outcomes (CO)	Knowledge Level (Blooms Level)
CO1	To write algorithms and to draw flowcharts for solving problems.	L5: Evaluate
CO2	To convert the algorithms/flowcharts to C programs	L6: Create, L2:Understand
CO3	To code and test a given logic in C programming language	L6: Create, L4: Analyze
CO4	To decompose a problem into functions and to develop modular reusable code	L5: Evaluate, L3:Apply
CO5	To use arrays, pointers, strings and structures to write C programs	L5: Evaluate
CO6	Searching and sorting problems	L3:Apply

Mapping onto PEO & PO

Program Outcomes (POs)		Level	Proficiency assessed by
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems	3	Assignments
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	2	Assignments
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	3	Experiments
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	2	Experiments
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	-	-
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	-	-
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	-	-
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	-	-

PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	-	-
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation make effective presentations, and give and receive clear instructions	-	-
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments	1	Mini Projects
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.	2	Research

I. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes (PSOs)		Level	Proficiency assessed by
PSO1	Software Development and Research Ability: Ability to understand the structure and development methodologies of software systems. Possess professional skills and knowledge of software design process. Familiarity and practical competence with a broad range of programming language and open source platforms. Use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.	3	Assignments
PSO2	Foundation of mathematical concepts: Ability to apply the acquired knowledge of basic skills, principles of computing, mathematical foundations, algorithmic principles, modeling and design of computer-based systems in solving real world engineering Problems.	2	Experiments
PSO3	Successful Career: Ability to update knowledge continuously in the tools like Rational Rose, MATLAB, Argo UML, R Language and technologies like Storage Computing, Communication to meet the industry requirements in creating innovative career paths for Immediate employment and for higher studies.	2	Experiments / Tools

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High) - : None