

Branch Name:	Computer Engineering / Information Technology / Artificial Intelligence and Data Science / Information and Communication Technology / Mechanical Engineering / Civil Engineering/ Electrical Engineering / Artificial Intelligence and Machine Learning / Electronics and Communication Engineering
Program Code:	ET103 / ET105 / ET108/ET107 / ET101 / ET106 / ET109 / ET114 / ET116
Course Title:	Problem Solving with Computational Thinking
Course Code:	2ET1000107T
Pre-requisite Course:	This course is designed for anyone who is just beginning programming. No prior programming is needed.

Course Objectives:

1. Explain the approach of problem solving and provide a suitable solution for a given problem.
2. Apply Critical thinking in real world scenarios to provide solutions.
3. Apply Divergent Thinking and Convergent Thinking.
4. Understand decision support systems and are able to build decision trees.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
03	03	-	-	03	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No	Details	Contact Hours
1	Introduction to computer and programming Introduction, Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming, Flowcharts and Algorithms	05
2	Fundamentals and Control structure of Programming Features of C language, structure of C Program, comments, header files, data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions, Simple statements, Decision making statements, Looping statements, Nesting of control structures, break and continue, goto statement.	09
3	Array & String Concepts of array, one- and two-dimensional arrays, declaration and initialization of arrays, string, string storage, Built-instring functions.	06
4	Functions & Recursion Concepts of user defined functions, prototypes, definition of function, parameters, parameter passing, calling a function, recursive function, Macros, Pre-processing, Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort	09
5	Pointers and Structure Pointers: Basics of pointers, pointer to pointer, pointer and array, pointer to array, array to pointer, function returning pointer. Structure: Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers.	09
6	Dynamic memory allocation & File management Introduction to Dynamic memory allocation and file management and its functions, malloc, calloc.	08

Reference Books:

1. Programming in ANCI C, Seventh edition, by Balagurusamy E, Tata McGraw-Hill Publishing Company Limited
2. Programming with C, Second edition, by Gottfried, Tata McGraw-Hill Publishing Company Limited
3. Star C Programming, Pub: STAR Certification
4. C Programming language, Second edition, by Kernighan B W and Ritchie D M Prentice Hall,
5. Let us C, Fifth edition, by Kanetkar Y. P., BPB Publication
6. Fundamentals of Computing and Programming in C, First Edition, Oxford University Press, 2009 by Pradip Dey, Manas Ghosh,
7. “Computer programming”, Pearson Education, 2007 by Ashok N. Kamthane.
8. “How to Solve it by Computer”, Pearson Education, Fourth Reprint, 2007 by R.G. Dromey.
9. Programming in C, Reema Theraja, Oxford.

Course Learning Outcomes (CLO): At the end of the course, students will be able to

Course Outcome	Description	Bloom's Taxonomy Level
CLO 1	Formulate algorithm/flowchart for given arithmetic and logical problem	Understanding (2)
CLO 2	Translate algorithm/flowchart into C program using correct syntax and execute it	Applying (3)
CLO 3	Write programs using conditional, branching, iteration, and recursion	Applying (3)
CLO 4	Decompose a problem into function	Applying (3)
CLO 5	Develop an application using the concepts of array, pointer, structure, and file management to solve engineering and/or scientific problems	Applying (3)
CLO 6	Apply the different problem-solving techniques to provide solutions	Applying (3)

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H	M	M		M											
CLO2	H	M			M							L				
CLO3	H	M	M		M											
CLO4	M	M	M		M							L				
CLO5	M	M										L				
CLO6	M	M										L				

H: High, M: Medium, L: Low