

## COURSE PLAN

Department	: CSE
Course Name & code	: CSE 1101 Problem Solving Using Computers
Semester & branch	: I & II (All branches)
Name of the faculty	: XXX

No of contact hours/week : 3

### ASSESSMENT PLAN:

#### 1. In Semester Assessments - 50 %

- Written tests : Two tests of 15 marks each (Max Marks: 30)
- Surprise quizzes : Five quizzes of 4 marks each (Max Marks: 20)

#### 2. End Semester Examination - 50%

- Written examination of 3 hours duration (Max. Marks: 50 )

Assignment portion	
Assignment no.	Topics
1	L1-L8
2	L9-L16
3	L17-L24
4	L25-L32
5	L33-L40
Test portion	
Test no.	Topics
1	L1-L15
2	L16-L35

## Course Outcomes

- *At the end of this course, the student should be able to:*
  - Understand the basic structure of a computer, problem solving techniques and cyber security concepts.
  - Identify control structures, looping constructs, 1D and 2D arrays, strings, structures and pointers for problem solving.
  - Understand the challenges in transitioning the problem definition including numerical methods to software programs.
  - Relate theoretical concepts in programming to C++ language.
  - Get insights into modular programming concepts.
  - Gain the ability to choose the right concept in implementing a solution.

## Course Plan

L/T Sl No.	Topics
L1	Block diagram of computer - Memory and its types – Input / Output Devices, Introduction to Software – Overview and classification of software
L2	Introduction to problem solving, Logic and Importance of logic in problem solving, Computational problem and its classification, Introduction to programming paradigms and methodologies
L3	Introduction to algorithms
L4	Introduction to flowcharts
L5	The C++ character set, identifiers and keywords, Data types, variables, declarations
L6	C++ program structure, Input and output operations, Software development Life Cycle
L7	Best practices for Programming
L8	C++ Operators – Arithmetic, Relational
L9	Logical, Assignment, Increment and decrement operators, Bitwise operators, conditional operator, comma operator
L10	Operator precedence and associativity
L11	Arithmetic expressions, evaluation of expressions, Type conversions
L12	Statements and blocks, simple if, if-else, Nested if statements, else-if ladder

L13	Switch–case statement
L14	Looping constructs- entry controlled and exit controlled loops, Problem solving using looping constructs
L15	Break and continue statements, exit statement
L16	1-D arrays-Declaration and Initialization, Programs on I-D array manipulation
L17	Sorting (bubble sort technique), Searching (linear search technique)
L18	2-D arrays-basics, simple programs on matrix manipulation
L19	Strings-operation on strings, built-in string handling functions, Programs on strings
L20	Interpolation-Finite differences-Newton’s forward and backward differences
L21	Interpolation-Lagrange’s interpolation formulae
L22	Numerical Integration-Trapezoidal rule
L23	Numerical Integration-Simpson’s one third rule, Simpson’s three eighth rule
L24	Solution of Algebraic and Transcendental equations-Bisection method
L25	Solution of Algebraic and Transcendental equations-Newton-Raphson method
L26	Numerical solution of ordinary differential equations-Taylor’s series method, Euler’s method
L27	Numerical solution of ordinary differential equations-Modified Euler’s method, Runge Kutta method
L28	Modular programming, library functions and user-defined functions
L29	Function declaration, definition and function call
L30	Parameter passing techniques
L31	Recursive functions
L32	Structures - basic operations and programs, advantages of structures over arrays
L33	Array of structures
L34	Pointers-pointers to simple variables
L35	Pointers to arrays, basic operation on pointers
L36	Procedure oriented programming versus object oriented programming

L37	Basic concepts of object oriented programming-inheritance, polymorphism
L38	Examples, benefits of object oriented programming
L39	Introduction to cybercrime, computer intrusions and hacking
L40	Computer security

**Reference:**

1. E. Balaguruswamy, Object Oriented Programming with C++, 6<sup>th</sup> edition, Tata McGraw Hill, 2013
2. E. Balaguruswamy, "Computing Concept and Programming in C", Tata McGraw Hill, 2008.
3. Delores M. Etter, "Engineering Problem Solving with C", 2013
4. Grewal B.S, "Numerical Methods in Engineering and Science with Programming in C and C++", Khanna Publishers, 2010
5. Course materials from NPTEL

Submitted by: Dr. Smitha S K Nair

(Signature of the faculty)

Date:

Approved by:

(Signature of HOD)

Date:

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