



## TEACHING PLAN: Programming in C and Numerical Method

<b>SCHOOL: (SOBAS)</b> <b>SCHOOL OF</b> <b>BASIC AND</b> <b>APPLIED</b> <b>SCIENCE</b>		<b>ACADEMIC SESSION: 2023 - 2024</b>	<b>FOR STUDENTS' BATCH: B.Sc 4<sup>th</sup> Sem.</b>		
<b>1</b>	<b>Course No.</b>	MA-206			
<b>2</b>	<b>Course Title</b>	<b>Programming in C and Numerical Method</b>			
<b>3</b>	<b>Credits</b>	2			
<b>4</b>	<b>Learning Hours</b>	Per week two lectures Total hours; 28			
<b>5</b>	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. Master programming fundamentals: algorithms, data types, operators.</li> <li>2. Understand decision control structures: if-else, switch, loops.</li> <li>3. Explore advanced topics: functions, arrays, strings, structures, pointers.</li> <li>4. Learn numerical methods for solving equations and linear algebraic systems.</li> </ol>			
<b>6</b>	<b>Course Outcomes</b>	<ol style="list-style-type: none"> <li>1. Demonstrate proficiency in programming concepts and flowcharting.</li> <li>2. Implement decision-making statements effectively.</li> <li>3. Develop algorithms using loops and switch-case structures.</li> <li>4. Apply numerical methods to solve algebraic equations and linear systems.</li> </ol>			
<b>7</b>	<b>Outline syllabus:</b>				
<b>7.01</b>	<b>Paper Code</b>	<b>Unit</b>	<b>Introduction</b>	<b>Page Numbers<sup>1</sup></b>	<b>Lectures</b>
<b>7.02</b>	<b>Unit I</b>	(a)	Programmer's model of a computer, Algorithms, Flow charts,	1.1 to 1.11	1,2
		(b)	Data types, Operators and expressions,	2.1 to 2.15	3,4
		(c)	Input / outputs functions	3.1 to 3.16	5,6,7
<b>7.03</b>	<b>Unit II</b>	(a)	Decisions control structure: UNIT-II Decision statements, Logical and conditional statements,	<b>3.17 to 3.30</b>	<b>8,9,10</b>
		(b)	Implementation of Loops, Switch Statement & Case control structures.	<b>3.31 to 3.35</b>	<b>11,12</b>
		(c)	Functions, Preprocessors and Arrays	<b>4.1 to 4.50</b>	<b>13,14</b>
<b>7.04</b>	<b>Unit III</b>	(a)	Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters.	<b>5.1 to 5.13</b>	<b>15,16</b>
		(b)	Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures. Pointers:	<b>6.1 to 6.25</b>	<b>17,18, 19</b>
		(c)	Pointers Data type, Pointers and Arrays, Pointers and Functions. Solution of Algebraic	<b>6.26 to 6.30</b>	<b>20,21</b>
<b>7.05</b>	<b>MA 303 Unit IV</b>	(a)	Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method,	<b>7.1 to 7.17</b>	<b>22,23</b>
		(b)	Triangularization method (LU decomposition method). Crout's method, Cholesky Decomposition	<b>7.18 to 7.30</b>	<b>24,25, 26</b>
		(c)	method. Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.	<b>8.1 to 8.13</b>	<b>27,28</b>

<b>8</b>	<b>Course Evaluation</b>	
<b>8.1</b>	<b>Attendance</b>	5%
<b>8.2</b>	<b>Homework</b>	4 Assignments, 5%
<b>8.3</b>	<b>Quizzes</b>	2Quizzes, 5%
<b>8.4</b>	<b>Projects</b>	1 Project, 5%
<b>8.5</b>	<b>Presentation</b>	1 Presentation, 5%
<b>8.2</b>	<b>MTE</b>	20%
<b>8.3</b>	<b>End-term examination: 60%</b>	
<b>9</b>	<b>Text Books &amp; References</b>	
<b>9.1</b>	<b>Text book</b>	<ol style="list-style-type: none"> <li>1. B.W. Kernighan and D.M. Ritchie : The C Programming Language, 2nd Edition</li> <li>2. V. Rajaraman : Programming in C, Prentice Hall of India, 1994</li> <li>3. Byron S. Gottfried : Theory and Problems of Programming with C, Tata McGraw -Hill Publishing Co. Ltd., 1998</li> <li>4. M.K. Jain, S.R.K. Lyengar, R.K. Jain : Numerical Method, Problems and Solutions, New Age International (P) Ltd., 1996</li> <li>5. M.K. Jain, S.R.K. Lyengar, R.K. Jain : Numerical Method for Scientific and Engineering Computation, New Age International (P) Ltd., 1999</li> <li>6. International (P) Ltd., 1999</li> </ol>
<b>9.2</b>	<b>References</b>	
<b>9.3</b>	<b>Video References</b>	

## QUESTION BANK

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**[Q.1]**

- a) Write an algorithm to find the sum of two numbers
- b) Write an algorithm to find the greatest among three number
- c) Write an algorithm to find the area of a circle with radius r
- d) Write any two advantage of flow -chart
- e) Define the hybrid Computer ?

**[Q.2]**

Find the roots of the equation by the bisection method up to two decimal places  $x^3 - 9x + 1 = 0$

**[Q.3]** Using the Newton Rapson method find the real root of the equation  $3x = \cos x + 1$

**[Q.4] (a)** Solve the equation by Gauss-Jordan method

$$x + y + z = 9, \quad 2x - 3y + 4z = 13, \quad 3x + 4y + 5z = 40$$

**(b)** Solve the equation by gauss Elimination method

$$x + 4y - z = -5, \quad x + y - 6z = -12, \quad 3x - y - z = 4$$

**[Q.5]**

Solve the equation by LU decomposition

$$5x + 2y + z = 29, \quad x + 4y + 2z = 4, \quad 2x - y + 10z = 44$$

**[Q.6]**

Solve the equation by the Jacobi method

$$5x + 2y + z = 12, \quad x + 4y + 2z = 15, \quad x + 2y + 5z = 20$$

**[Q.7]**

Solve the equation by the Gauss- Seidel Method

$$54x + y + z = 110, \quad 2x + 15y + 6z = 72, \quad -x + 6y + 27z = 85$$

**[Q.8]**

Draw a flow chart to find sum of two Number ?

**[Q.9]** Write the advantage of flow chart in detail ?