

**DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS**  
**KURUKSHETRA UNIVERSITY, KURUKSHETRA**

| Session: 2023-24                                                                                              |                                                                                                                                                                                                                                                                                                                                                                               |                           |               |
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| Part A - Introduction                                                                                         |                                                                                                                                                                                                                                                                                                                                                                               |                           |               |
| Subject                                                                                                       | COMPUTER SCIENCE                                                                                                                                                                                                                                                                                                                                                              |                           |               |
| Semester                                                                                                      | II                                                                                                                                                                                                                                                                                                                                                                            |                           |               |
| Name of the Course                                                                                            | Programming Methodologies                                                                                                                                                                                                                                                                                                                                                     |                           |               |
| Course Code                                                                                                   | B23-CSE-203                                                                                                                                                                                                                                                                                                                                                                   |                           |               |
| Course Type:<br>(CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)                                                     | CC-M                                                                                                                                                                                                                                                                                                                                                                          |                           |               |
| Level of the course (As per Annexure-I                                                                        | 100-199                                                                                                                                                                                                                                                                                                                                                                       |                           |               |
| Pre-requisite for the course (if any)                                                                         |                                                                                                                                                                                                                                                                                                                                                                               |                           |               |
| Course Learning Outcomes (CLO):                                                                               | After learning this course students will be able to:<br>1. Understand the problem-solving using algorithms and flowcharts.<br>2. understand the concept of program and debugging.<br>3. learn the basic programming constructs.<br>4. understand various programming methodologies.<br>5. understand the various programming methodologies by implementing these practically. |                           |               |
| Credits                                                                                                       | Theory                                                                                                                                                                                                                                                                                                                                                                        | Practical                 | Total         |
|                                                                                                               | 1                                                                                                                                                                                                                                                                                                                                                                             | 1                         | 2             |
| Contact Hours                                                                                                 | 1                                                                                                                                                                                                                                                                                                                                                                             | 2                         | 3             |
| Max. Marks:50(30(T)+20(P))<br>Internal Assessment Marks:15(10(T)+5(P))<br>End Term Exam Marks:35(20(T)+15(P)) |                                                                                                                                                                                                                                                                                                                                                                               | Time: 3 Hrs.(T), 3Hrs.(P) |               |
| Part B-Contents of the Course                                                                                 |                                                                                                                                                                                                                                                                                                                                                                               |                           |               |
| Instructions for Paper-Setter                                                                                 |                                                                                                                                                                                                                                                                                                                                                                               |                           |               |
| Unit                                                                                                          | Topics                                                                                                                                                                                                                                                                                                                                                                        |                           | Contact Hours |
| I                                                                                                             | <b>Problem Solving:</b> Understanding the problem, Analyzing the problem, and Identifying the solution.<br><b>Tools for Problem-Solving:</b> Flowcharts and its Symbols. Algorithm designing. Examples of Algorithms with flow chart. Decision Table.                                                                                                                         |                           | 4             |

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| II                                  | <p><b>Program:</b> Concept of a program, Need for writing programs, Characteristics of a good program, Programming style, Documentation, and Program Maintenance.</p> <p><b>Debugging Programs:</b> Syntax Errors, Run-Time Errors, Logical Errors.</p> <p>Process of conceptualizing a solution to a problem and moving from algorithm to programming.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4  |
| III                                 | <p><b>General Concepts:</b> Clarity and Simplicity of Expressions, Use of proper names for Identifiers, Comments, Indentation; and Documentation.</p> <p><b>Programming Constructs:</b> Sequence, Selection, and Iteration; Simulation (dry run) of the program for better understanding of algorithm; Comparison and Analysis of Algorithms through simulations.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4  |
| IV                                  | <p><b>Methodologies:</b> Structured programming, Top-down approach, Bottom-up approach, Functional programming, Modular programming, and Object-oriented programming.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3  |
| V*                                  | <p>Practicum:<br/>Students are advised to do laboratory/practical practice not limited to but including the following types of problems:</p> <ul style="list-style-type: none"> <li>• Draw a flowchart and design an algorithm that calculates simple interest using principle, rate, and time.</li> <li>• Draw a flowchart and write an algorithm to swap the values of two variables.</li> <li>• Draw a flowchart and design an algorithm to check whether the given number is even or odd.</li> <li>• Draw a flowchart and design an algorithm that inputs three numbers and displays the largest number.</li> <li>• Draw a flowchart and design an algorithm to find the smallest from n numbers.</li> <li>• Draw a flowchart and design an algorithm to find the greatest from n numbers.</li> <li>• Draw a flowchart and design an algorithm to find the sum and average of n input numbers.</li> <li>• Draw a flowchart and design an algorithm to find the sum of the digits of the input number.</li> <li>• Identify the requirements for a college system computerization.</li> <li>• Identify the various modules in a banking system.</li> <li>• Identify the complete design of a general grocery store.</li> <li>• Draw the decision table for finding the greatest of three numbers.</li> <li>• Draw to decision table for checking eligibility for admission to college in an undergraduate programme taking your assumptions.</li> </ul> | 30 |
| <b>Suggested Evaluation Methods</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |

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| <b>Internal Assessment:</b> <ul style="list-style-type: none"> <li>➤ <b>Theory</b> <ul style="list-style-type: none"> <li>• Class Participation: 4</li> <li>• Seminar/presentation/assignment/quiz/class test etc.: NA</li> <li>• Mid-Term Exam: 6</li> </ul> </li> <li>➤ <b>Practicum</b> <ul style="list-style-type: none"> <li>• Class Participation: NA</li> <li>• Seminar/Demonstration/Viva-voce/Lab records etc.: 5</li> <li>• Mid-Term Exam: NA</li> </ul> </li> </ul> | <b>End Term Examination:</b><br><b>A three-hour exam for both theory and practicum.</b><br><b>End Term Exam Marks:35(20(T)+15 (P))</b> |
| <b>Part C-Learning Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                        |
| <b>Text /Reference Books:</b> <ul style="list-style-type: none"> <li>• Sinha, P.K. &amp; Sinha, Priti, Computer Fundamentals, BPB.</li> <li>• Dromey, R.G., How to Solve it By Computer, PHI.</li> <li>• Norton, Peter, Introduction to Computer, McGraw-Hill.</li> <li>• Leon, Alexis &amp; Leon, Mathews, Introduction to Computers, Leon Tech World.</li> <li>• Rajaraman, V., Fundamentals of Computers, PHI.</li> </ul>                                                   |                                                                                                                                        |

\*Applicable for courses having practical components.