| Semester                       | Ι  |                        |
|--------------------------------|--|------------------------|
| Course                         | Multi-Disciplinary   |                        |
| Paper Code                     | M1DS250111P  |                        |
| Paper Title                    | Introduction to Programming  |                        |
| No. of Credits                 | 3  |                        |
| Theory/Composite/<br>Practical | Practical  |                        |
| Minimum No. of                 | 4  |                        |
| preparatory hours per          |  |                        |
| week a student has to          |  |                        |
| devote                         |  |                        |
| Number of Module               | 1  |                        |
| Syllabus                       | Unit 1: Algorithmic Concepts   | [10L]                  |
|                                | Defining programming and its role in Computer Science. Flowcharts, Algorith<br>Pseudocode. Basic Structure of Programs. Introduction to Integrated Developm<br>Environments and their use.   | ms and<br>nent<br>[4L] |
|                                | Problem-Solving and Algorithm Development. Problem Decomposition.  | [2L]                   |
|                                | Debugging Techniques: Using debugging tools and strategies to identify and fi code.  | x errors in<br>[2L]    |
|                                | Software Design: Understanding basic software design principles.   | [2L]                   |
|                                | Unit 2: Basic Programming  | [26L]                  |
|                                | Data Types, variables, constants, operators and expressions.   | [6L]                   |
|                                | Input/Output: Understanding how to get input from the user and display output. [2L]  |                        |
|                                | Conditional statements and loops.  | [8L]                   |
|                                | Function definition and function calling. Parameters and return values. Using p to pass data to functions and understanding return values.   | oarameters<br>[6L]     |
|                                | Arrays: Basic Concepts.  | [4L]                   |
| Learning Outcomes              | <ul> <li>Defining and describing algorithmic concepts for effective problem solving.</li> <li>Explaining and demonstrating the use of C programming elements such as data types, variables, constants, and operators.</li> <li>Applying sequential, conditional, and iterative statements to solve problems.</li> <li>Constructing functions with parameters and return values to implement structured programming.</li> <li>Evaluating and debugging programs, applying software design principles and problem decomposition strategies to enable the writing of clean code.</li> </ul> |                        |
| Reading/Reference<br>List      | <ol> <li>The C Programming Language, Kernighan and Ritchie, PHI Publications.</li> <li>Programming with C, Gottfried, TMH Publications.</li> <li>Programming in C, Dey and Ghosh, Oxford Publications.</li> <li>Programming in ANSI C, Balaguruswamy, McGraw Hill.</li> <li>Practical Julia: A Hands-On Introduction for Scientific Minds, Lee Phillips, No Starch Press.</li> </ol>   |                        |

|            | 6. Hands-On Julia Programming: An Authoritative Guide to the Production-Ready   |
|------------|---|
|            | Systems in Julia, Sambit Kumar Dash, BPB Publications.                          |
|            | 7. Computer Fundamentals, Sinha and Sinha, BPB Publications.                    |
|            | 8. Fundamentals of Computers, Rajaraman and Adabala, PHI Publications.          |
|            | 9. NPTEL course on Introduction to Programming in C by Dr. Satyadev Nandakumar, |
|            | IIT Kanpur; course link: https://youtu.be/XTiliI-LOY8                           |
| Evaluation | Continuous Assesment  |
|            |   |
|            |   |