

## Programming and Data Structures

Course Code: UEC000014T

Course Title : Programming and Data Structures

Semester : III

Credits : 02

### Rationale

*The course on Programming and Data Structures is designed to provide undergraduate students with a strong foundation in fundamental programming concepts and data structures. This course is integral to the holistic development of undergraduate students, providing them with the foundational skills and knowledge needed for success in the rapidly evolving and technology-centric landscape of today's world. The course equips students with the tools necessary to excel academically and thrive in diverse professional environments.*

### Course Outline

Contents	No. of Lectures
<b>Unit-I Introduction to Programming</b> Introduction to computer and number system, Procedures and Algorithms, overview of programming languages, Setting up the development environment, Basic syntax and program structure in Python	5
<b>Unit-II Variables, Data Types, Operators and Control Flow</b> Variables and data types (integers, floats, strings), Arithmetic and logical operators, Type conversion and casting, Conditional statements (if, else, elif), Loops (for, while), Control flow in economic modeling	5
<b>Unit-III Functions and Modularity</b> Defining and calling functions, Function arguments and return values, Modular programming in economic analysis	5
<b>Unit-IV Data Structures - Lists and Dictionaries</b> Lists: indexing, slicing, and manipulation, Dictionaries: key-value pairs and operations, Applications in economic data management	5
<b>Unit-V :File Handling and Input/Output Operations</b> Reading from and writing to files, Handling different file formats (e.g., CSV, JSON), Data import/export in economic research	5



### Course Outcomes

Upon successful completion of this course, candidates will be able to

- Demonstrate an understanding of fundamental programming concepts, including variables, data types, operators, control flow, and functions using a high-level language such as Python.
- Apply programming skills to solve economic problems, implement economic models, and analyze economic data sets.
- Utilize data structures such as lists and dictionaries for efficient storage, retrieval, and manipulation of economic data.
- Design and implement modular programs, employing functions and modular coding practices, to enhance reusability and maintainability in economic analysis.
- Effectively handle different types of files (e.g., CSV, JSON) and perform input/output operations for managing economic data in various formats.
- Understand and apply data structures to represent economic entities and relationships, with a focus on practical applications in economic analysis.

### Text Books

1. Michael, T. Goodrich ( 2023). Data Structures and Algorithms in Python, Wiley Publications, New Delhi
2. Bhasin, Harsh (2023). Data Structures with Python, bpb publication, New Delhi