Course Code	Course Name	Credits
20MCACC203	Core Python Programming	03

❖ Aim of the Course:

1	Python programming knowledge is intended to be useful to data analyst, data scientist, data visualization, machine learning, deep learning, computer vision, natural language processing and many other computer science fields. Goal of this course is to provide core aspects of programming with Python.

❖ Course Overview and Context:

1	The course is designed to provide an introduction to the Python programming language. The focus of the course is to provide course learners with an introduction to programming, basic conditional and looping constructs, list, tuple, dictionary, array, string , function , module file I/O, and object oriented programming using the Python programming language.

❖ Course Outcomes:

Sr #	Course Outcome	Cognitive Level
1	To **list** various features of python, data types and operators in Python.	Remember
2	To **explain** indexing and slicing on array and string.	Understand
3	To be able to **differentiate** list, tuple and dictionary by performing various operations on it and **determine** which data structure best suits the real-life scenario.	Understand, Apply
4	To **test** any program for its correctness and be able to use exception handling and prepare **outline** and convert program into structured form using UDF.	Understand, Apply, Analyze, Evaluate
5	To **Select** any real-life situation, **deconstruct** it and **solve** it using Object-oriented principles.	Understand, Apply, Analyze

❖ Content of the Course:

Unit-1 Introduction to Python

- **Introduction to Python** - features, executing program, memory management, garbage collection, installing python.
- **Data types** - comments, built-in data types, sequences, sets, literals, user-defined data types, constants, identifiers, reserved words, naming convention.
- **Operators, Input and Output statements, Command line arguments**

Unit-2 Looping and Control Structure, Arrays, Strings

- **Condition Statements:** if, if-else, nested if-else
- **Looping:** for, while, nested loops
- **Control Structure:** break, continue, pass
- **Array:** Creating, importing, index, processing, types of array, different ways of creating array, operations on array, attributes of an array, Multi-dimensional arrays and operations on it – indexing, slicing.
- **String:** Creating Strings and operations with strings, Characters

Unit-3 List, Tuple, Dictionary

- **Lists and Tuples:** Creating List and Tuples, Operations on list and tuples

- **Dictionaries:** Operation on dictionaries, dictionary methods, Sorting elements, Conversion of list and strings to dictionary, passing to function, ordered dictionary

Unit-4 Function, Exception Handling, Modules, File Handling

- **Functions:** Defining, Calling, returning result, pass by object, formal and actual arguments, default argument, variable length argument, passing group of elements, anonymous functions, functional decorators, generators.
- **Modules:** Importing module, Math module, Random module, packages, composition
- **Exception:** Errors, Exceptions handling, types of exception, assert statement, except block, user-defined exception
- **Files:** types of files, opening and closing, working with text files, various operations with files, random accessing of binary files, zipping and unzipping files

Unit-5 Object Oriented Programming

- **OOP:** Introduction to OOPs, problems in procedure-oriented approach, Classes and objects
- **Inheritance & Polymorphism:** Constructors in Inheritance, Overriding Super Class Constructors and Methods, The super () Method, Types of Inheritance, Single Inheritance, Multiple Inheritance, Method Resolution Order (MRO), Polymorphism, Duck Typing Philosophy of Python, Operator Overloading, Method Overloading, Method Overriding
- **Abstract classes and interfaces:** Abstract Method and Abstract Class, Interfaces in Python, Abstract Classes vs. Interfaces

❖ Learning Resources:

Sr #	Textbook | References | Internet Links
1	"Core Python Programming" by Dr. R. Nageswara Rao – 2017 Edition, Dreamtech Press
2	"Learn Data Analysis with Python" by A.J.Henley, Dave Wolf, APress
3	"Fundamentals of Python – First Programs", Kenneth A. Lambert, CENGAGE publication.
4	"Introduction to Computation and Programming Using Python" by John V Guttag, PHI publication
5	"Python Projects" by Laura Cassell, WROX
6	"Beginning Python from Novice to Professional" by Magnus Lie Hetland- APress

❖ Assignments (Optional):

Sr #	Description	Available From (Date)	Submission Date
1	Looping, List, Tuple, Dictionary, Array, String	After 3 Weeks	Within 10 Days
2	Function, Exception handling, Inheritance, Class, Object, MRO	After 6 Weeks	Within 7 Days