CORE COURSE X: 5B10CSC COMPUTATION USING PYTHON

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
5	5B10CSC	3	3	3

COURSE OUTCOME

CO1: Learn Python for expressing computation
CO2: Familiarize with functions and modules in python
CO3: Understand object-oriented programming concepts
CO4: Learn the techniques for database connectivity and GUI programming in Python

Unit I: Basic Elements and Control Statements

Features of Python, Different Methods to Run Python, Basic Elements (Objects, Expressions, Numerical Types, Strings, Variables), Comments, Indentation in Python, Input and Output in Python, import function, Operators in Python, Branching (if, else, elif), Iteration (while, for), range and enumerate functions, Tuples, Lists, Sets, Dictionaries, Built-in methods of lists, sets and dictionaries, Mutable and Immutable Objects.

(14 Hrs)

Unit II: Functions, Modules and Exception Handling

Functions Definition, Function Calling, Function Arguments (Required, Keyword, Default), Recursion, Modules, Built-in Modules, Creating Modules, File Handling (Opening, Closing, Writing, Reading), Exceptions, Built-in Exceptions (IndexError, OverflowError, ZeroDivisionError, RuntimeError), Exception Handling.

(16 Hrs)

Unit III: Object Oriented Programming, numpy Arrays and Data Visualization

Class Definition, Object Creation, Built-in Attribute Methods, Object Oriented Programming Features of Python. Arrays in Python, Numpy Module, ndarray, Creating Arrays (array, zeros, ones, empty, linspace, arrange, random), Two-Dimensional Array, Indexing, Slicing, Iterating, Copying, Splitting, Shape Manipulation (reshape, transpose, resize), Arithmetic Operations on Arrays. Data Visualization in Python matplotlib Module, pyplot, plot(), scatter, bar charts, Formatting, figure(), subplot(), text(), xlabel(), ylabel(), title(), Plotting Simple Mathematical Functions (sin x, x^2)

(10 Hrs)

Unit IV: Connecting to Database and GUI Programming

Connecting to a Database, Basic Operations on Database (Crater, Insert, Update, Delete), Fetching Data from a Database, Transaction Control.

GUI Programming using Tkinter, Tkinter Widgets (Label, Message, Entry, Text, Button, tkMessagebox, RadioButton, Checkbutton, Listbox, Menu, Menubutton, Scale, Scrollbar, Canvas), Layout Managers.

(14 Hrs)

Books for Study:

1. Taming Python By Programming, Dr. Jeeva Jose, Khanna Publishing
2. Introduction to Computation and Programming Using Python with Application to Understanding Data - John V. Guttag, PHI (2016)
3. https://www.numpy.org/devdocs/user/quickstart.html
4. https://matplotlib.org/users/pyplot_tutorial.html

Books for Reference:

1. https://www.tutorialspoint.com/python/
2. Introduction to Computer Science using Python - Charles Dierbach, Wiley (2015)
3. Python for Education by Ajith Kumar B P
4. https://docs.python.org/3/tutorial/index.html
5. Introduction to Computer Science and Programming Using Python Provided by Massachusetts Institute of Technology (MITx)

   Available at: (https://www.edx.org/course/introduction-to-computer-science-and-programming-using-python-2)

Marks including choice:

Unit	Marks
1	15
2	15
3	15
4	15