Essentials of Python

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Essentials of Python	2	0	0	2	Class XII	NA

Learning Objectives

The Learning Objectives of this course are as follows:
- To introduce programming concepts using python
- To use python programming to solve problems of different domains

Learning outcomes

The Learning Outcomes of this course are as follows:
- After studying this course, students will be able to understand the basics of programming language
- After studying this course, students will be able to develop, document and debug modular python programs
- After studying this course, students will be able to apply suitable programmimg constructs and built in data structures to solve a problem

SYLLABUS

Unit I (12 hours)
Introduction
What can Python do? Why Python? Python Syntax compared to other programming languages, Python Installation.
The print statement, Comments, Python Data Structures & Data Types, String Operations in Python, Simple Input & Output, Simple Output Formatting, Operators in python

Python Program Flow
Indentation, The If statement and its' related statement, An example with if and it's related statement, The while loop, The for loop, The range statement, Break &Continue, Assert, Examples for looping

Functions& Modules

Create your own functions, Functions Parameters, Variable Arguments, Scope of a Function, Function Documentations, Lambda Functions& map, n Exercise with functions, Create a Module, Standard Modules

Unit 2   (16 hours)

Exceptions Handling

Errors, Exception handling with try, handling Multiple Exceptions, Writing your own Exception

File Handling

File handling Modes, Reading Files, Writing& Appending to Files, Handling File Exceptions, The with statement

Classes In Python

New Style Classes, Creating Classes, Instance Methods, Inheritance, Polymorphism, Exception Classes & Custom Exceptions

Generators and iterators

Iterators, Generators, The Functions any and all, With Statement, Data Compression

Unit 3   (16 hours)

Data Structures

List Comprehensions, Nested List Comprehensions, Dictionary Comprehensions. Functions, Default Parameters, Variable Arguments, Specialized Sorts

Collections

namedtuple(), deque, ChainMap, Counter, OrderedDict, defaultdict, UserDict, UserList, UserString

Writing GUIs in Python (Tkinter)

Introduction, Components and Events, An Example GUI, The root Component, Adding a Button, Entry Widgets, Text Widgets, Check buttons

Python SQL Database Access

Introduction, Installation, DB Connection, Creating DB Table, INSERT, READ, UPDATE, DELETE operations, COMMIT & ROLLBACK operation, handling Errors

Network Programming

Introduction, A Daytime Server, Clients and Servers, The Client Program, The Server Program

Date and Time

Sleep, Program execution time, more methods on date/time

Unit 4   **(16 hours)**

Filter, Map, Reduce, Decorators, Frozen set, Collections

Regular Expression
Split, Working with special characters, date, emails, Quantifiers, Match and find all, character sequence and substitute, Search method

Threads ESSENTIAL
Class and threads, Multi-threading, Synchronization, Treads Life cycle, use cases

Accessing API ESSENTIAL
Introduction, Facebook Messenger, Openweather

DJANGO
Django Overview, Django Installation, Creating a Project, Usage of Project in depth Discussion, Creating an Application, Understanding Folder Structure, Creating a Hello World Page, Database and Views, Static Files and Forms, API and Security

Essential/recommended readings
- "Starting Out with Python plus My Programming Lab with Pearson eText -- Access Card Package (3rd Edition) Tony Gaddis ISBN-13: 978-0133862256".
- Python Crash Course: A Hands-On, Project-Based Introduction to Programming (2nd Edition).
- Head-First Python: A Brain-Friendly Guide (2nd Edition) by Paul Barry.
- Learn Python the Hard Way: 3rd Edition by Zed A. Shaw.
- Python Programming: An Introduction to Computer Science (3rd Edition) by John M. Zelle.
- Python Cookbook: Recipes for Mastering Python 3 (3rd Edition) by Brian Jones and David Beazley
- https://docs.djangoproject.com/
- Introduction to Programming using Python by Y. Daniel Liang. Publisher Pearson
- Taneja, S., Kumar, N. Python Programming- A modular Approach, Pearson Education India, 2018.
- Balaguruswamy E., Introduction to Computing and Problem Solving using Python, 2 nd edition, McGraw Hill Education, 2018

Examination scheme and mode:
Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.