

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN COMPUTER SCIENCE**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCE-CSC01**

**CORE: PROBLEM SOLVING USING PYTHON**

(Common paper to B.Sc. Software Applications, B.Sc. Computer Science with AI & B.C.A.)

**I YEAR**  
**I / II SEM**

**OBJECTIVES:**

- Describe the core syntax and semantics of Python programming language.
- Discover the need for working with the strings and functions.
- Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
- Understand the usage of packages and Dictionaries.

**OUTCOMES:**

- To Understand the principles of Python and acquire skills in programming in python
- To develop the emerging applications of relevant field using Python
- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- Able to develop simple turtle graphics programs in Python

**UNIT – I**

Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types.

**UNIT - II**

Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flags and Indefinite Loops. Lists: List Structures - Lists in Python - Iterating over lists in Python.

**UNIT - III**

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope.

**UNIT - V**

Objects and their use: Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files - String Processing - Exception Handling.

**UNIT - V**

Dictionaries and Sets: Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Recursion: Recursive Functions.

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**TEXT BOOK:**

1. Charles Dierbach, “Introduction to Computer Science using Python - A computational Problem solving Focus”, Wiley India Edition, 2015.

**REFERENCE BOOKS:**

1. Mark Lutz, “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media 2018, 5<sup>th</sup> Edition.
2. Timothy A. Budd, “*Exploring Python*”, Tata MCGraw Hill Education Private Limited 2011, 1<sup>st</sup> Edition.
3. Allen Downey, Jeffrey Elkner, Chris Meyers, “*How to think like a computer scientist: learning with Python*”, 2012.
4. Sheetal Taneja & Naveen kumar, “*Python Programming a Modular approach – A Modular approach with Graphics, Database, Mobile and Web applications*”, Pearson, 2017.
5. Ch Satyanarayana M Radhika Mani, B N Jagadesh, “*Python programming*”, Universities Press 2018.

**WEB REFERENCES**

- <http://interactivepython.org/courselib/static/pythonds>
- <http://www.ibiblio.org/g2swap/byteofpython/read/>
- <http://www.diveintopython3.net/>
- <http://greenteapress.com/wp/think-python-2e/>
- NPTEL & MOOC courses titled Python programming
- [http://spoken-tutorial.org/tutorial-search/?search\\_foss=Python&search\\_language=English](http://spoken-tutorial.org/tutorial-search/?search_foss=Python&search_language=English)
- <http://docs.python.org/3/tutorial/index.html>