

Course Code	Course Title	L	T	P	C
1156EC402	MOOC - PYTHON PROGRAMMING	0	0	0	2

a) Course Category

Independent Learning – Self Learning Course

b) Preamble

This course is an introduction to programming and problem solving in Python. The course covers basic concepts such as conditionals, loops, functions, lists, strings and tuples. It goes on to cover searching and sorting algorithms, dynamic programming and backtracking, as well as topics such as exception handling and using files

c) Prerequisite

Nil

d) Related Courses

Internet of Things

e) Course Outcomes

On successful completion of this course the student will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Write a basic python program using functions	K3
CO2	Write a python program using strings and different search operations	K3
CO3	Write a python program using different sorting techniques	K3
CO4	Write a python program using dictionaries and higher order functions	K3
CO5	Write a python program with nested functions and handle different data types	K3

f) Course Content

UNIT I INTRODUCTION TO PYTHON PROGRAMMING

Introduction to programming, algorithms and data structures via gcd, Downloading and installing Python. gcd in Python: variables, operations, control flow - assignments, condition-als, loops, functions

UNIT II PYTHON MEMORY MODEL

Python: types, expressions, strings, lists, tuples - Python memory model: names, mutable and immutable values -List operations: slices etc - Binary search: Inductive function definitions: numerical and structural induction - Elementary inductive sorting: selection and insertion sort In-place sorting

UNIT III ALGORITHM ANALYSIS

Basic algorithmic analysis: input size, asymptotic complexity, $O()$ notation -Arrays vs lists - Merge sort – Quicksort - Stable sorting

UNIT IV DICTIONARIES

Dictionaries - More on Python functions: optional arguments, default values - Passing functions as arguments - Higher order functions on lists: map, lter, list comprehension Exception handling - Basic input/output - Handling files - String processing

UNIT V BACKTRACKING AND DATA STRUCTURES

Backtracking: N Queens, recording all solutions - Scope in Python: local, global, nonlocal names Nested functions - Data structures: stack, queue - Heaps Abstract data types - Classes and objects in Python "Linked" lists: find, insert, delete

g) Learning Resources

Online Resources

1. https://onlinecourses.nptel.ac.in/noc17_cs10/preview
2. <https://www.coursera.org/courses?languages=en&query=python>
3. <https://in.udacity.com/course/python-foundation-nanodegree--nd002-inpy>