PYTHON PROGRAMMING SYLLABUS(KNC-302)

At the end of course, the student will be able to understand

CO1 To read and write simple Python programs. (K1, K2)

CO2 To develop Python programs with conditionals and loops. (K2, K4)

CO3 To define Python functions and to use Python data structures lists, tuples, dictionaries (K3)

CO4 To do input/output with files in Python (K2)

CO5 To do searching, sorting and merging in Python (K2, K4)

DETAILED SYLLABUS

UNIT I

Introduction: The Programming Cycle for Python, Python IDE, Interacting with Python Programs, Elements of Python, Type Conversion. Basics: Expressions, Assignment Statement, Arithmetic Operators, Operator Precedence, Boolean Expression.

UNIT II

Conditionals: Conditional statement in Python (if-else statement, its working and execution), Nested-if statement and Elif statement in Python, Expression Evaluation & Float Representation. Loops: Purpose and working of loops, while loop including its working, For Loop, Nested Loops, Break and Continue.

UNIT III

Function: Parts of A Function , Execution of A Function , Keyword and Default Arguments ,Scope Rules.

Strings : Length of the string and perform Concatenation and Repeat operations in it. Indexing and Slicing of Strings.

Python Data Structure: Tuples, Unpacking Sequences, Lists, Mutable Sequences, List Comprehension, Sets, Dictionaries

Higher Order Functions: Treat functions as first-class Objects, Lambda Expressions

UNIT IV

Sieve of Eratosthenes: generate prime numbers with the help of an algorithm given by the Greek Mathematician named Eratosthenes, whose algorithm is known as Sieve of Eratosthenes. File I/O: File input and output operations in Python Programming Exceptions and Assertions.

Modules: Introduction, Importing Modules,

Abstract Data Types : Abstract data types and ADT interface in Python Programming.

Classes : Class definition and other operations in the classes , Special Methods (such as _init_,_str_, comparison methods and Arithmetic methods etc.) , Class Example , Inheritance , Inheritance and OOP.

UNIT V

Iterators & Recursion: Recursive Fibonacci, Tower of Hanoi

Search: Simple Search and Estimating Search Time, Binary Search and Estimating Binary Search Time

Sorting & Merging: Selection Sort, Merge List, Merge Sort, Higher Order Sort

Text books:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3,Shroff/O‘Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/)

2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

3.John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013

4.Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

5.Timothy A. Budd, ―Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.,, 2015.

6.Kenneth A. Lambert, ―Fundamentals of Python: First Programs‖, CENGAGE Learning, 2012.

7.Charles Dierbach, ―Introduction to Computer Science using Python: A Computational ProblemSolving Focus, Wiley India Edition, 2013.

8.Paul Gries, Jennifer Campbell and Jason Montojo, ―Practical Programming: An Introduction to Computer Science using Python 3‖, Second edition, Pragmatic Programmers, LLC, 2013. Mapped With : https://ict.iitk.ac.in/product/python-programming-a-practical-approach/