**INT213:PYTHON PROGRAMMING**

L:0 T:0 P:4 Credits:2

**Course Outcomes:** Through this course students should be able to

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| • | design real life situational problems and think creatively about solutions of them. |
| • | apply a solution clearly and accurately in a program using Python |
| • | apply the best features of mathematics, engineering and natural sciences to program real life problems |
| •  **Unit I**  **Unit II**  **Unit III**  **Unit IV**  **Unit V**  **Unit VI** | apply their logic to solve and code various graph optimization problems and dynamic programming approach to program  **Introduction** : python programming language, introduction to program and debugging, formal and natural language  **Variables,Expression and Statements** : Values and types, variables, variables name and keywords, statements, operators and operand, order of operations, operations on string, composition and comments  **Conditionals and Iteration** : modulus operator, boolean expressions, logic operators, conditional, alternative execution, nested conditionals and return statements, while statements, encapsulation and generalization  **Functions and recursion** : function calls, type conversion and coercion, math functions, adding new function, parameters and argument, recursion and its use  **String** : string a compound data type, length, string traversal, string slices, comparision, find function, looping and counting  **Lists** : list values, length, membership, operations, slices, deletion, accessing elements, list and for loops, list parameters and nested list  **Tuples and Dictionaries** : mutability and tuples, tuple assignment, tuple as return values, random numbers and list of random numbers, counting and many buckets, dictionaries operations and methods, sparse matrices, aliasing and coping  **Files and exceptions** : text files, writing variables, directories, pickling, exceptions, glossary  **Classes and objects** : creating classes, creating instance objects, accessing attributes, overview of OOP terminology  **Object oriented programming terminology** : Class Inheritance, Overriding Methods, Data Hiding, Function Overloading  **Divide and Conquer technique** : introduction to divide and conquer technique, Binary search, Quick Sort, Merge Sort  **Graph optimization technique** : introduction to graph optimization technique, Depth first Search, Breadth first Search, Problem solving using graph optimization techniques |

**Greedy approach** : introduction to greedy approach, problem solving using greedy approach

**Dynamic programming** : introduction to dynamic programming, Fibonacci sequences, dynamic programming and 0/1 Knapsack problem

**Text Books:**

1. INTRODUCTION TO PROGRAMMING USING PYTHON by Y. DANIEL LIANG, PEARSON
2. NTRODUCTION TO COMPUTATION AND PROGRAMMING USING PYTHON by GUTTAG, JOHN V., MIT Press **References:**
3. LEARNING WITH PYTHON by ALLEN DOWNEY, JEFFREY ELKNER, CHRIS MEYERS, DREAMTECH PRESS
4. FUNDAMENTALS OF PYTHON by AUTHOR: KENNETH A. LAMBERT, CENGAGE

LEARNING

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**References:** 3. INTRODUCTION TO PROGRAMMING IN PYTHON: AN INTERDISCIPLINARY

APPROACH by ROBERT SEDGEWICK, PEARSON

1. DATA STRUCTURES AND ALGORITHMS IN PYTHON by MICHAEL T. GOODRICH, ROBERTO TAMASSIA, MICHAEL H. GOLDWASSER, WILEY
2. INTRODUCTION TO COMPUTING AND PROBLEM SOLVING USING PYTHON by

BALAGURUSWAMY, MCGRAW HILL EDUCATION

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