**GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING L T P C 3 0 0 3**

**OBJECTIVES:**

• To know the basics of algorithmic problem solving

• To read and write simple Python programs.

• To develop Python programs with conditionals and loops.

• To define Python functions and call them.

• To use Python data structures –- lists, tuples, dictionaries.

• To do input/output with files in Python.

**UNIT I ALGORITHMIC PROBLEM SOLVING 9**

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

**UNIT II DATA, EXPRESSIONS, STATEMENTS 9**

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

**UNIT III CONTROL FLOW, FUNCTIONS 9**

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

**UNIT IV LISTS, TUPLES, DICTIONARIES 9**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

**UNIT V FILES, MODULES, PACKAGES 9**

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

TOTAL : 45 PERIODS

**OUTCOMES:**

Upon completion of the course, students will be able to

• Develop algorithmic solutions to simple computational problems

• Read, write, execute by hand simple Python programs.

• Structure simple Python programs for solving problems.

• Decompose a Python program into functions.

• Represent compound data using Python lists, tuples, dictionaries.

• Read and write data from/to files in Python Programs.

**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.

**REFERENCES:**

1. Charles Dierbach, “Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.

2. John V Guttag, “Introduction to Computation and Programming Using Python’’, Revised and expanded Edition, MIT Press , 2013

3. Kenneth A. Lambert, “Fundamentals of Python: First Programs”, CENGAGE Learning, 2012.

4. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3”, Second edition, Pragmatic Programmers,LLC,2013.

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

6. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,, 2015.

**FACULTY H.O.D**

### DEPARTMENT OF CIVIL ENGINEERING

http://www.aubit.edu.in/assets/img/vision.gif

The department vision is to impart strong fundamentals and applied research for international needs to serve building industry and society through innovative solutions.

http://www.aubit.edu.in/assets/img/mission.gif

To provide the State-of-art knowledge to students in Civil Engineering

To impart practical knowledge and industrial exposure for thorough understanding the subject.

To provide multidisciplinary solutions to improve quality of life and the value of investments in infrastructure; and educational efforts that promote sustainability, eco-responsible design and environmental engineering.

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) :**

I.To prepare students for successful careers in Civil Engineering field that meets the needs of Indian and multinational companies.

II. To develop the confidence and ability among students to synthesize data and technical concepts and thereby apply it in real world problems.

III. To develop students to use modern techniques, skill and mathematical engineering tools for solving problems in Civil Engineering.

IV. To provide students with a sound foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyse engineering problems and to prepare them for graduate studies.

V. To promote students to work collaboratively on multi-disciplinary projects and make them engage in life-long learning process throughout their professional life.

**FACULTY H.O.D**

**PROGRAMME OUTCOMES (POs):**

On successful completion of the programme,

1. Graduates will demonstrate knowledge of mathematics, science and engineering.

2. Graduates will demonstrate an ability to identify, formulate and solve engineering problems.

3. Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data.

4. Graduates will demonstrate an ability to design a system, component or process as per needs and specifications.

5. Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.

6. Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.

7. Graduates will demonstrate knowledge of professional and ethical responsibilities.

8. Graduate will be able to communicate effectively in both verbal and written form.

9. Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.

10. Graduate will develop confidence for self education and ability for life-long learning.

**FACULTY H.O.D**

**UNIVERSITY COLLEGE ENGINEERING**

**BHARATHIDASAN INSTITUTE OF TECHNOLOGY CAMPUS**

**TIRUCHIRAPPALLI – 620024**

###### SUB CODE : GE8151 BRANCH: CIVIL-A & Tamil

**SUB NAME :** **PROBLEM SOLVING AND PYTHON** **SEMESTER:01**

**PROGRAMMING**

**FACULTY** : C.SURESHKUMAR

**YEAR** :NOV/ DEC-2019

**COURSE OUTCOME:**

**CO1:** Develop algorithmic solutions to simple computational problems

**CO2:** Read, write, execute by hand simple Python programs.

**CO3:** Structure simple Python programs for solving problems.

**CO4:** Decompose a Python program into functions.

**CO5:** Represent compound data using Python lists, tuples, dictionaries.

**CO6:** Read and write data from/to files in Python Programs.

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**MAPPING OF COURSE OUTCOME AGAINST PROGRAMME EDUCATIONAL OBJECTIVES**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PEO 1** | **PEO 2** | **PEO 3** | **PEO 4** | **PEO 5** |
| **CO 1** | S | A |  |  |  |
| **CO 2** | A | A |  |  |  |
| **CO 3** |  |  |  | A |  |
| **CO** 4 |  | A |  | S |  |
| **CO 5** |  |  |  | A |  |
| **CO 6** |  | S |  | A |  |

**MAPPING OF COURSE OUTCOME AGAINST PROGRAMME OBJECTIVES**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** | **PO 10** |
| **CO 1** | S | S |  | S | S |  |  |  |  |  |
| **CO 2** |  | A | A |  |  |  |  |  |  |  |
| **CO 3** |  |  |  | S |  |  | A |  |  |  |
| **CO** 4 | S |  |  |  | A |  |  |  |  |  |
| **CO 5** |  |  |  |  |  | S |  | A | S | A |
| **CO 6** |  |  |  |  |  |  |  | S |  | S |

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