



**Computer Science Paper 10**  
**Python Programming**  
**[SECC-I]**

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| Semester: V | Credits: 2 | Subject Code: BS52210 | Lectures: 36 |
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**Course Outcomes:**

**At the end of this course, the learner will be able to:**

- Explain the basic constructs of python programming such as data types, control statements etc.
- Use modules, packages and files in python programs
- Select the methods and data structures like Lists, functions, tuples, dictionaries and Sets in Python programs.
- Develop logic for problem solving.

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| <b>Unit 1: An Introduction to Python</b>   | <b>3</b> |
| <ul style="list-style-type: none"><li>• Introduction to Python</li><li>• The Python Programming Language, History, features, Applications, Installing Python, Running Simple Python program</li><li>• Basics of Python</li><li>• Standard data types - basic, none, Boolean (true &amp; False), numbers, Variables, Constants, Python identifiers and reserved words, Lines and indentation, multi-line statements and Comments, Input/output with print and input, functions Declaration, Operations on Data such as assignment, arithmetic, relational, logical and bitwise operations, dry run, Simple Input and output etc..</li></ul> |          |

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| <b>Unit 2: Control Statements</b>  | <b>4</b> |
| <ul style="list-style-type: none"><li>• <b>Sequence Control</b> – Precedence of operators, Type conversion</li><li>• <b>Conditional Statements</b>: if, if-else, nested if-else,</li><li>• <b>Looping</b>- for, while, nested loops, loop control statements (break, continue, pass)</li><li>• <b>Strings</b>: declaration, manipulation, special operations, escape character, string formatting operator, Raw String, Unicode, strings, Built-in String methods.</li></ul> |          |

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| <b>Unit 3: Lists, functions, tuples and dictionaries, Sets</b>   | <b>7</b> |
| <ul style="list-style-type: none"><li>• <b>Python Lists</b>: Concept, creating and accessing elements, updating &amp; deleting lists, traversing a List, reverse Built-in List Operators, Concatenation, Repetition, In Operator, Built-in List functions and methods.</li><li>• <b>Functions</b>: Definitions and Uses, Function Calls, Type Conversion</li></ul> |          |

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| Functions, Math Functions, Composition, Adding New Functions, Flow of Execution, Parameters and Arguments, Variables and Parameters, Stack Diagrams, Void Functions, Anonymous functions Importing with from, Return Values, Boolean Functions, More Recursion, Functional programming tools - filter(), map(), and reduce(), recursion, lambda forms.<br>● <b>Tuples and Dictionaries:</b> Tuples, Accessing values in Tuples, Tuple Assignment, Tuples as return values, Variable-length argument tuples, and Basic tuples operations, Concatenation, Repetition, in Operator, Iteration, Built-in tuple functions, indexing, slicing and matrices. Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods.<br>● <b>Sets-</b> Definition, transaction of set(Adding, Union, intersection), working with sets |  |
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| <b>Unit 4: Modules, Working with files, Exception handling</b>   | <b>4</b> |
| ● <b>Modules:</b> Importing module, Creating & exploring modules, Math module, Random module, Time module<br>● <b>Packages:</b> Importing package, creating package, examples<br>● <b>Working with files:</b> Creating files and Operations on files (open, close, read, write), File object attributes, file positions, Listing Files in a Directory, Testing File Types, Removing files and directories, copying and renaming files, splitting pathnames, creating and moving directories<br>● Introduction to GUI |          |

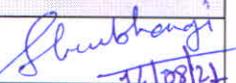
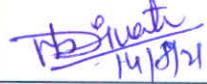
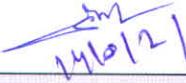
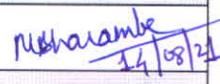
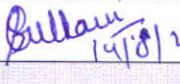
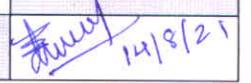
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| <b>Unit 5: Demonstration- Programming Assignments:</b>   | <b>18</b> |
| Out of 36 lectures, 18 are assigned for demonstration. Teacher should give demonstration of various programs mentioned below in the classroom or in the laboratory as per their convenience.<br><br>Programming assignments should be done individually by the student in their respective login from the list given in Lab book. The codes should be uploaded on either the local server, Moodle, Github or any LMS.<br>Assignment 1 - Python Basics<br>Assignment 2 – Arrays, Strings, and Functions<br>Assignment 3 - List, Tuples, Sets, and Dictionary<br>Assignment 4 - File Handling and Date-Time<br>Assignment 5 - Demonstration on GUI |           |

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### Recommended Reference Books:

- Charles Dierbach *Introduction to Computer Science Using Python*. Wiley Publication Learning with Python, Green Tea Press; 2002.
- E Balguruswamy *Introduction to Problem Solving with Python*. TMH publication; 2016.
- James Payne *Beginning Python: Using Python and Python 3.1*. Wrox Publication.
- Jason Montojo Jennifer Campbell, Paul Gries *An Introduction to Computer Science using Python*. The pragmatic bookshelf; 2013.
- John Paul Mueller *Beginning Programming with Python for Dummies*. Paperback; 2015
- Michael H. Goldwasser, David Letscher *Object-oriented Programming in Python*. Pearson Prentice Hall; 2008.

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