

## Python Programming

Subject Code – CSE201

Lecture (Knowledge Criteria)	Practice (Performance Criteria)
3 hours/week	4 hours/week (2 hours/batch twice in a week)
<p><b>Fundamental Concepts:</b>            brief history; features; applications of python;            python distributions; versions; python IDEs;            Python interpreter;            Execution of python programs, debugging python            code; Indentation, Comments; best practices for            python programming;            Character set; tokens; keywords, variables, naming            rules for variables,            Assignment,</p>	<ol style="list-style-type: none"> <li>1. Setup python environment</li> <li>2. Executing python: explore different ways to run python program</li> <li>3. debug python code</li> </ol>
<p><b>Basics I/O operations</b>            Input- input (), raw_input() ; output - print (),            formatting output.  <b>Datatypes</b></p>	<ol style="list-style-type: none"> <li>1. Code, execute and debug programs that               <ol style="list-style-type: none"> <li>a) Use i/o statements</li> </ol> </li> </ol>
<p>Scalar type: Numeric (int, long, float, complex),            Boolean, bytes, None; Typecasting  <b>Operators</b>            Arithmetic, Comparison/Relational,            Logical/Boolean, Bitwise; string operators;            Expressions and operator precedence</p>	<ol style="list-style-type: none"> <li>b) Evaluate expressions and displays formatted output</li> <li>c) Evaluate expressions to examine the operator precedence</li> </ol> <ol style="list-style-type: none"> <li>2. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>
<p><b>Control Flow: Conditional blocks</b> If statement:            general format; Multiway branching; Sufficient            examples;</p>	<ol style="list-style-type: none"> <li>1. Identify and Code, execute and debug programs using conditional statements.</li> <li>2. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>

<p><b>Control Flow: Loops</b>  While loop: general format; examples For loop: general format, examples. Range();nesting loops and conditionalstatements;  Controlling loop execution: Break,continue, pass statements;</p>	<ol style="list-style-type: none"> <li>1. Code, execute anddebug programs using loops.</li> <li>2. Code, execute anddebug programs using loops and conditional statements</li> <li>3. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>
<p><b>Data Collections</b>  Concept of mutability  Set – features, declaration, initialization, operations, comprehension;  Tuple-features; declaration, initialization, basic operations; indexing; slicing; built in functions;  Nested tuples;</p>	<ol style="list-style-type: none"> <li>1. Code, execute and debug programs to perform following <ul style="list-style-type: none"> <li>▪ set operations</li> <li>▪ set comprehension</li> </ul> </li> <li>2. Code, execute and debug programs to perform following <ul style="list-style-type: none"> <li>▪ basic operationson tuples</li> <li>▪ tuple indexingand slicing</li> </ul> </li> <li>3. Identify and resolve syntactic and semantic issues in thegiven code snippet</li> </ol>
<p><b>List</b>  features; declaration, initialization,basic operations; indexing;  List iterations; Slicing; built infunctions;  Nested Lists; Comprehensions;  Applications</p>	<ol style="list-style-type: none"> <li>1. Write code snippet toperform following onList <ul style="list-style-type: none"> <li>▪ basic operationson List</li> <li>▪ indexing andslicing</li> <li>▪ comprehension</li> </ul> </li> <li>2. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>

<p><b>Dictionary</b>  features; declaration, initialization, basic operations; indexing; adding and removing keys, iterating through dictionaries; built in functions; Comprehensions; Applications</p>	<ol style="list-style-type: none"> <li>1. Code, execute and debug programs to perform basic operations on Dictionary</li> <li>2. Code, execute and debug programs to perform Dictionary indexing Iterating comprehension</li> <li>3. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>
<p><b>Arrays and Strings</b>  Arrays: features; create, initialize, indexing, traversal, manipulation; Strings: create, assign, indexing, built in functions;</p>	<ol style="list-style-type: none"> <li>1. Code, execute and debug programs to perform string manipulation</li> <li>2. Code, execute and debug programs to perform array manipulation</li> <li>3. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>
<p><b>Functions</b>  Need of function; types; define function, calling function, function arguments; return and yield; None keyword; Scope of variables; Recursion; anonymous functions; sufficient examples;</p>	<ol style="list-style-type: none"> <li>1. Code, execute and debug programs to solve the given problem using built in functions</li> <li>2. Code, execute and debug programs to solve the given problem by defining a function</li> <li>3. Code, execute and debug programs to solve the given problem using recursion</li> <li>4. Define anonymous function and code to solve the given problem</li> <li>5. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>

<p><b>Modules and Packages</b>  Why modules? Module creation;Importing modules; Module Namespace;  Packages: basics; path setting; Package init .py Files;  Commonly used modules: Math,random; Emoji;</p>	<ol style="list-style-type: none"> <li>1. Create Modules and Packages</li> <li>2. Code, execute and debug programs using built in modules</li> </ol>
<p><b>NumPy</b>  Brief about NumPy module; NumPy arithmetic functions; NumPy array manipulation functions; NumPy statistical functions;  <b>Pandas</b>  Introduction, series, data frame; Create dataframes; formatting data; fundamental data frame operations;</p>	<ol style="list-style-type: none"> <li>1. Code, execute and debug programs using NumPy module.</li> <li>2. Code, execute and debug programs using series.</li> <li>3. Code, execute and debug programs using dataframes.</li> <li>4. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>
<p><b>Files</b>  Concept; features; file operations; Opening Files; Closing Files; Writing to Files;  Reading to Files; File methods; Working with files using data frame.</p>	<ol style="list-style-type: none"> <li>1. write code snippet to perform following operations on different types of files <ul style="list-style-type: none"> <li>▪ read file</li> <li>▪ write to file.</li> </ul> </li> <li>2. Write code to perform file operations using dataframes on different file types.</li> <li>3. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>
<p><b>Error and Exception Handling:</b> Python errors; exceptions: built in, user defined. How to catch exceptions?  Raising exceptions;</p>	<ol style="list-style-type: none"> <li>1. Integrate exception handling into above code</li> <li>2. Write code snippet to raise exceptions</li> <li>3. Identify and resolve syntactic and semantic issues in the given code snippet</li> </ol>

### Reference:

Sl. No.	Description
1	Core python programming, Wesley J. Chun Publisher: Prentice Hall PTR
2	Fluent Python by Luciano Ramalho
3	<a href="https://www.softcover.io/read/e4cd0fd9/conversational-python">https://www.softcover.io/read/e4cd0fd9/conversational-python</a>
4	<a href="https://realpython.com/">https://realpython.com/</a>
5	<a href="https://www.python-course.eu/">https://www.python-course.eu/</a>
6	<a href="https://www.datacamp.com/">https://www.datacamp.com/</a>
7	<a href="https://www.w3schools.com/">https://www.w3schools.com/</a>