

<b>PaperCode:</b> ICT160	<b>Paper: Programming in Python</b>						<b>L</b>	<b>P</b>	<b>C</b>			
<b>PaperID:</b> 164160								<b>2</b>	<b>1</b>			
<b>Marking Scheme:</b>												
<ol style="list-style-type: none"> <li>Teachers Continuous Evaluation: 40 marks</li> <li>Term end Theory Examinations: 60 marks</li> </ol>												
<b>Instructions:</b>												
<ol style="list-style-type: none"> <li>The practical list shall be notified by the teacher in the first week of the class commencement under intimation to the office of the school in which the paper is being offered.</li> </ol>												
<b>Course Objectives:</b>												
1:	The students will learn the Programming in the Python Language											
2:	The students will learn usage of language implemented data structures.											
3:	The students shall learn the object oriented features of the Python Language.											
4:	The students will learn usage of the Numpy, Panda and Matplotlib											
<b>Course Outcomes (CO):</b>												
CO1:	Ability to write procedural programmes in Python.											
CO2:	Ability to write programs using standard data structures.											
CO3:	Ability to use object oriented paradigm to write program in Python.											
CO4:	Ability to use Numpy, Panda and Matplotlib modules to write programs.											
<b>Course Outcomes (CO) to Programme Outcomes (PO) Mapping (scale 1: low, 2: Medium, 3: High)</b>												
<b>CO/PO</b>	<b>PO01</b>	<b>PO02</b>	<b>PO03</b>	<b>PO04</b>	<b>PO05</b>	<b>PO06</b>	<b>PO07</b>	<b>PO08</b>	<b>PO09</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	-	1	2	1	3	-	-	-	1	1	1	1
<b>CO2</b>	-	1	2	1	3	-	-	-	1	1	1	1
<b>CO3</b>	-	1	2	1	3	-	-	-	1	1	1	1
<b>CO4</b>	-	1	2	1	3	-	-	-	1	1	1	1

**Unit I**

Identifiers, keywords, statements & expressions, variables, operators, precedence & associativity, data types, indentation, comments, console I/O, type conversion. Control flow statements (if family; while & for loops; continue & break statements), exception handling. Functions, command line arguments.

**Unit II**

String management & usage, Lists, Dictionaries, Tuples & Sets. The operations on these data structures. Filter, Map and Reduce Function,

**Unit III**

Object Oriented Programming: Properties / attributes, methods, inheritance, class variables & functions, static methods, delegation, abstract base classes, Generic function.  
File Handling.

**Unit IV**

Numpy: Dtypes, Multidimensional Arrays, Slicing, Numpy Array & Memory, Array element-wise operations, Numpy Data I/O, floating point numbers, Advanced Numpy dtypes.  
Pandas: Using series and Dataframes, Indexing & Reindexing, Deleting and merging items, Common operations, Memory usage and dtypes, Pipes, Displaying dataframes, Rolling & Filling operations.  
Matplotlib: Setting defaults, Legends, Subplots, Sharing Axes, 3D surfaces.

**Note:** Atleast two laboratory practicals in each unit to be conducted. The list of practicals to be notified by the concerned teacher at the start of the teaching in the semester.

**Textbooks:**

- Introduction to Python Programming*, Gowrishankar S. and Veena A., CRC Press, 2019.
- Python Programming for Data Analysis*, Jose Unpingco, Springer Nature, 2021.

**References:**

- Python: An Introduction to Programming*, James R. Parker, 2<sup>nd</sup> Ed., Mercury Learning And Information, 2021.
- Introduction to Computation and Programming Using Python*, John V. Guttag, The MIT Press, 2021.
- Python Programming: A Practical Approach*, Vijay Kumar Sharma, Vimal Kumar, Swati Pathak, and Shashwat Pathak, CRC Press, 2021.