

	Course Title:	Introduction to Python Programming		
	Course Code:	22PLC15B/25B	CIE Marks	50
	Course Type (Theory/Practical /Integrated )	Integrated	SEE Marks	50
			Total Marks	100
	Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
	Total Hours of Pedagogy	40 hours	Credits	03
	<b>Course objectives</b> <ul style="list-style-type: none"> <li>• Learn the syntax and semantics of the Python programming language.</li> <li>• Illustrate the process of structuring the data using lists, tuples</li> <li>• Appraise the need for working with various documents like Excel, PDF, Word and Others.</li> <li>• Demonstrate the use of built-in functions to navigate the file system.</li> <li>• Implement the Object Oriented Programming concepts in Python.</li> </ul>			
	<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective <ol style="list-style-type: none"> <li>1. Use <a href="https://pythontutor.com/visualize.html#mode=edit">https://pythontutor.com/visualize.html#mode=edit</a> in order to visualize the python code</li> <li>2. Demonstrate and visualize basic data types (list, tuple, dictionary).</li> <li>3. Chalk and talk</li> <li>4. online and videos</li> </ol>			
	<b>Module-1 (08 hrs)</b>			
	<b>Python Basics:</b> Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program, <b>Flow control:</b> Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit(), <b>Functions:</b> def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number <b>Textbook 1: Chapters 1 – 3</b>			
	<b>Module-2 (08 hrs)</b>			
	<b>Lists:</b> The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References, <b>Dictionaries and Structuring Data:</b> The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things, <b>Textbook 1: Chapters 4 – 5</b>			
	<b>Module-3 (08 hrs)</b>			

	<p><b>Manipulating Strings:</b> Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup</p> <p><b>Reading and Writing Files:</b> Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the print.format() Function, Project: Generating Random Quiz Files, Project: Multiclipboard,</p> <p><b>Textbook 1: Chapters 6 , 8</b></p>
	<b>Module-4 (08 hrs)</b>
	<p><b>Organizing Files:</b> The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File,</p> <p><b>Debugging:</b> Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE's Debugger.</p> <p><b>Textbook 1: Chapters 9-10</b></p>
	<b>Module-5 (08 hrs)</b>
	<p><b>Classes and objects:</b> Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying,</p> <p><b>Classes and functions:</b> Time, Pure functions, Modifiers, Prototyping versus planning,</p> <p><b>Classes and methods:</b> Object-oriented features, Printing objects, Another example, A more complicated example, The init method, The __str__ method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,</p> <p><b>Textbook 2: Chapters 15 – 17</b></p>
<b>Course outcome (Course Skill Set)</b>	
At the end of the course the student will be able to:	
C01	Demonstrate proficiency in handling loops and creation of functions.
C02	Identify the methods to create and manipulate lists, tuples and dictionaries.
C03	Develop programs for string processing and file organization
C04	Interpret the concepts of Object-Oriented Programming as used in Python.
<b>Programming Exercises:</b>	
<ol style="list-style-type: none"> <li> <ol style="list-style-type: none"> <li>Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages.</li> <li>Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.</li> </ol> </li> <li> <ol style="list-style-type: none"> <li>Develop a program to generate Fibonacci sequence of length (N). Read N from the console.</li> <li>Write a function to calculate factorial of a number. Develop a program to compute binomial coefficient (Given N and R).</li> </ol> </li> <li>Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.</li> <li>Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.</li> <li>Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary</li> </ol>	

with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display dictionary slice of first 10 items]

6. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip(), len(), list methods sort(), append(), and file methods open(), readlines(), and write().]
7. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods.
8. Write a function named DivExp which takes TWO parameters a, b and returns a value c ( $c=a/b$ ). Write suitable assertion for  $a>0$  in function DivExp and raise an exception for when  $b=0$ . Develop a suitable program which reads two values from the console and calls a function DivExp.
9. Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N ( $N \geq 2$ ) complex numbers and to compute the addition of N complex numbers.
10. Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use \_\_init\_\_() method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display the score card details.]

#### Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### Continuous Internal Evaluation (CIE):

The CIE marks for the theory component of the IC shall be **30 marks** and for the laboratory component **20 Marks**.

#### CIE for the theory component of the IC

- Three Tests each of 20 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90-100% respectively.
- Two Assignments/two quizzes/ seminars/one field survey and report presentation/one-course project totaling 20 marks.

Total Marks scored (test + assignments) out of 80 shall be scaled down to **30 marks**

#### CIE for the practical component of the IC

- On completion of every experiment/program in the laboratory, the students shall be

evaluated and marks shall be awarded on the same day. The **15 marks** are for conducting the experiment and preparation of the laboratory record, the other **05 marks shall be for the test** conducted at the end of the semester.

- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to 15 marks.
- The laboratory test (**duration 03 hours**) at the end of the 15<sup>th</sup> week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to **05 marks**.

Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IC/IPCC for **20 marks**.

- The minimum marks to be secured in CIE to appear for SEE shall be 12 (40% of maximum marks) in the theory component and 08 (40% of maximum marks) in the practical component. The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total marks of all questions should not be more than 25 marks.

The theory component of the IC shall be for both CIE and SEE.

### **Semester End Examination (SEE):**

#### **SEE for IC**

Theory SEE will be conducted by University as per the scheduled time table, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

**The theory portion of the Integrated Course shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper shall include questions from the practical component).**

#### **Passing standard:**

- The minimum marks to be secured in CIE to appear for SEE shall be 12 (40% of maximum marks-30) in the theory component and 08 (40% of maximum marks -20) in the practical component. The laboratory component of the IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 04/05 questions to be set from the practical component of IPCC, the total marks of all questions should not be more than 30 marks.

- SEE will be conducted for 100 marks and students shall secure 35% of the maximum marks to qualify for the SEE. Marks secured will be scaled down to 50.

**Suggested Learning Resources:****Text Books**

1. Al Sweigart, “**Automate the Boring Stuff with Python**”, 1<sup>st</sup> Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at <https://automatetheboringstuff.com/>)  
(Chapters 1 to 18, except 12) for lambda functions use this link:  
<https://www.learnbyexample.org/python-lambda-function/>
2. Allen B. Downey, “**Think Python: How to Think Like a Computer Scientist**”, 2<sup>nd</sup> Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at <http://greenteapress.com/thinkpython2/thinkpython2.pdf>)  
(Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

**Web links and Video Lectures (e-Resources):**

- <https://www.learnbyexample.org/python/>
- <https://www.learnpython.org/>
- <https://pythontutor.com/visualize.html#mode=edit>

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- Quizzes for list, tuple, string dictionary slicing operations using below link  
<https://github.com/sushantkhara/Data-Structures-And-Algorithms-with-Python/raw/main/Python%203%20-%20400%20exercises%20and%20solutions%20for%20beginners.pdf>

**COs and POs Mapping (Individual teacher has to fill up)**

COs	POs						
	1	2	3	4	5	6	7
CO1							
CO2							
CO3							
CO4							
CO5							
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped							