

# Lovely Professional University, Punjab

Course Code	Course Title	Course Planner	Lecture/ Practical s	Tutorials	Practicals	Credits
INT213	PYTHON PROGRAMMING	20339::Usha Mittal	2	0	2	3
Course Weightage	ATT: 5    CA: 30    MTE: 20    ETT: 45	Exam Category: 14 : Mid Term Exam: All MCQ– End Term Exam: MCQ+Subjective				
Course Orientation	PLACEMENT EXAMINATION(Mass Recruiters), SOFTWARE SKILL					

Course Outcomes: Through this course students should be able to

C01:: analyze real life situational problems and think creatively about solutions of them.

C02 :: apply a solution clearly and accurately in a program using python.

C03 :: analyze and visualize the data using python libraries.

C04 :: apply the concept of dynamic programming to solve the real world problems

	<b>TextBooks ( T )</b>		
Sr No	Title	Author	Publisher Name
T-1	INTRODUCTION TO PROGRAMMING USING PYTHON	Y. DANIEL LIANG	PEARSON

	<b>Reference Books ( R )</b>		
Sr No	Title	Author	Publisher Name
R-1	PYTHON PROGRAMMING: USING PROBLEM SOLVING APPROACH	REEMA THAREJA	OXFORD UNIVERSITY PRESS
R-2	PYTHON THE COMPLETE REFERENCE	MARTIN C BROWN	Tata McGraw Hill, India
R-3	PROGRAMMING AND PROBLEM SOLVING WITH PYTHON	ASHOK KAMTHANE AND AMIT ASHOK KAMTHANE	Tata McGraw Hill, India

<b>Relevant Websites ( RW )</b>		
Sr No	(Web address) (only if relevant to the course)	Salient Features
RW-1	<a href="http://www.tutorialspoint.com/python/python_gui_programming.htm">http://www.tutorialspoint.com/python/python_gui_programming.htm</a>	Python GUI Programming (Tkinter)
RW-2	<a href="https://www.datacamp.com/courses/intro-to-python-for-data-science">https://www.datacamp.com/courses/intro-to-python-for-data-science</a>	Python Introduction
RW-3	<a href="https://www.coursera.org/learn/python">https://www.coursera.org/learn/python</a>	Learn Python from basics
RW-4	<a href="https://www.learnpython.org/">https://www.learnpython.org/</a>	Learn python from basics to advanced
RW-5	<a href="https://www.w3schools.com/python/python_tuples.asp">https://www.w3schools.com/python/python_tuples.asp</a>	Python Tuples
RW-6	<a href="https://www.tutorialspoint.com/python/python_database_access.htm">https://www.tutorialspoint.com/python/python_database_access.htm</a>	Python Database connection
RW-7	<a href="https://matplotlib.org/users/pyplot_tutorial.html">https://matplotlib.org/users/pyplot_tutorial.html</a>	Matplotlib tutorial

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RW-8	<a href="https://www.tutorialspoint.com/python_pandas/">https://www.tutorialspoint.com/python_pandas/</a>	Python pandas
RW-9	<a href="https://www.tutorialspoint.com/numpy/">https://www.tutorialspoint.com/numpy/</a>	Learn Numpy for matrix creation
RW-10	<a href="https://www.tutorialspoint.com/scipy/">https://www.tutorialspoint.com/scipy/</a>	Learn Scipy for scientific computation
RW-11	<a href="https://www.kaggle.com/benhamner/python-data-visualizations">https://www.kaggle.com/benhamner/python-data-visualizations</a>	Python data visualizations

Audio Visual Aids ( AV )		
Sr No	(AV aids) (only if relevant to the course)	Salient Features
AV-1	<a href="http://nptel.ac.in/courses/106105166/26">http://nptel.ac.in/courses/106105166/26</a>	Python Programming
AV-2	<a href="http://nptel.ac.in/courses/117106113/34">http://nptel.ac.in/courses/117106113/34</a>	Python Programming

Software/Equipments/Databases		
Sr No	(S/E/D) (only if relevant to the course)	Salient Features
SW-1	<a href="https://www.python.org/download">https://www.python.org/download</a>	Python Software
SW-2	<a href="https://anaconda.org/anaconda/python">https://anaconda.org/anaconda/python</a>	Anaconda software installation

LTP week distribution: (LTP Weeks)	
Weeks before MTE	7
Weeks After MTE	7
Spill Over (Lecture/Practical)	8

## Detailed Plan For Lecture/Practicals

Week Number	Lecture/Practical Number	Broad Topic(Sub Topic)	Chapters/Sections of Text/reference books	Other Readings, Relevant Websites, Audio Visual Aids, software and Virtual Labs	Lecture/Practical Description	Learning Outcomes	Pedagogical Tool Demonstration/ Case Study / Images / animation / ppt etc. Planned	Live Examples
Week 1	Lecture/Practical 1	Introduction(introduction to python)	T-1 R-1 R-2	RW-2 RW-3 RW-4 SW-1 SW-2 AV-1	Lecture/Practical 1 should be used to discuss Lecture zero. Lecture/Practical 2 should be used to discuss introduction and importance of Python and programming languages.	Student will understand the use of python programming and its importance in industry.	Class room discussion using power point presentation and Live demonstration of programs in Python	

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Lecture/Practical 2	Introduction(Programming languages)	T-1 R-1 R-2	RW-2 RW-3 RW-4 SW-1 SW-2 AV-1	Lecture/Practical 1 should be used to discuss Lecture/Practical zero. Lecture/Practical 2 should be used to discuss introduction and importance of Python and programming languages.	Student will understand the use of python programming and its importance in industry.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Introduction(Programming Errors)	T-1 R-1 R-2	RW-2 RW-3 RW-4 SW-1 SW-2 AV-1	Lecture/Practical 1 should be used to discuss Lecture/Practical zero. Lecture/Practical 2 should be used to discuss introduction and importance of Python and programming Languages and errors .	Student will understand the use of python programming and its importance in industry.	Class room discussion using power point presentation and Live demonstration of programs in Python	
Lecture/Practical 3	Variables,Expression and Statements(identifiers, variables)	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types.  Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding	Students should be able to learn variables types and operators and their precedence , type conversion	Class room discussion using power point presentation and live demonstration of programs in python.	
	Variables,Expression and Statements( Assignment Statements, Expressions)	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types.  Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding	Students should be able to learn variables types and operators and their precedence , type conversion	Class room discussion using power point presentation and live demonstration of programs in python.	

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Variables,Expression and Statements(data types )	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers , assignment statements  expressions, named constants and data types . Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding	Students should be able to learn variables types and operators and there precedence, type conversion	Class room discussion using power point presentation and live demonstration	
Variables,Expression and Statements(named constants )	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types. Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding	Students should be able to learn variables types and operators and there precedence, type conversion	Class room discussion using power point presentation and live demonstration in python	
Variables,Expression and Statements(Simultaneous Assignment )	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types. Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding Lecture/Practical 3 should be	Students should be able to learn variables types and operators and there precedence, type conversion  Students should be	Class room discussion using power point presentation and live demonstration in python  Class room	
Variables,Expression and Statements(Boolean type )	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types.	Students should be able to learn variables types and operators and there precedence, type conversion	Class room discussion using power point presentation and live demonstration in python	

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					Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding			
		Variables,Expression and Statements(Numeric data type)	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, keywords. Lecture/Practical 4 should be used to discuss operators and compositions	Students should be able to learn variables types and operators and their compositions	Class room  discussion using power point presentation and  Live demonstration of programs in Python	
	Lecture/Practical 4	Variables,Expression and Statements(operators )	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types. Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding	Students should be able to learn variables types and operators and there precedence, type conversion	Class room  discussion using power point presentation and live demonstration in python	
		Variables,Expression and Statements(operators Precedence and associativity)	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types. Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding	Students should be able to learn variables types and operators and there precedence, type conversion	Class room  discussion using power point presentation and live demonstration in python	
		Variables,Expression and Statements(type conversion And rounding)	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named	Students should be able to learn variables types and operators and there precedence, type conversion	Class room  discussion using power point presentation and live demonstration	

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					constants and data types. Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding		in python	
		Variables,Expression and Statements(augumented Assignment operator)	T-1 R-1 R-2		Lecture/Practical 3 should be used to discuss variables, identifiers, assignment statements, expressions, named constants and data types. Lecture/Practical 4 should be used to discuss operators and precedence, augmented assignment operator ,type conversion and rounding	Students should be able to learn variables types and operators and there precedence, type conversion	Class room discussion using power point presentation and live demonstration in python	
Week 2	Lecture/Practical 5	Conditionals and Iteration (Conditional expressions)	T-1 R-1 R-2 R-3		Lecture/Practical 5 should be used to discuss random numbers, conditional expressions and minimizing numerical errors.	Students able to learn Conditional expressions, minimizing numerical errors.	Class room discussion using power point and live demonstration using python.	
		Conditionals and Iteration (random numbers)	T-1 R-1 R-2 R-3		Lecture/Practical 5 should be used to discuss random numbers, conditional expressions and minimizing numerical errors.	Students able to learn Conditional expressions, minimizing numerical errors.	Class room discussion using power point and live demonstration using python	
		Conditionals and Iteration (minimizing numerical errors)	T-1 R-1 R-2 R-3		Lecture/Practical 5 should be used to discuss random numbers, conditional expressions and minimizing numerical errors.	Students able to learn Conditional expressions, minimizing numerical errors.	Class room discussion using power point and live demonstration using python	
	Lecture/Practical 6	Conditionals and Iteration (If statement)	T-1 R-1 R-2 R-3		Lecture/Practical 6 should be used to discuss conditional statement and iteration statement with example.	Students able to learn Conditional and iteration statement	Class room discussion using power point and live demonstration using python	
		Conditionals and Iteration (If- else statement)	T-1 R-1 R-2 R-3		Lecture/Practical 6 should be used to discuss conditional statement and iteration statement with example.	Students able to learn Conditional and iteration statement	Class room discussion using power point and live demonstration using python	
		Conditionals and Iteration (Nested If-elif statement)	T-1 R-1 R-2		Lecture/Practical 6 should be used to discuss conditional statement	Students able to learn Conditional and iteration statement	Class room discussion using power point and	

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		R-3		and iteration statement with example.		live demonstration using python	
	Conditionals and Iteration (Multi-way if-elif statement)	T-1 R-1 R-2 R-3		Lecture/Practical 6 should be used to discuss conditional statement and iteration statement with example.	Students able to learn Conditional and iteration statement	Class room discussion using power point and live demonstration using python	
Lecture/Practical 7	Conditionals and Iteration (for loop)	T-1 R-1 R-2 R-3		Lecture/Practical 7 should be used to discuss the iteration statements with examples.	Students able to learn Conditional and iteration statement	Class room discussion using power point and live demonstration using python	
	Conditionals and Iteration (While loop)	T-1 R-1 R-2 R-3		Lecture/Practical 7 should be used to discuss the iteration statements with examples.	Students able to learn Conditional and iteration statement	Class room discussion using power point and live demonstration using python	
	Conditionals and Iteration (nested loops)	T-1 R-1 R-2 R-3		Lecture/Practical 7 should be used to discuss the iteration statements with examples.	Students able to learn Conditional and iteration statement	Class room discussion using power point and live demonstration using python	
	Conditionals and Iteration (break and continue)	T-1 R-1 R-2 R-3		Lecture/Practical 7 should be used to discuss the iteration statements with examples.	Students able to learn Conditional and iteration statement	Class room discussion using power point and live demonstration using python	
Lecture/Practical 8	Functions and recursion (function calls)	T-1 R-1 R-2 R-3		Lecture/Practical 7 should be used to discuss functions and type conversions. Lecture/Practical 8 covers parameter types and recursion.	Student understand about function usage and their applications	Class room discussion using power point presentation and Live demonstration of programs in	
	Functions and recursion (function call)	T-1 R-1 R-2 R-3		Lecture/Practical 8 covers function definition , return values, function call and arguments.	Student understand about function usage and their applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Functions and recursion (return values)	T-1 R-1 R-2 R-3		Lecture/Practical 8 covers function definition , return values, function call and arguments.	Student understand about function usage and their applications	Class room discussion using power point presentation and Live demonstration of programs in Python	

		Functions and recursion (positional and keyword arguments)	T-1 R-1 R-2 R-3		Lecture/Practical 8 covers function definition , return values, function call and arguments.	Student understand about function usage and their applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
Week 3	Lecture/ Practical 9	Functions and recursion (passing arguments by reference values)	T-1 R-1 R-2 R-3		Lecture/Practical 9 covers scope of variables, default arguments and returning multiple values.	Student understand about function usage and their applications. Allocate project to students.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Functions and recursion (scope of variables)	T-1 R-1 R-2 R-3		Lecture/Practical 9 covers scope of variables, default arguments and returning multiple values.	Student understand about function usage and their applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Functions and recursion (default arguments)	T-1 R-1 R-2 R-3		Lecture/Practical 9 covers scope of variables, default arguments and returning multiple values.	Student understand about function usage and their applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Functions and recursion (returning multiple values)	T-1 R-1 R-2 R-3		Lecture/Practical 9 covers scope of variables, default arguments and returning multiple values.	Student understand about function usage and their applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/ Practical 10	Functions and recursion (recursion)	T-1 R-1 R-2 R-3		Lecture/Practical 10 covers recursion and math functions	Students will understand the concept of recursion and its difference with iteration.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Functions and recursion (recursion vs. iteration)	T-1 R-1 R-2 R-3		Lecture/Practical 10 covers recursion and math functions	Students will understand the concept of recursion and its difference with iteration.	Class room discussion using power point presentation and Live demonstration of programs in Python	

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		Functions and recursion (tail recursion)	T-1 R-1 R-2 R-3		Lecture/Practical 10 covers recursion and math functions	Students will understand the concept of recursion and its difference with iteration.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Functions and recursion (math functions)	T-1 R-1 R-2 R-3		Lecture/Practical 10 covers recursion and math functions	Students will understand the concept of recursion and its difference with iteration.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Pra ctical 11	String(string a compound data type, length)	T-1 R-1 R-2 R-3		Lecture/Practical 11 should be used to discuss string and its operations	Student will understand usage of string functionalities in various applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
		String(string traversal)	T-1 R-1 R-2 R-3		Lecture/Practical 11 should be used to discuss string and its operations	Student will understand usage of string functionalities in various applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
		String(string slices, comparision)	T-1 R-1 R-2 R-3		Lecture/Practical 11 should be used to discuss string and its operations	Student will understand usage of string functionalities in various applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
		String(find function, the str class)	T-1 R-1 R-2 R-3		Lecture/Practical 11 should be used to discuss string and its operations	Student will understand usage of string functionalities in various applications	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Pra ctical 12	Lists (list basics)	T-1 R-1 R-2 R-3		Lecture/Practical 12 should be used to discuss about lists and its operations	Student will understand usage of lists and its operations	Class room discussion using power point presentation and Live demonstration of programs in Python	

		Lists(copying lists)	T-1 R-1 R-2 R-3		Lecture/Practical 12 should be used to discuss about lists and its operations	Student will understand usage of lists and its operations	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Lists(passing lists to functions)	T-1 R-1 R-2 R-3		Lecture/Practical 12 should be used to discuss about lists and its operations	Student will understand usage of lists and its operations	Class room discussion using power point presentation and Live demonstration of programs in Python	
Week 4	Lecture/Practical 13	Lists (returning lists from functions)	T-1 R-1 R-2 R-3		Lecture/Practical 13 should be used to discuss about lists and its operations	Student will understand usage of lists and its operations	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Lists (searching and sorting lists)	T-1 R-1 R-2 R-3		Lecture/Practical 13 should be used to discuss about lists and its operations	Student will understand usage of lists and its operations	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Lists (multidimensional list)	T-1 R-1 R-2 R-3		Lecture/Practical 13 should be used to discuss about lists and its operations	Student will understand usage of lists and its operations	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 14	Numpy arrays (arrays vs lists)	RW-9		Lecture/Practical 14 should be used to discuss about Numpy arrays, creation of arrays, different operations on data and its difference from lists.	Students will understand usage of numpy arrays and its operations.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Numpy arrays (data types)	RW-9		Lecture/Practical 14 should be used to discuss about Numpy arrays, creation of arrays, different operations on data and its difference from lists.	Students will understand usage of numpy arrays and its operations.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Numpy arrays (array creation routines)	RW-9		Lecture/Practical 14 should be used to discuss	Students will understand usage of	Class room discussion using	

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				anout Numpy arrays, creation of arrays, different operations on data and its difference from lists.	numpy arrays and its operations.	power point presentation and Live demonstration of programs in Python	
	Numpy arrays (arrays from existing data)	RW -9		Lecture/Practical 14 should be used to discuss anout Numpy arrays, creation of arrays, different operations on data and its difference from lists.	Students will understand usage of numpy arrays and its operations.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Numpy arrays (indexing and slicing)	RW -9		Lecture/Practical 14 should be used to discuss anout Numpy arrays, creation of arrays, different operations on data and its difference from lists.	Students will understand usage of numpy arrays and its operations.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Numpy arrays (array maniputaion)	RW -9		Lecture/Practical 14 should be used to discuss anout Numpy arrays, creation of arrays, different operations on data and its difference from lists.	Students will understand usage of numpy arrays and its operations.	Class room discussion using power point presentation and Live demonstration of programs in Python	
Lecture/Practical 15	Numpy arrays (broadcasting)	RW -9		Lecture/Practical 15 should be used to discuss various operations on Numpy arrays like statisrical functions, binary operations, search and sort etc.	Students will understand the usage of numpy arrays	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Numpy arrays (binary operators)	RW -9		Lecture/Practical 15 should be used to discuss various operations on Numpy arrays like statisrical functions, binary operations, search and sort etc.	Students will understand the usage of numpy arrays	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Numpy arrays (mathematical functions)	RW -9		Lecture/Practical 15 should be used to discuss various operations on Numpy arrays like statisrical functions, binary operations, search and sort etc.	Students will understand the usage of numpy arrays	Class room discussion using power point presentation and Live demonstration of programs in Python	

		Numpy arrays (statistical functions)	RW -9		Lecture/Practical 15 should be used to discuss various operations on Numpy arrays like statistical functions, binary operations, search and sort etc.	Students will understand the usage of numpy arrays	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Numpy arrays (sort)	RW -9		Lecture/Practical 15 should be used to discuss various operations on Numpy arrays like statistical functions, binary operations, search and sort etc.	Students will understand the usage of numpy arrays	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Numpy arrays (search and counting functions)	RW -9		Lecture/Practical 15 should be used to discuss various operations on Numpy arrays like statistical functions, binary operations, search and sort etc.	Students will understand the usage of numpy arrays	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Pra ctical 16	Tuples , sets and dictionaries (introduction to tuples)	T-1 R-1 R-2 R-3		Lecture/Practical 16 will be used to discuss the tuples and operation on tuples.	Students will understand the use of tuples and various operations on tuples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Tuples , sets and dictionaries (operations on tuples)	T-1 R-1 R-2 R-3		Lecture/Practical 16 will be used to discuss the tuples and operation on tuples.	Students will understand the use of tuples and various operations on tuples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
Week 5	Lecture/ Practical 17	Tuples , sets and dictionaries (Introduction to sets)	T-1 R-1 R-2 R-3		Lecture/Practical 17 will be used to discuss the sets and operation on sets.	Students will understand the use of sets and various operations on sets.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Tuples , sets and dictionaries (set operations)	T-1 R-1 R-2 R-3		Lecture/Practical 17 will be used to discuss the sets and operation on sets.	Students will understand the use of sets and various operations on sets.	Class room discussion using power point presentation and Live demonstration of programs in Python	

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Lecture/Practical 18	Tuples , sets and dictionaries (creating dictionary)	T-1 R-1 R-2 R-3		Lecture/Practical 18 should be used to discuss dictionaries and operations on dictionaries.	Students will understand dictionaries and operations on dictionaries.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Tuples , sets and dictionaries (adding, modifying and retrieving values)	T-1 R-1 R-2 R-3		Lecture/Practical 18 should be used to discuss dictionaries and operations on dictionaries.	Students will understand dictionaries and operations on dictionaries.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Tuples , sets and dictionaries (deleting items)	T-1 R-1 R-2 R-3		Lecture/Practical 18 should be used to discuss dictionaries and operations on dictionaries.	Students will understand dictionaries and operations on dictionaries.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Tuples , sets and dictionaries (dictionary methods)	T-1 R-1 R-2 R-3		Lecture/Practical 18 should be used to discuss dictionaries and operations on dictionaries.	Students will understand dictionaries and operations on dictionaries.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Tuples , sets and dictionaries (operations on dictionary)	T-1 R-1 R-2 R-3		Lecture/Practical 18 should be used to discuss dictionaries and operations on dictionaries.	Students will understand dictionaries and operations on dictionaries.	Class room discussion using power point presentation and Live demonstration of programs in Python	
Lecture/Practical 19	Test - Code Based						

Week 6	Lecture/Practical 20	Handling data with pandas (introduction to pandas)	RW-8		Lecture/Practical 20 should be used to discuss series, data frames, statistics and sorting operations using pandas.	Students will understand python library i.e. pandas in detail with examples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Handling data with pandas (series)	RW-8		Lecture/Practical 20 should be used to discuss series, data frames, statistics and sorting operations using pandas.	Students will understand python library i.e. pandas in detail with examples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Handling data with pandas (dataframe)	RW-8		Lecture/Practical 20 should be used to discuss series, data frames, statistics and sorting operations using pandas.	Students will understand python library i.e. pandas in detail with examples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Handling data with pandas (descriptive statistics)	RW-8		Lecture/Practical 20 should be used to discuss series, data frames, statistics and sorting operations using pandas.	Students will understand python library i.e. pandas in detail with examples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 21	Handling data with pandas (sorting)	RW-8		Lecture/Practical 20 should be used to discuss series, data frames, statistics and sorting operations using pandas.	Students will understand python library i.e. pandas in detail with examples.	Class room discussion using power point presentation and Live demonstration of programs in Python	

		Handling data with pandas (working with csv files)	RW -8		Lecture/Practical 21 should be used to discuss working of csv files and operations on dataframes using pandas.	Students will understand python library i.e. pandas in detail with examples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Handling data with pandas (operations using data frames)	RW -8		Lecture/Practical 21 should be used to discuss working of csv files and operations on dataframes using pandas.	Students will understand python library i.e. pandas in detail with examples.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 22	Files and exceptions(introduction)	R-1 R-3		Lecture/Practical 22 used to discuss files and exception handling	Students will understand usage of file handling operations	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Files and exceptions(text input and output)	R-1 R-3		Lecture/Practical 22 used to discuss files and exception handling	Students will understand usage of file handling operations	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 23	Files and exceptions (pickling)	T-1 R-2 R-3		Lecture/Practical 22 will cover pickling and exceptions.	Student able to understand exception handling and related usages	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Files and exceptions (exceptions handling)	T-1 R-2 R-3		Lecture/Practical 23 will cover exception handling.	Student able to understand exception handling and related usages	Class room discussion using power point presentation and Live demonstration of programs in Python	

		Files and exceptions (raising exceptions)	T-1 R-2 R-3		Lecture/Practical 18 will cover exception handling.	Student able to understand exce- ption handling and related usages	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Pra ctical 24	Building GUI using python (tkinter programming)	R-2	RW-1	Lecture/Practical 20 should be used to discuss basics of Tkinter programming.	Student will understand GUI basics through python	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Building GUI using python (tkinter widgets like button, canvas, entry, frame, label, list box, menu, message, scale, text, spinbox, labelframe, tkMessageBox)	T-1 R-2 R-3		Lecture/Practical 21 should be utilized to discuss tkinter widgets like button, frame and labels. Lecture/Practical 22 should be used to cover labelframe, spinbox, menu and message box.	Student understand basics of GUI and widgets usages.	Class room discussion using power point presentation and Live demonstration of programs in Python	
Week 7	Lecture/Pra ctical 25	Building GUI using python (standard attributes)	T-1  R-1 R-2		Lecture/Practical 23 utilized to discuss standard attributes and list box.	Student will  understand geometry management.	Classroom  discussion using power point presentation and Live demonstration of programs in Python	
		Building GUI using python (geometry management)	T-1  R-1 R-2		Lecture/Practical 23 utilized to discuss standard attributes and list box.	Student will  understand geometry management.	Classroom  discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Pra ctical 26	Building GUI using python (GUI and database with sqlite3)	T-1  R-1 R-2 R-3	RW-6  SW-1 SW-2	Lecture/Practical 25 and 26 should be used to discuss GUI and sqlite database connections	Student will  understand basic database connection creation and usage.	Class room  discussion using power point presentation and Live demonstration of programs in Python	
<b>SPILL OVER</b>								
Week 7	Lecture/Pra ctical 27				Spill Over			

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	Lecture/Practical 28				Spill Over			
<b>MID-TERM</b>								
Week 8	Lecture/Practical 29	Classes and objects(creating classes)	T-1 R-2		Lecture/Practical 29 should be used to discuss classes and objects. Lecture/Practical 30 should be used to initialize objects and initiated classes.	Students understand usage of objects creation and accessing.	classroom discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 30	Classes and objects(creating instance objects)	T-1 R-2		Lecture/Practical 29 should be used to discuss classes and objects. Lecture/Practical 30 should be used to initialize objects and initiated classes.	Students understand usage of objects creation and accessing.	classroom discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 31	Classes and objects (accessing attributes)	T-1 R-2 R-3		Lecture/Practical 31 should be used to discuss attributes usages and OOP terminology	Students will understand usage of attributes and OOP terminology	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 32	Classes and objects (overview of OOP terminology)	T-1 R-2 R-3		Lecture/Practical 31 should be used to discuss attributes usages and OOP terminology	Students will understand usage of attributes and OOP terminology	Class room discussion using power point presentation and Live demonstration of programs in Python	
Week 9	Lecture/Practical 33	Object oriented programming terminology (Class Inheritance)	T-1 R-1 R-2 R-3	SW-2	Lecture/Practical 33 should be used to discuss Class Inheritance and Lecture/Practical 34 used to discuss Overriding methods	Student will understand the use of python programming and its importance in industry.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 34	Object oriented programming terminology (Overriding Methods)	T-1 R-1 R-2 R-3	SW-2	Lecture/Practical 33 should be used to discuss Class Inheritance and Lecture/Practical 34 used to discuss	Student will understand the use of python programming and its importance in	Class room discussion using power point presentation and	

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					Overriding methods	industry.	Live demonstration of programs in Python	
Week 18	Lecture/Practical 35	Object oriented programming terminology (Data Hiding)	T-1 R-1 R-2		Lecture/Practical 35 should be used to discuss data hiding and Lecture/Practical 36 should cover Function overloading. ALLOCATION OF CODE BASED 2	Student will understand usage of data hiding and related applications	Class room discussion using power point presentation and Live demonstration of programs in Python. ALLOCATION OF CODE BASED 2	
	Lecture/Practical 36	Object oriented programming terminology (Function Overloading)	T-1 R-1 R-2		Lecture/Practical 35 should be used to discuss data hiding and Lecture/Practical 36 should cover Function overloading. ALLOCATION OF CODE BASED 2	Student will understand usage of data hiding and related applications	Class room discussion using power point presentation and Live demonstration of programs in Python. ALLOCATION OF CODE BASED 2	
Week 10	Lecture/Practical 37	Data visualization with matplotlib(line plot)	R-2 R-3		Lecture/Practical 37 should be used to discuss line plots.	Student able to understand plot and related functionalities.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 38	Data visualization with matplotlib(multiple subplots in one figure)	R-2 R-3		Lecture/Practical 38 should be used to discuss multiple plots.	Student able to understand plot and related functionalities.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 39				BYOD – Practical			
	Lecture/Practical 40	Data visualization with matplotlib(histograms)	T-1 R-1 R-2		Lecture/Practical 40 should be sued to discuss histograms.	Student will understand the use of python programming and its importance in industry.	Class room discussion using power point presentation and Live demonstration of programs in Python	

Week 11	Lecture/Practical 41	Data visualization with matplotlib(bar charts)	T-1 R-1 R-2		Lecture/Practical 41 used to cover bar charts.	Student will understand the use of python programming and its importance in industry.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 42	Data visualization with matplotlib(pie charts)	T-1 R-2 R-3	RW-7 SW-2	Lecture/Practical 42 should be used to discuss pie charts and.	Student will understand the usage of plotting charts in various applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 43	Data visualization with matplotlib(scatter plots)	T-1 R-2 R-3	RW-7 SW-2	Lecture/Practical 43 used to discuss scatter plots.	Student will understand the usage of plotting charts in various applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 44	Data visualization with seaborn (seaborn – color palette)	T-1 R-2	RW-8	Lecture/Practical 44 used to discuss color palette and histogram plotting in seaborn.	Student will understand the use of seaborn library and its applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Data visualization with seaborn (histogram)	T-1 R-2	RW-8	Lecture/Practical 44 used to discuss color palette and histogram plotting in seaborn.	Student will understand the use of seaborn library and its applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
Week 12	Lecture/Practical 45	Data visualization with seaborn (kernel density estimates)	T-1 R-2	RW-8	Lecture/Practical 45 used to discuss kernel density estimates in seaborn library	Student will understand the use of seaborn library and its applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 46	Data visualization with seaborn (plotting categorical data)	T-1 R-2	RW-8	Lecture/Practical 46 used to discuss plotting categorical data in seaborn library.	Student will understand the use of seaborn library and its applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	

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	Lecture/Practical 47	Data visualization with seaborn (facet grid and pair grid)	T-1 R-1 R-2	RW-11	Lecture/Practical 47 should be used to discuss facet grid and pair grid in seaborn library.	Student will understand the use of seaborn library and its applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 48				Project			
Week 13	Lecture/Practical 49	Searching and sorting (linear search)	R-2	RW-9	Lecture/Practical 49 should be used to discuss linear search and binary search.	Student will understand the use of linear and binary search.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Searching and sorting (binary search)			Lecture/Practical 49 should be used to discuss linear search and binary search.	Student will understand the use of linear and binary search.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 50	Searching and sorting (insertion sort)	R-2	RW-9	Lecture/Practical 50 should be used to discuss insertion and selection sort.	Student will understand the use of insertion and selection sort.	Class room discussion using power point presentation and Live demonstration of programs in Python	
		Searching and sorting (selection sort)			Lecture/Practical 50 should be used to discuss insertion and selection sort.	Student will understand the use of insertion and selection sort.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 51	Searching and sorting (merge sort)	R-1 R-2	RW-10	Lecture/Practical 51 should be used to discuss merge sort.	Student will understand the use of merge sort.	Class room discussion using power point presentation and Live demonstration of programs in Python	

	Lecture/Practical 52	Searching and sorting (quick sort)	R-1 R-2	RW-10	Lecture/Practical 52 should be used to discuss quick sort.	Student will understand the implementation of quick sort	Class room discussion using power point presentation and Live demonstration of programs in Python	
Week 14	Lecture/Practical 53	Dynamic programming (introduction)	T-1 R-2		Lecture/Practical 53 and 54 should be used to discuss concept of dynamic programming and its applications	Student will understand the use of dynamic programming and its applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
	Lecture/Practical 54	Dynamic programming (applications of dynamic programming : factorial, Fibonacci, longest common subsequence)	T-1 R-2		Lecture/Practical 53 and 54 should be used to discuss concept of dynamic programming and its applications	Student will understand the use of dynamic programming and its applications.	Class room discussion using power point presentation and Live demonstration of programs in Python	
<b>SPILL OVER</b>								
Week 14	Lecture/Practical 55				Spill Over			
	Lecture/Practical 56				Spill Over			
Week 15	Lecture/Practical 57				Spill Over			
	Lecture/Practical 58				Spill Over			
Week 15	Lecture/Practical 59				Spill Over			
	Lecture/Practical 60				Spill Over			

### Scheme for CA:

CA Category of this Course Code is:C010102 (Total 3 tasks, 1 compulsory and out of remaining 1 best out of 2 to be considered)

Component	Iscompulsory	Weightage (%)	Mapped CO(s)
Project	Yes	50	CO1, CO2, CO3, CO4
Test - Code based 1	NO	50	CO1, CO2
BYOD - Practical	NO	50	CO1, CO3

### Details of Academic Task(s)

Academic Task	Objective	Detail of Academic Task	Nature of Academic Task (group/individuals)	Academic Task Mode	Marks	Allottment / submission Week
Project	To check and enhance the project development ability and team work among students.	A project topic assigned by instructor to each group	Group	Offline	30	3 / 12
Test - Code based 1	To evaluate subject understanding and learning ability of the students	Syllabus of test will cover from Introduction, Variable expression and statements, Conditionals and iterations, Function and Recursion, String, List, Tuples and Dictionaries,Building GUI using python, class and objects, file and exceptions, GUI and Sqlite database. Student should answer the question based on python code. Maximum marks of code based test is 30. All question should be of 1,2 or 5 marks.	Individual	Offline	30	4 / 5
Test - Code based 2	To evaluate subject understanding and learning ability of the students.	Syllabus of test will cover from classes and objects, OOPS terminology, data visualization using python, handling data with pandas and advanced machine learning libraries.	Individual	Offline	30	9 / 10

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