

**TECNIA INSTITUTE OF ADVANCED STUDIES**  
**GRADE 'A' INSTITUTE**  
**Department of Information Communication & Technology**  
**COURSE PLAN**  
**ACADEMIC SESSION 2024-25**

# As per Scheme of Examination & Syllabi for Bachelor of Computer Applications Scheme and Syllabus (w.e.f. Academic Session 2021-2022 onwards) Guru Gobind Singh Indraprastha University, New Delhi

PROGRAMME CODE:	020	PROGRAMME:	Bachelor of Computer Applications (BCA)	SHIFT:	1st	L	4	T/P	0	Credits	4
COURSE CODE:	BCA-211T	COURSE NAME:	Basics of Python	SECTION:	A						
		COURSE TYPE:	Discipline Specific Electives (DSE-1)	FACULTY:	Ms. Anima Pathak						

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following:


1. To understand Python programming fundamentals
2. To define the structure and components of a Python program.
3. To apply fundamental problem-solving techniques using Python
4. To design and program applications using Python.

**PREREQUISITE:** Fundamentals of computer.


**COURSE OUTCOME & MAPPING, COURSE ARTICULATION**

		COMMUNICATION SKILLS :	USE OF SOFTWARE TOOLS :	TECHNICAL SKILLS :	DOMAIN AWARENESS :	TECHNICAL SUPPORT :	ANALYSIS AND INVESTIGATION OF COMPLEX COMPUTING PROBLEMS :	DESIGN / DEVELOPMENT OF SOLUTIONS:	IMBIBE CYBER ETHICS :
		The student should be able to communicate the technical information both orally and in writing professionally.	TOOLS : Create, select, adapt and apply suitable tools and technologies to a wide range of computational activities.	Acquire necessary knowledge of technical, scientific as well as basic managerial and financial procedures to analyze and solve real world problems within their work domain	Clarity on both conceptual and application oriented skills in commerce, Finance & Accounting and IT Applications In Business context.	Must be able to provide technical support for various software applications.	Ability to analyze research and investigate complex computing problems through design of experiments, analysis and interpretation of data and synthesis of the information to arrive at valid conclusions.	Apply the knowledge gained in core courses to a broad range of advanced topics in computer science, to learn and develop sophisticated technical products independently.	Awareness on ethics, values, sustainability and creativity aspects of technical solutions.
		COMMUNICATION SKILLS	USE OF SOFTWARE TOOLS	TECHNICAL SKILLS	DOMAIN AWARENESS	TECHNICAL SUPPORT	ANALYSIS AND INVESTIGATION OF	DESIGN / DEVELOPMENT	IMBIBE CYBER ETHICS
<b>CO - PO MAPPING</b>		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Demonstrate knowledge of basic programming constructs in python	2	1	1	1	-	-	-	1
CO2	Illustrates string handling methods and user-defined functions in python	2	2	1	-	2	-	2	2
CO3	Applying data structures primitives like List, Dictionary and tuples	3	2	2	-	2	-	3	1
CO4	Identify the commonly used operations involved in file handling	2	3	3	1	3	1	3	1
CO5	To understand how python can be used for application development	1	3	2	-	2	2	2	1
Course Articulation (Average)		2	2.2	1.8	1	2.25	1.5	2.5	1.2




  
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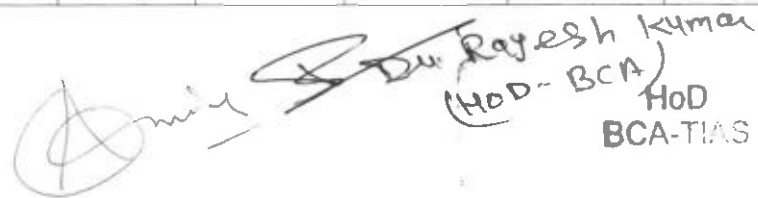
S. No.	Lecture No.	Unit No.	Topic	Sessional Outcome	Experiential Learning	Participative Learning	Problem Solving Methodologies	ICT Tools & E-Resources Utilization	Mapping with CD	Class Material (PPT Faculty+ Students)	Additional Material (Links/ Journals/ Articles/ NEWS)	Mode of Assessment	Status
1	L1	1	Introduction to Python. Its origin, need of Python programming. Features of Python	Students will be able to understand what is Python, the details of its origin, its basic features and the need of Python in today's world	Student teaching	Lecture Through PPT	Analysis of the Problem	<a href="https://docs.python.org/3/faq/general.html#what-is-python">https://docs.python.org/3/faq/general.html#what-is-python</a>	CO1	PPT	<a href="https://www.yourdata.com/watch?v=0235E625G4">https://www.yourdata.com/watch?v=0235E625G4</a>	PPT (CIA)	
2	L2	1	Program structure, identifiers and reserved words, escape sequences	Use the appropriate identifiers and reserved words in Python programs	Student teaching	Lecture Through PPT		<a href="https://docs.python.org/3/reference/lexical_analysis.html">https://docs.python.org/3/reference/lexical_analysis.html</a>	CO1	PPT	<a href="https://www.geeksforgeeks.org/python-keywords-and-identifiers/">https://www.geeksforgeeks.org/python-keywords-and-identifiers/</a>	PPT (CIA)	
3	L3	1	Installing Python Interpreter (IDLE)	Use IDLE Interpreter to execute Python programs	Demonstration	Lecture Through PPT	Case study	<a href="https://www.coursera.org/lectures/python/windows-10-install-python-and-writing-a-program-3mo9g">https://www.coursera.org/lectures/python/windows-10-install-python-and-writing-a-program-3mo9g</a>	CO1	PPT	<a href="https://www.scaler.com/topics/python/install-python-and-writing-a-program-3mo9g">https://www.scaler.com/topics/python/install-python-and-writing-a-program-3mo9g</a>	PPT (CIA)	
4	T1	1	Tutorials of L1, L2 & L3 (Intro. To Python and it's origin)	Understand Introduction to Python	Evaluation and Optimization	Discussion/ Doubt Clearing session	Analysis of the Problem	<a href="https://www.coursera.org/lectures/python/windows-10-install-python-and-writing-a-program-3mo9g">https://www.coursera.org/lectures/python/windows-10-install-python-and-writing-a-program-3mo9g</a>	CO1	Notes & PPT	<a href="https://www.scaler.com/topics/python/escape-sequences-in-python/">https://www.scaler.com/topics/python/escape-sequences-in-python/</a>	PPT (CIA)	
5	L4	1	Variables, assignment statements and Data Types	Use correct data types for creating variables and assigning values to them	Simulation and Modeling	Lecture Through PPT		E-article: <a href="https://pythonnumericalmethods.berkeley.edu/notebooks/chapter02.01-Variables-and-Assignment">https://pythonnumericalmethods.berkeley.edu/notebooks/chapter02.01-Variables-and-Assignment</a>	CO1	PPT	<a href="https://www.geekintrends.org/different-forms-of-assignment-statements-in-python/">https://www.geekintrends.org/different-forms-of-assignment-statements-in-python/</a>	PPT (CIA)	
6	L5	1	Operators: Assignment, Unary, Binary, Arithmetic, Relational	Apply correct operators for performing different mathematical operations	Hands on Design	Lecture Through PPT	Design Approaches	<a href="https://www.dcm.com/gov/india/7.2.02topic-spec-operators-expressions.1">https://www.dcm.com/gov/india/7.2.02topic-spec-operators-expressions.1</a>	CO1	Notes & PPT	E-article: <a href="https://www.programiz.com/python-programming/operators">https://www.programiz.com/python-programming/operators</a>	Flipped Classroom	
7	L6	1	Logical, Bitwise Operator and Membership operators	Apply correct operators for performing different mathematical operations	Evaluation and Optimization	Lecture Through PPT		<a href="https://prutor.ai/python-membership-and-identity-operators/">https://prutor.ai/python-membership-and-identity-operators/</a>	CO1	Notes & PPT	E-article: <a href="https://www.w3schools.com/python/gloss_python_mem">https://www.w3schools.com/python/gloss_python_mem</a>	Questions from Assignment	
8	L2	1	Tutorials of L4, L5 & L6 (Variables & Data types and Operators)	Recall concepts of Operators	Hands-on Design	Discussion/ Doubt Clearing session	Design Review and Refinement	<a href="https://prutor.ai/python-membership-and-identity-operators/">https://prutor.ai/python-membership-and-identity-operators/</a>	CO1	Notes & PPT	E-article: <a href="https://www.w3schools.com/python/gloss_python_mem">https://www.w3schools.com/python/gloss_python_mem</a>	Group Discussion	
9	L7	1	Control Structures: if-conditional statements, if-else condition, if-elif-else condition, nested if-elif-else condition	Use appropriate control structures for condition checking and flow control	Simulation and Modeling	Group Discussion		E-article: <a href="https://docs.python.org/3/Reference/controlflow.html#if-statements">https://docs.python.org/3/Reference/controlflow.html#if-statements</a>	CO1	PPT	E-article: <a href="https://docs.python.org/3/tutorial/controlflow.html#if-statements">https://docs.python.org/3/tutorial/controlflow.html#if-statements</a>	Group Discussion	
10	L8	1	Iteration (for loop and while loop). Nested Loops, break and continue statement	Use different types of loops as well as break and continue statements for writing iterative constructs	Service learning	Lecture Through PPT	Design Review and Refinement	E-article: <a href="https://docs.python.org/3/Reference/controlflow.html#for-statements">https://docs.python.org/3/Reference/controlflow.html#for-statements</a>	CO1	PPT	<a href="https://www.javatpoint.com/python-loops">https://www.javatpoint.com/python-loops</a>	PPT(CIA)	
11	L9	1	Iteration (for Loop and while loop). Nested Loops, break and continue statement	Use different types of loops as well as break and continue statements for writing iterative constructs	Service learning	Lecture Through PPT		E-article: <a href="https://docs.python.org/3/Reference/controlflow.html#for-statements">https://docs.python.org/3/Reference/controlflow.html#for-statements</a>	CO1	Notes & PPT	<a href="https://www.javatpoint.com/python-loops">https://www.javatpoint.com/python-loops</a>	PPT(CIA)	
12	T3	1	Tutorials of L7, L8 & L9 (Control Statements & Loops)	Understand Control statements and Loops	Simulation and Modeling	Discussion/ Doubt Clearing session		E-article: <a href="https://docs.python.org/3/Reference/controlflow.html#for-statements">https://docs.python.org/3/Reference/controlflow.html#for-statements</a>	CO1	Notes & PPT	<a href="https://www.javatpoint.com/python-loops">https://www.javatpoint.com/python-loops</a>	Group Discussion	
13	L10	1	Strings: Slicing, Membership, Built in functions (count, find, capitalize, title, lower, upper and swap case)	Apply various built-in functions on Python strings	Hands-on Design	Flipped Classroom	Design Review and Refinement	E-article: <a href="https://docs.python.org/3/Reference/introduction.html#strings">https://docs.python.org/3/Reference/introduction.html#strings</a>	CO1, CO2	PPT	<a href="https://www.tutorialsteacher.com/python/string-methods/">https://www.tutorialsteacher.com/python/string-methods/</a>	PPT(CIA)	
14	L11	1	Built in functions on strings: (replace, join, isspace (), isdigit(), split(), startswith(), endswith())	Apply various built-in functions on Python strings	Demonstration	Flipped Classroom	Reliability Testing	<a href="https://docs.python.org/3/library/stdtypes.html">https://docs.python.org/3/library/stdtypes.html</a>	CO1, CO2	PPT	<a href="https://www.scaler.com/topics/python/string-methods-python/">https://www.scaler.com/topics/python/string-methods-python/</a>	Flipped Classroom	
15	L12	1	Built in functions on strings: (replace, join, isspace (), isdigit(), split(), startswith(), endswith())	Apply various built-in functions on Python strings	Evaluation and Optimization	Lecture Through PPT	Evaluation and Analysis	<a href="https://docs.python.org/3/library/stdtypes.html">https://docs.python.org/3/library/stdtypes.html</a>	CO1, CO2	PPT	<a href="https://www.scaler.com/topics/python/string-methods-python/">https://www.scaler.com/topics/python/string-methods-python/</a>	PPT (CIA)	

  
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16	T4	1	Tutorials of L10, L11 & L12 (String Functions)	Understand String Functions	Simulation and Modeling	Discussion/ Doubt Clearing session	Reliability Testing	<a href="https://docs.python.org/3/library/stdtypes.html">https://docs.python.org/3/library/stdtypes.html</a>	CO1, CO2	PPT	<a href="https://www.scribd.com/document/45687421/string-methods-python/">https://www.scribd.com/document/45687421/string-methods-python/</a>	Group Discussion
17	L13	2	Mutable and Immutable objects: List: creating, initializing, accessing, slicing, and traversing List	Create Python lists, understand its use and perform various operations on it	Hands-on Design	Lecture Through PPT	Design Review and Refinement	<a href="https://www.youtube.com/watch?v=APW6qUgUg">https://www.youtube.com/watch?v=APW6qUgUg</a>	CO3	PPT	<a href="https://www.javatpoint.com/python-lists">https://www.javatpoint.com/python-lists</a>	Flipped Classroom
18	L14	2	List operations: length, concatenation, in, not in, max, min, sum, all, any	Apply Built-in operations on Python lists	Job shadowing	Lecture Through PPT	Evaluation and Analysis	<a href="https://www.youtube.com/watch?v=qJMShs5echMI">https://www.youtube.com/watch?v=qJMShs5echMI</a>	CO3	PPT & Notes	E-article: <a href="https://www.javatpoint.com/python-lists">https://www.javatpoint.com/python-lists</a>	Mini Projects
19	L15	2	List methods: append, extend, count, remove, index, pop, insert, sort, reverse	Use various Built-in operations on Python lists	Demonstration	Flipped Classroom		<a href="https://www.youtube.com/watch?v=qJMShs5echMI">https://www.youtube.com/watch?v=qJMShs5echMI</a>	CO3	PPT	<a href="https://www.geeksforgeeks.org/multi-methods-in-python-set-2-del-remove-sort-insert-pop-extend/">https://www.geeksforgeeks.org/multi-methods-in-python-set-2-del-remove-sort-insert-pop-extend/</a>	VIVA
20	T5	2	Tutorials of L13, L14 & L15 (List Operations & Methods)	Understand List Operations & Methods	Hands-on Design	Discussion/ Doubt Clearing session	Reliability Testing	<a href="https://www.youtube.com/watch?v=qJMShs5echMI">https://www.youtube.com/watch?v=qJMShs5echMI</a>	CO3	PPT	<a href="https://www.geeksforgeeks.org/list-methods-in-python-set-2-del-remove-sort-insert-pop-extend/">https://www.geeksforgeeks.org/list-methods-in-python-set-2-del-remove-sort-insert-pop-extend/</a>	Group Discussion
21	L16	2	Tuples: creating tuples	Create Python tuples, understand its uses	Demonstration	Lecture Through PPT	Brainstorming	<a href="https://www.youtube.com/watch?v=BL5bA18fgvU">https://www.youtube.com/watch?v=BL5bA18fgvU</a>	CO3	PPT	<a href="https://www.javatpoint.com/python-tuples">https://www.javatpoint.com/python-tuples</a>	PPT(CIA)
22	L17	2	Tuple operations: length, concatenation, repetition, membership	apply various operations on it	Simulation and Modeling	Flipped Classroom	Evaluation and Analysis	<a href="https://www.youtube.com/watch?v=BL5bA18fgvU">https://www.youtube.com/watch?v=BL5bA18fgvU</a>	CO3	PPT	<a href="https://www.javatpoint.com/python-tuples">https://www.javatpoint.com/python-tuples</a>	PPT(CIA)
23	L18	2	Tuple operations: maximum, minimum, tuple	apply various operations on it	Evaluation and Optimization	Lecture Through PPT	Practical	<a href="https://www.youtube.com/watch?v=BL5bA18fgvU">https://www.youtube.com/watch?v=BL5bA18fgvU</a>	CO3	Notes & PPT	<a href="https://www.javatpoint.com/python-tuples">https://www.javatpoint.com/python-tuples</a>	PPT(CIA)
24	T6	2	Tutorials of L16, L17 & L18 (tuples operations)	Understand Tuple and its Operations	Hands-on Design	Discussion/ Doubt Clearing session	Evaluation and Analysis	<a href="https://www.youtube.com/watch?v=BL5bA18fgvU">https://www.youtube.com/watch?v=BL5bA18fgvU</a>	CO3	Notes & PPT	<a href="https://www.javatpoint.com/python-tuples">https://www.javatpoint.com/python-tuples</a>	Group Discussion
25	L19	2	Dictionary: creating, accessing values, adding, modifying and deleting items in dictionary	Create Dictionary in Python and perform different functions on it	Simulation and Modeling	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=q3raG6h5AM">https://www.youtube.com/watch?v=q3raG6h5AM</a>	CO3	PPT	<a href="https://www.youtube.com/watch?v=1e18M0w0m0&amp;list=PL72ps_7DH8aD0cb29eU1uK0z2G_KT8&amp;index=25">https://www.youtube.com/watch?v=1e18M0w0m0&amp;list=PL72ps_7DH8aD0cb29eU1uK0z2G_KT8&amp;index=25</a>	PPT(CIA)
26	L20	2	Dictionary methods: len, str, clear, copy, get, update, copy	Apply different built-in methods on Python dictionaries	Hands-on Design	Lecture Through PPT	Evaluation and Analysis	<a href="https://in.coursera.org/lecture/python-functions-files-dictionaries/dictionary-methods-4nK5I">https://in.coursera.org/lecture/python-functions-files-dictionaries/dictionary-methods-4nK5I</a>	CO3	PPT	<a href="https://www.youtube.com/watch?v=1e18M0w0m0&amp;list=PL72ps_7DH8aD0cb29eU1uK0z2G_KT8&amp;index=29">https://www.youtube.com/watch?v=1e18M0w0m0&amp;list=PL72ps_7DH8aD0cb29eU1uK0z2G_KT8&amp;index=29</a>	PPT(CIA)
27	L21	2	Difference between list and dictionary	Compare and contrast Python lists and dictionaries	Demonstration	Lecture Through PPT		E-article: <a href="https://byjus.com/gate/difference-between-list-and-dictionary-in-python">https://byjus.com/gate/difference-between-list-and-dictionary-in-python</a>	CO3	Notes & PPT	E-article: <a href="https://byjus.com/gate/difference-between-list-and-dictionary-in-python">https://byjus.com/gate/difference-between-list-and-dictionary-in-python</a>	PPT(CIA)
28	T7	2	Tutorials of L19, L20 & L21 (List & Dictionary)	Understand Dictionary Operators and Methods	Hands-on Design	Discussion/ Doubt Clearing session	Evaluation and Analysis	E-article: <a href="https://byjus.com/gate/difference-between-list-and-dictionary-in-python">https://byjus.com/gate/difference-between-list-and-dictionary-in-python</a>	CO3	Notes & PPT	E-article: <a href="https://byjus.com/gate/difference-between-list-and-dictionary-in-python">https://byjus.com/gate/difference-between-list-and-dictionary-in-python</a>	Group Discussion
29	L22	3	Functions: Defining, and Calling	Define and invoke Python functions	Simulation and Modeling	Flipped Classroom		E-article: <a href="https://docs.python.org/3/reference/controlflow.html#defining-functions">https://docs.python.org/3/reference/controlflow.html#defining-functions</a>	CO1, CO2	PPT	<a href="https://www.tutorialspoint.com/python/python_function_1.htm">https://www.tutorialspoint.com/python/python_function_1.htm</a>	Mini Projects
30	L23	3	Types of Functions	Understand different types of functions in Python	Hands-on Design	Flipped Classroom	Evaluation and Analysis	<a href="https://nptel.ac.in/courses/106105145">https://nptel.ac.in/courses/106105145</a>	CO2	Notes & PPT	<a href="https://www.javatpoint.com/python-functions">https://www.javatpoint.com/python-functions</a>	Mini Projects
31	L24	3	Arguments and Return Values, Formal Vs Actual Arguments	Use arguments in functions and return values from them	Demonstration	Flipped Classroom		<a href="https://www.youtube.com/watch?v=N9u2RMA65Z">https://www.youtube.com/watch?v=N9u2RMA65Z</a>	CO1, CO2	Notes & PPT	E-article: <a href="https://www.guru99.com/functions-in-python.html">https://www.guru99.com/functions-in-python.html</a>	Mini Projects
32	T8		Tutorials of L22, L23 & L24 (Functions)	Understand Functions	Hands-on Design	Discussion/ Doubt Clearing session	Evaluation and Analysis	<a href="https://www.youtube.com/watch?v=N9u2RMA65Z">https://www.youtube.com/watch?v=N9u2RMA65Z</a>	CO1, CO2	Notes & PPT	E-article: <a href="https://www.guru99.com/functions-in-python.html">https://www.guru99.com/functions-in-python.html</a>	Group Discussion


  
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33	L25	3	Scope and Lifetime	Understand the difference between scope and lifetime of a variable	Demonstration	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=4q5GHR-lc&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=58">https://www.youtube.com/watch?v=4q5GHR-lc&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=58</a>	CO2	PPT	<a href="https://python-testbook.readthedocs.io/en/3.0/Variables_and_Scope.html">https://python-testbook.readthedocs.io/en/3.0/Variables_and_Scope.html</a>	Mini Projects
34	L26	3	Keyword Arguments and Default Arguments	Understand the use of keyword arguments and default arguments	Hands-on Design	Lecture Through PPT	Software Design Solutions	<a href="https://www.youtube.com/watch?v=NqjnCY2qQWU&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=57">https://www.youtube.com/watch?v=NqjnCY2qQWU&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=57</a>	CO2	Notes & PPT	E-article: <a href="https://www.geeksforgeeks.org/default-arguments-in-python/">https://www.geeksforgeeks.org/default-arguments-in-python/</a>	Mini Projects
35	L27	3	Recursion	Understand Recursion	Student teaching	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=NqjnCY2qQWU&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=57">https://www.youtube.com/watch?v=NqjnCY2qQWU&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=57</a>	CO1, CO2	PPT	E-article: <a href="https://docs.python.org/3/tutorial/classes.html#python-scopes-and-namespaces">https://docs.python.org/3/tutorial/classes.html#python-scopes-and-namespaces</a>	Mini Projects
36	T9	3	Tutorials of L25, L26 & L27 (Arguments and scope of lifetime)	Understand Arguments & Recursion	Simulation and Modeling	Discussion/ Doubt Clearing session		<a href="https://www.youtube.com/watch?v=NqjnCY2qQWU&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=57">https://www.youtube.com/watch?v=NqjnCY2qQWU&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=57</a>	CO1, CO2	PPT	E-article: <a href="https://docs.python.org/3/tutorial/classes.html#python-scopes-and-namespaces">https://docs.python.org/3/tutorial/classes.html#python-scopes-and-namespaces</a>	Group Discussion
37	L28	3	Importing Modules, Math and Random Module	Use Math module and Random module by importing them in Python program	Evaluation and Optimization	Lecture Through PPT		E-article: <a href="https://docs.python.org/3/Revision/modules.html">https://docs.python.org/3/Revision/modules.html</a>	CO5	PPT	<a href="https://www.edxschools.com/python/python-modules-at-0">https://www.edxschools.com/python/python-modules-at-0</a>	Mini Projects
38	L29	3	Creating your own modules	Create and use user-defined modules in Python programming language	Hands-on Design	Lecture Through PPT		E-article: <a href="https://pythonprogramming.net/making-modules/">https://pythonprogramming.net/making-modules/</a>	CO5	PPT	<a href="https://wallyr.com/python/how-to-create-custom-modules-in-python/">https://wallyr.com/python/how-to-create-custom-modules-in-python/</a>	VIVA and Presentation
39	L30	3	Concept of Packages	Understand the basics of packages in Python	Demonstration	Lecture Through PPT	Brainstorming	<a href="https://www.coursera.org/lecture/python-programming/python-modules-A3Dg5">https://www.coursera.org/lecture/python-programming/python-modules-A3Dg5</a>	CO5	PPT	<a href="https://python-course.eu/python-Revision/packages.php">https://python-course.eu/python-Revision/packages.php</a>	PPT(CIA)
40	T10	3	Tutorials of L28, L29 & L30 (Arguments & Modules)	Recall concepts of Modules & Packages	Hands-on Design	Discussion/ Doubt Clearing session		<a href="https://www.coursera.org/lecture/python-programming/python-modules-A3Dg5">https://www.coursera.org/lecture/python-programming/python-modules-A3Dg5</a>	CO5	PPT	<a href="https://python-course.eu/python-Revision/packages.php">https://python-course.eu/python-Revision/packages.php</a>	Group Discussion
41	L31	4	Introduction to NumPy	Understand the basics of numpy, its need and functionalities	Student teaching	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=00iNk1qoUE&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=88">https://www.youtube.com/watch?v=00iNk1qoUE&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=88</a>	CO5	PPT	<a href="https://www.youtube.com/watch?v=00iNk1qoUE&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=88">https://www.youtube.com/watch?v=00iNk1qoUE&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntc7rf&amp;index=88</a>	PPT(CIA)
42	L32	4	Creation of One-Dimensional Arrays	Create 1-D Arrays in Python using numpy	Hands-on Design	Lecture Through PPT		<a href="https://www.coursera.org/lecture/practical-python-for-ai-coding-2/array-operations-and-broadcasting-rule-BTGdH">https://www.coursera.org/lecture/practical-python-for-ai-coding-2/array-operations-and-broadcasting-rule-BTGdH</a>	CO5	Notes & PPT	<a href="https://www.geeksforgeeks.org/creating-a-one-dimensional-numpy-array/">https://www.geeksforgeeks.org/creating-a-one-dimensional-numpy-array/</a>	PPT(CIA)
43	L33	4	Re-shaping of an Array	Perform reshaping of the arrays using numpy	Simulation and Modeling	Lecture Through PPT		<a href="https://www.coursera.org/lecture/practical-python-for-ai-coding-2/array-operations-and-broadcasting-rule-BTGdH">https://www.coursera.org/lecture/practical-python-for-ai-coding-2/array-operations-and-broadcasting-rule-BTGdH</a>	CO5	Notes & PPT	<a href="https://numpy.org/doc/stable/reference/generated/numpy.reshape.html">https://numpy.org/doc/stable/reference/generated/numpy.reshape.html</a>	Mini Projects
44	T11	4	Tutorials of L31, L32 & L33 (NumPy & Array)	Understand Concepts of NumPy	Hands-on Design	Discussion/ Doubt Clearing session		<a href="https://www.coursera.org/lecture/practical-python-for-ai-coding-2/array-operations-and-broadcasting-rule-BTGdH">https://www.coursera.org/lecture/practical-python-for-ai-coding-2/array-operations-and-broadcasting-rule-BTGdH</a>	CO5	Notes & PPT	<a href="https://numpy.org/doc/stable/reference/generated/numpy.reshape.html">https://numpy.org/doc/stable/reference/generated/numpy.reshape.html</a>	Group Discussion
45	L34	4	Element-wise Operations and Aggregate Operations	Perform various element-wise operations on numpy arrays	Student teaching	Lecture Through PPT		<a href="https://www.coursera.org/lecture/neural-networks-deep-learning/a-note-on-python-numpy-vectors-87MUx">https://www.coursera.org/lecture/neural-networks-deep-learning/a-note-on-python-numpy-vectors-87MUx</a>	CO5	Notes & PPT	E-article: <a href="https://scipy-lectures.org/intro/numpy/operations.html">https://scipy-lectures.org/intro/numpy/operations.html</a>	PPT(CIA)


  
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46	L35	4	Array indexing and Array Slicing, Insert Rows/Columns	Use the concept of indexing to perform slicing operation on arrays	Student teaching	Lecture Through PPT	Brainstorming	<a href="https://r.coursera.org/lecture/practical-python-for-ai-coding-2/slicing-and-flattening-arrays-12xP">https://r.coursera.org/lecture/practical-python-for-ai-coding-2/slicing-and-flattening-arrays-12xP</a>	CO5	PPT	E-article: <a href="https://blog.devgenius.io/indexing-vs-slicing-in-python-de01cd99c499">https://blog.devgenius.io/indexing-vs-slicing-in-python-de01cd99c499</a>	VIVA
47	L36	4	Append Row/Column & Array Manipulation Operations	Perform manipulation of arrays using various operations	Student teaching	Lecture Through PPT	Practical	<a href="https://in.coursera.org/lecture/basic-modeling/1-1-6-">https://in.coursera.org/lecture/basic-modeling/1-1-6-</a>	CO5	PPT	E-article: <a href="https://blog.devgenius.io/in">https://blog.devgenius.io/in</a>	PPT(CIA)
48	T12	4	Tutorials of L34, L35 & L36 (Numpy Operations)	Understand NumPy Operations	Student teaching	Discussion/ Doubt Clearing session		E-article: <a href="https://blog.devgenius.io/indexing-vs-slicing-in-python-de01cd99c499">https://blog.devgenius.io/indexing-vs-slicing-in-python-de01cd99c499</a>	CO5	PPT	E-article: <a href="https://blog.devgenius.io/indexing-vs-slicing-in-python-de01cd99c499">https://blog.devgenius.io/indexing-vs-slicing-in-python-de01cd99c499</a>	Group Discussion
49	L37	4	Introduction to matplotlib	Understand the basics of matplotlib and its functionalities	Demonstration	Lecture Through PPT		E-article: <a href="https://matplotlib.org/">https://matplotlib.org/</a>	CO5	PPT	<a href="https://www.w3schools.com/python/matplotlib_numpy_tutorial">https://www.w3schools.com/python/matplotlib_numpy_tutorial</a>	PPT(CIA)
50	L38	4	Bar Graphs and pie charts	Create bar graphs and pie charts using matplotlib	Simulation and Modeling	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=eFByjKA3U4">https://www.youtube.com/watch?v=eFByjKA3U4</a>	CO5	PPT	E-article: <a href="https://www.geeksforgeeks.org/bar-plot-in-matplotlib/">https://www.geeksforgeeks.org/bar-plot-in-matplotlib/</a>	Questions from Assignment
51	L39	4	Bar Graphs and pie charts	Create bar graphs and pie charts using matplotlib	Student teaching	Flipped Classroom		<a href="https://www.youtube.com/watch?v=eFByjKA3U4">https://www.youtube.com/watch?v=eFByjKA3U4</a>	CO5	PPT	E-article: <a href="https://www.geeksforgeeks.org/bar-plot-in-matplotlib/">https://www.geeksforgeeks.org/bar-plot-in-matplotlib/</a>	PPT(CIA)
52	T13	4	Tutorial of L37, L38 & L39 (Matplotlib Library)	Understand Matplotlib Library	Hands-on Design	Discussion/ Doubt Clearing session		<a href="https://www.youtube.com/watch?v=eFByjKA3U4">https://www.youtube.com/watch?v=eFByjKA3U4</a>	CO5	PPT	E-article: <a href="https://www.geeksforgeeks.org/bar-plot-in-matplotlib/">https://www.geeksforgeeks.org/bar-plot-in-matplotlib/</a>	Group Discussion
53	L40	4	Types of Files (Text file, Binary Files, CSV file)	Understand various types of files that can be used in Python program	Simulation and Modeling	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=o5MBF0y6dIA&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=76">https://www.youtube.com/watch?v=o5MBF0y6dIA&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=76</a>	CO4	PPT	<a href="https://www.programiz.com/python-programming/file-operation">https://www.programiz.com/python-programming/file-operation</a>	PPT(CIA)
54	L41	4	Types of Files (Text file, Binary Files, CSV file)	Understand various types of files that can be used in Python program	Hands-on Design	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=o5MBF0y6dIA&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=76">https://www.youtube.com/watch?v=o5MBF0y6dIA&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=76</a>	CO4	PPT	<a href="https://www.programiz.com/python-programming/file-operation">https://www.programiz.com/python-programming/file-operation</a>	PPT (CIA)
55	L42	4	Creating, Writing & Appending	Create, update and delete Python files	Externship	Lecture Through PPT	Practical	<a href="https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77">https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77</a>	CO4	Notes & PPT	<a href="https://www.w3schools.com/python/python_file_handling.asp">https://www.w3schools.com/python/python_file_handling.asp</a>	Flipped Classroom
56	T14	4	Tutorials of L40, L41 & L42 (Indexing & Slicing)	Understand Indexing & Slicing	Simulation and Modeling	Discussion/ Doubt Clearing session		<a href="https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77">https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77</a>	CO4	Notes & PPT	<a href="https://www.w3schools.com/python/python_file_handling.asp">https://www.w3schools.com/python/python_file_handling.asp</a>	Group Discussion
57	L43	4	Insertion and Deletion	Create, update and delete Python files	Externship	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77">https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77</a>	CO4	PPT	<a href="https://www.w3schools.com/python/python_file_handling.asp">https://www.w3schools.com/python/python_file_handling.asp</a>	Group Discussion
58	L44	4	Updating	Create, update and delete Python files	Simulation and Modeling	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77">https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77</a>	CO4	PPT	<a href="https://www.w3schools.com/python/python_file_handling.asp">https://www.w3schools.com/python/python_file_handling.asp</a>	PPT(CIA)
59	L45	4	Modification of data into the files	Perform modification to the contents of a file in Python	Simulation and Modeling	Lecture Through PPT		<a href="https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77">https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77</a>	CO4	PPT	<a href="https://www.w3schools.com/python/python_file_handling.asp">https://www.w3schools.com/python/python_file_handling.asp</a>	PPT(CIA)
60	T15	4	Tutorials of L43, L44 & L45 (Insertion, Deletion, Updating & Modification)	Understand Insertion, Deletion, Updating & Modification	Evaluation and Optimization	Discussion/ Doubt Clearing session		<a href="https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77">https://www.youtube.com/watch?v=r7LjaAdgJhI&amp;list=PLDsnL5pk7-N_9oy2RN4A65Z-PEntvc7r7f&amp;index=77</a>		PPT	<a href="https://www.w3schools.com/python/python_file_handling.asp">https://www.w3schools.com/python/python_file_handling.asp</a>	Group Discussion


  
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Note : 1 Credit (Theory) =15 Hrs. in a Semester; 1 Credit (Practical) =30 Hrs. in a Semester.

Suggested Readings : (Latest Edition)

**TEXTBOOKS:**

TTA1 Programing in Python 3: A Complete Introduction to the Python Language (2nd Edition), Mark Summerfield  
TTA2 Python Programming: A Modular Approach by Taneis Sheetal, Kumar Naveen, Eleventh Impression, Pearson India Edu  
TTA3 Axile tools for real world data: Python for Data Analysis by Wes McKinney, O'Reilly

**REFERENCE BOOKS:**

RR1 Let Us Python 2Nd Ed: Python Is Future, Embrace It Fast (Second Edition); Yashvanti Kanelkar  
RR2 Programing Python, 4th Edition by Mark Lutz, Released December 2010 (Publishers): O'Reilly Media, Inc.  
RR3 Python: The Complete Reference by Martin Brown.

**JOURNALS**

1. Journal of Computer Science and Technology
2. International Journal of Computer Applications
3. Journal of Educational Computing Research
4. ACM Transactions on Programming Languages and Systems (TOPLAS)
5. International Journal of Programming Languages and Compilers
6. Computer Applications in Engineering Education
7. Journal of Computer Science Education
8. The Computer Journal
9. Software: Practice and Experience
10. Journal of Software Engineering and Applications

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