Department of CSE, PES University

Lesson Plan for Python for Computational Problem Solving

# of slots: 144 Credits: 5	Course code: UE23CS151A	Anchor Faculty: Prof. Sindhu R Pai

Class #	Chapter title/ Reference Literrature	Topics to be covered	% of Portions covered	
			% of syllabus	Cumulative
1	Unit - 1	Introduction to the course, Discussion of Evaluation Policy	22%	22%
2		Problem Solving - Computational and Non-Computational. Discussion on Examples for both		
3		Limits of Computation Problem Solving, Algorithms		
4		Digital Computer - Computer Hardware: Limits of IC technology		
5		Digital Computer - Computer Software: Operating System		
6		Syntax, semantics and program translation		
7		Lab 1, Slot 1: Problem Solving . No Programming. Flowchart + Algorithm		
8		Slot 2: Various Operating Systems and Simple commands of Ubuntu Operating System		
9		Process of Computational Problem Solving - Analysis, Design, Implementation, Testing, Translation models.		
10		Programming Paradigms and Introduction to Python Language		
11		First Program in Python, Program Structure and Running a program		
12		Output functions and variables		
13		type and id functions with discussion continuing on variables		
14		Input function		
15		Lab 2, Slot 1: Python installation on student systems on various OS		
16		Slot 2: Execution of programs using python interpreter		
17		Operators and Expressions		
18		Operators and Expressions		
19		Precedence and Associativity of operators		
20		Control structures - Selection statements		
21		Control structures - Looping statements		
22		Problem solving using Control structures and input functions		
23		Lab 3: Programs on Input, Output functions and Operators		
24				
25		Practice Session		
26		Revision		
27	Unit - 2	General introduction to Data Structures in python	28%	50%
28		List and it's operations		
29		List continuation, Tuple and it's operations		
30		Problem Solving using Lists and Tuples		
31		Lab 4: Programs on Combination of control structures		
32				
33		Problem Solving using Lists and Tuples and their combinations		
34		Dictionary and it's operations		
35		Problem solving using Dictionary		
36		Set and it's operations		
37		Problem solving using dictionary and sets		
38		Problem solving using dictionary and sets and their combinations		
39		Lab 5: Programs on Lists and tuples and their Combinations		
40				
41		String and it's types		
42		String Operations		
43		Problem solving using strings		

44		Problem solving using combinations of all above data structures		
45		Introduction to Files		
46		File operations: Working with Text files(read and write)		
47		Lab 6: Programs on Combination of Sets, Dictionaries and Strings		
48				
49		Problem Solving using Text file data as strings		
50		File operations: Working with CSV files(read and write)		
51		Functions: Definition and Call		
52		Positional and keyword parameters		
53		Variable number of arguments and Key value pair as arguments		
54		Combination of Variable number of args and key value pairs		
55		Lab 7: Lab Exam 1 + Viva conduction		
56				
57		Revision - Practice Quiz		
58		Doubts clarification session		
59	Unit - 3	Recursion	25%	75%
60		Programs on Recursion		
61		callbacks		
62		Programs on callback		
63		Lab 8: Mini Project Team formation, Title selection and Discussion		
64				
65		Closures		
66		Decorators		
67		Generators		
68		Problem solving using Closures and Decorators		
69		Problem solving using Generators		
70		Graphical User Interface with Tkinter package- Different geometric methods – Tk, mainloop		
71		Lab 9: Programs on strings read from the CSV files		
72				
73-79	**ISA - 1**			
80	unit - 3	Creating simple GUI - buttons, canvas, check button, labels, entry fields		
81		Creating simple GUI - Dialogs Widgets - sizes, fonts, colours layouts, nested frames		
82		Problem solving with GUI included		
83		Introduction to modules in python		
84		Types of modules		
85		Problem solving using modules		
86		Lab 10: Programs on Recursion and callbacks		
87				
88		Problem solving using modules and file handling		
89		Problem solving using modules and file handling		
90		Practice - Quiz		
91		Introduction to Functional Programming - Map in detail		
92		Filter in detail		
93		Problem solving using map and filter		
94		Lab 11: Generate a simple GUI as per the template given		
95				
96		Lambda		
97		reduce, min and max		
98		Problem solving using all functional programming constructs		
99		Problem solving using all functional programming constructs		
100		Introduction to Object Oriented programming		
101		Classes and objects		
102		Lab 12: Slot 1: Pytest , Function testing with Doctest		

103	Unit - 4	Slot 2: Pdb debugger commands	25%	100%
104		Classes and objects continuation		
105		Inheritance		
106		Polymorphism		
107		Simple programs to demo classes and objects		
108		Simple program to demo Inheritance		
109		Simple program to demo Polymorphism		
110		Lab 13: Programs on Functional programming constructs		
111				
112		Iterators		
113		Exceptions - try, except, else, finally		
114		Exception Propagation		
115		Revision		
116		Revision		
117		Practice Quiz		
119		Lab 14: programs on Object Oriented Programming constructs		
120				
121-123	lini Project+Lab Exam	Mini Project conduction and suggestions/support for students in implementation		
124-126		Mini Project Demo with viva - Final		
127		Lab 15: Lab Exam-2 plus Viva		
128				
	ISA - 2			