PART A: Introduction

Program: **Degree**	Class: **B.Sc.**		Year: **III Year**	Session: **2023-24**
		Subject: **Computer Science**		
1.	Course Code	S3-COSC2D		
2.	Course Title	**Programming with Python (Group A – Paper II)** **(Theory)**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Discipline Specific Elective**		
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels. This course can be opted as an elective by the students of Computer Science.		
5.	Course Learning Outcomes(CLO)	**After studying this subject, students shall be able to –** • Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. • Express proficiency in the handling of strings, functions and file handling. • Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. • Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python with class, modules and packages. • Identify the commonly used operations involving database connectivity and use of tkinter for GUI programming.		
6.	Credit Value	**Theory - 4 Credits**		
7.	Total Marks	Max. Marks : **30+70**		Min. Passing Marks: **35**

PART B: Content of the Course

No. of Lectures (in hours per week): **2 Lectures per week**

Total No. of Lectures: **60 Hrs.**

Module	Topics	No. of Lectures
I	**Python Basics** : Python interpreter, Python idle, dynamically typed and strongly typed features, basic data types, variables, expressions, statements, operators, flow of execution. Input and Output statements, Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration: while, for, break, continue, pass, implementing 'for' through range(), 'in' and 'not in' operators for sequence traversal. Creating and executing .py scripts. **Keywords: *interpreter, while, for, break, continue, scripts.***	12
II	**Data Structures**: Lists- append, extend, insert, index, remove, pop, count, sort, reverse, slicing, list comprehension, Copying a list: deep copy, shallow copy. Tuples- index, count, usage, use of tuples as a swap function. Dictionaries-keys, values, tuples, nested dictionaries, dictionary	12

Abhilasha Kumar

Chairman, Central Board of Studies, Computer Science

	comprehension. Strings- Single line and multi-line strings, formatter, isdigit, isalpha, isalnum, islower, istitle, isspace, title, lower, upper, strip, split, splitlines, join etc. Sets – union, intersection, subset, superset, difference, symmetric difference, copy, add, remove, discard etc. **Keywords:** *index, sort, deep copy, tuples, dictionary, sets, strings.*		
III	**Functions & File Handling**: Inbuilt Functions- id, len, chr, ord etc., defining and calling a function, arguments, global versus local variables, defining and using lambda functions, the map(), filter(), reduce() functions. Working with files : read, write and append modes: r, w, a, x, r+, w+, a+, x+, reading-read(), readline(), readlines(), writing-write(), writelines(), seek(), tell(). Word count, copy file scripts through file handling concepts. **Keywords:** *function, calling a function, arguments, global variables, read, write, copy, seek.*	12	
IV	**Classes, modules and exceptional handling**: Classes: Introduction, Member variables and defining methods, constructor, destructor, data encapsulation, inheritance, multiple inheritance, diamond problem solving technique of python. Modules: inbuilt modules- sys, random, time etc. import, from...import, from..import*. Constructing packages, role of __init__.py Exceptional Handling: The try-except-else-finally block, the raise statement, the hierarchy of exceptions, adding exceptions **Keywords:** *class, constructor, destructor, encapsulation, inheritance, exception, modules.*	12	
V	**Database & GUI Programming**: Importing sqlite, connecting to database, creating table, insert, select, update, delete, drop tables, accessing and modifying tables through python. Graphical user interfaces; event-driven programming paradigm; tkinter module, creating simple GUI; buttons, labels, entry fields, dialogs; widget attributes – sizes, fonts, colors layouts, nested frames. **Keywords:** *GUI, tables, database, insert, update, drop tables, event- driven programming, dialogs, frames.*	12	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:
- Taneja Sheetal & Kumar Naveen, "Python Programming: A modular approach", Pearson.
- Liang Y. Daniel, "Introduction to Programming Using Python", Pearson.

Reference Books:
- Zed A. Shaw, "Learn Python the Hard Way", Zed Shaw's Hard Way Series.
- Charles Dierbach, "Introduction to Computer Science using Python", Wiley.
- Michael T. Goodrich, "Data Structures and Algorithms in Python", Wiley.

Suggestive digital platform web links

https://www.guru99.com/how-to-install-python.html
https://www.udemy.com/course/pythonforbeginnersintro/

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https://www.python.org/about/gettingstarted/ https://spoken-tutorial.org/media/videos/89/Python-3.4.3-Instruction-Sheet-English.pdf		
Suggested equivalent online courses		
https://nptel.ac.in/courses/106/106/106106145/ https://www.youtube.com/watch?v=rfscVS0vtbw https://onlinecourses.swayam2.ac.in/aic20_sp33/preview		

PART D: Assessment and Evaluation

Suggested Evaluation Methods:
Maximum Marks: 100
Continuous Comprehensive Evaluation (CCE): 30 Marks   University Exam (UE): 70 Marks

Internal Assessment : Continuous Comprehensive Evaluation (CCE)	Class Tests/ Presentation / Assignment	30 **Marks**
External Assessment: University Exam (UE): Time : **03.00 Hours**	Section (A) : Very Short Questions Section (B) : Short Questions Section (C) : Long Questions	70 **Marks**
Any remarks/suggestions:		

Abhilasha Kumar
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	PART A: Introduction			
Program: **Degree**		Class: B.Sc.	Year: **III Year**	Session: **2023-24**
	Subject: **Computer Science**			
1.	Course Code	S3-COSC2Q		
2.	Course Title	**Python Programming Lab (Group A – Paper II) (Practical)**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Discipline Specific Elective**		
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels. This course can be opted as an elective by the students of Computer Science.		
5.	Course Learning Outcomes(CLO)	**After studying this subject, students shall be able to –** - Understand the python environment and its text editor. - Code and run the programs. - Debug the program. - Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. - Identify the commonly used operations involving database connectivity and use of tkinter for GUI programming.		
6.	Credit Value	**Practical - 2 Credits**		
7.	Total Marks	Max. Marks : **100**		Min. Passing Marks: **35**
	PART B: Content of the Course			
	No. of Lab. Practicals (in hours per week): **1 Lab. per week**			
	Total No. of Lab.: **30 Hrs.**			

	Suggestive List of Practicals	**No. of Labs.**
	1. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500. 2. Print the first 2 and last 3 characters in a given string. Use the string slicing. 3. Write a program that eliminates duplicates in a list. 4. Implement shallow copy and deep copy of a list. 5. Find the largest of n numbers, using a user defined function largest() 6. Write a function that capitalizes all vowels in a string. 7. Read a line containing digits and letters. Write a program to give the count of digits and letters. 8. Write a function myReverse() which receives a string as an input and returns the reverse of the string. 9. Use the list comprehension methodology in python, to generate the squares of all odd numbers in a given list. 10. Generate a dictionary and print the same. The keys of the dictionary should be integers between 1 and 10 (both inclusive). The values should be the cubes of the corresponding keys.	30

Abhilasha Kumar

Chairman, Central Board of Studies, Computer Science

11. Create a nested dictionary. The roll number of a student maps to a dictionary. This inner dictionary will have name, age, and place as keys. Read details of at least three students.
12. Enter a word. Create a dictionary with the letters of this word as keys, and the corresponding ASCII values as values.
13. Define a class with three methods: readString(), printString(), writeString(). The first method should read the contents of a file. The second method should print the contents to the console. The third method should write the contents to a new file.
14. Create a class account which has constructor to input account_no, name, balance from user, print_account() to display the account details, and deposit(), withdraw() which inputs amount and add/subtract them from the total amount of individual object.
15. Create a database table in sqlite and show the table data in python.
16. Implement DML commands in SQLite from python interface.
17. Implement tkinter methods in a python script.

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- Charles Dierbach, "Introduction to Computer Science using Python", Wiley.
- Michael T. Goodrich, "Data Structures and Algorithms in Python", Wiley.

Suggestive digital platform web links

https://www.guru99.com/how-to-install-python.html
https://www.python.org/about/gettingstarted/
https://spoken-tutorial.org/media/videos/89/Python-3.4.3-Instruction-Sheet-English.pdf

Suggested equivalent online courses

https://nptel.ac.in/courses/106/106/106106145/
https://www.youtube.com/watch?v=rfscVS0vtbw
https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

PART D: Assessment and Evaluation

Internal Assessment :		External Assessment :	
Class Interaction/Quiz		Viva voce practical	
Attendance	30	Practical record file	70
Assignments (Charts/ Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training		Table work / Experiments	

Total Marks: 100

Any remarks/ suggestions:

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