Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: Python Programming Lab		**Course Code:15MC65P**
Mode (L:T:P) : 0:2:4	**Credits:3**	**Core/ Elective: Core**
Type of Course Tutorials and Practical's		**Total Contact Hours: 78**
CIE- 25 Marks		**SEE- 50 Marks**

Prerequisites: Applied Science and Engineering Mathematics

Course Objectives: Understand and write Python program for simple Engineering applications

Course outcome: At the end of the Course, the students will be able to:

1. Demonstrate the basics of Python language, General Syntax, Variables Objects and Values, Operators, Conditionals, Loops and Nesting of Loops, Loops and Nesting of Loops, String Methods, Functions, Lambda Expressions and Recursions, Collections, Modules and File IO
2. Develop, execute, debug Python program for Engineering applications

Course Outcome		Cognitive Level	Linked with PO	Teaching Hours
CO1	Demonstrate the basics of Python language, General Syntax, Variables Objects and Values, Operators, Conditionals, Loops and Nesting of Loops, Loops and Nesting of Loops, String Methods, Functions, Lambda Expressions and Recursions, Collections, Modules and File IO	*U*	1,2	30
CO2	Develop, execute, debug Python program for Engineering applications	*A*	1,2,3,4	48
		Total sessions		**78**

Legend: R; Remember, U: Understand A: Application

Mapping of Course Outcomes with Program Outcomes

Course	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
Python Programming Lab	**3**	**3**	**3**	**3**	-	-	-	-	-	-

Contents

Unit I

Introduction to Python, Installing Python on Windows/Linux, Understanding Command Line, IDLE and the Interpreter ,General Syntax, Working with data types, Numbers and Fractions, Formatting Numbers, Working with Strings, Formatting Strings, Working with Dates, **Operators**(Arithmetical, Logical, Relational) **Conditionals**(If, if-else, elif and nesting), **Loops and Nesting of Loops**(While and for, Break/Continue/Pass Statements, Boolean Operators in, not in, is, is not, and, or , not, Local and Global Variables) **String Methods, Functions**(UDF-User Defined Functions in Python, Fixed Arguments and Returning Value, Arguments with default values, Variable Number of Arguments) **Lambda Expressions and Recursions, Collections**(Lists(Mutable), Tuples (Immutable Lists), Dictionaries)Working with different Modules, **File IO**(File modes, Open and Close a file, read and write, creating and deleting text files, pathnames)

Unit II

Programming Exercises

1. Develop a Python Script for temperature conversions using F=C*9/5+32 and C=(f-32)*5/9. Test your program with several values for Celsius and Fahrenheit
2. Develop a Python Script that displays various date-related values such as
    a. Current date and time
    b. The day of the week, month and year
    c. Time in seconds since Jan 1, 2012(epoch)
3. Develop a Python Script to print consecutive integers in the form as shown.
    1
    1 2
    1 2 3
    1 2 3 4
    1 2 3 4 5
4. Develop a Python Script using split() to compare word abc in a string x and find the match
5. Develop a Python Script using split() to print justified text
6. Develop a Python Script to explain Break, Continue and Pass statements using a While Loop find the divisor of a number
7. Develop a Python Script to find Prime Numbers using while loop
8. Develop a Python Script to find factorial of a number using Recursion

9. Develop a Python Script to find GCD of two positive integers using Euclid's algorithm & Recursion
10. Develop a Python Script to Calculate LCM of two positive integers.
11. Develop a Python Script to count the occurrences of digits and letters in a string
12. Develop a Python Script to find the various attributes of a file-modes like r,w,rw
13. Develop a Python Script to read and write data into a text file
14. Develop a Python Script to find whether a specified path references a file and if yes find the file size and timestamp

e-references

1. https://www.cs.uky.edu/~keen/115/Haltermanpythonbook.pdf
2. http://www.tutorialspoint.com/python/python_tutorial.pdf
3. http://greenteapress.com/thinkpython/thinkpython.pdf
4. http://www-scf.usc.edu/~jgada/documents/python.pdf
5. http://www.ucs.cam.ac.uk/docs/course-notes/unix-courses/PythonAB/files/handout.pdf
6. http://www.ucs.cam.ac.uk/docs/course-notes/unix-courses/PythonAB/files/handout.pdf
7. https://kushaldas.in/details/pym.pdf
8. http://www.cse.iitd.ac.in/~mcs112572/book1.pdf

Contents linked with CO and PO

Sl No	Contents	CO	PO
1	Introduction to Python, Installing Python on Windows/Linux, Understanding Command Line, IDLE and the Interpreter ,General Syntax, Working with data types, Numbers and Fractions, Formatting Numbers, Working with Strings, Formatting Strings, Working with Dates, **Operators**(Arithmetical, Logical, Relational) **Conditionals**(If, if-else, elif and nesting), **Loops and Nesting of Loops**(While and for, Break/Continue/Pass Statements, Boolean Operators in, not in, is, is not, and, or , not, Local and Global Variables) **String Methods, Functions**(UDF-User Defined Functions in Python, Fixed Arguments and Returning Value, Arguments with default values, Variable Number of Arguments) **Lambda Expressions and Recursions, Collections**(Lists(Mutable), Tuples (Immutable Lists), Dictionaries)Working with different	1	1,2

	Modules, **File IO**(File modes, Open and Close a file, read and write, creating and deleting text files, pathnames)		
2	Develop a Python Script for temperature conversions using F=C*9/5+32 and C=(f-32)*5/9. Test your program with several values for Celsius and Fahrenheit	2	1,2,3,4
3	Develop a Python Script that displays various date-related values such as a. Current date and time b. The day of the week, month and year c. Time in seconds since Jan 1, 2012(epoch)	2	1,2,3,4
4	Develop a Python Script to print consecutive integers in the form as shown. 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5	2	1,2,3,4
5	Develop a Python Script using split() to compare word abc in a string x and find the match	2	1,2,3,4
6	Develop a Python Script using split() to print justified text	2	1,2,3,4
7	Develop a Python Script to explain Break, Continue and Pass statements using a While Loop find the divisor of a number	2	1,2,3,4
8	Develop a Python Script to find Prime Numbers using while loop	2	1,2,3,4
9	Develop a Python Script to find factorial of a number using Recursion	2	1,2,3,4
10	Develop a Python Script to find GCD of two positive integers using Euclid's algorithm & Recursion	2	1,2,3,4
11	Develop a Python Script to Calculate LCM of two positive integers	2	1,2,3,4
12	Write a Python Script to count the occurrences of digits and letters in a string	2	1,2,3,4
13	Develop a Python Script to find the various attributes of a file-modes like r,w,rw	2	1,2,3,4
14	Develop a Python Script to read and write data into a text file	2	1,2,3,4
15	Develop a Python Script to find whether a specified path references a file and if yes find the file size and timestamp	2	1,2,3,4

Student Activity

Activity No	Description of the Activity
1	Write and execute Python program for a given application not mentioned in the curriculum

Note:

1. Each student should do above activity or any other similar activity related to the course COs and get it approved from concerned Teacher and HOD.
2. No student should have activity repeated or similar
3. Teacher should ensure activities by group must cover all COs
4. Teacher should asses every student by using suitable **Rubrics** approved by HOD

Sample Rubrics

Dimension	Exemplary	Accomplished	Developing	Beginning	Roll No. of the Student				
	5/4	3	2	1	1	2	3	4	5
Organization	Information presented in logical, interesting sequence	Information in logical sequence	Difficult to follow presentation--student jumps around	Cannot understand presentation--no sequence of information	2				
Subject Knowledge	Demonstrates full knowledge by answering all class questions with explanations and elaborations	At ease with expected answers to questions but does not elaborate	Uncomfortable with information and is able to answer only rudimentary questions	Does not have a grasp of the information. Cannot answer questions about subject	3				
Graphics	Explain and reinforce screen text and presentation	Relate to text and presentation	Occasionally uses graphics that rarely support text and presentation	Uses superfluous graphics or no graphics	4				
Oral Presentation	Maintains eye contact and pronounces all terms precisely. All audience members can hear	Maintains eye contact most of the time and pronounces most words correctly. Most audience members can hear presentation	Occasionally uses eye contact, mostly reading presentation, and incorrectly pronounces terms. Audience members have difficulty hearing	Reads with no eye contact and incorrectly pronounces terms. Speaks too quietly	5				
Total Score=(2+3+4+5)=14/4=3.5=4									

Course Assessment Pattern

Particulars			Max Marks	Evidence	Course outcomes
Direct Assessment	**CIE**	Two test (Average of Two tests)	10	Blue books	1 & 2
		Practical record	10	Practical record	1 & 2
		Student Activity	05	Student Activity Sheets	1 & 2
	SEE	End of the course	50	Answer scripts at BTE	1 & 2
Indirect Assessment	**Student Feedback on course**	Middle of the course		Feedback forms	1 &2
		End of the course		Feedback forms	1 & 2

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Scheme of valuation for SEE

Sl. No.	Particulars	Marks
1	Question from Unit -1	10
2	Writing two programs	20
3	Entering of any one program	05
4	Execution of any one program	10
5	Viva Voce	05
	Total	**50**

Requirements for Python Programming Lab.
(For an Intake of 60 Students [3 Batches])

Hardware requirement

Sl. No.	Equipment	Quantity
1	PC systems (latest configurations with speakers)	20
2	Laser Printers	04
3	Networking (Structured) with cat 6e / wireless 24 Port switches / Wireless Router I/O Boxes for networking (as required)	03

Software Requirement: Appropriate software.

Note: Students: Computers ratio should be strictly 1:1 for a batch of twenty Students.