GOVERNMENT POLYTECHNIC, AMRAVATI

(AN AUTONOMOUS INSTITUTE OF GOVERNMENTOF MAHARASHTRA)

CURRICULUM DEVELOPMENT CELL

PROGRAMME TITLE: DIPLOMA IN COMPUTER ENGINEERING
COURSE CODE: CM5461
COURSE TITLE: PROGRAMMING WITH PYTHON

TEACHING SCHEME:

LEVEL OF COURSE	PRERE-QUISITE	WEEKLY CONTACT HRS.			TOTAL CREDITS	TOTAL WEEKS	TOTAL CONTACT HOURS		
		L	T	P			L	T	P
V	--	03	--	04	07	16	48	--	64

EXAMINATION SCHEME:

THEORY(Marks)					PRACTICAL(Marks)		TOTAL (Marks)
ESE PAPER HRS.	ESE		PA	TOTAL	ESE	PA	
03	MAX.	70	30*	100	25#	25^	150
	MIN.	28	----	40	10	10	

@: Internal Assessment #: External AssessmentPracticalbased $: online examination
(*) Under the Theory PA, Out Of 30 Marks, 20 Marks is the Average of Two Tests and 10 Marks are for Micro project-
(^) Under practical PA Continuous Assessment of Practical Work is to be done by Course Teacher as per CDC norms.
For the courses having only practical examination, PA has two parts (i) Continuous Assessment of Practical work - 60% and (ii) microproject-40%.

1. RATIONALE:

Python is used for developing desktop GUI applications, websites and web applications. Also, as a high level programming language it allows you to focus on core functionality of the application by taking care of common programming tasks. This course is designed to help the students to understand fundamental syntactic information about 'Python'. Also it will help the students to apply the basic concepts, program structure and principles of' Python' programming paradigm to build given application. The course is basically designed to create a base to develop foundation skills of programminglanguage.

2. COURSE OUTCOMES (COs)

At the end of this course, student will be able to: -

1. Write and execute simple 'Python'programs
2. Write 'Python' programs using arithmetic expressions and controlstructure.
3. Develop 'Python' programs using List, Tuples andDictionary.
4. Develop/Use functions in Python programs for modular programmingapproach.
5. Develop 'Python' programs using File Input/outputoperations.
6. Write 'Python' code using Classes andObjects.

3. DETAILED CONTENTS: THEORY

Unit	Unit Outcomes	Topics and Subtopics	CO No.	Marks	Hours
Unit 1 Introduction	1a. Write and execute simple python Code for the given problem. 1b. Identify different Variables, Keywords and constants 1c. Use indentationin Python for the given Problem	1.1 Introduction: History of Python, Python features. 1.2 Basics of Python: Running Python script, Identifiers, Keywords,Indentation, Variables. 1.3 Input and Output	**1**	**08**	04
Unit 2 Types, Operators and Expression	2a.Write simple'Python' program using the given arithmetic expressions 2b. Use different types of operators for writing different arithmetic expressions. 2c. Write a 'Python' program using decision making structure for two- way branching to solve the givenproblem. 2d. Write a 'Python' program using decision making structure for multi-way branching to solve the given problem.	2.1 Standard Datatypes: Numbers, String, Tuples, List, Dictionary. 2.2 Operators: Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, python operator precedence. 2.3 Control flow: If, IF-ELSE, for loop, while loop, Break statement, Continue statement.	**2**	**10**	06
Unit 3 Data Structures	3a. Write a 'Python' code using Lists, Tuples, Sets and Dictionaries. 3b. Perform Different operations on Lists, Tuples, Sets and Dictionaries. 3c. Use built infunction in Python for Lists, Tuples, Sets, and Dictionaries.	3.1 Python List:Accessing values in list, deleting values in list, updating and lists. 3.2 Basic List Operations: Indexing, slicing. 3.3 Built-in List Functions and Methods**:** cmp, len, max, min, list etc 3.4 Tuples:Accessing values in tuples, deleting values in Tuples and updating Tuples. Basic Tuple Operations. 3.5 Sets:Accessing values in Set, deleting values in Set and updating Set. Basic Setoperations. 3.6 Dictionaries:	**3**	**12**	10

		Accessing values in Dictionary, deleting values in Dictionary and updating Dictionary. Basic Dictionary operations			
Unit 4 Function	4a. Use the given Library Function. 4b. Develop relevant User defined Functions for the Given problem. 4c. Write 'Python' codes to pass the given function parameters 4d. Develop program for handling the given Exception	4.1 Function Arguments: Default arguments, Variable Length arguments. Anonymous functions. Return Statement 4.2 Python Variable: Namespace, Scope of Variables: Global Variable and Local Variable. 4.3 Modules: Import statement. 4.4 Python Packages. 4.5 Exception Handling: try-catch statement, finally statement	**4**	**14**	12
Unit 5 File Handling	5a. Write Python code for reading and Writing the given data from/into the files. 5b. Use Files Mode in python programming	5.1 Opening file in different modes. 5.2 Accessing file Contents using standard library functions. 5.3 Closing a file.	**5**	**12**	06
Unit 6 Object Oriented Programming in Python	6a. Create classes and objects to solve the given problem. 6b. Develop Python code using data hiding. 6c. Develop Python code using data abstraction.	6.1 Creating Classes, Creating Objects. 6.2 Method Overloading and Overriding. 6.3 Data Hiding, Data Abstraction. 6.4 Inheritance: parent class and child class	**6**	**14**	10

4.LIST OF PRACTICALS:

Sr No.	PRACTICAL OUTCOMES (PrOs)	CO NO.
1	**Write /execute simple 'Python' program:** Develop minimum 2 programs using Arithmetic Operators, exhibiting data type conversion.	1
2	**Write /execute simple 'Python' program:** Develop programs using different data types (numbers, string, tuple, list, dictionary)	1
3	**Write /execute simple 'Python' program:** Calculate the Average of Numbers in a Given List	1
4	**Write /execute simple 'Python' program:** Exchange the Values of Two Numbers without Using a Temporary Variable	1
5	**Write /execute simple 'Python' program:** calculate the area and perimeter of the Square, and the volume & perimeter of the cone.	2
6	**Write /execute simple 'Python' program:** Read Height in Centimeters and then convert the Height to Feet and Inches	2

Sr No.	PRACTICAL OUTCOMES (PrOs)	CO NO.
7	**Write /execute simple 'Python' program:** Find the Sum of Digits in a Number	2
8	**Write /execute simple 'Python' program: P**rint all Numbers in a Range Divisible by a Given Number	2
9	**Using List:** Write a programs to: Create a list, add element to list, delete element from the list. Sort the list, reverse the list and counting elements in a list.	3
10	**Write /execute simple 'Python' program:** Merge Two Lists and Sort it	3
11	**Write /execute simple 'Python' program:** Remove the Duplicate Items from a List	3
12	**Using Dictionary:** Write a programs to: (i) Create dictionary, add element to dictionary, delete element from the dictionary**.**	3
13	**Looping:** Write a program to : To print all prime numbers from 1 to N. To read age of 15 person and count total Baby age, School age and Adult age.	4
14	**Looping:** Write a program to : Find factorial of a given number. Generate multiplication table up to 10 for numbers 1 to 5.	4
15	**Functions :** Write a program to : To calculate average, mean, median, and standard deviation of numbers in a list	4
16	**Functions :** Write a program to : To print Factors of a given Number.	4
17	**Exception Handling:** Write a program to : To handle simple runtime error To handle multiple errors with one except statement	4
18	**File Input/output**: Write a program to : Python Program to Read the Contents of a File	5
19	**File Input/output:** Write a program to : To create simple file and write "Hello World" in it. To opens a file in write mode and append Hello world at the end of a file.	5
20	**File Input/output:** Write a program to : To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' by 'a'. To open a file in read mode and print the number of occurrences of a character 'a'.	5
21	Write a program to Count the Number of Words in a Text File	5
22	**Classes and Objects:** Write a Program to: Create a Class which Performs Basic Calculator Operations	6
23	**Classes and Objects:** Write a Program to: Add two complex number using classes and objects. Subtract two complex number using classes and objects	6
24	**Inheritance:** Write a Program to: To create Class Person with attributes First name and Last name inherited by Subclass Student to print Name of Student using PrintMethod( )	6

Note

i. *The entire above listed practical's need to be performed compulsorily, so that the students reach the `Precision level of Dave's Psychomotor Domain'.*

ii. *The Process and Product related skills associated with each practical outcome shall be assessed on basis of following performance indicators*

S. No.	Performance Indicators	Weightage in %
1	Correctness of logic of a program	20
2	Debugging ability	20
3	Quality of input and output displayed (messaging and formatting)	20
4	Answer to sample questions	20
5	Submit report in time	20
	Total	100%

The above PrOs also comprise of the following social skills/attitudes which are Affective Domain Outcomes (ADOs) that are best developed through the laboratory/field based experiences:

a. Follow safety practices.
b. Practice good housekeeping.
c. Demonstrate working as a leader/a team member.
d. Maintain tools and equipment.
e. Follow ethical Practices.

The ADOs are not specific to any one PrO, but are embedded in many PrOs. Hence, the acquisition of the ADOs takes place gradually in the student when s/he undertakes a series of practical experiences over a period of time. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- 'Valuing Level' in 1st year
- 'Organizing Level' in 2nd year and
- 'Characterizing Level' in 3rd year

5. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related***Co-curricular*** activities which can be undertaken to accelerate the attainment of the variousOutcomes in this course:

a. Prepare journal of practicals.
b. Prepare a sample document with all word processing features. (Course teacher shall Allot appropriate document type to each students)
c. Undertake micro projects.

6. SUGGESTED INSTRUCTIONAL STRATEGIES

These are sample strategies, which the teacher can use to accelerate the attainment ofthe various outcomes in this course:

a. Massive open online courses (***MOOCs***) may be used to teach various topics/subtopics.
b. The teacher needs to ensure to create opportunities and provisions for ***co-curricular***Activities.About ***10-15% of the topics/sub-topics*** which is relatively simpler or descriptive in nature is to be given to the students for ***self-directed learning*** and assess the development of the LOs/COs through classroom presentations (see implementationGuideline for details).
c. Procure various materials required for practical exercises
d. Guide student(s) in undertaking micro-projects.
e. Guide student(s) in undertaking various activities in the lab/workshop.

f. Demonstrate students thoroughly before they start doing the practice.
g. Show video/animation films for handling/functioning of instruments.
h. Observe continuously and monitor the performance of students in Lab.

7. SUGGESTED MICRO-PROJECTS.

Only one micro-project is planned to be undertaken by a student assigned to him/her in the beginning of the semester. S/he ought to submit it by the end of the semester to develop the industry oriented COs. Each micro-project should encompass two or more COs which are in fact, an integration of practical's, cognitive domain and affective domain LOs. The microproject could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than ***16 (sixteen) student engagement hours*** during the course. In the all semesters, the micro-project could be group-based(5-6 students)to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry.
A Suggestive list is given here. Similar micro-projects could be added by the concerned faculty:

a) Create an English dictionary which is able to perform following function.
b) Add a word its meaning.
c) Delete a word its meaning.
d) Update word or its meaning.
e) Print list of word and its meaning.
f) To create simple calculator using classes and objects.
g) Develop student management system which will able to
h) Add ii) Delete iii) Update iv)Display student related information like
i) Roll No, Name, Age, Address, Email-Id, Contact Numbered.
j) Develop Employee management system which will able to
k) Add ii) Delete iii) Update iv)Display student related information like
l) Emp ID, Name, Age, Address, Email-Id, Contact Numbered.
m) Develop Online mobile recharge system using python
n) Develop Library Management system using python
o) Develop Food Ordering system using python
p) Develop Library Management system using python
q) Develop Alarm Clock using python

Any other micro-projects suggested by subject faculty on similar line.
(Use functions, Classes, Objects and other features of 'Python' to develop above listed applications)

8. MAJOR EQUIPMENTS/INSTRUMENTS REQUIRED

Sr No.	Equipment Name with Broad Specification	Practical No.
1	Computer system (Any computer system with basic configuration)	For all Experiments
2	'Python' Interpreter	

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Introduction	04	04	--	08
2	Types, Operators and Expression	02	04	04	10
3	Data Structures	04	04	04	12
4	Function	02	04	08	14
5	File Handling	04	04	04	12
6	Object Oriented Programming in Python	02	04	08	14
Total		18	24	28	70

10. SUGGESTED LEARNING RESOURCES:

Sr.No.	Title Of Book	Author	Publication
1.	Python Programming	K. Nageswara Rao, Shaikh Akbar	Scitech Publications (India) Pvt. Ltd. **ISBN-10:** 9385983458 **ISBN-13:** 978-9385983450
2.	Learn to program using Python	Alan Gauld	Addison-Wesley **ISBN-10:** 0201709384 **ISBN-13:** 978-0201709384
3.	Fundamentals of Python: Data Structures	Kennet Lambert	Delmar Cengage Learning; **ISBN-10:** 1285752007 **ISBN-13:** 978-1285752006

11. SOFTWARE/LEARNING WEBSITES.

a. https://www.tutorialspoint.com/python/index.htm
b. nptel.ac.in/courses/117106113/34
c. https://www.w3schools.com/python/default.asp
d. https://www.programiz.com/python-programming
e. http://spoken-tutorial.org/

12. COURSE CURRICULUM DEVELOPMENT COMMITTEE:

SR. NO.	NAME	DESIGNATION	INDUSTRY/INSTITUTE
1	S.S.CHAVHAN	Lecturer in Computer Science	Govt. Polytechnic Amravati
2	K.P.UKEY	Lecturer in Information Technology	Govt. Polytechnic Amravati
3	C. P. AHIR	Lecturer in Computer Science	Govt. Polytechnic Amravati

Govt. Polytechnic, Programme Board of Studies Computer Engineering has approved the above course curriculum on 30/12/2020 and is adopted for Computer Engineering Programme.

CHAIRMAN
PROGRAMME BOARD OF STUDIES,
COMPUTER ENGINEERING
GOVERNMENT POLYTECHNIC,AMRAVATI.

The General Board of Studies has approved the above course curriculum on 06/02/2021

The Governing Body has approved the above course curriculum on 13/08/2021