Purbanchal University

Faculty of Engineering, Biratnagar, Nepal

Syllabus

Level: Bachelor
Program: Bachelor in Computer Engineering
Subject: Python Programming

Year-II **Semester-**IV

Teaching Schedule Hours/Week					Examination Schedule						Total Marks
					Final				Internal Assessment		
					Theory		Practical		Theory Marks	Practical Marks	
Credit Hours	L	T	P	Total	Duration	Marks	Duration	Marks	40	30	150
3	3	2	3	8	3 Hrs.	60	-	20			

Note: L: Lecturer **T:** Tutorial **P:** Practical

Course Objectives:

This course introduces fundamental programming concepts and program design using Python programming language. Students will be introduced to understand decision structures, loops, functions, object-oriented programming as well as basic machine learning using Python.

Chapter	Topic	Duration
1.	**Introduction** Introduction to Python History of Python Features of Python Installing python and environment set up	2hrs.

2.	**Fundamentals of Python** Constant and Variables Naming and Using Variables Avoiding Name Errors When Using Variables Variable as a label Data type: Strings Numbers Integers Floats Operators and its types Multiple Assignment	6hrs.

	Comments, Indentation and Statements Basic Input statement, output statement Debugging and Testing	
3.	**Conditional Statements and Branching** if Statements Simple if Statements if-else Statements The if-elif-else Chain Using Multiple elif Blocks Testing Multiple Conditions Switch Case	3hrs.
4.	**Control Statements** while Statement, do… while, for Statement, foreach statement, Nested loops Break Statement Continue Statement Pass Statement	5hrs.

5.	**List and Tuple** **What Is a List?** Accessing Elements in a List **List Operations and its Types** **Changing, Adding, and Removing Elements** Modifying Elements in a List Adding Elements to a List Removing Elements from a List **Organizing a List** Sorting a List Permanently with the sort() Method Sorting a List Temporarily with the sorted() Function Printing a List in Reverse Order Finding the Length of a List Avoiding Index Errors When Working with Lists **Making Numerical Lists** Using the range() Function Using range() to Make a List of Numbers **WORKING WITH LISTS** Looping Through an Entire List **Working with Part of a List** Slicing a List Looping Through a Slice Copying a List **Tuples** Defining a Tuple Looping Through All Values in a Tuple Writing over a Tuple	5hrs.

6.	**Dictionaries** Introduction: Simple dictionary, Adding, removing elements Accessing values in dictionaries Working with dictionaries Properties Functions: add, remove, modify Looping Through a Dictionary Nesting dictionary	3hrs.

7.	**FUNCTIONS** **Defining a Function** Passing Information to a Function Arguments and Parameters **Passing Arguments** Positional Arguments Keyword Arguments Default Values Equivalent Function Calls Avoiding Argument Errors **Return Types** Returning a Simple Value Returning a Dictionary **Passing a List** Modifying a List in a Function Preventing a Function from Modifying a List **Storing Your Functions in Modules** Importing an Entire Module Importing Specific Functions Using as to Give a Function an Alias Using as to Give a Module an Alias Importing All Functions in a Module Namespaces **Packages** Bringing Everything into the Current Scope Re-importing Modules and Packages Basics of Testing Your Modules and Packages	6hrs.
8.	**Classes and Objects** Creating and Using a Class Creating the Dog Class Making an Instance from a Class Working with Classes and Instances The Car Class example Setting a Default Value for an Attribute	6hrs.

	Modifying Attribute Values **Inheritance** The __init__() Method for a Child Class Defining Attributes and Methods for the Child Class Overriding Methods from the Parent Class **Introduction to Importing Classes with example**	

9.	**FILES, DIRECTORIES AND EXCEPTIONS** Opening and closing a file Reading and Writing from a file Reading line by line Reading Big file **Writing to a File** Writing to an Empty File Appending to a File Renaming, Moving, Copying, and Removing Files	5hrs.
10.	**Machine Learning/Deep Learning Framework** Scikit-learn introduction (training and evaluating classifiers) - introduction only Keras / TensorFlow introduction (training deep learning classifiers) - introduction only NumPy, SciPy - introduction only Pandas and Tabular - introduction only	4 hrs.

Books

1. Beginning Python: Using Python 2.6 and Python 3.1 (Wrox Programmer to Programmer) by James Payne
2. Introduction to Problem Solving with Python by E. Balagurusamy
3. The Complete Reference Python, Martin C. Brown, McGraw Hill
4. Head First Python, 2nd Edition

Marks Distribution:

Chapters	Marks	Remarks
1	2	Th
2	6	Th + P
3	8	Th + P
4	4	Th + P
5	4	Th + P
6	4	Th + P
7	4	Th + P
8	10	Th + P

9	**10**	**Th + P**
10	**8**	**Th + P**
Total	**60**	
Note: There might be minor deviation in mark distribution.		

Question Type	No. of Questions	Marks	Total Marks
Short	4	2	8
Medium	7	4	28
Long	3	8	24
Total			60

Detailed Syllabus of Python Programming

Note: Define (D), Description (Des), Derive (Dr), Illustration (I), Explanation (E), Application (A), Algorithm (Alg), Experimentation [Hardware (H) / Program(p)], Numerical (N)

Ch No.	Topic		Subtopic	Depth								
				D	Des	Dr	I	E	A	Alg	H	N
1	Introduction	1.1	Introduction to Python		Des							
		1.2	History of Python		Des		I					
		1.3	Features of Python		Des		I					
		1.4	Installing python and environment set up		Des		I			P		
2	Fundamentals of Python	2.1	Constant and Variables • Naming and Using Variables • Avoiding Name Errors When Using Variables • Variables as Labels	D				E		P		

		2.2	Data type • Strings • Numbers • Integers • Floats	**D**			**I**					

		2.3	Comments, Indentation and Statements Styling Your Code • The Style Guide • Indentation • Line Length • Blank Lines • Other Style Guidelines		**Des**		**I**			P		
		2.4	Basic Input statement, output statement					**E**		P		
		2.5	Debugging and Testing					**E**		P		
3	Conditional Statements and Branching	3.1	if Statements • Simple if Statements					**E**		P		
		3.2	if-else Statements • The if-elif-else Chain • Using Multiple elif Blocks					**E**		P		
		3.3	Testing Multiple Conditions					**E**		P		
		3.4	Switch Case					**E**		P		
4	Control Statements	4.1	while Statement, do… while statement		**Des**			**E**		P		

		4.2	for Statement, foreach statement, Nested loops		**Des**			**E**		P		

		4.3	Break Statement Continue Statement Pass Statement		**Des**			**E**		P		
5	List and Tuples	5.1	What Is a List? • Accessing Elements in a List	**D**								
		5.2	List Operations and its Types Changing, Adding, and Removing Elements • Modifying Elements in a List • Adding Elements to a List • Removing Elements from a List					**E**		P		
		5.3	Organizing a List • Sorting a List Permanently with the sort() Method • Sorting a List Temporarily with the sorted() Function		**Des**			**E**		P		

			• Printing a List in Reverse Order • Finding the Length of a List • Avoiding Index Errors When Working with Lists									
		5.4	Making Numerical Lists • Using the range() Function • Using range() to Make a List of Numbers					**E**		P		

		5.5	WORKING WITH LISTS • Looping Through an Entire List Working with Part of a List • Slicing a List • Looping Through a Slice • Copying a List			**I**		**E**		P		
		5.6	Tuples • Defining a Tuple	**D**	**Des**					P		
			• Looping Through All Values in a Tuple • Writing over a Tuple									
6	Dictionaries	6.1	Introduction • Simple dictionary, Adding, removing elements • Accessing values in dictionaries	**D**				**E**		P		
		6.2	Working with dictionaries • Properties • Functions: add, remove, modify • Looping Through a Dictionary • Nesting dictionary					**E**		P		
7	FUNCTIONS	7.1	Defining a Function • Passing Information to a Function • Arguments and Parameters	**D**	**Des**			**E**		P		

		7.2	Passing Arguments • Positional Arguments • Keyword Arguments • Default Values					**E**		P		

			• Equivalent Function Calls • Avoiding Argument Errors									
		7.3	Return Types • Returning a Simple Value • Returning a Dictionary					**E**		P		
		7.4	Passing a List • Modifying a List in a Function • Preventing a Function from Modifying a List					**E**		P		
		7.5	Storing Your Functions in Modules • Importing an Entire Module • Importing Specific Functions • Using as to Give a Function an Alias • Using as to Give a Module an Alias • Importing All Functions in a Module • Namespaces					**E**		P		

		7.6	Packages • Bringing Everything into the Current Scope • Re-importing Modules and Packages • Basics of Testing Your Modules and Packages					**E**		P		
8	Classes and Objects	8.1	CLASSES • Creating and Using a Class • Creating the Dog Class • Making an Instance from a Class • Working with Classes and Instances • The Car Class example • Setting a Default Value for an Attribute • Modifying Attribute Values	**D**	**Des**			**E**	**A**	P		
		8.2	Inheritance • The __init__() Method for a Child Class	**D**	**Des**			**E**		P		

			• Defining Attributes and Methods for the Child • Class • Overriding Methods from the Parent Class									
		8.3	Introduction to Importing Classes with example	**D**	**Des**							

9.	FILES, DIRECTORIES AND EXCEPTIONS	9.1	Opening and closing a file Reading and Writing from a file Reading line by line Reading Big file	**D**				**E**		P		
		9.2	Writing to a File • Writing to an Empty File • Appending to a File • Renaming, Moving, Copying, and Removing Files					**E**		P		
10.	Machine Learning/Deep Learning Framework	10.1	Scikit-learn introduction (training and evaluating classifiers) - introduction only	**D**	**Des**					P		
		10.2	Keras / TensorFlow introduction (training deep learning classifiers) - introduction only	**D**	**Des**					P		
		10.3	NumPy, SciPy - introduction only Pandas and Tabular - introduction only	**D**	**Des**					P		

Laboratory Works:

1. There shall be at least 15 Laboratory classes of python programming.

PURBANCHAL UNIVERSITY

Model Questions Paper - 2023

LEVEL: - BE Computer/ **Fourth Semester**

SUBJECT: - Python Programming FULL MARKS: - 60

TIME: - 03:00 hrs. PASS MARKS: - 24

Candidates are required to give their answers in their own words as far as practicable.

[

Group - A Attempt All Questions. 4 x 2 = 8 Q.1. In some languages every statement ends with a semicolon. What happens if you put a semi-colon at the end of a Python statement?
[2] Q.2. What is the difference between the List type and the Tuple type? [

2] Q.3. What do you need to do first when you want to use a module? [2]

Q.4. Write a python function called do_plus that accepts two parameters and adds them together with the "+" operation? [2] **Group**

– B (Attempt any seven Questions.) 4 x 7 = 28

Q.5. How do you perform input and output in Python? Provide examples to illustrate your answer. [1 + 3]

Q.6. Explain increment and decrement operators that are included within the python language with examples. [4]

Q.7. What is the difference between using the 'with' statement and manually closing a file? [4]

Q.8. Defines a function called calculate_average that takes a list of numbers as input and calculate the average of list. Finally, the function returns the average of that list. [4]

Q.9. Describe car class with an example using python. [4]

Q.10.What is Dictionaries? How do you add, remove and access elements in dictionaries? [1+3]

Q.11. What is an exception in Python, and when does it occur? What

is the purpose of using try-except blocks in Python? [4]

12. Write a program to perform add and remove operation on dictionary. [4]

Group – C (Attempt any three Questions.) 3 x 8 = 24

Q.13. Write a Python class called Person with the following attributes: name (string), age (integer), gender (string)
The class should have a constructor method that initializes these attributes, as well as methods to do the following:
introduce: Print a message introducing the person, including their name, age, and gender.
have_birthday: Increase the person's age by 1. [8]

Q.14. What are the differences between the 'for' loop, 'while' loop, and 'do-while' loop in Python? When would you use each one, and what are some advantages and disadvantages of each type of loop? [3 + 3 + 2]

Q.15. What is a module? How do you store functions in a module? List and describe different way of importing module in your program? [1 + 3 + 4]
Q.16. Write a short note on the following python based artificial intelligence libraries: (i) TensorFlow (ii) Scikit-learn [4 + 4]

The End