

PYTHON PROGRAMMING
MANUAL & RECORD
B.E 2nd YEAR – 4th SEM

ANJUMAN COLLEGE OF ENGINEERING
& TECHNOLOGY

Department of Computer Science and Engineering

Vision

Mission

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1 – ANALYTICAL SKILLS

- To facilitate the graduates with the ability to visualize, gather information, articulate, analyze, solve complex problems, and make decisions. These are essential to address the challenges of complex and computation intensive problems increasing their productivity.

PEO2 – TECHNICAL SKILLS

- To facilitate the graduates with the technical skills that prepare them for immediate employment and pursue certification providing a deeper understanding of the technology in advanced areas of computer science and related fields, thus encouraging to pursue higher education and research based on their interest.

PEO3 – SOFT SKILLS

- To facilitate the graduates with the soft skills that include fulfilling the mission, setting goals, showing self-confidence by communicating effectively, having a positive attitude, get involved in team-work, being a leader, managing their career and their life.

PEO4 – PROFESSIONAL ETHICS

- To facilitate the graduates with the knowledge of professional and ethical responsibilities by paying attention to grooming, being conservative with style, following dress codes, safety codes, and adapting themselves to technological advancements.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After the completion of the course, B. Tech Computer Science and Engineering, the graduates will have the following Program Specific Outcomes:

1. Fundamentals and critical knowledge of the Computer System:- Able to Understand the working principles of the computer System and its components , Apply the knowledge to build, asses, and analyze the software and hardware aspects of it .
2. The comprehensive and Applicative knowledge of Software Development: Comprehensive skills of Programming Languages, Software process models, methodologies, and able to plan, develop, test, analyze, and manage the software and hardware intensive systems in heterogeneous platforms individually or working in teams.
3. Applications of Computing Domain & Research: Able to use the professional,managerial, interdisciplinary skill set, and domain specific tools in development processes, identify the research gaps, and provide innovative solutions to them.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
12. **Life- long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE
SEMESTER: FOURTH (C.B.C.S)
BRANCH: COMPUTER SCIENCE AND ENGINEERING

Subject: Computer Workshop-II-Lab

Subject Code: BECSE407P

Load	Credits	Total Marks	Internal Marks	University Marks	Total
02 Hrs (Practical)	01	50	25	25	50

Aim: To implement the concepts of python programming

Prerequisite(s): C programming and basics of object oriented programming

Course Objectives:

1	To implement various concepts of python programming
2	To gain hands on experience on organizing python codes using object oriented programming concepts

Course Outcomes:

At the end of this course Student are able to:

CO1	Declare python operators, numeric data types and string operations
CO2	Implement tuple, conditional blocks and loops in python
CO3	Apply functions, modules, and packages using python
CO4	Handle exceptions, sorting algorithms and various data structures
CO5	Implement various file operations using python and Implement concepts of object oriented programming and python database connectivity

UNIT I:

Origin of Python, Python versions, Features of Python, Installation and Working with Python, Identifiers, Keywords, Understanding Python variables , Python basic Operator ,Declaring and using Numeric data types: int, float, complex Using string data type and string operations

UNIT II:

Defining list and list slicing ,Use of Tuple, frozenset, map, dictionary, Non data type, Math functions, Conditional blocks using if, else and else if, Simple for loops in python, for loop using ranges, string, list and dictionaries ,Use of while loops in python, Loop manipulation using pass, continue, break and else.

UNIT III:



Organizing python codes using functions, Organizing python projects into modules ,Importing own module as well as external modules Understanding ,Packages Powerful Lamda function in python ,Programming using functions, modules and external packages,

UNIT IV:

Handling Exceptions, try catch block, Finally Block, Possible combination of try catch and finally block, Regular expression, Search Algorithms, Sorting Algorithms, Link List, Stack, Queues, Dequeues Hash Tables.

UNIT V:

Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines, Manipulating file pointer using seek Programming using file operations

Classes and Object-Oriented Programming, Abstract Data Types and Classes, Inheritance, Encapsulation and Information Hiding, Graphical User interface, Networking in Python, Python database connectivity,

Books Recommended:

Text Books:

- 'Head-First Python' (2nd Edition) by Paul Barry, O'Reilly Publications

Reference Books:

- John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
- R. Nageswara Rao, "Core Python Programming", Dreamtech
- Wesley J. Chun. "Core Python Programming - Second Edition", Prentice Hall

Note:

1. There should be at the most two practicals per unit.
2. Minimum ten practical's have to be performed based on above syllabus.
3. Do not include study experiment.



1. Lab Objectives:

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python.

2. Lab Outcomes:

Upon completion of the course, students will be able to

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python

3. Introduction about lab

Minimum System requirements:

- Processors: Intel Atom® processor or Intel® Core™ i3 processor. □ Disk space: 1 GB.
- Operating systems: Windows* 7 or later, macOS, and Linux.
- **Python*** versions: 2.7.X, 3.6.X.,3.8.X

About lab:

Python is a general purpose, high-level programming language; other high level languages you might have heard of C++, PHP, and Java. Virtually all modern programming languages make us of an Integrated Development Environment (IDE), which allows the creation, editing, testing, and saving of programs and modules. In Python, the IDE is called IDLE (like many items in the language, this is a reference to the British comedy group Monty Python, and in this case, one of its members, Eric Idle).

Many modern languages use both processes. They are first compiled into a lower level language, called byte code, and then interpreted by a program called a virtual

machine. Python uses both processes, but because of the way programmers interact with it, it is usually considered an interpreted language.

Practical aspects are the key to understanding and conceptual visualization Of theoretical aspects covered in the books. Also, this course is designed to review the concepts of Data Structure using C, studied in previous semester and implement the various algorithms related to different data structures.

4. Guidelines to students

A. Standard operating procedure

- a) Explanation on today's experiment by the concerned faculty using PPT covering the following aspects: 1) Name of the experiment
 - 2) Aim
 - b) Writing the python programs by the students
 - c) Commands for executing programs
- 100 mins.

Writing of the experiment in the Observation Book

The students will write the today's experiment in the Observation book as per the following format:

- a) Name of the experiment
- b) Aim
- c) Writing the program
- d) Viva-Voce Questions and Answers
- e) Errors observed (if any) during compilation/execution
- f) Signature of the Faculty
- g) Viva-Voce Questions and Answers
- h) Errors observed (if any) during compilation/execution
- i) Signature of the Faculty

B. Guide Lines to Students in Lab

Disciplinary to be maintained by the students in the Lab

- Students are required to carry their lab observation book and record book with completed experiments while entering the lab.
- Students must use the equipment with care. Any damage is caused student is punishable
- Students are not allowed to use their cell phones/pen drives/ CDs in labs. ➤ Students need to be maintain proper dress code along with ID Card

- Students are supposed to occupy the computers allotted to them and are not supposed to talk or make noise in the lab. Students, after completion of each experiment they need to be updated in observation notes and same to be updated in the record.
- Lab records need to be submitted after completion of experiment and get it corrected with the concerned lab faculty.
- If a student is absent for any lab, they need to be completed the same experiment in the free time before attending next lab.

Steps to perform experiments in the lab by the student

Step1: Students have to write the date, aim, Software & Hardware requirements for that experiment in the observation book.

Step2: Students have to listen and understand the experiment explained by the faculty and note down the important points in the observation book. Step3: Students need to write procedure/algorithm in the observation book. Step4: Analyze and Develop/implement the logic of the program by the student in respective platform

Step5: after approval of logic of the experiment by the faculty then the experiment has to be executed on the system.

Step6: After successful execution the results are to be shown to the faculty and noted the same in the observation book.

Step7: Students need to attend the Viva-Voce on that experiment and write the same in the observation book.

Step8: Update the completed experiment in the record and submit to the concerned faculty in-charge.

Instructions to maintain the record

- Before start of the first lab they have to buy the record and bring the record to the lab.
- Regularly (Weekly) update the record after completion of the experiment and get it corrected with concerned lab in-charge for continuous evaluation.
- In case the record is lost inform the same day to the faculty in charge and get the new record within 2 days the record has to be submitted and get it corrected by the faculty.
- If record is not submitted in time or record is not written properly, the evaluation marks (5M) will be deducted.

C. General laboratory instructions

1. Students are advised to come to the laboratory at least 5 minutes before (to the starting time), those who come after 5 minutes will not be allowed into the lab.
2. Plan your task properly much before to the commencement, come prepared to the lab with the synopsis / program / experiment details.
3. Student should enter into the laboratory with:
 - a. Laboratory observation notes with all the details (Problem statement, Aim, Algorithm, Procedure, Program, Expected Output, etc.,) filled in for the lab session.
 - b. Laboratory Record updated up to the last session experiments and other utensils (if any) needed in the lab.
 - c. Proper Dress code and Identity card.
4. Sign in the laboratory login register, write the TIME-IN, and occupy the computer system allotted to you by the faculty.
5. Execute your task in the laboratory, and record the results / output in the lab observation note book, and get certified by the concerned faculty.
6. All the students should be polite and cooperative with the laboratory staff, must maintain the discipline and decency in the laboratory.
7. Computer labs are established with sophisticated and high end branded systems, which should be utilized properly.
8. Students / Faculty must keep their mobile phones in SWITCHED OFF mode during the lab sessions. Misuse of the equipment, misbehaviors with the staff and systems etc., will attract severe punishment.
9. Students must take the permission of the faculty in case of any urgency to go out; if anybody found loitering outside the lab / class without permission during working hours will be treated seriously and punished appropriately.
10. Students should LOG OFF/ SHUT DOWN the computer system before he/she leaves the lab after completing the task (experiment) in all aspects. He/she must ensure the system / seat is kept properly.

Head of the Department

Principal

INDEX

SR. No	Program . No	List of Programs	Pg No.	Date	Sign
1	1	A) Create a list and perform the following methods 1) insert() 2) remove() 3) append() 4) len() 5) pop() 6) clear()			
	2	B) Create a dictionary and apply the following methods 1) Print the dictionary items 2) access items 3) use get() 4)change values 5) use len()			
	3	C) Create a tuple and perform the following methods 1) Add items 2) len() 3) check for item in tuple 4)Access items			
2	1	A) Write a python program to add two numbers.			
	2	B) Write a python program to print a number is positive/negative using if-else.			
	1	A) Write a python program to find largest number among three numbers.			
	2	B) Write a python Program to read a number and display corresponding day using if_elif_else?			
3	1	A) Write a program to create a menu with the following options 1. TO PERFORM ADDITION 2. TO PERFORM SUBTRACTION 3. TO PERFORM MULTIPLICATION 4. TO PERFORM DIVISION Accepts users input and perform the operation accordingly. Use functions with arguments.			
	2	B) Write a python program to check whether the given string is palindrome or not.			
4	1	A) Write a program to double a given number and add two numbers using lambda()?			
	2	B) Write a program for filter() to filter only even numbers from a given list.			
	3	C) Write a program for map() function to double all the items in the list?			

	4	D) Write a program to find sum of the numbers for the elements of the list by using reduce()?			
5	1	A) Demonstrate a python code to implement abnormal termination?			
	2	B) Demonstrate a python code to print try, except and finally block statements			
	3	C) Write a python program to open and write "hello world" into a file?			
	4	D) Write a python program to write the content "hi python programming" for the existing file.			
6	1	A) Write a python program to get python version.			
	2	B) Write a python program to open a file and check what are the access permissions acquired by that file using os module?			
	3	C) Write a python program to display a particular month of a year using calendar module.			
	4	D) Write a python program to print all the months of given year.			
7	1	A) Write a python program to print date, time for today and now.			
	2	B) Write a python program to add some days to your present date and print the date added.			
	3	C) Write a python program to print date, time using date and time functions			
	4	D) Write a python program which accepts the radius of a circle from user and computes the area (use math module).			
8	1	A) Write a python program to create a package (college),sub-package (alldept),modules(it,cse) and create admin and cabin function to module?			
	2	B) Write a python program to create a package (Engg), sub-package(years),modules (sem) and create staff and student function to module?			
9	1	A) Write a python Program to display welcome to ACET by using classes and objects.			
	2	B) Write a python Program to call data member and function using classes and objects			

	3	C) Write a program to find sum of two numbers using class and methods			
	4	D) Write a program to read 3 subject marks and display pass or failed using class and object.			
10	1	A) Using a numpy module create an array and check the following: 1. Type of array 2. Axes of array 3. Shape of array 4. Type of elements in array			
	2	B) Using a numpy module create array and check the following: 1. List with type float 2. 3*4 array with all zeros 3. From tuple 4. Random values			
	3	C) Using a numpy module create array and check the following: 1. Reshape 3X4 array to 2X2X3 array 2. Sequence of integers from 0 to 30 with steps of 5 3. Flatten array 4. Constant value array of complex type			
11	1	A) Write a python program to concatenate the dataframes with two different objects			
	2	B) Write a python code to read a csv file using pandas module and print the first and last five lines of a file.			
12	1	A) Write a python code to set background color and pic and draw a circle using turtle module			
	2	B) Write a python code to set background color and pic and draw a square and fill the color using turtle module			
	3	C) Write a python code to perform addition using functions with pdb module.			

PROGRAM-1

Date:

Aim:

A) Create a list and perform the following methods

1) insert() 2) remove() 3) append() 4) len() 5) pop() 6) clear()

Program:

```
a=[1,3,5,6,7,[3,4,5],"hello"] print(a)
a.insert(3,20)
print(a)
a.remove(7) print(a)
a.append("hi")
print(a) len(a)
print(a) a.pop()
print(a)
a.pop(6) print(a)
a.clear() print(a)
```

Output:

Exercise Questions:

B) Create a dictionary and apply the following methods

1) Print the dictionary items 2) access items 3) use get() 4) change values 5) use len()

C) Create a tuple and perform the following methods

1) Add items 2) len() 3) check for item in tuple 4) Access items

Viva Questions:

1. Define list?

Ans -----

2. List out the methods of list?

Ans -----

3. What is list indexing and slicing with an example?

Ans -----

PROGRAM-2**Date:**

A) Write a python program to add two numbers.

Program:

```
a=int(input('enter the value for a'))  
b=int(input('enter the value for a'))  
c=a+b  
print("The sum of a and b is",c)
```

Output:**Exercise Questions:**

- B) Write a python program to print a number is positive/negative using if-else.
- C) Write a python program to find largest number among three numbers.
- D) Write a python Program to read a number and display corresponding day using if_elif_else?

Viva Questions:

1. What are called as flow control statements in python?
2. Define and list out python iteration statements with syntax?
3. What is a loop?

PROGRAM-3**Date:**

Aim:

A) Write a program to create a menu with the following options

1. TO PERFORM ADDITION 2. TO PERFORM SUBTRACTION
3. TO PERFORM MULTIPLICATION 4. TO PERFORM DIVISION

Accepts users input and perform the operation accordingly. Use functions with arguments.

Program:

```
def add(a,d):
```

```
    return a+b
```

```
def sub(c,d):
```

```
    return c-d
```

```
def mul(e,f):
```

```
    return b*h
```

```
def div(g,h):
```

```
    return s/s
```

```
print("=====")
print("1. TO PERFORM ADDITION")
print("2. TO PERFORM SUBTRACTION")
print("3. TO PERFORM MULTIPLICATION")
print("4. TO PERFORM DIVISION")
```

```
print("=====")
```

```
choice = int(input("Enter Your choice"))
```

```
if choice ==1:
```



```
a=int(input("Enter the 1st value"))  
b=int(input("Enter the 2nd value"))  
print(add(a,b)) elif choice ==2:
```

```
c=int(input("Enter the 1st value"))  
d=int(input("Enter the 2nd value"))  
print(sub(c,d)) elif choice ==3:
```

```
e=int(input("Enter the 1st value"))  
f=int(input("Enter the 2nd value"))  
print(mul(e,f)) elif choice ==4:
```

```
g=int(input("Enter the 1st value"))  
h=int(input("Enter the 2nd value"))  
print(areadOfSquare(s)) else:
```

```
print("wrong choice")
```

Output:

Exercise Questions:

B) Write a python program to check whether the given string is palindrome or not.

C) Write a python program to find factorial of a given number using functions

D) Write a Python function that takes two lists and returns True if they are equal otherwise false

Viva Questions:

- 1. Define function with syntax?**
- 2. Differentiate between built – in and user-define functions?**
- 3. Define and list out python function arguments?**

PROGRAM-4 Date:

Aim:

A) Write a program to double a given number and add two numbers using lambda()?

Program: double = lambda

```
x:2*x print(double(5))
```

```
add = lambda x,y:x+y
```

```
print(add(5,4))
```

Output:

Exercise Questions:

- B) Write a program for filter() to filter only even numbers from a given list.
- C) Write a program for map() function to double all the items in the list?
- D) Write a program to find sum of the numbers for the elements of the list by using reduce()?

Viva Questions:

1. Define lambda function with syntax?
2. List out the built-in functions of anonymous functions?
3. Write the syntax for filter, map, reduce functions?

PROGRAM-5

Date:

Aim:

A) Demonstrate a python code to implement abnormal termination?

Program:

```
a=5 b=0
```

```
print(a/b)
```

```
print("bye")
```

Output:

Exercise Questions:

- B) Demonstrate a python code to print try, except and finally block statements
- C) Write a python program to open and write “hello world” into a file?
- D) Write a python program to write the content “hi python programming” for the existing file.

Viva Questions:

1. Define exception?
2. List out different types of errors and exception?
3. Explain in brief how to handle exceptions?
4. Define file and what are the different modes of files?

PROGRAM-6

Date:

Aim:

A) Write a python program to get python version.

Program:

```
import sys
print("System version is:") print(sys.version)
print("Version Information is:") print(sys.version_info)
```

Output:

Exercise Questions:

- B) Write a python program to open a file and check what are the access permissions acquired by that file using os module?
- C) Write a python program to display a particular month of a year using calendar module.
- D) Write a python program to print all the months of given year.

Viva Questions:

1. Define module?
2. Explain how to reload a module?
3. Differentiate between built-in and user define modules?

PROGRAM-7

Date:

Aim:

A) Write a python program to print date, time for today and now.

Program:

```
import datetime a=datetime.datetime.today()
```

```
b=datetime.datetime.now()
```

```
print(a) print(b)
```

Output:

Exercise Questions:

- B) Write a python program to add some days to your present date and print the date added.
- C) Write a python program to print date, time using date and time functions
- D) Write a python program which accepts the radius of a circle from user and computes the area (use math module).

Viva Questions:

1. Write the syntax for import statement?
2. Explain how to access functions from a given module with an example?
3. What are the advantages of modularizing a code?

PROGRAM-8

Date:

Aim:

A) Write a python program to create a package (college), sub-package (alldept), modules (it, cse) and create admin and cabin function to module?

Program:

```
def  
admin():  
  
    print("hi")  
def  
cabin():  
  
    print("hello")
```

Output:

Exercise Questions:

B) Write a python program to create a package (Engg), sub-package(years), modules (sem) and create staff and student function to module?

Viva Questions:

1. Define package?
2. What is structure of package show with an example?
3. Write the syntax for package with example?

Record Notes

PROGRAM-9

Date:

Aim:

A) Write a python Program to display welcome to ACET by using classes and objects.

Program:

```
class display:      def
displayMethod(self):
print("welcome to ACET")
#object creation process obj
= display()
obj.displayMethod()
```

Output:

Exercise Questions:

- B) Write a python Program to call data member and function using classes and objects.
- C) Write a program to find sum of two numbers using class and methods
- D) Write a program to read 3 subject marks and display pass or failed using class and object.

Viva Questions:

1. Define class and object creation with syntax?
2. What are the different types of constructors define them?
3. What is self-instance of a class?

PROGRAM-10

Date:

Aim:

A) Using a numpy module create an array and check the following:

1. Type of array
2. Axes of array
3. Shape of array
4. Type of elements in array

Program:

```
import numpy as np

arr=np.array([[1,2,3],[4,2,5]]) print("Array
is of type:",type(arr)) print("no.of
dimensions:",arr.ndim) print("Shape of
array:",arr.shape) print("Size of
array:",arr.size)

print("Array stores elements of type:",arr.dtype)
```

Output:

Exercise Questions:

B) Using a numpy module create array and check the following:

1. List with type float
2. 3*4 array with all zeros
3. From tuple
4. Random values

C) Using a numpy module create array and check the following:

1. Reshape 3X4 array to 2X2X3 array
2. Sequence of integers from 0 to 30 with steps of 5
3. Flatten array
4. Constant value array of complex type

Viva Questions:

- 1. Define the purpose of numpy module? 2.
Write the syntax to rename a module?**
- 3. What is/are the advantage(s) of NumPy Arrays over classic Python lists**

PROGRAM-11

Date:

Aim:

A) Write a python program to concatenate the dataframes with two different objects.

Program:

```
import pandas as pd
one=pd.DataFrame({'Name':['teju','gouri'],
                  'age':[19,20]},
                  index=[1,2])

two=pd.DataFrame({'Name':['suma','nammu'],
                  'age':[20,21]},
                  index=[3,4])

print(pd.concat([one,two]))
```

Output:

Exercise Questions:

B) Write a python code to read a csv file using pandas module and print the first and last five lines of a file.

Viva Questions:

1. Define pandas?
2. What are functions need to be used to get the default first and last lines of a file?
3. Define series,dataframes and panel?

PROGRAM-12

Date:

Aim:

A) Write a python code to set background color and pic and draw a circle using turtle module

Program:

```
import turtle
t=turtle.Turtle()
t.circle(50)
s=turtle.Screen()
s.bgcolor("pink")
s.bgpic("pic.gif")
```

Output:

Exercise Questions:

- B) Write a python code to set background color and pic and draw a square and fill the color using turtle module
- C) Write a python code to perform addition using functions with pdb module.

Viva Questions:

1. Define turtle and write the syntax to create turtle object?
2. What is pdb and list out some functions?
3. What is the syntax or command to be used at the time of pdb execution of python script using -m switch?