

PYTHON PROGRAMMING LAB FOR ELECTRICAL ENGINEERING

Course Code: 22EE1110

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Prerequisites: Problem Solving using C, Electrical Circuit Analysis, Engineering Electromagnetics

Course outcomes: At the end of the Course, the student shall be able to

CO1: Illustrate Decision Making statements and Functions.

CO2: Develop programs with different data types such as lists, tuples and strings.

CO3: Assess the Object properties and use for GUI applications.

CO4: Evaluate the electrostatic field parameters using Python.

CO5: Determine the Electrical/ Electronic network parameters using Python.

LIST OF EXPERIMENTS:

1. Basic Input, output, Variable and Functions

- Print the "Python" for 1, print "Day - 1" for 2. By changing the variable "look" for each statement.
- Write a program to print the sum of all the even numbers in the range 1 - 50 and print the even sum.
- Write a Program to display all prime numbers within an interval of 20 and 50.
- Write a program to define a function with multiple return values.
- Write a program which creates an adder given a value (Use only lambda).

2. Loops, Conditionals and Strings

- Write a program to print the following patterns using loop:
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- Write a program to print multiplication tables of 8, 15, 69.
- Write a program to check if two strings are anagrams or not.
- Write a program to check if the substring is present in a given string or not. (use regular expressions).

3. Lists and Tuples

- Write a program to perform the given operations on a list:
i. add ii. insert iii. slicing

- b. Write a program to get a list of the even numbers from a given list of numbers.(use only comprehensions)
- c. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
- d. Write a program to return the top 'n' most frequently occurring chars and their respective counts.
e.g. aaaabbbbcccc, 2 should return [(a 5) (b 4)]

4. Sets and Dictionaries

- a. Write a program that displays which letters are present in both strings.
- b. Write a program to sort a given list of strings in the order of their vowel counts.
- c. Write a program to generate a dictionary that contains numbers (between 1 and n) in the form of (x, x*x).
- d. Write a program to check if a given key exists in a dictionary or not.

5. Files and Classes

- a. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered. (Handle exceptions)
- b. Write a program to find the most frequent words in a text. (read from a text file).
- c. Write a Python class named Person with attributes name, age, weight (kgs), height (ft) and takes them through the constructor and exposes a method get_bmi_result() which returns one of "underweight", "healthy", "obese".
- d. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.

6. Arrays and GUI

- a. Write a program to create, display, append, insert and reverse the order of the items in the array.
 - b. Write a program to add, transpose and multiply two matrices.
 - c. Write a program to create a temperature converter using tkinter.
7. Conversion from one coordinate system to another coordinate system using Python commands.
 8. Calculation of Force, Electric field and Potential at a given point using Python commands.
 9. Calculation of ripple factor for a given rectifier: Half-wave/Full-wave/Bridge circuit using Python program.
 10. Obtain the characteristics for the given circuit using Maximum power transfer theorem.

In addition to the above Ten experiments, at least any two of the Experiments from the list are required to be conducted:

11. Modelling of an electrical circuit using Python program.
12. Apply Nodal analysis and Mesh analysis for a given electrical circuit.

13. Conversion between Star-Delta configurations and generate three phase voltage waveforms for Star and Delta configurations using Python commands.
14. Generate Continuous and Discrete time signals for elementary functions.
15. Obtain the response of a Second-order system (Time-response, Root locus, Bode plot).
16. Calculation of the equivalent circuit parameters and efficiency of a Transformer at different loads using Python commands.

TEXT BOOKS:

1. Y. Daniel Liang, *Introduction to programming using Python*, 1st Edition, Pearson Publications, 2017.
2. Sheetal Taneja, *Python Programming A Modular Approach*, 1st Edition Pearson Publications, 2017.

REFERENCES:

1. Brett Slatkin (C), *Effective Python: 59 Specific Ways to Write Better Python*, I/C, 1st Edition Pearson Publications, 2015.
2. Ashok Namdev Kamathane and Amit Ashok Kamathane, *Programming and Problem Solving with Python*, 1st Edition, McGraw Hill Education (India) Private Limited, 2017.

WEB REFERENCES:

1. <https://pyspice.fabrice-salvaire.fr/releases/v1.6>
2. [https://tbc-python.fossee.in/convert notebook/Electrical_Circuit_Theory_And_Technology](https://tbc-python.fossee.in/convert%20notebook/Electrical_Circuit_Theory_And_Technology)
3. <https://wiki.python.org/moin/PythonBooks>