

22EE470	ELECTRICAL PROBLEM SOLVING USING COMPUTERS	Category	L	T	P	Credit
		PCC	0	0	2	1

Preamble

The purpose of this course is to introduce to students to the field of programming using Python language. The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in Python. The programming will be done for electrical applications.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course students will be able to

CO Number	Course Outcome Statement	TCE Proficiency Scale	Expected Proficiency in %	Expected Attainment Level %
CO1	Solve the given problem statement using python programming concepts such as objects, data types, expression, statements, looping and	TPS3	80	70
CO2	Apply the concepts of functions, tuples, list, dictionary and string in design of simple applications	TPS3	80	70
CO3	Apply structured types, and file handling to design a solution for a problem of moderate complexity.	TPS3	80	70
CO4	Use packages and libraries in python programming for problem solving by reducing time and space complexity	TPS4	80	70
CO5	Apply the concepts of classes and objects in solving the problem using python programming.	TPS3	80	70
CO6	Develop a Python program for the given electrical problem / tasks	TPS4	80	70

Mapping with Programme Outcomes and Programme Specific Outcomes

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	S	M	L		S							M	S	S
CO 2	S	M	L		S							M	S	S

CO 3	S	M	L		S							M	S	S
CO 4	S	S	M	L	S							M	S	S
CO 5	S	M	L		S							M	S	S
CO 6	S	S	M	L	S			M	M	M		M	S	S

S- Strong; M-Medium; L-Low

Assessment Pattern: Cognitive Domain

Cognitive Levels	Model Examination	Terminal Examination
Remember		
Understand		
Apply	30	30
Analyse	40	40
Evaluate		
Create		

Assessment Pattern: Psychomotor

Psychomotor Skill	Mini project /Practical Component/Observation
Perception	
Set	
Guided Response	
Mechanism	30
Complex Overt Responses	
Adaptation	
Origination	

List of Experiments/Activities with CO Mapping

Experiment	CO
Simple Programs including print, input and computations	CO1
Branching Programs	CO1
Looping Programs	CO1
String Programs	CO2
Programs handling functions	CO2
File handling with exceptions	CO3
Python programs to solve electrical engineering problems using libraries and packages	CO4

Programs including object oriented concepts	CO5
Mini-Project	CO6

Sample problems:

1. Determine the value of inductance / resistance / capacitance for the given specifications of materials.
2. Determine electric potential/electrical field / flux density for the given charge information.
3. Calculate energy stored in inductor/capacitor
4. Obtain the value of resistance for the given colour coding.
5. Solve the mesh/nodal equations of the given electrical circuit
6. Obtain the rating of fuse to be used in the mains for the given set of domestic loads.
7. Compute electric bill for a residential building.
8. Compute transient value of current/voltage in an electrical network at time "t".
9. Create a database of EB customer's data and retrieve necessary data.
10. Calculate the efficiency of a transformer/motor.
11. Obtain the voltage regulation for the given generator specifications.
12. Obtain the characteristics curve of diode/BJT/MOSFET.
13. Calculate the gain of electronics circuit including transistors/opamps
14. Calculate the equivalent Digital value of the analog input.

Reference Book & Web Resources

1. E. Bala gurusamy, "Introduction to Computing and Problem Solving using Python", McGraw Higher Ed, First Edition, 2016.
2. John V.Guttag, " Introduction to Computation and Programming Using Python : With Application to Understanding Data", Prentice-Hall International publishers, Second Edition, 2017.
3. ReemaThareja, "Python Programming using problem solving Approach", Oxford University, Higher Education Oxford University Press, First edition, 2017.
4. R.G.Dromey, "How to solve it by Computers", Pearson Education India , First Edition, 2008
5. NPTEL course "A joy of computing using python" , <https://nptel.ac.in/courses/106106182/>

Course Designers:

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