

## PYTHON LAB

IV Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
A5ME40	PCC	L	T	P	C	CIA	SEE	Total
		1	-	2	2	30	70	100
<p><b>COURSE OBJECTIVES :</b></p> <ol style="list-style-type: none"> <li>1. Understand the basics and function of Python Programming Language.</li> <li>2. Understand the string operation and sequences used in Python Programming Languages.</li> <li>3. Understand the data structures used in Python Programming Languages.</li> <li>4. Know the classes and objects in Python Programming Language.</li> <li>5. Use the reusability concepts in Python Programming Language.</li> </ol>								
<b>LIST OF PYTHON PROGRAMS</b>								
<ol style="list-style-type: none"> <li>1. Write a program to find root of quadratic equation.</li> <li>2. Write a program to find and delete repeating number in Given List.</li> <li>3. Write a program to perform equations of uniform motion of kinematics :               <ol style="list-style-type: none"> <li>i. <math>v = u + at</math></li> <li>ii. <math>s = ut + \frac{1}{2}(at^2)</math></li> <li>iii. <math>v^2 = u^2 - 2as</math></li> </ol> </li> <li>4. Write a menu driven program to perform following properties of thermodynamics as given below:               <ol style="list-style-type: none"> <li>i. First Law of thermodynamics ( <math>U = Q - W</math> ), where <math>\Delta U</math> is the change in the internal energy. Q is the heat added to the system, and W is the work done by the system.</li> <li>ii. Efficiency of Heat Engine = <math>(T_H - T_C) / T_H</math> where <math>T_H</math> &amp; <math>T_C</math> is the temperature of HOT and COLD Reservoirs.</li> </ol> </li> <li>5. Write the menu program to find the relationship between stress and strain curve as given below:               <ol style="list-style-type: none"> <li>i. Young's Modulus</li> <li>ii. Shear Modulus</li> <li>iii. Poisson Ratio</li> </ol> </li> <li>6. Write the program to determine the shear force and bending moment in beams.</li> <li>7. Write a program to find maxima/minima of functions of two variables and evaluate some real definite and finite integrals.</li> <li>8. Write a Program to find out unknown magnitude of <math>T_B</math> and <math>T_D</math> of unknown tensions can be obtained from two scalar equations of equilibrium i.e. <math>\sum F_x = 0</math> and <math>\sum F_y = 0</math>.</li> <li>9. Write a program to perform interpolation of equally and unequally spaced data.</li> <li>10. Write a program to calculate total pressure exerted in ideal fluid as equation is given below:  <math>P + \frac{1}{2}(\rho v^2) + \rho gh = \text{constant}</math>                Where P is Pressure, V is Velocity of fluid, <math>\rho</math> is density and h is the height of the container.             </li> <li>11. Write a program to input and print the element sum of user defined matrix.</li> <li>12. Write a program to input and multiply two different matrices.</li> <li>13. Write a program to compute eigen value and vector of a given 3*3 matrix using NumPy.</li> <li>14. Write a program to find a solution of linear equations in <math>y=mx+c</math></li> <li>15. Write a program to draw line using equation <math>y=mx+c</math></li> <li>16. Write the program to determine the intersection point of two lines.</li> <li>17. Draw various types of charts using matplotlib.</li> <li>18. Write a program to find numerical differentiation using Finite differences Method by importing NumPy and plot the numerical values using matplotlib libraries of python.</li> <li>19. Write a program for bresenham's line drawing algorithm.</li> <li>20. Write a program for geometric transformation of a given object.</li> </ol> <p><b>Note:</b> Minimum 12 experiments are to be conducted.</p>								

**COURSE OUTCOMES:**

1. Apply conditional statement, loops condition and functions in python program
2. Solve mathematical and mechanical problems using python program
3. Plot various type of chart using python program
4. Analyze the mechanical problem using python program
5. Illustrate programs on various python libraries such as numpy, pandas and matplotlib