

Subject Code: 01ME0509

Subject Name: Python for Mechanical Engineering

B. Tech. Year - III (Semester - 5)

Type of course : Graduate

Prerequisite : NA

Rationale : The course is prepared to provide the basic understating of Python for mechanical engineering.

Course Outcome :

After completion of this course, student will be able to

1. Understand the basic syntax of python
2. Implementation of various plotting techniques of python in mechanical engineering
3. Development of Python code for Manufacturing.
4. Development of Python code for Mechanical Design
5. Development of Python code for Thermal System
6. Development of Python code for computational

Teaching and Examination Scheme :

Teaching Scheme			Credits C	Examination Marks					Total Marks
THEORY	TUTORIAL	PRACTICAL		Theory Marks			Practical Marks		
				ESE(E)	IA	CSE	Viva (V)	Term Work (TW)	
0	0	4	2	0	0	0	50	50	100

Content :

Sr. No.	Content	Total Hrs.
1	Python-Basic: Data type, Mathematical Operation, Boolean operation, Loops, Function, List, Tuple, Set, Dictionary, Class, File handling, Introduction of Library, Numpy, Matplot, Scipy	12
2	Python for Manufacturing: Code for Metal cutting: Code MRR, Code for Tool Wear, Code on Theory of Metal Cutting, Code for optimum arc gap in welding, Code for welding efficiency, Code for Heat distribution in welding, Code for Design of Riser, Code for metal forming	12

3	Python for Mechanical Design: Code for kinematics analysis, Code for Gear Train, Code for Cam and follower, Code for principal stresses, Code for joints, Code for design Shaft, Code for coupling, Code for design of column	12
4	Python for Thermal System: Code for hydrostatic forces, Code for fluid kinematics and dynamics, Code for viscous and turbulent flow, Code for flow through pipe, Code for first law of thermo dynamics, Code on carnot cycle, Code on Heat Transfer	12
5	Python for Computation: Python code for ODE, Python code for PDE, Python code Fourier, Python code for Matrix algebra, Python code for Vector Calculus, Python code for Numerical Analysis	12

Distribution of Theory Marks

R Level	U Level	A Level	N Level	E` Level	C Level
10	20	25	25	10	10

Legends: R: Remember; **U:** Understand; **A:** Apply; **N:** Analyze; **E:** Evaluate; **C:** Create

List of Experiments :

1. Python code for basic syntax
2. Python code for different visualization techniques
3. Python code for machining cost estimation
4. Python code for heat distribution in welding
5. Python code for calculating the yield in sand casting
6. Python code for kinematic analysis of quick return mechanism in shaper
7. Python code for design of cam for Lathe machine
8. Python code for design of back gear train for Lathe machine
9. Python code for visualizing the flow pattern in pipes
10. Python code for calculating work done in engine
11. Python code for application of PDE in mechanical engineering
12. Python code for application of Matrix algebra in mechanical engineering

Reference books :

1. Python Programming Fundamentals, Lee, Kent D., Springer
2. Python Workbook: a brief introduction with exercises and solutions, Stephenson, Ben, Springer
3. Core Python Programming, 2nd ed Rao, Nageshwar R Dream Tech Press
4. Core Python Applications Programming, 3rd ed. Chun, Wesley J. Pearson India Education

Services Pvt. Ltd

5. Elementary Mechanics Using Python: a modern course combining analytical and numerical techniques Malthe-Sorensen, Anders Springer
6. Primer on Scientific Programming with Python Langtangen, Hans Petter Springer
7. Introduction to Computation and Programming Using Python Gutttag, John V. PHI Learning Private Limited
8. Head First Python: a brain friendly guide, 2nd ed Barry, Paul Shroff Publishers & Distributors Pvt. Ltd.

List of Open Base Software / learning website :

1. <https://colab.research.google.com>
2. <https://atom.io>
3. <https://www.anaconda.com>