

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B. Tech in Electronics and Instrumentation Engineering
Course Code:	2EIDE63
Course Title:	Programming with Python & MATLAB
Course Type:	(<input type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course/ <input checked="" type="checkbox"/> Departmental Elective / <input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/ <input type="checkbox"/> Any other)
Year of introduction:	2023-2024

(Offered to the student who has not taken similar course under open elective)

Credit Scheme

L	T	Practical component			C
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. illustrate basics of Python and MATLAB programming
2. identify appropriate libraries of Python to apply for various computational problems.
3. develop applications using Python.
4. apply various techniques to solve engineering-related computational problems using MATLAB.

Syllabus:

Total Teaching hours: 30

Unit	Syllabus	Teaching hours
UNIT-I	Introduction Importance of Python and MATLAB programming.	01
UNIT-II	Python basics Basic elements of Python, operators, control statements and loops, strings, list, array, tuple, set, dictionary, functions in python, various built in functions in python, reading text from a file, writing text into a file, module and packages in python.	09
UNIT-III	Libraries in Python Introduction to various libraries in Python like Numpy, Matplotlib, Pandas.	06
UNIT-IV	Branching, Loops and Plotting in MATLAB Relational and logic operators, branches, WHILE loops FOR loops, SWITCH, BREAK, CONTINUE, sorting & searching, plotting, 2D plots, 3D plots, reading text from a file, writing text into a file.	04

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GUI programming, application development, data acquisition, optimization methods, signal processing, image processing, machine learning, deep learning, curve fitting and data analysis, robotics system.

Self-Study: The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

Laboratory Work: Laboratory work will consist of minimum 10 experiments based on the above syllabus.

Suggested List of Experiments:

1. To implement plotting, file reading and writing operations in MATLAB.
2. To implement curve fitting and data analysis in MATLAB.
3. GUI programming in MATLAB.
4. To implement operations with variables, Numpy arrays, expressions and functions in python.
5. To implement operations with strings, lists, dictionaries and tuples in Python.
6. To Implement conditional codes, loops and iteration in Python
7. To implement file reading, writing and editing operations in Python.
8. Plotting and data analysis in Python.
9. To implement signal processing operation.
10. To implement image processing operation
11. To implement machine learning operations.
12. To implement optimization techniques.

Suggested Readings/References:

1. MATLAB Programming with Applications for Engineers, Stephen J. Chapman, Brooks/Cole Publishing Co.
2. Jamal T. Manassah, Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB, CRC Press.
3. Rudra Pratap, Getting Started with MATLAB, Oxford University Press.
4. Stormy Attaway, MATLAB: A Practical Introduction to Programming and Problem Solving, Butterworth-Heinemann Publishers.
5. R Nageshwara Rao, Core Python Programming, dreamtech.
6. Wesley J. Chun, Core Python Programming, Prentice Hall.
7. Burkhard Meier , Python GUI Programming Cookbook. Packt Publication.

Suggested Case List: --

L= Lecture, T=Tutorial, P= Practical, C= Credit