

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B. Tech.in Electronics and Instrumentation Engineering
Semester:	III
Course Code:	2EI103
Course Title:	Software for Engineers
Course Type:	Core
Year of Introduction:	2023-24

L	T	Practical component				C
		LPW	PW	W	S	
2	0	2	-	-	-	3

Course Learning Outcomes (CLOs):

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

1. illustrate basics of Python, LabVIEW and MATLAB programming. (BL2)
2. identify appropriate libraries of Python to apply for various computational problems (BL3)
3. develop applications using Python, LabVIEW and MATLAB. (BL3)
4. test the contents covered in theory sessions with software simulation (BL6)

Teaching Hours: 30

Unit	Syllabus	Teaching Hours
Unit- I	Introduction Importance of programming.	01
Unit- II	Fundamentals of Python Programming Basic elements of Python, operators, control statements and loops, strings, list, array, tuple, set, dictionary, functions in python, various built in functions in python, module and packages in python.	07
Unit-III	Libraries in Python Introduction to various libraries in Python like Numpy, Matplotlib, Pandas.	06
Unit-IV	Fundamentals of LabVIEW Programming Introduction to LabVIEW, modular programming, subVI, condition and loops, array, clusters, LabVIEW NXG, introduction to toolkits and modules.	06
Unit-V	Fundamentals of MATLAB Programming Relational and logic operators, branches, WHILE loops FOR loops, SWITCH, BREAK, CONTINUE, sorting & searching, plotting, reading and writing files.	03
Unit-VI	Advanced features and development of applications GUI programming, optimization methods, signal processing, image processing, machine learning, deep learning, curve fitting and data analysis.	07

Laboratory Work:

This shall consist of at least 10 practicals based on the above syllabus.

Suggested Reading:

1. Wesley J. Chun, Core Python Programming, Prentice Hall.
2. R Nageshwara Rao, Core Python Programming, dreamtech Press.
3. Burkhard Meier , Python GUI Programming Cookbook, Packt Publication.
4. Jovitha Jerome, Virtual Instrumentation using LabVIEW, Prentice Hall India Learning Private Limited.
5. MATLAB Programming with Applications for Engineers, Stephen J. Chapman, CL-Engineering.
6. Rudra Pratap, Getting Started with MATLAB, Oxford University Press.
7. Stormy Attaway, MATLAB: A Practical Introduction to Programming and Problem Solving, Butterworth-Heinemann Publishers.

**Suggested List of Experiments (not restricted to the following):
(Only for Information)**

	Title of Experiment	Hrs.
1.	To implement operations with Data Types (Numbers, List, Dictionary, Tuple) in Python.	2
2.	To implement operations (Data Type Conversion, using Operators, Operands, and Expression) in Python.	2
3.	To implement decision making, Loops and Iterations in Python.	2
4.	To implement string operations in python.	2
5.	To plot graphs in Python.	2
6.	Reading and writing files in Python with Pandas	2
7.	To design Graphical User Interface in LabVIEW	2
8.	To design subVI in LabVIEW.	2
9.	Implement programs using structures in LabVIEW.	2
10.	To work with programming constructs in MATLAB	2
11.	To generate 2D, 3D Plots in MATLAB.	2
12.	To design Graphical User Interface in MATLAB	4

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

w.e.f. the academic year 2023 - 24 and onwards