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Course Code:INT318**Semester: VII****IT WORKSHOP SCILAB / MATLAB****Course Objectives:**

This course will help the learner to understand the MATLAB environment. This course also focuses on MATLAB programming, GUI, design programs in MATLAB to solve scientific, mathematical and real time problems.

UNIT - I**11 Periods**

Introduction: History, basic features, strengths and weaknesses, good programming practices and plan your code. **Working with variables, workspace and miscellaneous commands:** Creating MATLAB variables, overwriting variable, error messages, making corrections, controlling the hierarchy of operations or precedence, controlling the appearance of floating point number, managing the workspace, keeping track of your work session, entering multiple statements per line, miscellaneous commands.

UNIT - II**11 Periods**

Matrices and Arrays: Matrix generation, entering a vector, entering a matrix, matrix indexing, colon operator, linear spacing, creating a sub-matrix, dimension, matrix operations and functions matrix generators, special matrices, array and array operations, solving linear equations, other mathematical functions. **Basics plotting:** Overview, creating simple plots, adding titles, axis labels, and annotations, multiple data sets in one plot, specifying line styles and colours.

UNIT – III**11 Periods**

M-Files: Introduction, M-File Scripts, script side-effects, M-File functions, anatomy of a M-File function, input and output arguments, input to a script file, output commands. **Control flow and operators:** "if ... end" structure, relational and logical operators, ``for ... end" loop, ``while ... end" loop, other flow structures, operator precedence, saving output to a file.

UNIT - IV**12 Periods**

Debugging M-Files: Debugging process, preparing for debugging, setting breakpoints, running with breakpoints, examining values, correcting and ending debugging, correcting an M-file.

MATLAB GUI: Creating ICE's graphical user interface, programming the ICE interface, initialization code, opening and output functions.

TEXTBOOKS

1. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, *Digital Image Processing using MATLAB*, Pearson Education, Inc., Second Edition, 2004.
2. Stormy Attaway *MATLAB: A Practical Introduction to Programming and Problem Solving*, Butterworth-Heinemann, Sixth Edition, 2023.

REFERENCES

1. Stephen J.Chapman, *Essentials of MATLAB Programming*, Cengage Learning, Third Edition, 2016.
2. Holly Moore, *MATLAB for Engineers*, Pearson Prentice Hall, Fifth Edition, 2018.

ONLINE MATERIALS

1. https://www.mathworks.com/content/dam/mathworks/mathworks-dot_com/moler/exm/book.pdf
2. https://www.mathworks.com/help/releases/R2014b/pdf_doc/matlab/getstart.pdf

UNITWISE LEARNING OUTCOMES

Upon successful completion of each unit, the learner will be able to

Unit I	<ul style="list-style-type: none"> • Understand the basic concepts of MATLAB programming • Understand the MATLAB commands and workspace
Unit II	<ul style="list-style-type: none"> • Illustrate the computations on matrices and array • Visualize dataset using various plotting methods
Unit III	<ul style="list-style-type: none"> • Select an appropriate construct to solve the given problem • Design programs using functions, branching and looping constructs
Unit IV	<ul style="list-style-type: none"> • Debug M-files to correct errors • Create applications using MATLAB GUI

COURSE LEARNING OUTCOMES

Upon successful completion of this course, the learner will be able to

CO No.	Course Outcome	Knowledge Level
1	Understand the basics of MATLAB programming and commands	K2
2	Apply plotting techniques to visualize the data set	K3
3	Analyze digital images and signals using matrices and array	K4
4	Create MATAB programs to solve the given problem	K5
5	Analyze M-Files to remove errors in a program	K3
6	Develop applications to solve real time problems using MATLAB GUI	K6