



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3736501

Subject Name: MATLAB Applications in Civil Engineering

WEF Academic Year:	2023-2024
Semester:	3
Category of the Course:	Open Elective

Prerequisite:	Programming in C
Rationale:	MATLAB is a versatile mathematical tool for solution of various Civil Engineering problems. Various mathematical modes can be developed and numerical solutions of the problems can be solved using this tool.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
2	-	2	3	70	30	30	20	150

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	Introduction: MATLAB Introduction, Symbolic Calculations, MATLAB installation and computer requirements, Basics of MATLAB	04	10
2	Interactive Computation: Matrices and Vectors..., Input, Indexing, Matrix Manipulation, Creating Vectors, Matrix and Array Operations, Arithmetic operations, Relational operations, Logical operations, Elementary math functions, Matrix functions, Character strings, Creating and Using Inline Functions, Using Built-in Functions and On-line Help, Saving and Loading Data, Plotting simple graphs	08	30
3	Programming in MATLAB: Scripts and Functions: Script Files, Function Files, Executing a function, More on functions, Sub functions, Compiled (Parsed) functions: P-Code, The Profiler, Language-Specific Features, Global variables, Loops, branches, and control-flow, Interactive input, Recursion, Advanced Data Objects, Multidimensional matrices, Structures & Cells	08	30



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4	Applications & Graphics Linear Algebra, Solving a linear system, Gaussian elimination, Finding eigenvalues & eigenvectors, Matrix factorizations, Curve Fitting and Interpolation, Polynomial curve fitting, Least squares curve fitting, Interpolation, Data Analysis and Statistics. Basic 2-D Plots, Using subplot to Layout Multiple Graphs, 3-D Plots, Handle Graphics, Saving and Printing Graphs. Applications of MATLAB in Civil Engineering	08	30
Total		28	100

Reference Book:

1. MATLAB :A Practical Introduction To Programming And Problem-Solving by Stormy Attaway
2. Beginning MATLAB and Simulink: From Beginner to Pro by Sulaymon Eshkabilov
3. MATLAB: An Introduction with Applications by Amos Gilat
4. MATLAB® and its Applications in Engineering, by Rajkumar Bansal, Ashokkumar Goel & Manoj Kumar Sharma
5. Soft Computing With MATLAB Programming by N.P. Padhy and S.P. Simon

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	Apply various MATLAB commands for problem solving	AP
02	To manage data and apply for programming purpose using MATLAB	AP
03	Program using MATLAB scripts and function	AN
04	Solve numerical problems using MATLAB	EL
05	Solve Civil Engineering problems using MATLAB	AP

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create



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List of Practicals Examples based on:

1. Introduction to MATLAB
2. Installation/set up the MATLAB
3. Programming in MATLAB
4. Curve fitting and other solutions to numerical method problems using MATLAB
5. Practical's on various applications of MATLAB in civil engineering
6. Iterative and transformations methods
