Title of the Course: Introduction to MATLAB

INTRODUCTION:

MATLAB or (Matrix Laboratory) is a high performance fourth generation programming language which is used for technical computing. It provides multi paradigm numerical computing environment and was developed by Math Works. The applications of MATLAB are immense. It is used for integrating computation, visualization, and programming so that the programming environment becomes easy to use. Furthermore, MATLAB is a modern programming language environment: it has sophisticated data structures, contains built-in editing and debugging tools, and supports object-oriented programming. These factors make MATLAB an excellent tool for teaching and research.

This course will introduce students to computer programming and problem solving using MATLAB. It is an introductory course for students aimed at developing their skill in scientific computing. The class is lab-focused, so students will spend much more time doing hands-on exercises in computer lab. There are no maths or programming prerequisites; however elementary skills in computer science will be an advantage.

Course Objective:

The main objectives of the programme are:

- To impart the knowledge to the students with MATLAB software. *[This enhances programming knowledge in Research and Development]*
- To develop skills in analysis, design, problem solving, and selection of appropriate techniques to develop algorithms in MATLAB.
- To provide a working introduction to the MATLAB technical computing environment. *[Themes of data analysis, visualization, and programming]*
- To introduce students the use of a high-level programming language, MATLAB. *[scientific problem solving with applications and examples from Engineering]*

Course Learning Outcomes:

After completing the course/programme the students will be able to:

- Use MATLAB for interactive computations.
- Able to generate plots and export this for use in reports and presentations.
- Apply MATLAB as a tool to solve problems of mathematics, various fields of science and technology, commerce and management, humanities, soft-computing etc.
- Develop new techniques/ methods for solving the problems.
- Apply MATLAB in research.
- Major outcome is students are able to work as a ‘MATLAB programmer’ in the industry because of the hands on practical sessions. This course will helps students to get the jobs in future.

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COURSE DETAILS

Course level : Certificate Course (Certificate shall be awarded by Dhemaji College).

Type of the Course : Add-on (Students enrolled in different UG course may also get themselves enrolled)

Fund/ Finance : Self-financing course

Course Duration : 06 months (1 semester)

Eligibility Criteria : 10+2 i.e., Higher secondary passed with any stream

Admission schedule : 1st week of August

Intake capacity : 30

Class timing : 03:00 to 4:00 PM

Total Marks : 50 (Theory: 35; Practical: 15)

Examination : At the end of course the examination will be conducted

Examination patterns :

Course	Full Marks	Examination Duration
MLT–01 (Theory paper)	35	2 hours
MLP–01 (Practical paper)	15	2 hours

Grading System

The marks obtained by the students shall be used to confer them with grades as follows:

Marks Obtained	Letter Grade	Meaning of Letter Grade	Grade Point	Description of Performance
45 – 50	O	Outstanding	5	Pass
35 – 45	A	Very Good	4	
25 – 35	B	Good	3	
15 – 25	C	Pass	2	
0 – 15	F	Fail	1	Fail

Exclusive Class Interval

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SYLLABUS

Course Code: MLT-01
Course Title: Introduction to MATLAB (Theory)
Duration: 38 hours
Marks: 35

Unit 1: Marks: 15, Hours: 20

Introduction to MATLAB, Basics of MATLAB: working in command window, using MATLAB as a calculator, rules about variable names, predefined variables and keywords, display formats, built-in function, user-defined function, assignment operators, scripts and M-Files, vectors and matrices, plotting graphics: two-dimensional and three dimensional plots.

Unit 2: Marks: 10, Hours: 8

Programming in MATLAB, relational and logical operators, conditional statements, switch-case statement, loops, break and continue statement, function, sub-function.

Unit 3: Marks: 10, Hours: 10

Applications: root finding, solving a linear system of equations, derivatives, numerical integration, ordinary differential equations.

Course Code: MLP-02
Course Title: Introduction to MATLAB (Practical)
Duration: 12 hours
Marks: 15

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1. Interactive computation: matrices and vectors.
2. Finding root of a polynomial.
3. Solving two or more equations simultaneously.
4. Sorting numbers.
5. Finding prime numbers.
6. Use of if, if-else, nested of if, if-else, for-end loop, while-end loop, switch-case statement, break and continue statement.
7. Numerical integration.
8. Solving ordinary differential equations with boundary conditions.
9. Two dimensional plots.
10. Three dimensional plots.

Suggested Readings:

[1] Getting started with MATLAB- Rudra Pratap, Oxford University Press.
[2] MATLAB: An Introduction with Applications, John Wiley & Sons, INC.
[3] Understanding MATLAB- S N Alam, I K International Publishing House.
[4] Programming in MATLAB- Patel and Mittal, Pearson Education India
[5] Web resource: www.mathworks.com

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