



Al-Mustaqbal University / College of Technical Engineering
Department (Medical Device Engineering)
Class (First)
Computer Programming and Applications I / Code (UOMU0204026)
Lecturer (Msc. Heba Hussien)

2nd term – Lecture 1 Introduction to MATLAB

Lecture 1

Introduction to MATLAB



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(Assessment)

توزيع الدرجات

Assessment	Percentage
Quiz	10%
Report	10%
Assignments	10%
Lab Projects	10%
Midterm	10%
Final Exam	50%



1. Introduction

MATLAB stands for MATrix LABoratory. It is a high-level programming language and computing environment widely used for numerical computation, data analysis, algorithm development, and visualization.

MATLAB is especially useful for engineers and scientists because it allows them to solve complex mathematical and engineering problems efficiently.

MATLAB is based on matrix operations, which makes it powerful for performing mathematical calculations and handling large datasets.

2. Applications of MATLAB

MATLAB is widely used in many fields such as:

- Engineering analysis
- Numerical computation
- Data visualization
- Signal processing
- Control systems
- Image processing
- Machine learning
- Algorithm development

Because of its powerful tools and built-in functions, MATLAB is commonly used in universities, research centers, and industries.

3. Advantages of MATLAB

Some important advantages of MATLAB include:

- Easy to learn and use
- Powerful built-in mathematical functions
- Strong visualization and plotting capabilities
- Large library of engineering toolboxes



- Supports graphical user interface (GUI) development
- Efficient matrix and vector operations

4. Starting MATLAB

When MATLAB starts, the user interface appears. This interface is called the MATLAB Environment.

The MATLAB environment contains several windows that allow users to interact with the program, write commands, and manage variables.

The most important windows are:

- Command Window
- Workspace Window
- Command History Window
- Editor Window
- Help Window

5. MATLAB Environment

The MATLAB environment provides tools for writing commands, executing programs, and viewing results.

The environment includes menus, toolbars, and different windows that help users perform programming and data analysis tasks.

Each window in the MATLAB environment has a specific function.

6. MATLAB Windows

6.1 Command Window

The Command Window is the main window where users type MATLAB commands and execute them immediately. It allows users to perform calculations and display results instantly.

Example:



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```
5 + 3
```

Output:

```
ans = 8
```

Example with variables:

```
a = 10  
b = 5  
c = a + b
```

Output:

```
c = 15
```

6.2 Workspace Window

The Workspace Window displays all variables currently stored in MATLAB memory. It provides information such as variable name, value, size, and data type.

Example: If we define variables:

```
x = 5;  
y = 10;
```

They will appear in the Workspace:

Variable	Value
x	5
y	10



6.3

Command History Window

The Command History Window stores all previously executed commands. This allows users to review earlier commands, reuse commands easily, and avoid typing commands repeatedly.

Users can execute a previous command by double-clicking it.

6.4 Editor Window

The Editor Window is used to write MATLAB programs or scripts. Programs written in MATLAB are saved with the extension .m

Example of a simple MATLAB script:

```
a = 5;  
b = 10;  
c = a + b;  
disp(c)
```

This script calculates the sum of two numbers and displays the result.

6.5 Help Window

The Help Window provides documentation and explanations for MATLAB functions and commands. Users can search for help on any MATLAB function.

Example:

```
help plot
```

This command displays information about the plot function. Users can also access detailed documentation using the Help Browser.

7. Example of MATLAB Calculations

MATLAB can perform many mathematical operations easily.

Example:



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```
a = 4;  
b = 6;  
c = a * b
```

Output:

```
c = 24
```

Another Example:

```
sqrt(25)
```

Output:

```
ans = 5
```

8. Summary

In this lecture, we introduced MATLAB and its environment. We learned about:

- What MATLAB is
- Applications of MATLAB
- Advantages of MATLAB
- The MATLAB environment
- The main MATLAB windows

The main MATLAB windows are:

- Command Window
- Workspace Window
- Command History Window
- Editor Window
- Help Window

Understanding these components is essential for working effectively with MATLAB.



Homework

1. Open MATLAB and identify the following windows:

- Command Window
- Workspace
- Command History
- Editor
- Help

2. Execute the following commands in the Command Window:

```
a = 5  
b = 8  
c = a * b
```

3. Observe the variables in the Workspace Window.