



NAVI MUMBAI

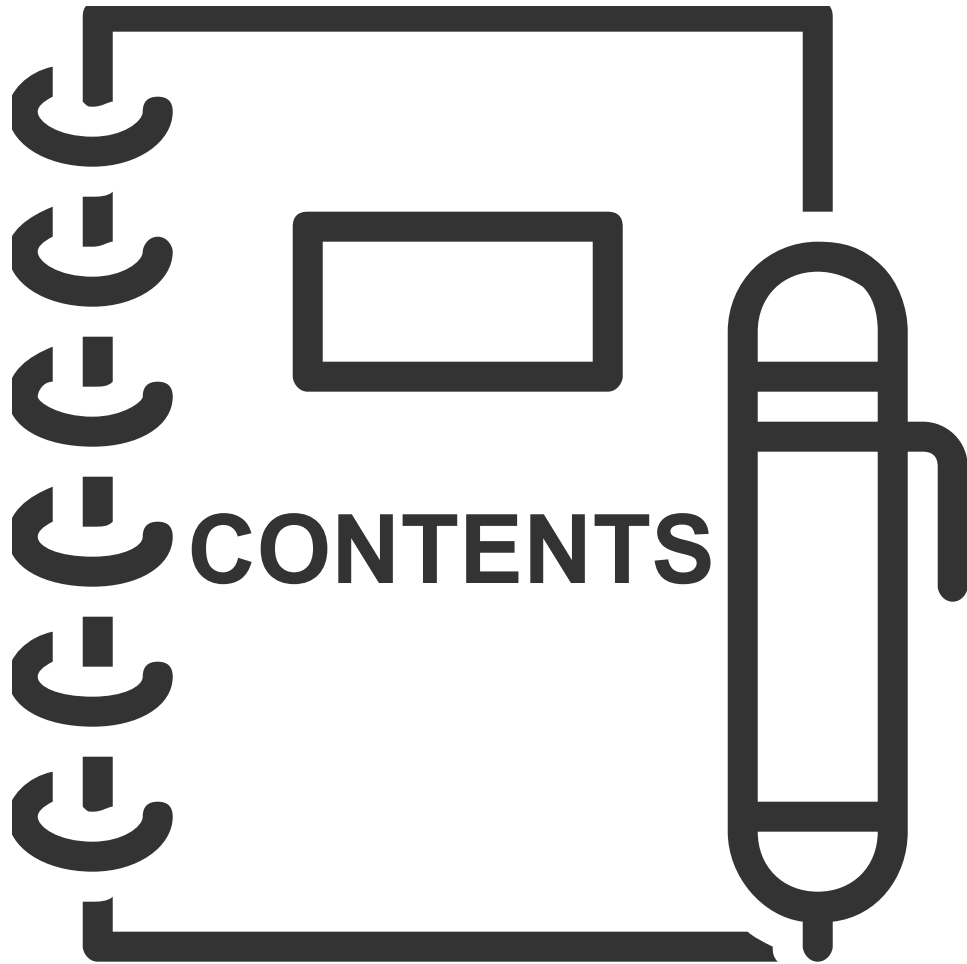
# MATLAB

## Unit 1-Lecture 1

---

BTech (CSBS) -Semester VII

12 July 2022, 09:35AM



**Teaching plan**

---



**Assessment analysis**

---



**Text/Reference books**

---



**Unit 1-Lecture 1**

---



# Teaching plan/Assessment analysis

## Teaching plan

Teaching Scheme				Evaluation Scheme	
Lecture (Hours/week)	Practical (Hours/week)	Tutorial (Hours/week)	Credit	Internal Continuous Assessment (ICA) As per Institute Norms (50 Marks)	Theory (3 Hrs, 100 Marks)
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

## Assessment analysis

Assessment Component	ICA (100 Marks) (Marks scaled to 50)					TEE (100 marks) (Marks scaled to 50)
	Lab Performance	Lab Exam and Viva	Research activity (beyond syllabus)	Class Test 1 and Class Test 2	Class Partition	
<b>Weightage</b>	10%	5%	10%	20%	5%	50%
<b>Marks</b>	20	10	20	20+20	10	100
<b>Date/week of activity</b>	Weekly	10 <sup>th</sup> and 11 <sup>th</sup> week	14 <sup>th</sup> week	T1: 16-23 August, 2022 T2: 10-15 October, 2022	2 <sup>nd</sup> and 13 <sup>th</sup> Week	16 <sup>th</sup> Nov.2022 to 2 <sup>nd</sup> Dec., 2022



# Text/Reference books

---

## Text Books:

- 1) Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, “*Digital Image Processing using MATLAB*”, Pearson Education, Inc., Second Edition, 2004.
- 2) Stormy Attaway, Butterworth-Heinemann, “*MATLAB: A Practical Introduction to Programming and Problem Solving*”, Butterworth-Heinemann is an imprint of Elsevier, Fourth Edition, 2017.

## Reference Books:

- 1) Clever Moler, “*Experiments with Matlab*”, MathWorks, Inc., 2011.



# **Unit 1-Lecture 1→Agenda**

---

- 1) Desktop Basics
- 2) Numbers & Arithmetic Operations
- 3) Workspace Variables



# 1: Introduction

---

When you start MATLAB, the desktop appears in its default layout.

- The desktop includes these panels:
- **Current Folder** — Access your files.
- **Command Window** — Enter commands at the command line, indicated by the prompt (`>>`).
- **Workspace** — Explore data that you create or import from files.
- **Command History** — View or rerun commands that you entered at the command line.

## Command Window

- type commands

## Current Directory

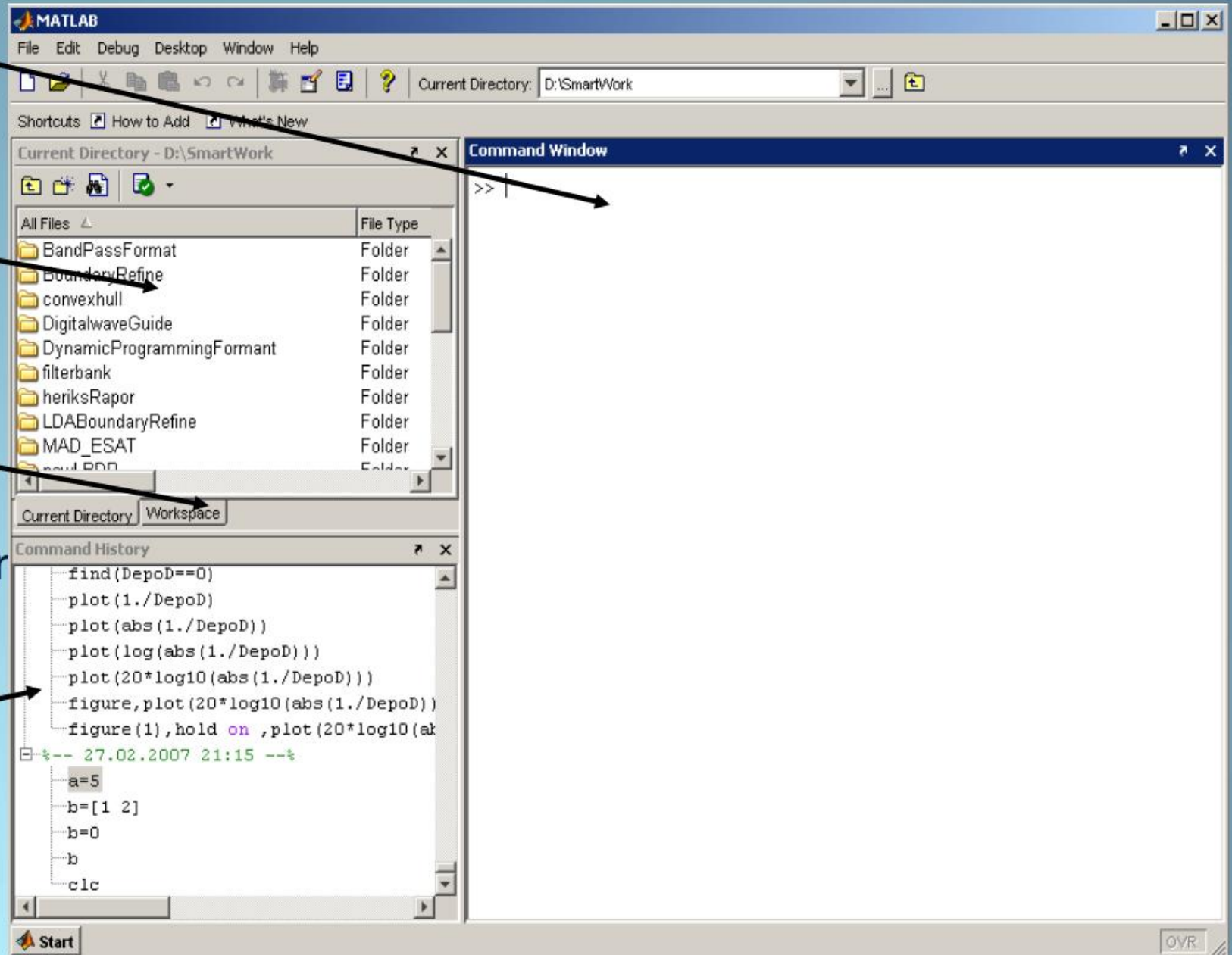
- View folders and m-files

## Workspace

- View program variables
- Double click on a variable
- to see it in the Array Editor

## Command History

- view past commands
- save a whole session using diary





# MATLAB window

---

- Figure Window -contains output from graphic commands
- Help Window -provides help information
- Editor Window -creates and debugs script and function files
- Current directory Window -shows files in current directory
- Launch Pad Window -provides access to tools,demos and documentation





# Command window

---

>> type code

Press enter

Command executed and output displayed

**semicolon (;)**

output not displayed

**Ellipsis(...)** if a command is too long to fit in one line

Command can continue line after line up to 4096 characters.



# comman commands

---

## Matlab commands    **case sensitive**

%            -comment

clc           -clear screen

↑            -recall previously typed commands

↓            -move down to previously typed



# Arithmetic Operations With Scalars

---

<u>Operation</u>	<u>Symbol</u>	<u>Example</u>
Addition	+	$5+3$
Subtraction	-	$5-3$
Multiplication	*	$5*3$
Right division	/	$5/3$
Left division	\	$5\backslash 3=3/5$
Exponentiation	^	$5^3=125$



# Order of Precedence

---

Parentheses



Exponentiation



Multiplication and division



Addition and subtraction



# Display Formats

---

Command	Description
format short	Fixed-point with 4 decimal digits
format long	Fixed-point with 14 decimal digits
format bank	2 decimal digits
format compact	Eliminates empty lines
format loose	Adds empty lines



# Elementary Math functions

---

Function	Description
<code>sqrt (x)</code>	Square root
<code>exp (x)</code>	Exponential ( $e^x$ )
<code>abs (x)</code>	Absolute value
<code>log (x)</code>	Natural logarithm Base $e$ logarithm
<code>Log10(x)</code>	Base 10 logarithm
<code>factorial(x)</code>	Factorial function $x!$



# Trigonometric/rounding Math functions

$\sin(x), \cos(x),$   
 $\tan(x), \cot(x)$

## Rounding function

Function	Description
<code>round(x)</code>	Round to the nearest integer
<code>fix(x)</code>	Round towards zero
<code>ceil(x)</code>	Round towards infinity
<code>floor(x)</code>	Round towards minus infinity
<code>rem(x,y)</code>	Returns remainder after x is divided by y



# Trigonometric/rounding Math functions

Elementary functions (sin, cos, sqrt, abs, exp, log10, round)

-type **help elfun**

Advanced functions (bessel, beta, gamma, erf)

-type **help specfun**

-type **help elmat**





# Defining scalar variables

---

variable is a name made of a letter or a combination of several letters that is assigned a numerical value

- actually name of a memory location
- assignment operator “=”

eg. `>>x=15`  
`>>x=3*x-12`

When new variable is created matlab assigns appropriate memory space where assigned value can be stored

- When variable is used stored data is used
- If assigned new value content of memory is replaced

eg. `>>ABB=72;`  
`>>ABB=9;`  
`>>ABB`

`ABB=`



# Rules about variable names

---

- Variable names are case sensitive.
- Variable names can contain up to 63 characters (as of MATLAB 6.5 and newer).
- Variable names must start with a letter followed by letters, digits, and underscores.
- Must begin with a letter.
- Avoid using names of built-in functions for variable.