## WORKSHOP ON MATLAB AND PYTHON PROGRAMMING

(MPP 2025)

Organized by

Department of Mathematics, National Institute of Technology Jamshedpur May 19 - 23, 2025 (Online / Virtual Mode)

## Schedule (Tentative)

Time	19-05-2025	20-05-2025	21-05-2025	22-05-2025	23-05-2025
/ Date					
10:00-	Inaugural Session	LECT04	LECT08	LECT12	LECT16
11:00	(OPENING)	(RKB)	(RT)	(BS)	(RKM)
	[Chief Guest:				
	Prof. A. Swaminathan]				
11:00-	BREAK				
11:15					
11:15-	LECT01	LECT05	LECT09	LECT13	LECT17
12:45	(AS)	(RKB)	(RT)	(RKM)	(BS)
12:45-	BREAK				
14:00					
14:00-	LECT02	LECT06	LECT10	LECT14	LECT18
15:30	(SD)	(MKG)	(RKM)	(IP)	(VS)
15:30-	BREAK				
15:45					
15:45-	LECT03	LECT07	LECT11	LECT15	
17:15	(SD)	(RK)	(RKM)	(BS)	Valedictory Session (CLOSING)
					START AT 04:30 PM

AS: Prof. A. Swaminathan, Indian Institute of Technology (IIT), Roorkee.

RKB: Dr. Ratikanta Behera, Indian Institute of Science (IISc), Bangalore.

MKG: Dr. Mahendra Kumar Gupta, Indian Institute of Technology (IIT), Bhubaneswar.

**RK:** Dr. Rajat Kaushik, Regional Institute of Education, NCERT, Bhopal.

RT: Dr. Rajat Tripathi, National Institute of Technology Jamshedpur.

RKM: Dr. Rakesh Kumar Meena, Jawaharlal Nehru University (JNU).

BS: Dr. Birendra Singh, AIMT, Lucknow.

IPT: Dr. Indira P Tripathi, S. V. National Institute of Technology (SVNIT), Surat.

**VS:** Dr. Vikas Srivastava, Indian Institute of Technology Madras.

**SD:** Dr. Saikat Das, Indian Institute of Technology Madras.

## CONTENTS

**LECT01**: Introduction to MATLAB, Basic operations, MATLAB as Calculator (Finite and Infinite Sums, Derivatives, Antiderivatives, Integrals, etc.),

**LECT02-03:** Handling Variables, Data Input / Output in Various Format,

Expressions, Conditional / Logical Statements, Execution Control, Loops, Writing

Functions

LECT04: Matrix operations and Linear equations

**LECT05:** Basic plotting (overview, creating simple plots, adding titles, axis labels, and annotations

Multiple data sets in one plot, specifying line styles and colors)

LECT06: Analytical and Numerical Solutions of ODE's

LECT07: Assignment Solving (REVIEW and Practice)

LECT08: Analytical and Numerical Solutions of PDE's

LECT09: Machine Learning using Toolbox of MATLAB

**LECT10:** Introduction to Python Programming: Basic syntax and operations, handling variables, Data types, writing and evaluating expressions.

**LECT11:** Control Structures, Functions: Conditional and logical statements, Control structures: if-else, loops (for, while), User-defined functions.

LECT12: Python libraries (math, NumPy, SymPy, SciPy, and Matplotlib).

**LECT13:** Plotting in Python: Creating plots using Matplotlib; Customizing plots: titles, labels, legends, colors, and styles; working with subplots and figure layouts; Introduction to 3D plotting.

LECT 14: Support Vector Machine using PYTHON (Indira)

LECT15: Using IDLE IDE, Debugging Python Code

**LECT16:** Solving Differential Equations Using Python: Introduction to numerical and symbolic solutions of differential equations, solving initial value problems (IVPs): Euler's method and Runge-Kutta 4th order method.

**LECT17:** Object Oriented Approach: Classes and Objects

**LECT18:** Machine Learning using PYTHON

**NOTE:** 1. Lectures LECT01-LECT18 are not in order. It will be adjusted according to the speakers.

2. Link for the ONLINE LECTURES has been sent through email to the registered participants.