

Department of Physics

Kharagpur College

Notice for Certificate Course on “Advanced Computer Programing using MATLAB & Python Language”.


Date: 20.01.2022

This is to inform all the 1st and 3rd semester students of the College that a certificate course on “Advanced Computer Programming using MATLAB & Python Language” will be organized by the Department of Physics, Kharagpur College on and from 30.01.2022. The course duration will be 30 hours. This course will be offline mode. Last date of registration for the course is 27.01.2022. For registration you are asked to submit your name to the course coordinator or at the college office.

Members of the Organizing Committee:

1. Dr. Jyotirmoy Pramanik, Associate Professor in Physics
2. Dr. Ritwik Saha, Assistant Professor in Physics
3. Prof. Rudra Narayan Mondal, Assistant Professor & HOD in Physics
4. Dr. Samir Kumar Giri, Assistant Professor, Physics, Coordinator




 20/01/22
Principal
Kharagpur College

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Kharagpur College

Department of Physics and Mathematics, Kharagpur College
Certificate Course on “Advanced Computer Programming using MATLAB & Python Language”
Course Schedule

30.01.2022	Inaugural Address by HOD Physics & Mathematics and brief introduction to the course (12.00 noon to 2.00 pm.	
Dates	11 am -12 pm	12 pm -1 pm
05.02.2022	JP	SKG
06.02.2022	RNM	RS
07.02.2022	JP	SKG
08.02.2022	RS	RNM
09.02.2022	JP	SKG
12.02.2022	JP	SKG
15.02.2022	JP	RNM
16.02.2022	RS	RNM
19.02.2022	RS	RNM
20.02.2022	RNM	RS
21.02.2022	SKG	JP
22.02.2022	JP	RNM
23.02.2022	RS	RNM
27.02.2022	RS	RNM
28.02.2022	SKG	JP
29.02.2022	Evaluation	Valedictory Address & certificate distribution

JP – Dr. Jyotrimoy Pramanik, RS – Dr. Ritwik Saha, RNM – Prof. Rudra Narayan Mondal, SKG – Dr. Samir Kumar Giri


Coordinators of certificate course




Principal

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**Department of Physics
Kharagpur College**

Certificate Course on “Advanced Computer Programming using MATLAB & Python Language”.

(Duration: 30.01.2022 onwards)

Module-1

1. Local environment setup
2. Understanding the MATLAB environment
3. Basic syntax
4. Variables
5. Commands
6. Data Types
 - a. Some commonly used data types used in MATLAB
 - b. Data type conversion
7. Operators

Module-2

1. Decision making
 - a. if...endstatement
 - b. if...else ...endstatement
 - c. if... elseif...else ...endstatement
 - d. nested ifstatement
 - e. switchstatement
 - f. nested switchstatement
2. Loops
 - a. while loop
 - b. for loop
 - c. nested loop
3. Loop control
 - a. breakstatement
 - b. continuestatement
4. Vectors
5. Matrix
6. Arrays
7. Colon notation



Module-3

1. Analytical Functions
2. Data Import
3. Data Output
4. Making plots

Module-4

1. Algebra
2. Calculus
 - a. Calculating limits
 - b. Verification of basic properties of limits
 - c. Left and right sided limits
3. Differentiation
4. Integration
5. Polynomials

Module-5

1. Finding roots of equation - Bisection Method, Newton Raphson Method
2. Integration - (Simpson 1/3, Trapezoidal rule)
3. Fast Fourier Transform

Module-6

1. Differential Equations
2. System of Differential Equations
 - a. Solve system of linear differential equations
 - b. Differential equations in matrix form
3. Numerical solution of Second Order Differential Equations
 - a. Rewriting second order ode as a system of first order ode
 - b. Generating MATLAB function
 - c. Solving the system of first order ode using ode45
 - d. Plotting the solution
4. Differential Algebraic Equations
 - a. Specifying equations and variables
 - b. Reducing differential order
 - c. Checking and reducing differential index
 - d. Converting DAE system to MATLAB function handles
 - e. Finding initial conditions for solvers
 - f. Solving DAE using ode15i



Module-7

1. File Handling: Reading from and writing to files; Handling exceptions and errors; Practical exercises on file handling
2. Plotting using Matplotlib: Define a Python function and plot in a domain. Bar chart plots, histograms, polar plots, pie plots, Plot from data file, saving the figures, subplots, multiple plots.
3. Drawing using turtle

Module-8

1. Introduction to Python and its scientific computing libraries (NumPy, SciPy, Matplotlib)
2. Exploring common Python libraries (e.g., NumPy, Scipy)
3. Introduction to NumPy and its multidimensional arrays; Performing mathematical operations on arrays; Array indexing and slicing; Linear algebra operations with NumPy

Module-9

1. Interpolation techniques using python: Newton's forward and Backward difference formula

Module-10

1. Solving Ordinary Differential Equations (ODEs) using Euler's and RK2 methods
 2. Solving ODEs using scipy.integrate module
 3. Solving Boundary value problems using shooting method
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SKA




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Sample question for the certificate course on "Advanced Computer programming using MATLAB & Python Language".

- 1) Which among the following can be a variable name in Matlab
- a. x6
 - b. for
 - c. 1college
 - d. Calculate#1

Correct Answer: a

2) If $f = \sin(x*y)$. Which among the following Matlab code can be used to find the partial derivative of f with respect to x .

- a. `syms y`
`diff(f)`
- b. `syms x,y`
`diff(f,x)`
- c. `syms x,y`
`diff(f,y)`
- d. `syms x`
`diff(f)`

Correct Answer: b

3) Which among the following in-built function is used for solving numerical integration in Matlab.

- a. `integrate`
- b. `int`

- c. integration
- d. integral

Correct Answer: d

4) Which among the following in-built function is used for solving differential equation in Matlab.

- a. dsolve
- b. dsolution
- c. diffsolve
- d. solvediff

Correct Answer: a

5) If A and B are two matrices. Which among the following is the correct MATLAB syntax to perform matrix multiplication (BA).

- a. A.*B
- b. B.*A
- c. B*A
- d. A*B

Correct Answer: c

6) If A and B are two matrices. Which among the following is the correct MATLAB syntax to perform element wise multiplication of two matrices.

- a. A*B
- b. B*A

- c. $B^*.A$
- d. $B.*A$

Correct Answer: d

- 7) Index of an array in Matlab start with
- a. 0
 - b. 1
 - c. Depends on the class of array.
 - d. Unknown

Correct Answer: b

- 8) What is the return type of angles function in Matlab.
- a. Degree
 - b. Radians and Degree
 - c. Radians
 - d. Depend on the argument.

Correct Answer: c

- 9) Which of the following command is used to clear command window in Matlab.
- a. `clc`
 - b. `clear`
 - c. `close all`
 - d. `clear all`

Correct Answer: a

10) Which among the following is not a predefined variable in Matlab

- a. inf
- b. pi
- c. i
- d. gravity

Correct Answer: d

11) Which among the following inbuilt function returns the adjoint of a matrix in Matlab.

- a. det
- b. inv
- c. adjoint
- d. adj

Correct Answer: c

12) In Matlab, which among the command is used to add text label to x axis.

- a. axes
- b. xlabel
- c. axis
- d. ylabel

Correct Answer: b

13) $x=2*3;$

$y=x*2$

What will be the output when the above commands are executed in Matlab.

a. $y=12$

$x=2*3$

b. $y=12$

$x=6$

c. $y=2*3*2$

$x=6$

d. $y=12$

Correct Answer: d

14) What is the use of abs function in Matlab.

a. Returns the magnitude of a number.

b. Returns the square root of a number.

c. Returns the power of a number.

d. None

Correct Answer: a

15) Which among the following is used to check if two elements are equal in Matlab.

a. $!=$

b. $=$

c. $==$

d. `isequal`

Correct Answer: c

Kharagpur College
Department of Physics
Certificate Course on "Advanced Computer Programing using MATLAB & Python
Language"

List of Registered Candidates

Date - 05.02.2022

SL. No.	Name of the Student	Signature	Remarks
01	Subhayu Kuila	Subhayu Kuila	
02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
04	Somudip Koley	Somudip Koley	
05	Mrinmoy Chowdhury	Mrinmoy Chowdhury	
06	Soumyadip Maity	Soumyadip Maity	
07	Monomoy Mondal	Monomoy Mondal	
08	Debjani Das	Debjani Das	
09	Supriyo Kumar De	Supriyo Kumar De	
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11	Kiranmay Maity	Kiranmay Maity	
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16	Arpan Sahoo	Arpan Sahoo	
17	Nabin Das	Nabin Das	
18	Parijat Patra	Parijat Patra	
19	Sayan Chakraborty	Sayan Chakraborty	
20	Dibyendu Roy	Dibyendu Roy	
21	Subhrangshu Tunga	Subhrangshu Tunga	
22	Souvik Jana	Souvik Jana	
23	Rabindranath Manna	Rabindranath Manna	
24	Souvik Shee	Souvik Shee	
25	Rupam Day	Rupam Day	
26	Sandip Dutta	Sandip Dutta	
27	Subhajit Khanra	Subhajit Khanra	
28	Shraban patra	Shraban Patra	
29	Joydeep Saha	Joydeep Saha	

30	Soumyadip Khasnobis	Soumyadip Khasnobis	
31	Debraj Paul	Debraj Paul	
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33	Ranjit Giri	Ranjit Giri	
34	Soumen Patra	Soumen Patra	
35	Subhajit Kundu	Subhajit Kundu	
36	Rahul Chanda	Rahul Chanda	
37	Bidyasundar Khan	Bidyasundar Khan	
38	Tushar Kanti Majhi	Tushar Kanti Majhi	
39	Gour Kishor Giri	Gour Kishor Giri	
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41	Ayandip Maity	Ayandip Maity	
42	Sk. Sahalam	Sk Sahalam	
43	Aparup Mahakul	Aparup Mahakul	

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List of Registered Candidates

Date - 07.02.2022

SL. No.	Name of the Student	Signature	Remarks
01	Subhayu Kuila	Subhayu Kuila	
02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
04	Somudip Koley	Somudip Koley	
05	Mrinmoy Chowdhury	Mrinmoy Chowdhury	
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43	Aparup Mahakul	Aparup Mahakul	

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List of Registered Candidates

Date - 09.02.2022

SL. No.	Name of the Student	Signature	Remarks
01	Subhayu Kuila	Subhayu Kuila	
02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
04	Somudip Koley	Somudip Koley	
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List of Registered Candidates

Date - 15.02.2022

SL. No.	Name of the Student	Signature	Remarks
01	Subhayu Kuila	Subhayu Kuila	
02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
04	Somudip Koley	Somudip Koley	
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List of Registered Candidates

Date-19-02-2022

SL. No.	Name of the Student	Signature	Remarks
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02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
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41	Ayandip Maity	Ayandip Maity
42	Sk. Sahalam	Sk. Sahalam
43	Aparup Mahakul	Aparup Mahakul

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List of Registered Candidates

Date - 21.02.2022

SL. No.	Name of the Student	Signature	Remarks
01	Subhayu Kuila	Subhayu Kuila	
02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
04	Somudip Koley	Somudip Koley	
05	Mrinmoy Chowdhury	Mrinmoy Chowdhury	
06	Soumyadip Maity	Soumyadip Maity	
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List of Registered Candidates

Date - 22.02.2022

SL. No.	Name of the Student	Signature	Remarks
01	Subhayu Kuila	Subhayu Kuila	
02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
04	Somudip Koley	Somudip Koley	
05	Mrinmoy Chowdhury	Mrinmoy chowdhury	
06	Soumyadip Maity	Soumyadip Maity	
07	Monomoy Mondal	Monomoy mondal	
08	Debjani Das	Debjani Das	
09	Supriyo Kumar De	Supriyo Kumar De	
10	Pradip Kumar Sahoo	Pradip Kumar Sahoo	
11	Kiranmay Maity	Kiranmay maity	
12	Arijit Das	Arijit Das	
13	Biplab Mandal	Biplab Mandal	
14	Sourav Bagal	Sourav Bagal	
15	Rajat Das	Rajat Das	
16	Arpan Sahoo	Arpan Sahoo	
17	Nabin Das	Nabin Das	
18	Parijat Patra	Parijat Patra	
19	Sayan Chakraborty	Sayan Chakraborty	
20	Dibyendu Roy	Dibyendu Roy	
21	Subhrangshu Tunga	Subhrangshu Tunga	
22	Souvik Jana	Souvik Jana	
23	Rabindranath Manna	Rabindranath Manna	
24	Souvik Shee	Souvik Shee	
25	Rupam Day	Rupam Day	
26	Sandip Dutta	Sandip Dutta	
27	Subhajit Khanra	Subhajit Khanra	
28	Shraban patra	Shraban Patra	
29	Joydeep Saha	Joydeep Saha	

30	Soumyadip Khasnobis	Soumyadip Khasnobis	
31	Debraj Paul	Debraj Paul.	
32	Pradipta Das	Pradipta Das	
33	Ranjit Giri	Ranjit Giri	
34	Soumen Patra	Soumen Patra	
35	Subhajit Kundu	Subhajit Kundu	
36	Rahul Chanda	Rahul Chanda	
37	Bidyasundar Khan	Bidyasundar Khan	
38	Tushar Kanti Majhi	Tushar Kanti Majhi	
39	Gour Kishor Giri	Gour Kishor Giri	
40	Sourav Das	Sourav Das.	
41	Ayandip Maity	Ayandip Maity	
42	Sk. Sahalam	Sk Sahalam	
43	Aparup Mahakul	Aparup Mahakul	

Kharagpur College
Department of Physics
Certificate Course on "Advanced Computer Programing using MATLAB & Python Language"

List of Registered Candidates

Date - 27.02.2022

SL. No.	Name of the Student	Signature	Remarks
01	Subhayu Kuila	Subhayu Kuila	
02	Ananda Mohan Baskey	Ananda Mohan Baskey	
03	Sanjib Mandal	Sanjib Mandal	
04	Somudip Koley	Somudip Koley	
05	Mrinmoy Chowdhury	Mrinmoy Chowdhury	
06	Soumyadip Maity	Soumyadip Maity	
07	Monomoy Mondal	monomoy Mondal	
08	Debjani Das	Debjani Das	
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