

JAMIA HAMDARD
Department of Computer Science & Engineering
School of Engineering Sciences & Technology
New Delhi – 110062
Odd Semester Examination 2024

Paper Name: IT Workshop (Sci Lab/MATLAB)
Paper Code: BTCSE 305 (BACKLOG)
Time: 3 Hours

Maximum Marks: 75

Section A (All Questions (7 × 5 = 35))

Attempt ALL questions from this section

Q.No.	Questions	Marks	CO	PO
1	Describe the features of Sci-Lab?	5	4	L1
2	Write a Sci-Lab/MATLAB script that prompts the user to enter a single character and displays its ASCII value.	5	1	L3
3	Create a MATLAB function to find the n^{th} element of Fibonacci sequence.	5	3	L4
4	Write a program, to sum the elements of vector $x=[34\ 56\ 23\ 33\ 44\ 35]$ without using any inbuilt function.	5	5	L2
5.	Solve the following equation using MATLAB's or Sci-Lab $f(x) = x^4 - 3x^3 + 2$, over the interval $[0, 2\pi]$	5	3	L3
6.	Write a program to compute the eigenvalues and eigenvectors of a given matrix without using built-in functions.	5	2	L4
7.	Write a MATLAB/Scilab script that checks if a given year is a leap year.	5	4	L5

Section B (4 × 10 = 40)

Attempt any FOUR questions, out of Six.

Q.No.	Questions	Marks	CO	PO
1	Make a comparison between MATLAB and Sci-Lab and answer the following questions. (i) What are the differences between MATLAB and Sci-Lab? (ii) What are the similarities between MATLAB and Sci-Lab?	10	1,4	L1
2	What are the purposes of following built-in MATLAB functions? input, floor, ceil, quit, asin, imag, zeros, conj, format short, who	10	3	L2

3	(i) What are the Matlab commands entered to plot the trigonometric functions $\sin(x)$ and $\cos(x)$ where x varies from 0 to 4π as multiple plots. Add legend, labels, markers, colours and title to the plot. (ii) Draw the curves to be displayed as output.	10	2	L6
4	Write a script that uses a for loop to compute and plot the finite Fourier series given by the sum: $y(x) = \sum_{n=1}^{1000} \frac{\sin(nx)}{n}$ over the interval $x=(0, 8\pi)$. The plot you should see is called the 'sawtooth function'. Here's one algorithm (set of steps) for solving this problem with iteration (loops): 1. Create a vector with many x values in the range (to plot a continuous curve). 2. Create a vector of y values with the initial value of 0 that correspond to the x vector created. 3. For each value n from 1 to 1000 1. Replace each value in y with the calculated value $y + \sin(n*x)/n$. 4. Plot x vs y and label the axis.	10	1,2	L6
5	(i) Solve the following system of linear equations and determine the values of x, y and z. $3x - 4y + z = 3, \quad x + y - z = 5, \quad 2x - y + 4z = 1$ (ii) What are the MATLAB commands entered to solve the equations?	10	2	L5
6	A matrix is created in Sci-Lab using the command $d = [2 \ 3 \ 4; \ 7 \ 1 \ 0; \ 9 \ 5 \ 6].$ What are the outputs for the following commands? $d', \ d(2,3), \ d(:,1), \ size(d), \ det(d), \ d.*d, \ d-d, \ d*d, \ d(1,2)=7$	10	4	L4

BL- Bloom's Taxonomy Levels (1-Remembering, 2-Understanding, 3-Applying, 4-Analysing, 5-Evaluating, 6-Creating), CO- Course Outcomes