EGR 110 Due Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Engineering Graphics

File: EGR 110 MATLAB Assignment A

# **MATLAB Assignment A – MATLAB Review**

**Reading Assignment:**

EGR 110 MATLAB Lecture A – MATLAB Review

Chapters 1-6 in MATLAB – An Introduction with Applications, 5th Edition, by Gilat (freely available through Safari books on the TCC library website)

**General instructions for all MATLAB assignments.**

* **Warning**: Your assignments must be your own work. You can ask other students questions, but sharing files is cheating. If any evidence of copied files is discovered, all parties involved will receive grades of 0 and may be subject to further disciplinary action.
* For **all problems**, begin all MATLAB programs (scripts or .m files) with the following information:

% John Doe (**your name**)

% EGR 110

% Homework Assignment #?, Problem ?

% Filename: YourFileName.m

% Instructions: (briefly summarize the instructions for the problem)

* Use descriptive variable names
* Use ***format compact*** to reduce extra lines in the output.
* Use the disp( ) function to display your name and assignment number.
* See a Sample MATLAB Solution on the last page of this assignment.
* Print the program (script or .m file) and the results for each problem. If you post the results online, post both the program and the results.

**MATLAB Assignment:**

1. (24 pts – 4 pts per part) Write a single MATLAB program (script or .m file) to evaluate each of the following (put all parts of the problem in the same program).
   * Begin with the block of comments as described above.
   * Use the disp( ) function to display the problem number for each part before the answer.
   * Use variables for assigned values, not numbers. For example, if the problem is to find the area of a circle with a radius = 5, use

***disp(‘MATLAB Assignment A – John Doe’)***

***disp(‘Problem 1H’)***

***Radius = 5.0; % Use variables for all assigned values***

***Area = pi\*Radius^2 % Do not use Area = pi\*(5.0)^2***

1. Find the radius of a circle if the area is 500.
2. Find y1 = 400cos(A) if A = 75 degrees.
3. Given the law of cosines: A2 = B2 + C2 -2⋅B⋅Ccos(θ), find angle θ (in degrees) if A=5, B=12, and C=33.
4. Find y2 = 100e-3.5x if x = 0.75
5. Find y3 = 25⋅ln(x3) if x = 2.65.
6. Find  for x = 3.33 with the result expressed in degrees.

1. (25 pts) Write a MATLAB program to convert temperature from degrees Celsius to degrees Fahrenheit.
   * Prompt the user to enter a temperature in Celsius.
   * Calculate the corresponding temperature in Fahrenheit.
   * Use ***fprintf( )*** to display each temperature with 1 digit after the decimal point using the format shown in the example below: Example: ***23.9 degrees C = 75.0 degrees F***
   * If you have trouble with the formatting, print the results in any form to receive most of the credit.
   * Run the program for the following 3 test cases:
     + 1. 2 degrees C
       2. 27 degrees C
       3. 105 degrees C
2. (26 pts) ***Table and Graph***. Write a MATLAB program (script or .m file) to create a table showing angle α in degrees and cos(α) as α varies from 0 to 360 degrees. Also graph cos(α) vs α. Specifically:
   * Write a MATLAB program (script or .m file).
   * Begin with the block of comments as described above. Add other comments throughout the program.
   * Use a range variable to assign the values of α from 0 to 360 degrees in increments of 20 degrees.
   * Use a formula on the vector above to create another vector for cos(α).
   * Combine the transpose of the two vectors to create a new vector (table).
   * Display the problem number and your name before displaying the table.
   * Display the table and include a table heading (with units).
   * No special formatting is required for this problem.
   * Extra credit: Use fprintf to use 1 digits after the decimal point for angle α and to use 4 digits after the decimal point for cos(α).
   * Form a graph of cos(α) vs α. Add major gridlines. Label the axes. Add a title.
   * Print the script, the output table, and the graph.
3. (25 points) Write a MATLAB program to prompt the user to enter three numbers (A, B, C).

The program should display the largest of the 3 values.

Use an if structure to determine which of the 3 values is largest and display the largest value.

* Test the program where A is the largest value
* Test the program where B is the largest value
* Test the program where C is the largest value

Turn in a printout of the program and a printout showing the 3 test cases. Include plenty of comments in your program.

**Sample MATLAB Problem**

Print the program (script or .m file) and the results. (Boxes not required.)

% John Doe

% EGR 110

% Homework Assignment #4, Problem 1

% Filename: JohnDoeHW4P1.m

% Description: Determine the radius of a circle given the area

clc

format compact

disp('HW#4 - John Doe')

disp('Problem 1')

Area = 100; % Use variables for assigned values

Radius = sqrt(Area/pi) % Do not use Area = sqrt(100/pi)

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.

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HW#4 - John Doe

Problem 1

Radius =

5.6419

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