Lab 10 (Due: Monday, April 25, 2016, 11 : 59 : 00pm Central Time)

CSCE 155N

1 Lab Objectives

- Use simple plot commands to generate $2D$ graphs
- Decorate or enhance existing $2D$ graphs
- Get and set some advanced properties using graphic handles
- Generate M-files for reproducing figures

2 Prior to Laboratory

- Review the laboratory handout
- Read Chapter 11 in Attaway

3 Topics Covered in Lab

- Basic $2D$ plotting

  Most commonly used plots such as line plots and polar plots

  Change properties of existing plots

  Incorporating plots in programs

4 Activities/Exercises

Before You Begin

- **Download files from** http://cse.unl.edu/~cse155n/labs/10 **to your** `Z:\csce155n` **directory**

4.1 Practice: $2D$ Plotting Drills

- Study the following snippets of plotting code by copying and pasting code snippets and check the output. Use `help` if necessary

4.1.1 Line Type and Legend

```
x = 0 : 0.01 : 2;
y = sinh( x );
z = tanh( x );
plot( x , y , '-' , x , z , '-.' );
legend( 'sinh( x )' , 'tanh( x )' );
```

4.1.2 Multiple Plots, One Set of Axes

```
x = 0 : 0.01 : 2;
y = sinh( x );
plot( x , y );
hold( 'on' );
z = tanh( x );
plot( x , z , '-.g' );
hold( 'off' );
legend( 'sinh( x )' , 'tanh( x )' );
```

4.1.3 `subplot`

```
x = 0 : 0.01 : 2;
y = sin( x );
subplot( 2 , 1 , 1 );
plot( x , y );
xlabel( 'x label' );
ylabel( 'y label' );
title( 'y = sin( x )' );

z = cos( x );
subplot( 2 , 1 , 2 );
plot( x , z );
xlabel( 'x label' );
ylabel( 'z label' );
title( 'z = sin( x )' );
```

4.1.4 Parametric Plots

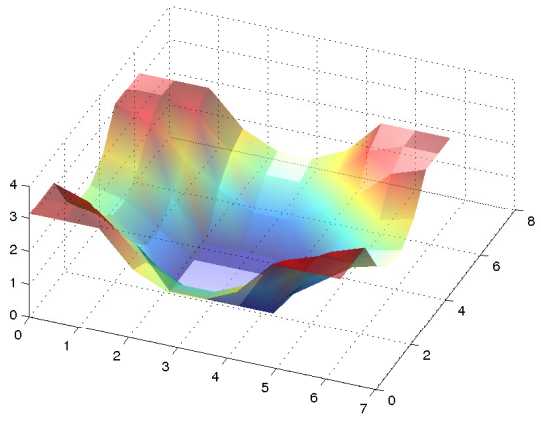
```
t = 0 : pi / 50 : 10 * pi;
plot3( sin( t ) , cos( t ) , t );
grid on;
```

4.1.5 `set`

```
t = 0 : pi / 50 : 10 * pi;
plot3( sin( t ) , cos( t ) , t );
grid on;
h = gca;
set( h , 'Color' , 'r' );
set( gcf , 'Color' , 'k' );
```

4.2 $3D$ Surface and Contour Plots

- Fill in the ??s in the provided code to get a $3D$ contour plot
- Save an EPS file (named `ourPlot.eps`) of your result




```
1  % Script/Function Filename:
2  %     ourPlot.m
3  % Purpose:
4  %     Enter the purpose of the function/file here
5  %
6  % Record of modifications:
7  %     Programmer(s): {Your Name}
8  %     Date Due: YYYY-MM-DD
9  %     Date Submitted: YYYY-MM-DD
10 %     References: ????
11 %     Help Received: ????
12 %
13 % Variables Used:
14 %     f : {Enter the purpose of the variable here}
15 %     d : {Enter the purpose of the variable here}
16 %     X : {Enter the purpose of the variable here}
17 %     Y : {Enter the purpose of the variable here}
18 %     Z : {Enter the purpose of the variable here}
19 %     fg: {Enter the purpose of the variable here}
20 %     Enter the other variables that you use here}
21 function [] = ourPlot()
22 % enter code/comments here
23 f = @( x , y ) real( acos( -cos( x ) - cos( y ) ) );    % a function of two
       variables
24 d = ??                                                  % define 10 evenly-spaced
       points between 0 and 2pi
25 [ X , Y ] = ??                                         % use meshgrid to create
       grids of points
26 Z = f( X , Y );                                        % evaluation f at each (X,
       Y) point
27 ??                                                     % create a new figure
       window
28 ??                                                     % plot the (X,Y,Z) points
       to make a 3D surface
29 shading interp;                                        % ??
30 alpha( 0.6 );                                          % ??
31 light( 'Position' , [ 0 0 5 ] , 'Style' , 'local' );   % ??
32 light( 'Position' , [ 0 8 9 ] , 'Style' , 'local' );   % ??
33 view( 22 , 56 );                                       % ??
34 box off                                                % ??
35 end
```

5 Code Documentation

Remember to document your files in the way that we did for the previous labs. It will come in handy when you look back at code after a long time, or when someone else is trying to understand what your code does.

6 What to Submit

You will be submitting four (4) files (`ourPlot.m`, `ourPlot.eps`, `members10lab.txt`, and `contributions10lab.txt`

7 Additional Resources

Online MATLAB Documentation
CSE Webhandin
CSE webgrader

8 Point Allocation

Component	Points
`ourPlot.m`	60
`ourPlot.eps`	25
`members10lab.txt`	5
`contributions10lab.txt`	5
webgrader PDF	5
Total	100