Homework Assignment

1- Do the examples in the handout on your own. Make sure you understand them!

2- Do these problems in the text and submit them: 5.2, 5.3, 5.5, 5.7, 5.12, 5.14, 5.17

3- Plot Figure 5.8 on page 108 using Matlab. Explain clearly the significance of this plot.

4- Go to http://www.amanogawa.com/archive/antennaA.html. Click on Linear Dipole Antenna. Learn how to use the applet
   a) Set wavelength (WL) to 0.15. with Current = 1; What is the radiation power? What is the directivity?
   b) Set wavelength (WL) to 0.15. Change the current to 2. What happens?
   c) For what value of WL we see the maximum power radiation?
   d) For what value of WL we see the maximum directivity?
   e) Take a snap shot of the radiation pattern when it has its optimum power and include it in your report.

5- For this part you must use Matlab.
   a. Using Matlab draw the following function in polar coordinate: sin(2t)cos(2t).
   b. Go to http://www.amanogawa.com/archive/antennaA.html; click on Linear Dipole Antenna. Set the WL=0.2. Make sure you set the pattern to POWER. How can you change the function above such that you can get the similar result? Draw the new plot using Matlab. What does this tell us?

6- Read the references about designing a Cantenna. Assume we want to design a Cantenna to transmit on channel 6 of WiFi. Clearly draw the antenna and identify all its dimensions. Briefly explain how you calculated your values. Briefly explain how the antenna works.

7- This question deals with selecting the right antenna type. Go to L-Com (product wizard - you can also use their catalog) and select their 2.4 GHz 5dBi Wide beam (135) Panel Antenna. Carefully read the spec for the antenna. Answer the following questions.
   a. What type of connector 135-NF antenna requires? How does it look like? (include a picture)
   b. On the radiation patterns clearly show the vertical and horizontal beam width. What is the difference between the two?
   c. What will be the beam width if the antenna is connected to the ceiling?
   d. Assuming we input a 200mW signal, what will be the radiated power if you are standing at 50 degree angle from the antenna that is vertically installed?
   e. Do you think this antenna can sufficiently operate if the input power is 40 dBW? Why?
   f. Calculate the reflection for this antenna. What will be the unit?
   g. Read about VSWR. Assuming the input power is 20 mW, calculate the actual radiated power. Hint: You must include the return loss and mismatch loss.
Optional Questions (do not submit these)

What is link quality indicator? What is the difference between RSSI and link quality indicator? Make sure you include your reference. Do not copy and paste!

Using the L-Com (product wizard - you can also use their catalog) compare a Yagi and a Log-periodic antenna. You must compare in terms of the following: power gain, directionality, beam width, size, radiation pattern, and cost.