ADS Layout Design Kit for ECE 218C/145C

Sample layouts for circuit elements like Resistors, Capacitors, test pads and HBTs are provided in the ADS design kit namely **Layout_for_class_prj**. They are created as instances in the design library, and can be inserted into your own layouts by using – **Component - Insert** from the Toolbar.
A design rule of 0.5um is followed for layout designing and the grid spacing is set for 0.25um.

Following are the files provided in the design kit:

I. HBT: Heterojunction Bipolar Transistors are provided with different emitter lengths based on maximum current requirements. The width (W_E) of the emitter is – 0.25um and lengths (L_E) with – 1um, 2um, 4um and 8um are used.
The syntax of the HBT file names are of the form – **HBT_lay_ W_E _ L_EXX**

1. HBT_lay_0p25_1um
2. HBT_lay_0p25_2um
3. HBT_lay_0p25_4um
4. HBT_lay_0p25_8um

II. Resistors: 20 Resistors with different W and L values are provided in the design library; the selection can be made based on the required resistor value and current requirements. M1toM2 Vias on Metal1 layer for resistors are not created in the sample layouts, they need to be created depending on requirement.

The syntax for resistor file names are of the form – **R_LXX_WXX**

1. For W=1 um :
   R_L2_W1, R_L4_W1, R_L8_W1, R_L16_W1, R_L32_W1
2. For W=2 um:
   R_L2_W2, R_L4_W2, R_L8_W2, R_L16_W2, R_L32_W2
3. For W=4 um:
   R_L2_W4, R_L4_W4, R_L8_W4, R_L16_W4, R_L32_W4
4. For W=8 um:
   R_L2_W8, R_L4_W8, R_L8_W8, R_L16_W8, R_L32_W8

III. Capacitors: Two bypass capacitors of 10pF and 1pF respectively are provided in the design library. No metal3 layer is created on the capacitors, it would be created as part of the ground plane, but the design consists of M2, CapMetal Layers and CapM to M3 via.

The files for Capacitors are:

1. C_1pF
2. C_10pF

IV. Test Pads: Test pads with GSG and GSGSG configurations are provided in the design library. Other configurations like GSGSGSGS etc. can be created by putting together more than one instance of the provided pads.

The files are :

1. gsg_rf_probe
2. gsgsg_rf_probe

NOTE: Use INSTANTIATION in order to use a particular layout section multiple times for your own designs, do not do COPY + PASTE for this purpose. Creating an instance and reusing it, keeps track of any updates made to the parent layout, and automatically updates in all the layouts using that instance. Instance can be created by saving the file and can then be reused by using COMPONENT – INSERT from the toolbar to insert the instance in some other layout. You can pop into the instances using the Down Arrow given in the toolbar and make changes to it as required.

Example – Differential Amplifier layout for the circuit given in HW1 is provided as an example layout.
File name – **example_diff_amp_top_lev**