**Lab 2 (Basics, VDR, CDR) Highlights**

Color bands of a resistor

Breadboard layout (demo the back of a breadboard to show the metal bars)

Measure passive element value – remove the element (device under testing, or DUT) from the breadboard, or isolate the DUT on the breadboard

Good practice on circuit building on breadboard – your previous experience may not apply here

* Lay down the ground rail and the other requisite voltage rail(s) – use minigrabber patch cord and wires to connect the power supply knobs and the breadboard voltage rails
* Plan out all the nodes (need not copy geometry of the circuit diagram)
* Place each element on the breadboard to straddle their requisite nodes
* Connect the nodes with wires according to the circuit diagram to complete the circuit
* Double check – node by node; for each node, check what are the elements connected to it
* Important: the only thing to be inserted into breadboard holes are wires and electrical elements (resistors, capacitors, op amps, etc.). You may not bend the tip of a minigrabber patch cords to insert into a breadboard hole – this will damage the minigrabber!

Power supply basics

* Connect the ground terminal (Green knob) to the breadboard to produce the ground rail
* Set the voltage drop from the power supply high terminal (Red knob) to the low terminal (Black knob)
* Connect the low terminal (Black knob) to the ground terminal (Green knob) with a banana patch cord, so that the high terminal (Red knob) becomes a positive voltage rail. Connect the high terminal (Red knob) to the breadboard to produce the high voltage rail.
* To produce a negative voltage rail, connect the high terminal (Red knob) to the ground terminal (Green knob). The low terminal (Black knob) is now a negative voltage rail.
* Over current protection (OCP) setting
* Over voltage protection (OVP) setting

Measuring voltage with DMM (nodal voltage or element voltage)

* Insert a short wire into a node to be used as a sampling wire
* To measure nodal voltage, attach the DMM black terminal to the breadboard ground rail, and attach the DMM red terminal to the node to be measured
* To measure an element voltage, attach the DMM red terminal to the designated plus node, and the DMM black terminal to the designated minus node

Measuring current flowing through a node

* Separate the node into two sub-nodes
* Insert a short wire into each sub-node, and connect the DMM red and black terminal to their requisite sub-node, in a way such that the current will flow into the red terminal of the DMM
* Remember to set the DMM to its current-measuring setting