Plan for Physics 492 Fall 2016		
	Lab name	**Subjects**
I	Diode Experiments	Introduction to the test equipment you will use in Physics 492 and also in Physics 493.
II	Frequency Dependence	You will study circuits made from linear components: resistors, capacitors and inductors. You will build filters and resonators. You will learn the concept of impedance and its importance in circuit analysis and electrical measurements. You will also learn why we use scope probes and terminators for scope measurements.
III	More Diodes	This lab begins the study of semiconductor components. You will find the relation between the voltage and current in an ordinary diode and a zener diode, study temperature effects, rectification, and nonlinear circuit equilibirium.
IV	Constructing a Diode Thermometer	You will use a diode to design an analog thermometer that will work down to liquid nitrogen temperatures. Your final thermometer design will then be constructed in a metal housing with battery power.
V	Measuring Specific Heat of Metals	Use your homemade analog thermometer to measure the specific heat ofvarious metals over a wide temperature range.
VI	Bipolar Transistors	The workhourse of electronics: the bipolar transistor. You will build amplifiers, an emitter follower, a constant-current source, and a switch.
VII	JFET Transistors I	This lab explores basic JFET transistor characteristics, circuits and applications. You will build a JFET switch, memory cell, current source, and source follower.
VIII	JFET Transsistors II	This lab investigates some more sophisticated JFET circuits such as voltage amplifiers, differential amplifiers, attenuators, and modulators.
IX	Differential Amplifiers	The differential amplifier forms the front end of all operation amplifiers. You will build a differential amplifier with a constant current source to eliminate all common mode noise.
X	Op-amps	This week's lab studies operational amplifiers and feedback. You will construct a comparator, follower, current source, as well as inverting, non inverting, differential, and summing amplifiers. The lab assumes that the op amps are perfect and uses the Op Amp Golden Rules to analyze the circuits.
	Textbook:	
		Thomas C. Hayes, **Learning The Art of Electronics** (Paperback, 2016)
This textbook has <u>not</u> been ordered by the USC Bookstore. Order your copy today from the internet.		