University of Wisconsin - Madison  
College of Engineering [EGR]  
Last Offered: 2015-2016 Spring [1164]  
Direct Link to this Syllabus :

1. ECE 271, Circuits Laboratory II  
2. Credits : 1  
3. Contact Hours : 2.5

3. Textbook and Materials :

   ECE 271 Lab Manual

   a. Other Supplemental Materials : None

   • Specific Course Information :

   a. Brief description of the content of the course (Course Catalog Description) :  
      Experiments cover electronic device characteristics, limitations and applications of  
      operational amplifiers, and feedback circuits.
   b. Pre-requisites or Co-requisites : ECE 270; ECE 340 or con reg
   c. EE required, CMPE-Selected Elective

   • Specific Goals for the Course :

   a. Course Outcomes :

      1. Measure the resonant frequency of a series resonant circuit (SRC), measure the voltages  
         and currents of elements in an SRC as a function of frequency, show that the input  
         impedance is at a minimum at the resonant frequency, and explain the relationship  
         between circuit Q and bandwidth
      2. Measure the magnitude and phase angle of voltages and currents in a circuit when a  
         sinusoidal source is used
      3. Determine the power factor of a given load, determine the appropriate value of  
         capacitance to change the power factor to a given value, and design a circuit that will
4. Predict and experimentally verify the output voltage characteristics of various series and parallel diode circuits; convert an AC voltage to DC using a full-wave rectifier without capacitors, with capacitors, and with loads; measure ripple versus load resistance, explain the concept of load regulation; and measure actual capacitance of a capacitor whose nominal value is 500 μF or more.

5. Classify the region a given BJT is operating in, measure the beta of a transistor, explain how temperature affects a transistor, and measure the overall current gain of a Darlington pair.

6. Determine the output range of a given bridge amplifier circuit; determine the common-mode gains, differential-mode gains, and CMRR for a given differential amplifier circuit.

- **ABET Student Learning Outcomes:**

  (a) Ability to apply mathematics, science and engineering principles.
  (b) Ability to design and conduct experiments, analyze and interpret data.
  (e) Ability to identify, formulate and solve engineering problems.
  (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered:**

  1. Series and parallel resonance of inductance-capacitance circuits
  2. Iron-core transformers
  3. Operational amplifier circuits
  4. Rectification and capacitive filters
  5. Elementary common-emitter transistor amplifiers
  6. Power amplifiers with negative feedback