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

1. E C E 304, Electric Machines Laboratory  
2. Credits: 1  Contact Hours: 4.3  
3. Textbook and Materials:

   There is an individual set of notes for each lab experiment. ECE 304 Course Notes

a. Other Supplemental Materials: None

• Specific Course Information:

a. Brief description of the content of the course (Course Catalog Description): Terminal characteristics of electric machines, elements of speed control, voltage regulation, and applications in systems. Emphasis on the experimental approach to the solution of complex physical problems.

b. Pre-requisites or Co-requisites: ECE 271; ECE 355 or con reg

c. This is a Selected Elective course.

• Specific Goals for the Course:

a. Course Outcomes:

1. Students will be able to make high frequency measurements on coaxial transmission line networks using both pulse and steady-state sinusoidal techniques.
2. Students should be able to work with the four types of machines listed below and understand their electrical and mechanical properties.
3. They will know how to use a microwave network analyzer.
4. Students should be able to do a better job of operating oscilloscopes and using them to gather and process electrical data.
5. They will know how to measure impedances on transmission lines and design matching networks.

6. Students should be able to do a better job of writing lab reports and communicating technical information.

7. They will know how to measure radiation patterns of microwave horns.

- **ABET Student Learning Outcomes:**
  
  (a) Ability to apply mathematics, science and engineering principles.  
  (b) Ability to design and conduct experiments, analyze and interpret data.  
  (d) Ability to function on multidisciplinary teams.  
  (e) Ability to identify, formulate and solve engineering problems.  
  (g) Ability to communicate effectively.  
  (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

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

  1. Properties of DC Machines  
  2. Properties of Squirrel-Cage Induction Machines  
  3. Properties of Wound-Field Synchronous Machines  
  4. Properties of Permanent Magnet Synchronous Machines