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

1. ECE 504, Electric Machine & Drive System Laboratory
2. Credits: 3  Contact Hours: 4.3
3. Textbook and Materials: ECE 504 Course Notes

a. Other Supplemental Materials: None

• Specific Course Information:

a. Brief description of the content of the course (Course Catalog Description): Steady state and dynamic performance of electric machines in combination with power electronic converters. Parameter measurement, performance evaluation, design of experimental procedures for problem solving, use of digital data acquisition systems and signal processing equipment in system evaluation.

b. Pre-requisites or Co-requisites: ECE 304 and 411 or con reg 411 and cons inst

c. This is a Selected Elective course.

• Specific Goals for the Course:

a. Course Outcomes:

1. Students should be able to measure the parameters of electrical machines and use them to predict the machine’s steady-state and transient characteristics

2. Students should be able to do a better job of operating laboratory instrumentation including oscilloscopes, power-meters, and spectrum analyzers, and be able to use them to gather and process measured data

3. Students should be able to do a better job of writing lab reports and communicating technical information
• **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. Measurement and Calculation of Induction Motor Parameters  
2. Induction Motor Drive Characteristics with a Voltage Source Inverter  
3. Stability of an Induction Motor under Sinusoidal Excitation  
4. PWM Voltage Source Inverter Characteristics  
5. Field Oriented Control of an Induction Motor  
6. Performance Characteristics of Permanent Magnet Synchronous Machines  
7. Performance Characteristics of a Variable Reluctance Motor