Catalog Description: EEC 471 (2-0-2).
Pre-requisite: EEC 470.
Steady state performance of electric machines: dc, induction, and synchronous in combination with power electronics converters.

Textbook:

Laboratory Manual Lab Volt Manual

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Course Objectives: To give a student “hands on experience” with equipment and instrumentation used in the electric machines and power electronics laboratory. To give a student opportunity to compare theoretical results with those attainable in practice.

Expected Outcomes: Upon completion of this course students should be able to:

1. Work on industrial projects related to power electronics and electric machines and drives.

Fulfills The Following Electrical Engineering Program Objectives and Outcomes:

Objectives: 1. Practice electrical engineering in power electronics. 2. Define and diagnose problems, and provide and implement electrical engineering solutions in industry, business, and government.

Outcomes: (a) ability to apply knowledge of mathematics, science, and engineering to power electronics. (b) ability to design and conduct electrical engineering experiments, as well as to analyze and interpret data. (c) ability to design a system, component or process. (e) ability to identify, formulate, and solve electrical engineering problems. (g) ability to communicate effectively.
(k) ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.

**Contribution of Course to Meeting the Professional Component:**

Math & Basic Science: 0 credits;  
Engineering Topics: 4 credits;  
General Education: 0 credits

**Prerequisite by Topic:**

1. Polyphase systems.  
3. Principles of electromechanical energy conversion.  
4. Transformers.  
5. Steady-State performance of AC Machines.  
7. AC/DC Converters.  
8. DC/DC Converters  
9. DC/AC Converters.

**Experiments:**

1. Transformers 3  
2. AC/DC Converters – Diode Bridge Rectifiers 3  
3. AC/DC Converters – Thyristor Bridge Rectifiers 3  
4. DC/AC Converters 3  
5. DC/DC Converters-Buck 3  
6. DC/DC Converters-Boost &Buck-Boost 3  
7. Midterm Bench Exam 3  
8. Introduction to DSPACE  
   Mechanical System Modeling 3  
9. DC Machine - DSPACE 3  
10. Synchronous Motors 3  
11. Synchronous Generators 3  
12. Induction Machine 3  
13. Induction Motor-V/F Control 3  
14. Bench Exam 3

**Laboratory Projects:**

One project per experiment.

**Computer Usage:**

Software-Matlab and Pspice

**Grading:**

Midterm-30%, Final-40%  
Laboratory Reports – 20%  
Quizzes – 10%

**Prepared by:** Dr. Ana V. Stankovic  
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