

ELEC 344

Applied Electronics and Electromechanics

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Lectures: Mon, Wed 16:00-17:00 MacLeod 202

Tutorials: Fri 16:00-17:00 MacLeod 228

Textbook

- Principles of Electric Machines & Power Electronics by P.C.Sen, Wiley (ISBN 978-0471022954)

Supplemental Textbooks

- Electric Machinery Fundamentals by Stephen J. Chapman, McGraw Hill, 3rd Ed.
- Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N.O. Sakiku, McGraw Hill

Course Outline

We will study a variety of AC/DC electromechanical devices such as electrical machines and their drives, and power transformers. The prerequisite skills for this course include basic circuit analysis ability (i.e. Ohm's Law, Kirchoff's Voltage and Current laws.)

Course Agenda

There will be 24 lectures and 12 tutorials.

Module 1: Introduction & Magnetic Circuits (Chapter 1), Basic Electromechanical Devices and Energy Conversion (Chapter 3)

Module 2: Brushed DC Machines (Chapter 4), Applied Power Electronics (Chapter 10)

Module 3: Single and Three Phase AC Power (Appendix B & C), Transformers (Chapter 2)

Module 4: Induction Machines (Chapter 5)

Module 5: AC Synchronous Machines (Chapter 6)

Module 6: Stepper Motors (Chapter 8)

Grades

Homework: 5%

Lab: 15%

Quizzes: 15%

Midterm: 25%

Final Exam: 40% (50% Grade required on the final to pass the course)

Exams

- Midterm: Nov 2nd During Normal Lecture Period - Covering to the end of Transformers

- Final Exam: Cumulative. Date & time TBD. Students must pass the final exam (>50%) to pass the course.

Quizzes

- There will be 3 to 5 quizzes. Failure to attend the quiz will be considered as zero mark unless appropriate note is provided to justify the absence.

Labs

There will be 6 lab sessions for this course in the Electromechanical Devices Laboratory (located in McLoed 130). It is students' responsibility to read all required material, and get prepared for each lab experiment.

The following general rules apply to the labs:

- To pass this course, each student (or group of two/three) must have submitted reports for all the labs
- Sign-in and sign-out on the provided sheet are required at each lab session. Failure to sign the sheet shall be considered as failure to perform the lab.
- Each student must clear the work place and put back the equipment and wires at their original places prior to leaving the lab. After the bench is checked by a TA, each student may sign-out.
- Reports are due one week after the completion of the experiment. The pre-lab shall be included in the report.
- Late reports will be penalized by 10% per day.
- Students must submit one report per bench. This means all the students conducting the experiment at each bench will submit one report together. Each report should reflect the work of each group and their understanding of the experiment.