

EE 306: ELECTROMECHANICAL DEVICES

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Textbook: Electromechanical Energy Devices and Power System, by Z. Yamayee & J. Bala, 1994.

Tentative Schedule for Semester (101)

- 1) **Three-Phase Circuits:** (4 Lectures)
 - ◆ Balanced three-phase circuits
 - ◆ Phasor diagram
 - ◆ Delta and Wye connections
 - ◆ Power calculations
- 2) **Magnetic Circuits:** (3 Lectures)
 - ◆ Magnetic circuit definition
 - ◆ Magnetic circuit concept and analogy
 - ◆ Magnetization curves of ferromagnetic materials
 - ◆ Magnetic circuit computations
 - ◆ Magnetic circuit losses
- 3) **Transformers:** (6 Lectures)
 - ◆ Introduction and construction
 - ◆ Theory of operation
 - ◆ Equivalent circuit
 - ◆ Equivalent circuit parameter determination from tests
 - ◆ Voltage regulation and efficiency
- 4) **DC Machines:** (7 Lectures)
 - ◆ Introduction and construction
 - ◆ Generation of unidirectional voltage
 - ◆ Induced EMF equation
 - ◆ DC machine classification
 - ◆ Equivalent circuit of DC generator
 - ◆ DC generator characteristics
 - ◆ Equivalent circuit of DC motor
 - ◆ DC motor characteristics
- 5) **Synchronous Machines:** (5 Lectures)
 - ◆ Introduction and construction
 - ◆ Generated EMF equation
 - ◆ Equivalent circuit
 - ◆ Equivalent circuit parameter determination from tests
 - ◆ Voltage regulation and efficiency
 - ◆ Power-angle characteristics
 - ◆ Synchronous motor
- 6) **Three-Phase Induction Motor:** (5 Lectures)
 - ◆ Introduction and construction
 - ◆ Equivalent circuit
 - ◆ Equivalent circuit parameter determination from tests
 - ◆ Power and torque equations
 - ◆ Torque-speed characteristics

Tentative Laboratory and Problem Session Schedule

Experiment # 1: Three-phase circuits (**Week of Oct. 9th**)
Experiment # 2: Magnetic circuits (**Week of Oct. 16th**)

Problem Session I: During the Lab Session (Week of Oct. 23rd)

Experiment # 3: Equivalent circuit of transformers (**Week of Oct. 30th**)
Experiment # 4: Regulation and efficiency of transformers (**Week of Nov. 6th**)
Experiment # 5: Characteristics for DC generators (**Week of Nov. 27th**)

Problem Session II: During the Lab Session (Week of December 4th)

Experiment # 6: Characteristics for DC motors (**Week of Dec. 11th**)
Experiment # 7: Equivalent circuit of synchronous generators (**Week of Dec. 18th**)
Experiment # 8: Characteristics for induction motors (**Week of Dec. 25th**)

Final Lab Exam (Week of Jan. 8th)

Major Exam Schedule

Major I: Wednesday, October 27th, 2010, Time 7:00-9:00 PM (Room 59-1001)

Major II: Wednesday, December 8th, 2010, Time 7:00-9:00 PM (Room 59-1001)

Grading Distribution

Two Major Exams	30%
Final Exam	30%
Attendance, HWs and Quizzes	15%
Lab	20%
Design Project	5%

Important Points to Remember

1. **Lab Grading:** the lab grade will be distributed as 12% for attendance, performance and reports and 8% for experimental final lab exam.
2. **Lab. Makeup:** No lab. makeup will be allowed without an official excuse.
3. **Homework:** The homework out of the textbook will be given. However, homework solution will not be collected. Instead, a quiz related to the homework problems is expected. In addition, external assignments will be given and collected for grading.
4. **Attendance:** According to the university regulations, any student who exceeds 20% of the scheduled class meeting without an official excuse will receive a grade of DN in the course.
5. **Official excuses:** All official excuses must be submitted to the instructor no later than one week of the date of the official excuse. The instructor may not accept the late excuses.
6. **Safety: Students must wear proper cloths during labs (No Thope/Ghuttra/Shomakh will be allowed during Labs).**