Electrical Engineering 3501: Electromechanics Laboratory
Prior Number - Electrical Engineering 208

Credit and Contact Hours
1 credit hour laboratory (One 90-minute sessions per week).

Instructor
Graduate Teaching Assistants coordinated by a faculty member
J. Kimball, Ph.D. (faculty coordinator)

Text(s)
Electromechanics Laboratory Manual
Available at: http://ece.mst.edu/currentcourses/classnotesinfo/

Course Information
Course Description
Experiments with power measurement, transformers, magnetically coupled circuits, rotating magnetic fields, stepper motors, DC machines, induction machines, synchronous machines, and brushless DC machines.

Prerequisites
Electrical Engineering 2120 (153) with a grade of “C” of better; Passing the Electrical Engineering Advancement Exam II. Preceded or accompanied by Electrical Engineering 3500 (205).

Required or Elective
Option for Power Elective for electrical engineering majors

Course Goals
General Outcomes
1. Learn 3-phase power measurement techniques.
2. Understand dynamics of transformers, obtain equivalent circuit parameters.
3. Learn principles of utilizing a dynamometer.
4. Understand basic principles of rotating magnetic fields
5. Learn steady-state characteristics of DC, induction, and brushless DC machines.
6. Understand basic concepts of numerical solution of differential equations
7. Use simple integration algorithms to model dynamic behavior of BDC drive system
### Relationship of Course to Program Outcomes

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<tr>
<th>EE Outcome</th>
<th>Course Objective</th>
<th>Comments</th>
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<td>a</td>
<td>S S M S M S S</td>
<td>The laboratory provides ample opportunities to connect theory to practice.</td>
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<td>b</td>
<td>M M M M M</td>
<td>Thorough experimental analysis is expected.</td>
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<td>k</td>
<td>M M S S S S S</td>
<td>The laboratory relies on hands-on skills, analysis, and the use of modern engineering tools, such as computerized analysis and simulation.</td>
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S – strong connection; M – medium connection; W – weak connection

### Topics Covered

1. Electrical Safety 1 week
2. Technical Writing Instruction and Expectations 1 week
3. Three-phase power measurement 1 week
4. Single phase transformer 1 week
5. DC Motors, DC drive circuits 2 weeks
6. Rotating Magnetic Fields 1 week
7. Induction Machines 2 weeks
8. Brushless DC Machines 2 weeks
9. Instructor Conferences, Additional Work, and Make-up Sessions 4 weeks