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**ECE610014**  
**Electromagnetic and Electromechanical**  
**Component Design**

Class Outline and Policies

Fall 2019

S.D. Sudhoff

# Contact Information

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# Topics

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- Optimization
  - Prerequisite: ECE6950 “Time-Domain Simulation and Optimization for Design”, 1 credit, runs every semester, self study materials will be provided. See Chapter 1 of course text.
- Magnetics and Magnetic Equivalent Circuits
- Inductor Design
- Force and Torque
- Electromagnet Design
- Magnetic Core Loss

# Topics (Continued)

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- Transformer Design
  - Distributed Windings
  - Permanent Magnet AC Machine Design
  - Thermal Equivalent Circuits
  - AC Conductor Losses
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- We may or may not get through all of this

# Before You Take This Course

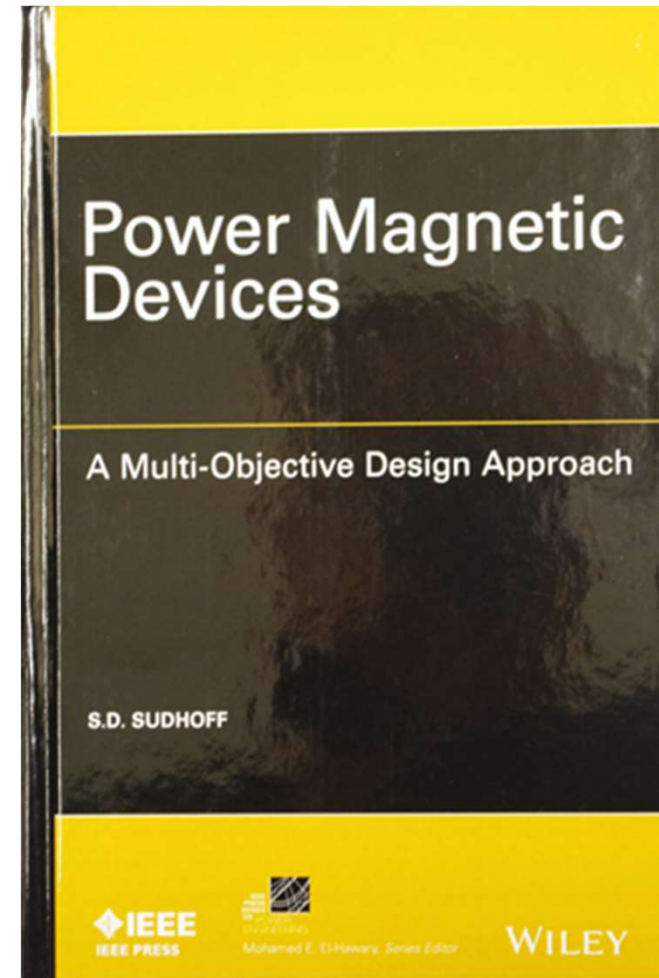
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- Prerequisites
  - Understanding of theory of operation of permanent magnet synchronous machines (brushless dc machines), a basic knowledge of electromagnetic fields
- Software
  - We will be using Matlab extensively

# Course Text

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- S.D. Sudhoff, *Design of Power Magnetic Devices: A Multi-objective Approach*, IEEE Press/Wiley, 2014.
- ISBN 978-1-118-48999-4
- Written specifically for this course
- We will use it extensively and follow it closely
- Excellent bed time reading, though exciting parts may keep you up



# Grading

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- There will be three in-class exams. Each exam is worth 10% of your grade.
- There will be one cumulative final exam during finals week. This is also worth 10% of your grade.
- The final exam will also serve as a QE question.
- Homework – Periodically assigned. Worth 60% of your grade.

# Homework

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- Homework sometimes is sometimes short problems (we'll call this just homework, sometimes involves coding (we'll call these coding problems – just another form of homework).
- Late homework will be penalized at 20% per business day. It is due at the beginning of the period.
- You may freely discuss your homework with other students; however, individual work is expected unless explicitly told otherwise (ex, a group homework)



# In-Class Exam Policies

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- No computers, calculators, cell-phones, PDAs, slide rules, abacus, rulers, are allowed
- There will be no crib sheet
- Do not look past your own desk. Hats with front brims are not allowed
- Makeup exams will only be rarely allowed in exceptional circumstances. They will be formidable. They will not be curved. Not recommended.
- Exams may be curved on a per test basis.
- Final exam grade scaling for the course and for the QE may not be the same.

# Cheating

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- At minimum, cheating will result in a zero on the assignment in question.
- All instances of cheating, even suspected cheating, will be reported to the ECE Assistant Head for Education

# Grade Distribution Philosophy

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- Fall 2013 (as example)
  - A's: 8
  - B's: 4
  - C's: 2
  - D's: 2
  - F's: 1

# Final Notes

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- In the event of invasion by trifids [1], giant catfish men [2], green slime [3], alligator people [4], giant leeches [5], hound dogs wearing killer shrew suits [6], or other such event, class policies may be adjusted midcourse. Information will be posted on course web site in such a case.

[1] *The Day of the Triffids*, 1951

[2] *Zaat*, 1971

[3] *The Green Slime*, 1968

[4] *The Alligator People*, 1959

[5] *Attach of the Giant Leaches*, 1959

[6] *The Killer Shrews*, 1959