

ELEG 3304 Energy Systems Spring 2019

MWF 9:40-10:30 AM – BELL 2273

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Textbook: “Electric Machinery Fundamentals”, 5th Edition, by Stephen J. Chapman

Publisher: McGraw Hill Education; 5 edition (February 17, 2011)

Language: English · ISBN-10: 9780073529547 · ISBN-13: 978-0073529547

<https://www.amazon.com/Electric%E2%80%90Machinery%E2%80%90Fundamentals%E2%80%90Stephen%E2%80%90Chapman/dp/0073529540>

This course is an introduction to electrical energy conversion components and systems. The emphasis is on developing equivalent circuits for electrical machinery and simulating their performance when connected to other power system components.

Homework problems, submissions and their solutions will be done through Blackboard (learn.uark.edu). It is the student’s responsibility to work through solutions and inquire in-class about methods of analysis.

Approximately 8 quizzes will be given, and may sometimes occur during the laboratory time during a non-lab week. The quizzes will cover recent course material and will closely follow the example problems solved in class. Make-up quizzes will not generally be given. Missed quizzes due to an excusable absence (documented illness or student activity) will be omitted from grade calculations. Quizzes are generally closed-notes and closed-book. Students are expected to memorize formulas and equivalent circuits.

Exams: Two in-class tests will be given, and will be announced at least one week in advance. Exam questions are similar in scope to quizzes and homework problems. The first exam will be given after completing Chapter 3, and the second will be given after completing Chapter 6. A final exam covering all the course topics will be given at the standard UA assigned time. Students will generally be expected to memorize important formulas and equivalent circuits. Formula sheets and student notes are generally not allowed during exams.

Laboratory: There are five lab sessions throughout the course. One of these is a PCB design and soldering project of a pulse-width modulated buck dc-dc converter.

Research Paper and Poster Presentation: A research paper on battery technologies will be assigned. The paper will be in an IEEE publication format and the poster will be presented during a public session. Papers are prepared individually. Posters are developed in teams of 2 or 3 students.

Outline

1. Introduction to Power Electronics (6 class meetings) and review of three-phase power.
2. Chapter 1: Magnetic Fields, Mechanical Power and 3-Phase Review (4 class meetings) Sections 1.1 – 1.10
3. Chapter 2: Transformers (4 class meetings) Sections 2.1 – 2.6, 2.10
4. Chapter 3: AC Machinery Fundamentals (4 class meetings) Sections 3.1 – 3.7
5. Chapter 4-5: Synchronous Motors & Generators (4 class meetings) Sections 4.1-4.9, 5.1 – 5.5
6. Chapter 6: Induction Motors (6 class meetings) Sections 6.1 – 6.13
7. Chapter 7 & 8: DC Machinery Fundamentals (3 class meetings) Sections 7.1-7.5, 8.1-8.14
8. **Final Exam: (Per UA Registrar Schedule).**

Grading:

Grading	
Laboratory:	25%
Quizzes:	10%
Homework:	5%
Two tests:	15% each
Final Exam:	15%
Research Paper:	10%
Poster and Presentation:	5%

Overall course grades will be assigned based on an assessment of the student's mastery of the subject from the submitted course assignments. As a general guideline, the *approximate* course grade breakdown might be typically:

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
< 60	F

Conduct

Students are required to be aware of and comply with the University of Arkansas policies for academic integrity as described at <http://www.uark.edu/campus-resources/rlee/honesty.html>. Behavior in class is required to conform to University standards of conduct. In particular, the University faculty, administration and staff are committed to providing an equal educational opportunity to all students. The University of Arkansas does not condone discriminatory treatment of students or staff on the basis of age, disability, ethnic origin, marital status, race, religious commitment, sex, or sexual orientation in any of the activities conducted upon this campus.

Please note the following:

- **Inclement Weather Policy:** In the event of extremely hazardous, the University may announce that the inclement weather policy is in effect. You may call 575-7000 after 5:00 a.m. for announcements. Announcements are also made on the KAUF Radio (91.3 FM) as well as local radio and television stations. I will also do my best to email the class if there are any other issues that might cancel class.
- ***University of Arkansas Academic Policy Series 1520.10 requires that students with disabilities are provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact me privately at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through the Center for Educational Access (contact 479-575-3104 or visit <http://cea.uark.edu> for more information on registration procedures).***
- “As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail.”
- “Each University of Arkansas student is required to be familiar with and abide by the University’s ‘Academic Integrity Policy’ which may be found at <http://provost.uark.edu/> Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.”
- The campus faculty has adopted a new academic integrity policy. The policy now incorporates a rubric for assigning penalties for academic integrity infractions. The policy can be located at <http://provost.uark.edu/246.php>, and the rubric can be located at <http://provost.uark.edu/245.php>. Please spend a few minutes reviewing the policy and rubric.

EMERGENCY PROCEDURES

Many types of emergencies can occur on campus; instructions for specific emergencies such as severe weather, active shooter, or fire can be found at [emergency.uark.edu](https://www.uark.edu/emergency).

Severe Weather (Tornado Warning):

- Follow the directions of the instructor or emergency personnel
- Seek shelter in the basement or interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building
- Stay in the center of the room, away from exterior walls, windows, and doors

Violence / Active Shooter (CADD):

- **CALL-** 9-1-1
- **AVOID-** If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY-** Barricade the door with desk, chairs, bookcases or any items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it's safe.
- **DEFEND-** Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.