ECE 3300 Syllabus

Electromechanical and Electromagnetic Energy Conversion, Section A, 3 Credits

Fall 2026

Instructor Information

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General Course Information

Description

Electromechanical devices are involved in electric vehicles, drones, electric aircraft, robots, wind generators, satellites, spacecraft, etc. This course serves as an introduction to electromagnetic and electromechanical energy conversion and the operating principles of electric motors and generators, or collectively electric machines. "An understanding of the principles of electromechanics is quite important for all those who desire to extend the usefulness of electrical technology in order to ameliorate the problems of energy, pollution, and poverty that presently face mankind."

Course Learning Outcomes

1. Get familiar with three main families of rotating electric machines, i.e. DC machines, synchronous machines, and induction machines, as well as transformers, which are stationary electromagnetic devices.

2. Understand the working principles of these machines/devices from the standpoints of fields as well as equivalent circuits

3. Able to analyze the magnetostatic fields in electric machines and transformers using magnetic circuits (different from equivalent circuits)

4. Able to carry out steady-state performance calculations for these electric machines and transformers

5. Understand the characteristics and application scenarios of these machines/devices

Required Course Materials

S. Umans, *Fitzgerald & Kingsley's Electric Machinery*, 7th Ed., McGraw-Hill, 2014.

Grading Policy:

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Assignments

- Homework (6 sets), 30% (5% each set)
- Midterm #1, 20%
- Midterm #2, 20%
- Final Exam, 30%

Description of Graded Components

Homework assignments are an important part of the learning process. There will be 6 sets of homework, covering magnetic circuits, transformers, electromechanical energy conversion, DC machines, synchronous machines, and induction machines respectively.

All midterm and final exams are closed books and closed notes. No computers/tablets/phones are permitted. One calculator and one formula sheet (both sides of U.S. letter-size paper) are allowed. The formula sheet should be handwritten originals (or print of electronic notes), not photocopied.

The final exam is comprehensive. All the material presented in the course may be covered in the final.

The final grades calculated by Canvas are not subject to the grading policy laid out in this syllabus (e.g., extra credits aforementioned), therefore **please do not use Canvas aggregated grades as your reference**.

Final grades will be curved to guarantee a grade of B when a final score (weighted sum) equal to or greater than the class average.

Course Policies

Attendance and/or Participation

Attendance will be taken starting from the second week. There will be bonus points (added to the course overall score) if you have absence less than 3. No excuses are accepted for missed lectures.

Absence	Bonus Points
0	+3
1	+2
2	+1
3	0

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Pre- &/or Co-Requisites

Students should be very familiar with steady-state AC circuit analysis and phasors. Students should also be familiar with basic principles of magnetostatics, and three-phase systems.

Extra Credit Opportunities

Bonus questions (up to 10 points) may be provided in the exam. (The maximum score of each exam will be capped at 100 points.)

If your exam score is higher than the immediate last one, then extra points equaling the difference between the two and capped at 5 will be added to your current exam score (capped at 100 pts).

If your final exam score is higher than the average of midterm ones, then extra points equaling the difference between the two and capped at 5 will be added to your final score (capped at 100 pts).

There will also be bonus points (added to the course overall score) if you have absence less than 3. Please refer to the attendance section.

Collaboration, Group Work, and Use of Generative AI

Students are encouraged to work together on homework assignments. However, you must submit your own version of the assignment. You are expected to complete the midterms and final exam yourself, without any external help or communication.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Late Homework Policy:

Late by	Percentage of Point Reduction
1 day	5%
2 days	10%

Late by	Percentage of Point Reduction
Beyond 2 days	100% (i.e., not accepting anymore)

Exam Makeup Policy: The instructor shall be notified at least one week before the midterm or final exams. The makeup exam will be held **before** the official one and the exact time will be determined between the student and the instructor.

Inclement Weather and Digital Learning Days

If a weather-related event affects campus operations, we'll follow guidelines provided by Georgia Tech.

Student Use of Mobile Devices in the Classroom

Mobile devices are expected to be handled to the podium during exam hours and will be returned after an exam is done.

Additional Course Policies

Five Times Strategy: "It is expected that this course will require at least 9 hours of effort per week on average when you consider time spent on lectures, reading assignments, homework, and re-writing of your class notes. I strongly recommend that you implement the "Five Times Strategy" for learning in this class. This requires that you cover the course material at least 5 times before exams. The first time that you cover the material is when you perform your reading assignment before class. The second time that you cover the material is during lectures. The third time that you cover the material is when you re-write your "lecture set" of notes that include material from lectures and the reading assignments, including all derivations and your additions. The fourth time that you cover the material is when you do your homework assignments. Finally, the fifth time that you cover the material is when you study for your exams. This technique will help you master the material and also will provide you with a comprehensive set of notes to potentially teach from one day. Please note that if you do not do well on the exam, I will ask if you followed my recommendation regarding the 'Five Times Strategy.'"

Future Updates: All information given in this document may be subject to change at some future date. Notice will be sent out via the Canvas platform.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Graduate Student Academic and Professional Success Resources:

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- *Professional Development such as the programming from the Career Center and other professional development resources and events"*

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu)