

EEL 3211 –Basic Electric Energy
EEL 3211C
Class Periods: MWF, Period 6, and 12:50 to 1:40
Location: Online (Zoom)
Academic Term: Spring 2021

Instructor:

Morgan Thomas
morganana13@ufl.edu
561-346-4054
Office Hours: MW 3:00 to 3:50 PM Location: zoom

UPI/NINJA:

Please contact through the Canvas website

- Brenden Mears, bmears@ufl.edu, zoom, office hours TBD (UPI)
- Paulo Torres, ptorres@ufl.edu, zoom, office hours TBD (NINJA)

Course Description

Analysis and modeling of power system components. Magnetic circuits, energy conservation, transformers, and AC and DC rotating machines. Laboratory. (4 credit course)

Course Pre-Requisites / Co-Requisites

EEL 3008

Course Objectives

Learn the basics magnetic circuits, transformers, motors, and generators. Design circuits and systems to meet desired needs. Engage in life-long learning. After successful completion of this course, the student will have a basic understanding of:

- | | |
|---|------------|
| • MATLAB examples and Electromagnetic circuits and systems | Week 1-3 |
| • Three phase circuits including wye and delta configurations | Week 3-4 |
| • Transformer function, characteristics and uses | Week 5-7 |
| • AC machinery | Week 8-9 |
| • Synchronous Machinery, characteristics and uses | Week 9-11 |
| • Induction Motors, characteristics and uses | Week 12-13 |
| • DC Machinery, characteristics and uses | Week 14 |
| • Transmission Lines, characteristics | Week 15 |

Materials and Supply Fees

Course Fee – \$30.00

Professional Component (ABET):

Analysis and modeling of power system components. Magnetic circuits, energy conservation, transformers, AC and DC rotating machines, introduction to power transmission. Learn the basics magnetic circuits, transformers, motors, and generators. Design circuits and systems to meet desired needs. Engage in life-long learning. After successful completion of this course, the student will have a basic understanding of:

- | | |
|---|----------|
| MATLAB examples and Electromagnetic circuits and systems | Week 1-3 |
| Three phase circuits including wye and delta configurations | Week 4 |
| Transformer function, characteristics and uses | Week 5-6 |
| AC machinery | Week 7-8 |

Synchronous Machinery, characteristics and uses
 Induction Motors, characteristics and uses
 DC Machinery, characteristics and uses
 Transmission Lines, characteristics

Week 9-10
 Week 11-12
 Week 13-14
 Week 14-15

This course consists of 4 credits of Engineering Science

Relation to Program Outcomes (ABET):

Outcome	Coverage*
An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
An ability to communicate effectively with a range of audiences	
An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Medium
An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

Required Textbooks and Software

- Title: Electric Machinery Fundamentals
- Author: Stephen J. Chapman
- 5th ed.
- ISBN 0073529540

Course notes and videos were done by Professor Rambo.

Calculator: A TI N-Spire or equivalent polar-rectangular mixed mode calculator will be *required*.

Recommended Materials

- Title: Electric Machinery and Power System Fundamentals
- Author: Stephen J. Chapman
- 1st ed.
- ISBN 978-00-712262-0

Course Schedule

Week 1: Topic: MATLAB & Core
 Quizzes (on Lecture): 1, 2, 3

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- Week 2: Topic: Core
Quizzes (on Lecture): 4,5
- Week 3: Topic: Core
Quizzes (on Lecture): 6,7,8
- Week 4: Topic: Core & Transformer
Quizzes (on Lecture): 9,10,11
- Week 5: Topic: Transformers
Quizzes (on Lecture): 12,13,14
Exam #1(tentative)
- Week 6: Topic: Transformers
Quizzes (on Lecture): 15,16,17
- Week 7: Topic: Rotating Machines
Quizzes (on Lecture): 18,19,20
- Week 8: Topic: Rotating & Synchronous Machines
Quizzes (on Lecture): 21,22,23
- Week 9: Topic: Synchronous Machines
Quizzes (on Lecture): 24,25,26
Exam #2(tentative)
- Week 10: Topic: Synchronous Machines
Quizzes (on Lecture): 27,28,29
- Week 11: Topic: Induction Machines
Quizzes (on Lecture): 30,31,32
- Week 12: Topic: Induction & DC Machines
Quizzes (on Lecture): 33,34,35
- Week 13: Topic: DC Machines & Transmission Lines
Quizzes (on Lecture): 36,37,38
- Week 14: Topic: Transmission Lines
Quizzes (on Lecture): 39,40
Exam #3(tentative)
- Week 15: Topic: Transmission Lines
Quizzes (on Lecture): 41

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance:

This class will be presented online using Zoom and requires access to a working webcam and stable internet connection. I prefer that students keep their camera on during the class so that I can see you as I would during normal face-to-face classes. Studies show that if we can see each other's faces then we will have more engagement, more student success, and more faculty success. However, this is not a requirement. I understand if on certain days you can't have your camera on due to internet bandwidth limitations, other family members, health issues, or any other reasons.

Attendance to every class is required. You will be expected to attend the entire lecture and a quiz will be given during lecture. You are required to be in attendance the whole class period in order to get credit for the quiz.

Class Expectations:

Class attendance *for the entire period* and *participation* is required. There will be *three* tests, a final, Laboratory, in/out of class *homework* and *daily quizzes via PollEverywhere* (for required video viewing and class *attendance verification (no credit provided for partial period attendance/participation).*) *Homework turned in late will not be given credit* as solutions will be reviewed and video posted following the homework due date.

For the daily quizzes, you must log in with your gatorlink id and must have watched 90% or more (as measured by Mediasite analytics) of each of the videos that are required for that class period as shown on the website eadmin.ece.ufl.edu. Failure to meet this requirement will result in a zero score for the material on that quiz. A quiz grade credit of (+0.25) will be given for attending and putting your name on the quiz if you have not watched the material as the quiz is for two purposes: Attendance and Comprehension. Each class period will have one quiz associated with that period unless otherwise notified on Canvas.

Quiz/Test/Exam Expectations: One 3" X 5" card will be allowed to assist, as well as calculator. No other electronics are allowed. A ruler will be allowed and will be helpful in interpreting graphs. Formula sheet will be provided with formulas from Chapman on Tests/Exam. Each quiz also contains bonus point(s) that are mostly based on architecture of the UF campus. You will see me standing in front of, places on campus, which you should be able to identify as a member of the Gator Nation (hint: check out.... <http://web.uflib.ufl.edu/ufarch/historic.htm> and <http://web.uflib.ufl.edu/ufarch/gallery.htm>).

The tests (1-3) and exams will be given in evenings as part of a combined help session/test starting at 7:00 PM. The tests will be done through Honorlock.

Class Make-Up Policy: If one has a school or instructor approved absence a make-up will be provided for exams, labs, etc. Please give at least a week's notice if you will need a make-up for expected occurrences like class or exam conflicts, conferences, etc.

Absences: Students are responsible for satisfying all academic objectives as defined by the instructor. Absences count from the first class meeting. In general, acceptable reasons for absence from or failure to participate in class include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips,

professional conferences), military obligation, severe weather conditions, religious holidays, and participation in official university activities such as music performances, athletic competition or debate. Absences from class for court-imposed legal obligations (e.g., jury duty or subpoena) must be excused. Other reasons also may be approved. Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence. Students cannot participate in classes unless they are registered officially or approved to audit with evidence of having paid audit fees. The Office of the University Registrar provides official class rolls to instructors. If a student does not participate in at least one of the first two class meetings of a course or laboratory in which they are registered, and he or she has not contacted the department to indicate his or her intent, the student can be dropped from the course. Students must not assume that they will be dropped, however. The department will notify students if they have been dropped from a course or laboratory. The university recognizes the right of the individual professor to make attendance mandatory. After due warning, professors can prohibit further attendance and subsequently assign a failing grade for excessive absences.

Religious Holidays: At the University of Florida, students and faculty work together to allow students the opportunity to observe the holy days of his or her faith. A student should inform the faculty member of the religious observances of his or her faith that will conflict with class attendance, with tests or examinations, or with other class activities prior to the class or occurrence of that test or activity. The faculty member is then obligated to accommodate that particular student's religious observances. Because students represent a myriad of cultures and many faiths, the University of Florida is not able to assure that scheduled academic activities do not conflict with the holy days of all religious groups. Accordingly, individual students should make their need for an excused absence known in advance of the scheduled activities.

The Florida Board of Education and state law govern university policy regarding observance of religious holidays.

The following guidelines apply:

- Students, upon prior notification to their instructors, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith.
- Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence.
- Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances.

If a faculty member is informed of or is aware that a significant number of students are likely to be absent from class because of a religious observance, the faculty member should not schedule a major exam or other academic event at that time.

A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence. Furthermore, a student who believes that he or she has been unreasonably denied an education benefit due to religious beliefs or practices may seek redress through the student grievance procedure.

Illness Policy: If a student is absent from classes or examinations because of illness, she or he should contact their instructors. Students should contact their college by the deadline to drop a course for medical reasons. Students can petition the [Dean of Students Office](#) to drop a course for medical reasons. The university's policy regarding [medical excuse](#) from classes is maintained by the Student Health Care Center. Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence.

Twelve-Day Rule: Students who participate in athletic or extracurricular activities are permitted to be absent 12 scholastic days per semester without penalty. (A scholastic day is any day on which regular class work is scheduled.) Instructors must be flexible when scheduling exams or other class assignments. The 12-day rule applies to individual students participating on athletic or scholastic teams. Consequently, a group's schedule that requires absence of more than 12 days should be adjusted so that no student is absent from campus more than 12 scholastic days. If a student previously has been warned about absences or unsatisfactory work, he or she should not incur additional absences, even if he or she has not been absent 12 scholastic days. It is the student's responsibility to maintain satisfactory academic performance and attendance.

Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets	100 each	15%
Quizzes	3 each	3%
Exams (3 + final)	100 each	62%
Lab	100 each	20%
Total		100%

Grading Policy

Percent	Grade	Grade Points
92.5-100	A	4.00
90-92.499...	A-	3.67
87.5-89.99...	B+	3.33
82.5-87.499...	B	3.00
80-82.499...	B-	2.67
77.5-79.999...	C+	2.33
72.5-77.499...	C	2.00
70-72.499..	C-	1.67
67.5-69.99...	D+	1.33
62.5-67.499...	D	1.00
60-62.499...	D-	0.67
Less than 60	E	0.00

More information on UF grading policy may be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any

condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](mailto:title-ix@ufl.edu), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.

EEL3211C - Electrical Energy Conversion Laboratory

Fall 2020

I. Catalog Description

Electric energy conversion, devices and systems.

II. Pre/Co-requisites

Must be taking EEL 3211C Course and have previously taken EEL 3008

III. Course Objectives

The main purpose of this lab is to familiarize the student with the main areas of study of conventional electric energy conversion. This includes Power Measurement & Instrumentation, Transformers, DC Motors & Generators, Induction Machines, and Synchronous Machines.

IV. Lab TA: Brenden Mears

a. Phone: N/a

b. Email: mearsb@ufl.edu

V. Class Ninja TA: None for Lab

VI. Meeting Location

NEB 289 VIA ZOOM

VII. Grading for Lab

The course will be composed of the following:

- Lab Reports
- Participation and Prelab

VIII. Grading Scale

Letter grades are based on the table below.

Overall Score	Grade
92.5-100	A
90-92.499...	A-
87.5-89.99...	B+
82.5-87.499...	B
80-82.499...	B-
77.5-79.999...	C+
72.5-77.499...	C
70-72.499..	C-
67.5-69.99...	D+
62.5-67.499...	D
60-62.499...	D-
Less than 60	E

IX. Lab Policies & Expectations

- a. Groups: Beginning with Lab 1, students will form groups of two, with each group getting a separate workstation.
- b. Preparation: The student is expected to read and understand the laboratory procedure before starting the experiment, and to have answers for any questions contained in any assigned prelab.
- c. Safety: All safety requirements are outlined in the lab manual and must be followed at all times.
- d. Reports: Lab Reports are due by the start of the next lab. Each member of every group is responsible for their own lab report. For more information on report structure and grading, refer to the lab manual. *You are not allowed to directly copy text from the lab manual. Everything in your report should be in your own words.* The lab reports are run through Turnitin.
- e. Make-Up Labs: If a lab cannot be attended, send the TA an **email about a week prior** to the lab to arrange a make-up.
- f. Late Attendance: If a student is 10 minutes late to class, the student will not be allowed to perform the lab that day or turn in a lab report.
- g. Late Lab Reports: Completed lab reports are due the following lab (Usually every two weeks). If a lab report is not turned in during the first 10 minutes of the following lab, there is a 25% penalty. If it is turned in 3 days to a week after the due date, there will be a 50% penalty. Anything turned in over a week late will not be accepted.

X. Lab Schedule-

Jan 11-Jan 24	<u>NO LAB</u>
Jan 25/26/27	Prelab Due , Perform Lab 0 (All students attend registered day ex. M attend T or W)
Feb 1/2/3	Lab 1 – Group 1
Feb 8/9/10	Lab 1 – Group 2
Feb 15/16/17	Lab 2 – Group 1
Feb 22/23/24	Lab 2 – Group 2
Mar 1/2/3	Lab 3 – Group 1
Mar 8/9/10	Lab 3 – Group 2
Mar 15/16/17	Lab 4 – Group 1
Mar 22/23/24	Lab 4 – Group 2
Mar 29/30/31	Lab 5 – Group 1
Apr 5/6/7	Lab 5 – Group 2
Apr 12/13/14	Lab 6 – All Groups attend