

Power Electronics II

EEL 6246

Class Periods: Tuesday Period 4: 10:40 AM - 11:30 AM;
Thursday Period 4, 5: 10:40 AM – 11:30 AM; 11:45 AM – 12: 35 PM

Location: Zoom Link in Canvas

Academic Term: Spring/2021

Instructor:

Dr. Shuo Wang

Email Address: shuo.wang@ece.ufl.edu

Office Phone Number: 352-392-4691

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

- No TA
- Office hour via zoom: by appointments or the time to be announced in the class

Course Description

This is an advanced course so it is organized based on the applications of power electronics. The students will be able to learn and apply the power electronics theory to actual power electronics applications. The objective of the course is to help students to learn power electronics theory and design skills.

Course Pre-Requisites / Co-Requisites

EEL 4242C / EEE 5317C

Course Objectives

- (1) Electric machine and motor drive basics
- (2) Soft switching techniques, LLC converters
- (3) Magnetic components, electromagnetic interference, and reduction for power electronics systems
- (4) Grid reactive, active and harmonic control using power electronics
- (5) Power semiconductor devices, renewable energy, integration of power grid, photovoltaic, electric vehicle charging and energy storage integration

Materials and Supply Fees

N/A

Required Textbooks and Software

- Slides will be posted in Canvas
- Circuit simulation software such as Simplis may be needed for projects

Recommended Materials

- Recommended articles, papers and books will be given in the class

Course Schedule

- Week 1 - 3: Topics on the power electronics in the electrification of transportation
- Electric machine and motor drive basics
- Week 4 - 6: Topics on the power electronics in consumer electronic products
- Soft switching techniques, LLC converters
- Week 7 - 9: Topics on the power electronics in residential applications

- Magnetic components, electromagnetic interference, and reduction for power electronics systems

Week 10-12: Topics on the power electronics in industry applications

- Grid reactive, active and harmonic control using power electronics

Week 13-15: Topics on the power electronics in energy conversion and integration

- Power semiconductor devices, renewable energy, integration of power grid, photovoltaic, electric vehicle charging and energy storage integration

Final Exam: 4/30/2021 @ 10:00 AM - 12:00 PM

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 and for the students enrolled in EDGE sections. 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.

Note: The recorded videos will be posted within 24 hours after the class.

Attendance Policy, Class Expectations, and Make-Up Policy

All students except for those enrolled in EDGE sections are required to attend the class during the scheduled lecture time.

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.

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
Final Exam	25	25%
Project	65	65%
Class attendance	10	10%
Total	100	100%

Project evaluation rubrics:

	Level of Achievement			Score
	Very Good (3)	Average (2)	Unacceptable (1)	
Identification of problems	Good explanation of the problem	Average explanation of the problems	Minimal explanation of the problem	

Analysis of problems	Detailed and in-depth analysis	Average detailed and in-depth analysis	Minimal detailed and in-depth analysis	
Solve Problems	Successful solving of the problem	Average solving of the problem	Minimal solving of the problem	

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
93 - 100	A	4.00
90.0 - 92.9	A-	3.67
87 - 89.9	B+	3.33
83 - 86.9	B	3.00
80.0 - 82.9	B-	2.67
77 - 79.9	C+	2.33
73 - 76.9	C	2.00
70.0 - 72.9	C-	1.67
67 - 69.9	D+	1.33
63 - 66.9	D	1.00
60.0 - 62.9	D-	0.67
0 - 59.9	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.aa.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.aa.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>