Course Syllabus

EEE 3396 Solid State Electronic Devices

(Fall, 2023, MWF 6, 12:50-1:40pm), LAR330

Instructor:

Dr. Jing Guo

Office location: 551 NEB

Telephone: 392-0940

E-mail address: guoj@ufl.edu

Class Web site: UFL elearning canvas website

Course Description

Introduces the principles of semiconductor electron device operation.

3 Credits

Grading Scheme: Letter Grade

Course Pre-Requisites / Co-Requisites

EEL 3008

Course Objectives: To present the theoretical and practical background of device physics so that students understand and are able to design and optimize the charge transport properties of semiconductor materials and devices.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. 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	Medium
3. An ability to communicate effectively with a range of audiences	Low
4. 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	Low
5. 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	Low
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	High
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

Required Textbooks and Software:

"Solid State Electronic Devices," 7th Edition by Ben Streetman and Sanjay Banerjee, published by Pearson, Prentice Hall (required).

Recommended Materials:

Semiconductor Device Fundamentals, Pierret, Robert F., Addison-Wesley, 1996

Office hours:

Dr. Guo: 9-10am, Wed. (Zoom: https://ufl.zoom.us/j/9976443936 (Links to an external site.)Links to an external site.   Meeting ID: 997 644 3936).

Course Schedule:

Week 1:   Chapter 1: Introduction to Semiconductor Materials

Week 2:   Chapter 2: Atoms and Electrons

Weeks 3-5:   Chapter 3: Energy bands and Charge Carriers in Semiconductors- Chap

Weeks 6-7:   Chapter 4: *Excess Carriers in Semiconductors: Diffusion, Continuity Equation*

Weeks 8-10: Chapter 5: PN Junctions and Metal-Semiconductor Junctions

Weeks 11-13: Chapter 6: Metal-Oxide-Semiconductor Transistors

Weeks 14-15: Chapter 7: Bipolar Junction Transistors

Attendance Policy, Class Expectations, and Make-Up Policy:

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/Links to an external site.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade	Date
Homework or Assignment Sets	10 each	15%	Announce in canvas, late submission results in loss of points
Midterm Exam	100	35%	**In class, Oct. 25, 2022**
Final Exam	100	50%	**7:30-9:30am, Dec. 14, 2023**
		100%	

Make-up Exam Policy: University attendance policies can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspxLinks to an external site.. If you have a University-approved excuse and arrange for it in advance, a make-up test will be arranged. The student must submit a written petition to the instructor one week prior to the scheduled exam with the supporting document, and the instructor must approve the petition. The makeup test will be comprehensive and arranged after the Final Exam date, with an equal or greater difficulty level. If the deadline for finalizing the grade cannot be met, it will result in an "Incomplete" grade and the make-up exam will be arranged in the next semester.

Partial credit:

The following policy for test and quiz partial credit applies.

1. All requests for partial credit should be directed, **in writing and documented**, to Prof. Jing Guo within one week after the work has been returned.
2. You will only receive credit for work handed in for grading.
3. You cannot receive full credit for wrong answers.

Grading Policy

The overall class average will determine the B-/ B breakpoint. The A range will start one standard deviation above this point, the C- range one standard deviation below.

More information on UF grading policy may be found at:

[https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspxLinks to an external site.](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

The following is given as an **example only**.

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

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/Links to an external site.](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/Links to an external site.. 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/Links to an external site.. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/Links to an external site..

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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/process/student-conduct-code/)Links to an external site. 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
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@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.htmlLinks to an external site.

Campus Resources:

<u>*Health and Wellness*</u>

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 <u>umatter@ufl.edu</u> 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: https://counseling.ufl.eduLinks to an external site., 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 ComplianceLinks to an external site., 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/Links to an external site..

<u>*Academic Resources*</u>

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtmlLinks to an external site..

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.eduLinks to an external site..

Library Support, http://cms.uflib.ufl.edu/askLinks to an external site.. 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/Links to an external site..

Writing Studio, 302 Tigert Hall*,* 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/Links to an external site..

Student Complaints Campus*:* https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/Links to an external site.;https://care.dso.ufl.eduLinks to an external site..

On-Line Students Complaints*:* https://distance.ufl.edu/state-authorization-status/#student-complaintLinks to an external site..