FLORIDA POLYTECHNIC UNIVERSITY

Course Syllabus

Course Information

- **Course Number and Title**: EEE 3351 – Electronic Devices
- **Credit Hours:** 3 Credits – (2 Lectures/week)
- **Academic Term:** SP 2026

Instructor Information

- **Instructor:** Dr. Farhan Bin Tarik
- **Office Location:** IST 2090
- **Office Hours**: Both in-person and virtual: T, R : 11:30 AM – 12:30 PM;
  By appointment through Teams: F : 4:15 PM – 5:15 PM
- **Email address**: fbintarik@floridapoly.edu

Course Delivery and Course Description

- **Delivery Mode**: In Person (TR 02:30 pm - 03:45 pm (IST-1062))
- **Course Website**: Canvas
  - **Official Catalog Course Description**: This course is an introduction to the internal operation, terminal characteristics, and material physics of semi-conductors and op-amps. Transistors, diode models and applications are also discussed. Principles of semiconductor devices and microelectronic circuits will be examined, along with the characteristics of diodes, multi-junction devices, metal oxide semiconductors and Field Effect Transistor based devices
  - **Course Prerequisites**: EEL 3112 – Circuits 2
  - **Course Co – requisities or Prerequisite**: None
  - **Communication/Computation Skills Requirement (6A-10.030)**: N
  - **Pre-requisite Policy**:
    1. The pre-requisite(s) and co-requisite(s) of a course as indicated in the course catalog will be strictly enforced, without exception.
    2. A student who completes a course without first completing its prerequisites will be required to retake the class regardless of the grade received for the course.
- **Required Texts and Materials:**
  - Required textbook: Donald A. Neamen, *Semiconductor Physics and Devices*, Fourth Edition, McGraw Hill, ISBN: 978-0073529585.
  - Recommended textbook: Sedra/Smith, *Microelectronic Circuits*, Eight Edition, Oxford University Press, ISBN: 9780190853464.
  - Required Equipment and materials: Scientific calculators
    Note: Only use of the following calculator models as used on the Fundamentals of Engineering (FE) Exam will be allowed:
    Casio: All fx-115 and fx-991 models (Any Casio calculator must have "fx-115" or "fx-991" in its model name.)
    Hewlett Packard: The HP 33s and HP 35s models, but no others
    Texas Instruments: All TI-30X and TI-36X models (Any Texas Instruments calculator must have "TI-30X" or "TI-36X" in its model name.)

Course Objectives and Course Learning Outcomes (CLOs)

- **Course Objectives**:

At the completion of this course students will hold an in-depth knowledge and understanding of the physics of semiconductor materials and some of the more technologically important semiconductor devices, such as diodes, BJT, CMOS and MOSFET. Students will further be able to analyze the basic properties of semiconductor materials and devices.

- **Course Learning Outcomes**:

After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following Learning Outcomes of Instruction:

CLO-1: Identify the properties of intrinsic and extrinsic semiconductors.
CLO-2: Explain the operating principle of semiconductor diodes.
CLO-3: Explain physics and analyze small-signal performance of BJT and MOSFET devices.
CLO-4: Acquire and apply new knowledge of semiconductor devices in electronic circuits.
CLO-5: Recognize ethical and professional responsibilities

Alignment with Program Outcomes (ABET)

The Electrical Engineering program at Florida Polytechnic University has aligned its Student Outcomes (SO) with ABET-EAC Criterion 3 Student Outcomes (1-7).

These outcomes are:

1. **Identify/Formulate**: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. **Apply Engineering Design**: 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.
3. **Communicate Effectively**: An ability to communicate effectively with a range of audiences.
4. **Ethical/professional responsibilities**: 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.
5. **Collaborate in a Team**: An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives.
6. **Conduct Experimentation**: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. **Apply New Knowledge**: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Program Outcome (ABET)	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
Identify/Formulate	**X**	**X**	**X**		
Apply Engineering Design					
Communicate Effectively				**X**	
Ethical/professional responsibilities					**X**
Collaborate in a Team				**X**	
Conduct Experimentation					
Apply New Knowledge				**X**	

Course Policies

Attendance

- Students in **face-to-face (this includes labs and C-courses)** courses are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP).
- Exceptions to any attendance requirements may be made on a case-by-case basis.

Participation

Students are expected to participate in the classroom experience. The use of earbuds/headphones during class is specifically not allowed and students who engage in this behavior may be asked to leave the class for the day (noting exceptions for authorized accommodations). In addition, students who routinely do not bring materials to class that are required for participation, will not be given credit for class attendance, and if this becomes a pattern of behavior, may be asked to leave the class for the day. Persistent problems with participation may result in a code of conduct referral.

Late Work/Make-up work

No makeup tests or quizzes, except in case of emergency, e.g., illness and accident. For makeup tests, medical certificate is required, and the instructor must be notified in advance of the test.

Grading Scale

0	60	62	64	67	70	74	77	80	84	87	90
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A

(See also University Grading Policy).

Grades will be posted to Canvas for reference only, and students should make sure they are recorded correctly. Grades for each assignment will be posted to Canvas and students should make sure they are recorded correctly. However, there is no guarantee that the percentages or projected grades provided there are correct. The instructor will calculate final percentages and will determine final grades regardless of Canvas calculations.

Assignment/Evaluation Methods

Category	Points
Attendance	5%
Homework and Assignment	30%
Quiz	25%
Midterm	20%
Final Exam	20%
Total	**100%**

Course Schedule

Week	Date	Topics	Classes	Quiz	Assignment
1.	Jan 12 – 16	Introduction and Overview of Semiconductor Device Industry	2		
2.	Jan 19 – 23	Crystal Structure, Quantum Mechanics and Wave Equation	2		1st Assignment
3.	Jan 26 – 30	Intrinsic and Extrinsic Semiconductors	2	1	
4.	Feb 2 – 6	Junction Formation and Doping	2		
5.	Feb 9 – 13	Drift, Diffusion, Continuity Equation	1		2nd Assignment
6.	Feb 16 – 20	The PN Junction Diode	2	2	
7.	Feb 23 - 27	Zener Diode and Schottky Barrier Diode	2		3rd Assignment
8.	Mar 2 – 6	Bipolar Junction Transistor (BJT)	2		**Mid-term Exam**
9.	Mar 9 – 13	Current Gain and Small-Signal Analysis of BJT	2		4th Assignment
10.	Mar 16 – 20	Spring Break – **NO CLASS**	0		
11.	Mar 23 – 27	Metal Oxide Semiconductor (MOS)	2	4	
12.	Mar 31 – Apr 3	Complementary Metal Oxide Semiconductor (CMOS)	2		

13.	Apr 6 – 10	Metal Oxide Semiconductor Field Effect Transistor (MOSFET)	2		5th Assignment
14.	Apr 13 – 17	Junction Field Effect Transistor (JFET)	2	5	
15.	Apr 20 – 24	Moore's Law and Technology Scaling	2		6th Assignment
16.	Apr 28	Review Class (Last Day of Classes)	1		
	Apr 29 – May 1	Reading Days – No Classes			
16.	May 4 – 8	Final Exam Weeks			**Final Exam**
		Total	**28**		

Note: This is a tentative schedule. Changes may occur as the semester progresses.
Important Dates: https://floridapoly.edu/academics/academic-calendar/index.php

- February 10, 2026 – Career Day (No Classes)
- March 09, 2026 – Mid-Term Grades Due
- April 17, 2026 – Withdrawal Without Academic Penalty Deadline (W assigned)
- May 11, 2026 – Final Grades Due from Faculty by 4:00 PM

Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to library@floridapoly.edu.
- **Tutoring and Learning Center (TLC)**: : The Tutoring and Learning Center (The TLC) provides tutoring to all Florida Poly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in the IST Commons (second floor).
- **Knack Tutoring:** Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.
- **Academic Success Coaches**: All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.
- **Writing Center**: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit https://floridapoly.edu/writingcenter.

University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations. If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal, and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive. If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible: DisabilityServices@floridapoly.edu; (863) 874-8770; www.floridapoly.edy/disability.

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discuss resources and options available.

Academic Integrity

Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in sanctions up to and including expulsion from the university.

Any "special" instructions that are appropriate for academic integrity and the course should go here.

Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action). Recording class activities including, but not limited to, lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is prohibited.

Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is ***prohibited****.*

Civility and Collegiality (optional statement)

Faculty and students come to the university for the same reason, which is to participate in a highly professional educational environment. To that end, both students and faculty are expected to treat each other with mutual regard and civility. Communication, written, oral and behavioral, between faculty and students must remain respectful. Within and outside of the classroom, students must refrain from derogatory comments toward the faculty member and their fellow students, and faculty as well must refrain from derogatory comments toward their students. Faculty and students should address each other with respect, in accordance with the wishes of the faculty and the students: for example, no one should be addressed by their last name alone.

Faculty from the outset of a course can and should specify what constitutes activities and behavior that take away from, that diminish, the educational environment. An individual student's distracting behavior impedes the education of fellow students, which itself is a form of disrespect. Civility and collegiality also include respecting each other's time: for example, neither students nor faculty should arrive late to class (unless unforeseen, pressing circumstances prevail); faculty should be present at the posted office hours; and students and faculty should be punctual when meeting times are scheduled. In more general terms, collegiality means respecting the right of both faculty and students to participate fully and fairly in the educational enterprise.