Prerequisites: EEL3300, or equivalent (grading C or better). Basic background in semiconductor physics and devices is beneficial, but not absolutely necessary.

Textbook:

Office Hours:
TuTh 11:30am-1:00pm or by appointment.

Homework:
Homework is essential to understand the concepts presented in this course. Students will typically have one or two weeks to complete homework assignments. Assignments will be collected at the beginning of class, and no late homework will be accepted. Solutions will be available online at [www.eng.fsu.edu/~pandrei/Courses/EE4351/](http://www.eng.fsu.edu/~pandrei/Courses/EE4351/) after the due date. Students are allowed and encouraged to work together on the homework, but each student must submit an individual solution set. Directly copying a solution from another student or source is not permitted.

Exams:
There will be one in-class test (midterm) and a final exam. Failure to take the test/exam will result in a grade of zero for that test/exam. Permission to take them at a different time may be granted if the student contacts the instructor before the exam date.

Objectives and Outcomes:
The overall objective of this course is to provide students with an understanding of the basic physics of semiconductor materials and with the ability to analyze solid-state electronic devices. Upon completing this course the student should be able to:

1. Describe crystal properties and growth of semiconductors.
2. Apply basic quantum mechanics to atomic and semiconductor models.
3. Derive equations of charge transport in semiconductors under normal operating conditions.
4. Determine charge, electric field, and potential distributions, and energy band diagrams in pn-junction diodes under normal operating conditions.
5. Apply charge diffusion equation to pn-junction diodes and bipolar junction transistors, and
derive I-V characteristics for diodes and transistors, and small-signal admittance and transient response for diodes.

6. Derive I-V characteristics of field-effect-transistors.

7. Discuss the fundamental applications of photodiodes, solar cells, and light-emitting diodes.

8. List fabrication steps used in production of pn-junction diodes and various types of transistors.

**Policy Statements:**

- Class attendance is required for all students. College and University rules allow only 3 unexcused absences for this course.
- Homework is due on the announced date and at the beginning of class.
- The general policy is no makeup exams. In the event of an excused absence, you must notify the instructor prior to the exam to discuss proper procedure.
- Cellular phones and beepers must be turned off in the classroom.
- Coming in late or leaving early will be considered as absence of class.
- Students are bound by the honor code of their university. Violations of the honor code will be reported. Penalties include but are not limited to 1) failing grade on the assignment and 2) failing grade for the course.
- Students with disabilities who need academic accommodations should: (1) Register with and provide documentation to the Student Disability Resource Center (SDRC); and (2) Bring a letter to the instructor indicating the need for accommodations and the specific type. This should be done within the first week of class. This syllabus and other class materials are available in alternative format upon request.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>40%</td>
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<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Final Examination</td>
<td>50%</td>
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</tbody>
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(comprehensive exam)

Grading scale: **A: >90%, B: 80-90%, C: 65-79%, D: 50-64%, F: <50%**

These breakpoints may be lowered slightly depending on overall class performance.