ECE 616 – Semiconductor Devices II

Currently identified as ECE 516

Catalog Description: Advanced treatment of three-terminal semiconductor electronic devices. Offered alternate years. OTHER PREREQS: ECE 615.

Credits: 3  Terms Offered: Spring, alternate years

Structure: Three 50-minute lectures or two 80-minute lectures per week.

Prerequisites:
By course: ECE 615 or instructor approval required.
By topic: Other Prerequisites: Semiconductor physics, 2-terminal device physics

Courses that require this as a prerequisite: none
Instructor: J.F. Wager

Topics
- Bipolar junction transistors (BJTs)
- Junction field-effect transistors (JFETs)
- Metal semiconductor field-effect transistors (MESFETs)
- Metal oxide semiconductor field-effect transistors (MOSFETs)
- Heterojunction field-effect transistors (HFETs)

Measurable Student Learning Outcomes:
Students are expected to demonstrate the ability to:
1. Apply energy band diagrams and current-voltage characteristics to explain the basic operation of BJTs and FETS.
2. Evaluate the advantages/disadvantages of BJTs compared to FETs and between different types of FETs.
3. Explain how SPICE models of 3-terminal devices arise from device physics assessment, from both a large- and a small-signal perspective.

Evaluation of Student Performance:
- final, 4 homework sets

Learning Resources:
- Avanti (circuit/device simulation commercial software package)
- Silvaco (device simulation commercial software package)

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

**Link to Statement of Expectations for Student Conduct**, i.e., cheating policies [http://oregonstate.edu/admin/stucon/achon.htm](http://oregonstate.edu/admin/stucon/achon.htm)