ECE 614 – Semiconductors

Currently identified as ECE 514

Catalog Description: Essential aspects of semiconductor physics relevant for an advanced understanding of semiconductor materials and devices. Offered alternate years.

PREREQS: Exposure to quantum mechanics and solid state physics.

Credits: 3  Terms Offered: Fall, alternate years

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

Prerequisites:
By course: ENFORCED PREREQS: Graduate standing or instructor approval required.
By topic: Other Prerequisites: calculus, basic physics

Courses that require this as a prerequisite: ECE 615

Primary Instructor: J.F. Wager  Secondary Instructor: J.F. Conley

Topics

• Energy bands
• Semiconductor statistics
• Nonequilibrium properties of semiconductors
• Semiconductor transport

Measurable Student Learning Outcomes:
Students are expected to demonstrate the ability to:

1. Explain k-space and how it relates to indirect/direct band gap semiconductors, effective mass, and electron/hole velocity in solids.
2. Explain the importance of charge balance and the continuity equation and use this perspective to quantitatively formulate semiconductor assessment problems.
3. Describe the purpose and evaluate the utility of the Boltzmann transport equation, and to distinguish between linear and nonlinear transport.

Evaluation of Student Performance:

• 1 midterm, final, 4 homework sets

Learning Resources:


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)