ECE/CHE 611 - Electronic Materials Processing

- Currently identified as ECE 511 & ChE 571

Catalog Description: Technology, theory, and analysis of processing methods used in integration circuit fabrication. Offered alternate years. PREREQS: Graduate standing or instructor approval required. CROSSELISTED: CHE/ECE 611

Credits: 3  Terms Offered: Fall, alternate years

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

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

Courses that require this as a prerequisite: ECE/CHE 612
Instructor: Milo Koretsky (primary), J.F. Wager (secondary)

Topics
- Vacuum science & technology
- Epitaxy
- Chemical vapor deposition
- Oxidation
- Diffusion
- Ion implantation
- Physical vapor deposition
- Metalization
- Lithography
- Wet processing
- Dry processing

Measurable Student Learning Outcomes:
Students are expected to demonstrate the ability to:
1. Describe the principle mechanisms and identify key processing issues for the major unit processes in microelectronics fabrication including: bulk crystal growth, cleaning, diffusion, oxidation, ion implantation, lithography, etching, chemical mechanical planarization, and thin film deposition.
2. Apply the kinetic theory of gases to explain what parameters are important in vacuum systems and plasmas. Use this framework to analyze microelectronics fabrication systems by making order of magnitude estimates.
3. Use fundamental engineering science principles from heat transfer, mass transfer, thermodynamics and reaction kinetics to analyze these individual unit processes.
4. Choose the processing method best applied to a step in an integrated circuit process flow by evaluating available alternatives.

Evaluation of Student Performance:
- 1 midterm, final, 6 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

6/23/09