

EE4353/4153, VLSI Nanotechnology
EE5318/5118, Electronic Materials Processing
Spring 2016
University of Texas at El Paso

Instructor:	David Zubia, Ph. D.	Office Hours:
Office:	335 Engineering Annex	M 3:00-4:30, W 3:00-4:00
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Course Description:

This course deals with the science and technology needed to fabricate semiconductor devices. The course will include lectures, hands-on laboratories and computer simulations. The course will cover important fabrication processes needed to manufacture electronic devices including; Diffusion, Thermal Oxidation, Ion Implantation, Rapid Thermal Processing, Lithography, Etching and, Thin Film Deposition. The relationships between manufacturing conditions, structure and performance will be highlighted for each process to gain a deeper appreciation of each process. Emphasis is placed on conceptual understanding and problem solving.

Semiconductors and electronic devices are used in circuits to make complex analog and digital functions such as amplifiers (for audio, high-frequency, wireless, etc) and microprocessors. This course is fundamental to the manufacturing of electronic devices and will benefit persons from different backgrounds including, physics, chemistry, materials science, mechanical engineering and electrical engineering.

Crystal Defect Topic for Graduate Students:

Graduate students will learn about point and linear defects. The course will cover the structure of defects and how they are created and the relationship between processing conditions and defect density and character. It will also cover how defects affect the properties of semiconductors and device performance.

Learning Objectives:

After completion of this course, students should be able to:

- Understand the principles of fabrication processes including; Crystal Growth, Substrate Preparation, Diffusion, Thermal Oxidation, Ion Implantation, Lithography, Etching, and Thin Film Deposition.
- Apply the principles of fabrication processes and their integration to create functional semiconductor structures.
- Apply concepts important to efficient fabrication of semiconductor devices including Yield, Statistical Process Control, and Design of Experiments.
- For Graduate Students: Understand the principles and importance of point and linear defects in semiconductor device processing or Setup of laboratory experiments

Required Textbook:

Silicon VLSI Technology, Plummer, Prentice Hall, 2000

Evaluation:

	Value
Problems	25%
Exam I	25%
Exam II	25%
Exam III	25%
Total	100%

Grading and Policies:

A: 90%-100% B: 80%-<90% C: 70%-<80% D: 60%-<70% F: 0-<60%

Late course work will not be accepted.

No make-up work will be given.

Academic Dishonesty:

Incidents of academic dishonesty will be referred to the Director of Electrical Engineering and the Dean of Students.

<http://studentaffairs.utep.edu/Default.aspx?alias=studentaffairs.utep.edu/dos>

The descriptions and definitions of academic dishonesty can be found at:

<http://admin.utep.edu/hoop> Look under Student Affairs and then Chapter one, section 1.3.1.

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.