

**EE4353 VLSI Nanotechnology**  
**EE5318 Electronic Materials Processing**

University of Texas at El Paso

Instructor: David Zubia, Ph. D.  
Email: [dzubia@utep.edu](mailto:dzubia@utep.edu)  
Office Room: A335 Engineering  
Office Hours: By appointment

**Student Tasks:**

- **Read:** Assigned textbook chapters
- **View:** View lecture presentations
- **Discuss:** Discuss concepts and methods from textbook and presentations
- **Complete:** Question Sets (13 sets. 1 set per week)
  - Answer conceptual and calculation questions
  - Can collaborate but submit individually and on-line
- **Complete:** Parameter Studies (4 studies)
  - Study processing parameter relationships using graphs
  - Work in teams and submit on-line as a team
- **Mid-Term Exam:** 8<sup>th</sup> week (on-line)
- **Final Exam:** Finals week (on-line)

**Evaluation:**

	Value
Question Sets	20%
Parameter Studies	40%
Exam 1 (Midterm)	20%
Exam 2 (Final)	20%
Total	100%

**Required Textbooks:**

*Silicon VLSI Technology, Plummer, Prentice Hall, 2000*

*Semiconductor Devices: Physics and Technology, 3rd Edition, S. M. Sze and M. K. Lee, Wiley, 2012*

**Content Description:**

This course covers the techniques needed to fabricate semiconductor devices. The course will include lectures, hands-on laboratories and computer simulations.

**Learning Objectives:**

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

- Understand the important fabrication techniques including; 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.
- For Graduate Students: Setup of laboratory experiments or computer exercises and assist with fabrication or simulation of semiconductor devices.

**Topics:**

- Substrate preparation
- Oxidation
- Diffusion
- Implantation
- Lithography
- Deposition
- Etching

**Grading Policy:**

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

**Lab Work Evaluation:**

	Value
Oxidation	10%, 0% no effort
Diffusion	10%, 0% no effort
Lithography	10%, 0% no effort
Etching	10%, 0% no effort
Deposition	10%, 0% no effort
Attendance	50% 0 absences, 40% 1 absence, 30% 2 absences, 20% 3 absences, 10% ≥ 4 absences
Total	100%

**Prerequisites:**

EE 3329 with grade of "C" or better.

**Content Delivery:**

The course is listed as in-person however if needed all content will be delivered online through synchronous lectures and other online materials. Content will be provided on a topic-by-topic basis. Initially and hopefully for the rest of the

semester, there will be mostly face-to-face meetings. Depending on conditions, we will reserve the possibility to meet in low density at a later point in time.

**Non-Compliance Policy:**

**Late Work:** Late course work will not be accepted.

**Make-up Work:** No make-up work will be given.

**Posting Netiquette:** Postings that violate UTEP policy will be investigated and appropriate actions will be taken.

**Attendance:** Attendance in activities is mandatory to receive course credit. Excessive nonattendance will result in loss of credit.

**Participation:** Participation in assignments and discussions is mandatory to receive credit. Lack of participation will result in loss of credit.

**Group Work:** Lack of significant contribution to group work will result in zero credit. If lack of contribution persists for any one or more than one exercise, the instructor will take action to ensure equity for group members that are contributing significantly and meaningfully.

**Syllabus Changes:** The content in the syllabus is subject to change for improvements or other factors. Any changes will be communicated.

**Academic Dishonesty:**

Incidents of academic dishonesty will be referred to the Director of Electrical Engineering and the Dean of Students. [Link to Dean of Students.](#)

The descriptions and definitions of academic dishonesty can be found at: [Link to Academic Dishonesty Descriptions and Definitions](#) Look under Student Affairs and then Chapter one, section 1.3.1.

**Classroom Accommodations:**

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 [Link to CASS email](#), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at [Link to CASS Website](#)