EE 328L Microcircuit Fabrication Lab

Credits: 1

Categorization of credits: engineering topic

Instructors or course coordinator: Aaron Ohta

Textbook and Other Required Materials:

- Required: "Silicon VLSI Technology," by Plummer, Deal and Griffin (Prentice Hall).
- References:
    - "The Science and Engineering of Microelectronic Fabrication," by Stephen A. Campbell (Oxford)
    - "Micromechanics and MEMS, Classic and Seminal Papers to 1990", Edited by William Trimmer.

Designation: Elective

Catalog Description:
EE 328L Microcircuit Fabrication Lab (1) (1 3-hr Lab) Hands-on laboratory where students make various electronic and electromechanical micro-devices using IC technology. Devices are also tested and analyzed. Pre: 324 or consent. Co-requisite: 328. DY

Pre-requisites: EE 327 Theory and Design of IC Devices. **Co-requisite:** EE 328 Microcircuit Fabrication

Class/Lab Schedule: One 3-hour lab per week

Topics Covered:

- CMOS IC processing techniques (1 week)
- Clean room principles (2 weeks)
- Lithography (2 weeks)
- Oxidation (1 week)
- Doping Techniques (1 week)
- Thin Film Deposition (1 week)
- Etching (1 week)
- Back-End Technology (2 weeks)
- MEMS (2 weeks)

Course Objectives and Relationship to Program Objectives:

A student should demonstrate ability in (i) IC processing techniques (ii) MEMS techniques, (iii) use of lab equipment, (iv) and design of experiments and analysis of data. [Program Objectives this course addresses: 1, 2, 4]

Course Outcomes and Their Relationship to Program Outcomes

The following are the course outcomes and the subset of Program Outcomes (numbered 1-7 in square braces "[ ]") they address:

- Design fabrication processes to realize semiconductor and electromechanical functions. [1, 3, 6]
- Understand the relationship between material science, chemistry, semiconductor theory, mechanical engineering, circuit theory, circuit layout, and processing techniques. [1]
- Use of processes, fabrication tools and clean-rooms. [1, 6, 7]
- Characterize process outcomes. [1, 6]
- Communicate solutions to fabrication challenges to others. [2, 3, 4, 6]

Contribution of Course to Meeting the Professional Component

Engineering topics: 100%

Computer Usage:

Computers are used for mask designs and MEMS simulations and presentation preparation in about 80% of assignments.

Design Credits and Features:
1 design credit. Device design and relationship to layout, materials and processes available, and design of process flows.

Person Preparing Syllabus and Date: V. Lubecke, Oct. 7, 2014. Modified by A. Ohta, Jan. 14, 2021.