

ELE432 Laboratory Syllabus Spring 2008

Overview of Laboratory: Student will learn all the phases of producing a thin film device such as a resistor, capacitor etc. and characterize the device performance using state-of-the art equipment such as the atomic force microscope, scanning electron microscope (EDS), and the surface analyzer (AES, ESCA and SIMS). Each student will be required to maintain a laboratory notebook that must be meticulously maintained. The weekly laboratory schedule will be as follows:

Laboratory I: Vacuum Technology (1 Week)

Laboratory II: Photolithography for thin film resistor (1 Week)

Laboratory III: Evaporation & Sputtering (Thickness Measurements) (1 Week)

Laboratory IV: Resistivity Measurement and Electrical Characterization of Thin Film Resistor.(1Week)

Laboratory V: Fabrication of Thin Film Capacitor (3/4 Weeks)

Laboratory VI: Electrical Properties of the Thin Film Capacitor (1 Week)

Laboratory VII: Microscopic Characterization of Thin Film Devices

- A.) Optical Microscopy & Sample Preparation (2 Week)
- B.) Atomic Force Microscopy (AFM)(1 Week)
- C.) Scanning Electron Microscopy (EDS) (1 Week)
- D.) Auger Electron Spectroscopy, Electron Spectroscopy for Chemical Analysis and Secondary Ion Mass Spectroscopy (1 Week)

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Course Requirements:

Dedicated Notebook

Grades will be based on the notebook documenting the eight required labs. Notebooks will be reviewed and graded every two weeks. Notebooks will comprise of 80 % of the grade.

There will be one quiz worth 20% of the lab grade given on the last lab day.

Attendance is mandatory. Makeup of lab will be at the discretion of the instructor.

Notebooks:

Emphasis is on quality of data documented. Obtaining the proper answers is secondary if one can explain the results. Notebook should contain the following minimal items

1. Date
2. Overview of what is to be accomplished.
3. Detail description of experimental setup (Pictures worth a thousand words)
4. Error analysis
5. Summary of results explaining in detail the data.

Notebook should be written such that someone who has not performed the experiment could reproduce the work done by reading your notebook. This is the underlying theme and what will determine if the notebook is of any value.