Design of Semiconductor Devices

September 2014

10310ENE 535500
半導體元件設計
Design of Semiconductor Devices

CLASS INFORMATION

- Professor: 林崇榮
- Office: 台達館903 (cjlin@ee.nthu.edu.tw ; ext. 62182)
- Handout: well.ee.nthu.edu.tw ; Login: PWD:
- TA: 旻哲 (教育106 ext. 34034)
- Class: T7T8F2 (台達202)
- Reference: Handouts

Course Description

In this course, lessons consisting of VLSI device measurement and characterization by lectures and assigned projects, which developing students' CMOS device knowledge acquired in the previous device physics class. Students learn to know the characterization and design method of CMOS devices. They also learn to take accurate current, capacitance properties, bench measurement and test details. Extended device TCAD simulation is also performed and practiced. CMOS design rule and integration will be taught in class. New device design for layout and tape-out will be drafted for students and aspects of the new device characterization will be discussed.

Course Outcomes

- Understand CMOS Integration and Design Rule
- Understand CMOS Technology, Device Layout, and Process
- Execute the TCAD Process/Device Simulation for Assigned Performance
- Measure and Characterize Devices Accurately
- Compare and Discuss Simulation and Measurement Results from Process and Device Physics Viewpoints
- Stress Devices to Understand the Limitation and Reliability of CMOS Devices
- Design New CMOS Device to Obtain Required Performance and Application

Syllabus

- **Integration**: Lecture for 0.18um CMOS 1W
- **TCAD Simulation 1**: Process + Report 2W
- **TCAD Simulation 2** : Device + Report 2W
- **New Device Design** : Concept + Operation 2W
- **New Device Design** : TCAD Simulation 3W
- **Measurement and Analysis**: Common 2W
- **New Device Layout** : Layout and DRC 2W

Grading Policy

- 30% - Participation and Attitude
- 70% - Homework/Project Assignment