Syllabus
ECE 571—Microelectronic Fabrication
ECE Department, UMass Amherst
Spring 2019

Course Instructors: Prof. Qiangfei Xia, 201D Marcus Hall, qxia@umass.edu
Prof. J. Joshua Yang, 201G Marcus Hall, jjyang@umass.edu

Office Hours: Xia: Tues: 10:00 am- noon or by appointment
Yang: Wed: 12:00-2:00 pm or by appointment

TAs: Shiva Asapu: sasapu@umass.edu
Rivu Midya: rmidya@umass.edu
Wenhao Song: wsong@umass.edu

First meeting: 1/22/2019, Tuesday

Organization: Lecture – Tues/Thurs 8:30 – 9:45 AM, E-Lab 306
Lab – one session each week, Marcus 15A

Enrollment: limited to 20 students

Prerequisites: ECE 344 or equivalent background

Credits: 4 (with lab) (NO audit)

Grading: 50% Laboratory (If your chip fails and you have to get raw data from other people’s chip, you should let the TA know and the analyses should be your own); 20% Exam 1; 20% Exam 2; 10% Homework (5 highest scores out of 6 homeworks); 2 fastest ring oscillator awards (each gets a notch up in final grade, e.g., A- to A)

Course Goals:
• To introduce basic technologies and knowledge of IC fabrication.
• To fabricate semiconductor devices and integrated circuits starting from bare silicon wafers.
• To test devices/circuits and analyze their performance using your knowledge in semiconductor physics and electronics.

Lecture Topics:
• Overview of IC fabrication
• Semiconductor Crystal Growth
• Substrate Preparation and Cleaning
• Thermal Oxidation and Gate Dielectrics
• Optical Lithography
• Dopant Diffusion and Ion Implantation
• Wet and Dry Etching
• Thin Film Deposition
• Metallization and Interconnection
• Bonding, Packaging and Yield

Course Materials:
• Lab manual, handouts, and lecture notes (Moodle).