

**CHE 323/384 – Fall 2015**  
Chemical Processes for Micro- and Nanofabrication

Unique # 14545/14850, Room: CPE 2.216, MWF 10:00 – 11:00 am

**Instructor:** Chris Mack, [chris@lithoguru.com](mailto:chris@lithoguru.com)

**Office Hours:** MWF 11:00am – 11:45am, and M 3:00pm – 4:00pm, CPE 3.458, or by appointment

**Class Website:** [www.lithoguru.com/scientist/CHE323](http://www.lithoguru.com/scientist/CHE323)

**Course Objective:** The objective of this course of study is to provide students with a glimpse into the semiconductor industry that has been the foundation upon which the electronics industry has been based for the past half century, and to provide insight into the future of that industry as well as nanotechnology in general. In the last 50 years, the dimensions of the features built into integrated circuits have shrunk from 25  $\mu\text{m}$  to 25 nm. Over the next decade these features will approach atomic dimensions, giving rise to a host of unique nanotechnology challenges and opportunities.

**Topics Covered:** The definition and description of the terminology and processes of microelectronics; semiconductor facilities and chemical processes for integrated circuit manufacture with an emphasis upon unit processes; the major unit processes including thin-film metal and dielectric deposition and etching, silicon oxidation and etching, ion implantation, diffusion, lithography, and planarization; an overview of promising nanopatterning and nanofabrication techniques, such as electron and other particle-beam imaging, nanoimprint, and others.

**Prerequisites:** Admission to an appropriate major sequence in engineering or permission of department; CH 318M or 310M, and 318N or 310N.

**Text:** Fabrication Engineering at the Micro- and Nanoscale, 4<sup>th</sup> ed, by S. A. Campbell + Handouts

<b>Grading for 323:</b>	In-class Quizzes	30%
	Exam #1	15%
	Exam #2	15%
	Exam #3	15%
	Final	25%

<b>Grading for 384:</b>	In-class Quizzes	25%
	Exam #1	13%
	Exam #2	13%
	Exam #3	13%
	Project/Paper	13%
	Final	23%

This class will use +/- grades. Attendance will not count towards the grade in this class, though all students are responsible for all material discussed during the lectures and assigned as reading and practice homework.

Homework will be assigned about weekly, but will not be collected or graded. Instead, there will be a short, 5-10 minute quiz at the beginning of each class. The question(s) will come mostly from the “what have we learned” section at the end of every lecture, but some problems will come from the assigned homework as well.

Reading assignments are important! Please have all assigned material read before each class. The textbook will act as the main text, but supplementary material will also be available on the class website, or distributed in class.

**Top Hat:** We will be using the Top Hat ([www.tophat.com](http://www.tophat.com)) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or via text message (SMS). You can visit <http://tinyurl.com/THStudentRegistration> for the Student Quick Start Guide which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system. An email invitation will also be sent to your email account (if you don't receive this email, you can register by visiting our direct Top Hat course URL [tophat.com/e/614411](http://tophat.com/e/614411)). Top Hat will require a paid subscription. There are multiple options to choose from.

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259, <http://www.utexas.edu/diversity/ddce/ssd/>.

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

I take the UT Honor Code very seriously:

The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.