

CHE 323/384T: Chemical Engineering for Micro/Nano Fabrication Fall 2017 – UNIQUE NUMBERS 14500 & 14775

DESCRIPTION: This course will survey the science and engineering of micro and nano structure fabrication processes as practiced in the microelectronics industry. The course begins with a study of the physical basis for high resolution pattern formation based on optical, electron beam and x-ray lithography. The next section of the course covers the chemical engineering basis for design of the resist materials required to support each of these technologies and the translation of the latent image they generate into a relief pattern. There is a section on pattern transfer by reactive ion etching and modern methods for controlling the shape and aspect ratio of such patterns. The course will end with an overview of emerging fields of interest in high resolution patterning including step and flash imprint lithography, directed self-assembly of block copolymers and other approaches to pitch multiplication. We end with a view of the future.

Goals: Each student should finish the course with a firm back ground understanding of the high resolution patterning processes practiced by the semiconductor industry.

CLASS TIME: Tuesday and Thursday from 11:00 a.m. – 12:30 p.m.

LOCATION: CPE 2.222

WEBSITE: <http://willson.cm.utexas.edu>

TEXT: There is no text book. Reading assignments will be from Journal Publications

INSTRUCTOR: **Prof. C. Grant Willson**

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hours: Wednesday 10-11AM or by appt.
Phone: 512-471-3975 please call in the AM

TA: **Mr. Wontae Joo**

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hours: Tuesday and Thursday 1:30–2:30 pm

The Class: The class includes both graduate students and undergraduate students. The two groups will take the same exams, but will be graded separately and only against their peers. The graduate students will each make a 20 minute oral presentation on an assigned topic that will constitute 10% of their grade. Undergraduates will not make a presentation but may be tested on the content of the graduate presentations. The details of the presentation assignment will be distributed separately to the graduate students. Attendance at the lectures and the graduate student presentations is very important. Reading will be assigned from the literature. Attend every lecture. *This is a lecture course.* The information that I want you to learn will be presented in the lecture and the graduate presentations. Do not get behind.

Quizzes: Short quizzes will be given at the beginning of many, but not all class meetings. The quizzes will begin promptly at 11:00 AM and collected at 11:10, so it is important to be in class on time. The topic of the quiz will be the information from the previous lecture. Your lowest quiz grade will be dropped. If, for any reason you are unable to take a quiz, the missed quiz will be dropped.

Grading (CHE323): Your grade will be made up as follows: 10% of quizzes, 40% midterm exams and 50% the final exam. You will take two midterm exams and the lowest midterm score will be dropped. There are no make up exams. If, for any reason you are unable to take a midterm exam, the missed exam will be dropped.

Grading (CHE384T): Your grade will be made up as follows: 10% of quizzes, 40% midterm exam, 40% final exam and 10% of an oral presentation. You will take two midterm exams and the lowest midterm score will be dropped. There are no make up exams. If, for any reason you are unable to take a midterm exam, the missed exam will be dropped. The oral presentation assignment is explained in detail in a separate document.

Examinations:

Exam 1 (in class) Tuesday October 17th
Exam 2 (in class) Thursday, November 16th
Final Exam (location & time TBA)

Academic Dishonesty: Please read and review the information at this University of Texas Site: <http://deanofstudents.utexas.edu/conduct/academicintegrity.php>

Administrative: The University of Texas policy states:

- **Course Instructor Surveys.** Students will be informed of the date that the Course/Instructor evaluations will be done. Students are required to attend class on that date unless prior arrangements have been made.
- **Accommodations for Disabilities:** The University of Texas at Austin provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TTY.
- **Religious Holy Days:** A student who misses classes or other required activities, including examinations, for the observance of a religious holy day should inform the instructor at least fourteen days prior to the religious holiday so that arrangements can be made to complete an assignment within a reasonable time after the absence.
- **Absence for Military Service:** In accordance with Section 51.9111 of the Texas Education Code, a student is excused from attending classes or engaging in other required activities, including exams, if he or she is called to active military service of a reasonably brief duration. The student will be allowed a reasonable time after the absence to complete assignments and take exams.