

MASC 350L

Nanostructured Materials: Design, Synthesis, and Processing

Instructor: Prof. Andrea Armani, Dept. of Chemical Engineering and Materials Science, MCB 495, (213) 740-4428, armani@usc.edu; email is preferred and response time is usually within 5 hours during normal working hours.

Class Hours: Tuesday/Thursday 8:00-9:20am plus a 4 hour lab/discussion section

Office Hours: immediately before/after every class for 30 minutes and upon request

Textbook/Reference material:

There is no specific textbook. Reference materials, such as review articles, will be posted on Blackboard. Lecture notes/slides will also be posted.

Course Vision:

This course is designed to discuss Nanotechnology from the bottom up and top down. In that sense, we will first discuss the building blocks of nanotechnology, or structures like nanocrystals, polymers and nanowires/tubes, and their fundamental properties (optical, electrical, mechanical, etc). From there, we will use these individual structures to build more complex devices using methods ranging from self-assembly to lithography, and different applications. The specific applications discussed will be determined by a survey given to the students at the start of the semester.

Course Objective:

The objective of this course is to expose students to modern engineering tools and challenges and teach them how to approach and solve problems which have immediate relevance. A secondary objective is to teach students how to express research results in a scientific manner.

Grading:

Homework (2)	5%
Discussion section presentation	20%
Discussion section participation	10%
Midterm (1)	25%
Final Project (1)	40%

Expectations/Information for Assignments, Exams and Papers:

Homework assignments:

There will be two problems sets/homeworks. They are due at the beginning of class. Late homeworks are not accepted. The answers to the homeworks will be reviewed in class.

The homeworks are the midterm and final from a previous class.

In addition, students are expected to complete reading assignments. Reading assignments will be posted on Blackboard.

Discussion Section:

The discussion section will focus on learning more about the field in two ways: reading and discussing current literature and engaging with professional engineers who are actively

working in the field as well as different career paths involving nanotechnology. Your total discussion grade is a combination of your presentation (20%) and your participation (10%).

Literature discussions: Each of you will present and lead a 1 hour discussion on a paper. Additional details on paper selection, presentation guidelines, and tips for leading a discussion are provided on Blackboard.

Careers in nanotechnology: Based on the results from a pre-class survey, engineers working in fields of interest will be invited to speak to the class and answer your questions. This is intended to be an interactive discussion, not a presentation. We will also hold more general discussions on different types of careers.

Exams:

There is 1 midterm and 1 final project.

The midterm will consist of 7-10 problems, structured to allow the entire exam to be completed in a single class period. Students will be given a 24hr window to complete the exam.

The final project (completed individually) is writing a critical review of a recently published paper (past four months). Information and a template on writing a critical review will be provided on Blackboard.

Detailed Course Outline:

Posted on Blackboard

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

<https://engemannshc.usc.edu/counseling/>

National Suicide Prevention Lifeline - 1-800-273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. <http://www.suicidepreventionlifeline.org>

Relationship & Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>

Office of Equity and Diversity (OED)/Title IX compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class.

<https://equity.usc.edu/>

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. <https://studentaffairs.usc.edu/bias-assessment-response-support/>

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations.

<http://dsp.usc.edu>

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. <https://studentaffairs.usc.edu/ssa/>

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students.

<https://diversity.usc.edu/>

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible, <http://emergency.usc.edu>

USC Department of Public Safety – 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime.

Provides overall safety to USC community. <http://dps.usc.edu>