

NANOTECHNOLOGY AND NANOSCIENCE (NANO)

500 Level Courses

NANO 500: *Introduction to Nanomaterials and Interactions*. 3 credits.
Introduction to nanotechnology. Discussion of the Feynman challenge and its relation to modern science. Applications to nanostructures of charges, currents, diamagnetics, paramagnetics, and ferromagnetics. Offered by Computational & Data Sciences. May not be repeated for credit.

Recommended Prerequisite: BS in any physical science, mathematics, or engineering; or permission of certificate director.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Non Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

NANO 510: *Strategies for Nanocharacterization*. 3 credits.
Introduces various nanocharacterization techniques, with a discussion of which techniques are most useful in various applications. Includes gates and bridges, chemical thermodynamics, kinetics, and solid-state reactions. Offered by Computational & Data Sciences. May not be repeated for credit.

Recommended Prerequisite: NANO 500 or permission of certificate director.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Non Degree or Senior Plus.

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Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

NANO 520: *Survey of Nanostructures*. 3 credits.
Discusses nanomechanical oscillators and nanoresonators, nanofibers, and conducting polymer nanowires. Nanomechanical beams for reacting ion etching. Electron-beam lithography and photolithography. Offered by Computational & Data Sciences. May not be repeated for credit.

Recommended Prerequisite: NANO 500 and 510 or permission of certificate director.

Registration Restrictions:

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Schedule Type: Lecture

NANO 530: *Nanofabrication*. 3 credits.

Covers pulsed laser deposition, molecular beam epitaxy, controlled vapor deposition, reactive sputtering, and doping and implant isolation. Offered by Computational & Data Sciences. May not be repeated for credit.

Recommended Prerequisite: NANO 500 and 510, or permission of certificate director.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Non Degree or Senior Plus.

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Schedule Type: Lecture

NANO 540: *Nanotechnology in Commerce and Government*. 3 credits.
Discusses competitive position of United States and other countries in nanoscience and nanotechnology. Covers business strategies, environmental, and public health aspects of nanotechnology applications. Also introduces students to issues involving legal, economic, social, and political controls over nanotechnology and nanoscience research. Offered by Computational & Data Sciences. May not be repeated for credit.

Recommended Prerequisite: NANO 500, and admission into graduate certificate program in nanotechnology and nanoscience.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Non Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

600 Level Courses

NANO 610: *Nanoelectronics*. 3 credits.

Introduces basic elements of nanoelectronic structures, including quantum layers, quantum wires, and quantum dots. Covers sub-band structure, transport in quantum layers, behavior in the presence of magnetic fields, Coulomb blockades, CMOS nanodevices and nanoelectronics, and SOI multigate device physics and modeling. Offered by Computational & Data Sciences. May not be repeated for credit.

Recommended Prerequisite: NANO 500, 510, and 520, or permission of instructor.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Non Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

NANO 620: *Computational Modeling in Nanoscience*. 3 credits.

Introduction to simulation methods used in nanoscience. Covers computational approaches to modeling molecular and condensed matter at the nanoscale level, including interatomic and molecular potentials, molecular mechanics, molecular dynamics, monte carlo averaging, ensemble distributions, numerical sampling, thermodynamic functions, dynamic structure, and introduction to cellular automata. Offered by Computational & Data Sciences. May not be repeated for credit.

Recommended Prerequisite: NANO 500, 510, and 520, or permission of instructor.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Non Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture