Nanoscale Science and Engineering (NSE)

Courses

Expand all course descriptions [+]Collapse all course descriptions [-]

NSE C201 Introduction to Nano-Science and Engineering 3 Units
Terms offered: Spring 2015, Spring 2013, Spring 2012
A three-module introduction to the fundamental topics of Nano-Science and Engineering (NSE) theory and research within chemistry, physics, biology, and engineering. This course includes quantum and solid-state physics; chemical synthesis, growth fabrication, and characterization techniques; structures and properties of semiconductors, polymer, and biomedical materials on nanoscales; and devices based on nanostructures. Students must take this course to satisfy the NSE Designated Emphasis core requirement.

Rules & Requirements
Prerequisites: Major in physical science such as chemistry, physics, etc., or engineering; consent of advisor or instructor
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Nanoscale Science and Engineering/Graduate
Grading: Letter grade.
Instructors: Gronsky, S.W. Lee, Wu
Also listed as: BIO ENG C280/MAT SCI C261/PHYSICS C201
Introduction to Nano-Science and Engineering: Read Less [-]

NSE C203 Nanoscale Fabrication 4 Units
Terms offered: Spring 2022, Spring 2016, Spring 2015, Spring 2013
This course discusses various top-down and bottom-up approaches to synthesizing and processing nanostructured materials. The topics include fundamentals of self assembly, nano-imprint lithography, electron beam lithography, nanowire and nanotube synthesis, quantum dot synthesis (strain patterned and colloidal), post-synthesis modification (oxidation, doping, diffusion, surface interactions, and etching techniques). In addition, techniques to bridging length scales such as heterogeneous integration will be discussed. We will discuss new electronic, optical, thermal, mechanical, and chemical properties brought forth by the very small sizes.
Nanoscale Fabrication: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Nanoscale Science and Engineering/Graduate
Grading: Letter grade.
Instructor: Chang-Hasnain
Also listed as: EL ENG C235
Nanoscale Fabrication: Read Less [-]

NSE C242 Computational Nanoscience 3 Units
A multidisciplinary overview of computational nanoscience for both theorists and experimentalists. This course teaches the main ideas behind different simulation methods; how to decompose a problem into "simulatable" constituents; how to simulate the same thing two different ways; knowing what you are doing and why thinking is still important; the importance of talking to experimentalists; what to do with your data and how to judge its validity; why multiscale modeling is both important and nonsense.
Computational Nanoscience: Read More [+]

Rules & Requirements
Prerequisites: Graduate standing or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Nanoscale Science and Engineering/Graduate
Grading: Letter grade.
Also listed as: PHYSICS C203
Computational Nanoscience: Read Less [-]
NSE 290 Special Topics in Nanoscale Science and Engineering 3 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
Lectures and appropriate assignments on fundamental or applied topics of current interest in nanoscale science and engineering.
Special Topics in Nanoscale Science and Engineering: Read More [+]
Rules & Requirements
Prerequisites: Graduate standing or consent of instructor
Credit Restrictions: Subject to home department limitations.
Repeat rules: Course may be repeated for credit when topic changes.
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Additional Details
Subject/Course Level: Nanoscale Science and Engineering/Graduate
Grading: Letter grade.
Special Topics in Nanoscale Science and Engineering: Read Less [-]

NSE 298 Group Studies, Seminars, or Group Research 1 Unit
Terms offered: Spring 2022, Fall 2021, Spring 2021
Advanced studies in various subjects through special seminars on topics to be selected each year. Informal group studies of special problems, group participation in comprehensive design problems, or group research on complete problems for analysis and experimentation.
Group Studies, Seminars, or Group Research: Read More [+]
Rules & Requirements
Prerequisites: Required for participants in Designated Emphasis
Repeat rules: Course may be repeated for credit without restriction.
Hours & Format
Fall and/or spring: 15 weeks - 1 hour of seminar per week
Additional Details
Subject/Course Level: Nanoscale Science and Engineering/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Group Studies, Seminars, or Group Research: Read Less [-]