



Course Announcement

Department of Electrical and Computer Engineering, Santa Clara University



ECEN/MECH 156: Introduction to Nanotechnology

Dr. David Yu Zheng, Director of Dry Lab Operations, STEM

Fall 2025

Class Time: T/Th 10:20 AM – 12 PM

BULLETIN DESCRIPTION: Introduction to the field of nanoscience and nanotechnology. Properties and measurements of nanomaterials and devices, applications, and societal implications. Materials characterizations using scanning electron microscope and atomic force microscope. Coverage of nanoelectronics includes crystal structure, energy band structure, carrier statistics and transport, basic operations of semiconductor devices ranging from diodes to cutting-edge transistors, and advanced lithography for chip manufacturing.

BACKGROUND INFORMATION: The U.S. government's current initiatives of bringing manufacturing jobs back to the country, including the essential chip manufacturing, together with the U.S. nanoelectronics industry's concurrent effort with similar funding commitments, are expected to result in a surge of employment opportunities in the semiconductor and related industries in the coming years. In response to such nationwide initiatives, the Electrical & Computer Engineering Department has decided to reprioritize its course offerings in this area. ECEN 156 (cross-listed with MECH 156) is an informative course covering the science and technology fundamentals underlying the nanoelectronics industry. The topics include materials and device characterizations, structural and electrical properties of materials, and basic operations of semiconductor devices. The contents of this course are necessary and beneficial for students interested in exploring internship and/or employment opportunities in this sector. It also serves as a refresher course for practicing engineers who are either working in the electronics industry or are contemplating joining it.

Prerequisite: PHYS 33, and either PHYS 34 or CHEM 11 or MECH 15

Co-requisite: ECEN/MECH 156L Laboratory (1 unit, W 2:15 – 5 PM)

