

Nanotechnology (NANO)

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Nanotechnology Minor Faculty Coordinators and Curriculum Committee

- Gregory Salamo, Distinguished Professor, Physics
- Min Zou, Professor, Mechanical Engineering
- Jin-Woo Kim, Professor, Biological and Agricultural Engineering
- Raj Rao, Professor, Biological and Agricultural Engineering
- Karthik Nayani, Assistant Professor, Chemical Engineering
- Jingyi Chen, Professor, Chemistry and Biochemistry
- Fisher Yu, Professor, Electrical Engineering
- Steve Tung, Professor, Mechanical Engineering
- Po-Hao Adam Huang, Associate Professor, Mechanical Engineering
- Keisha Bishop Walters, Department Head and Professor, Chemical Engineering

The Nanotechnology minor is an interdisciplinary program that provides students with foundational knowledge and skills related to the emerging field of nanotechnology, including hands-on experience in several major areas of nanotechnology, such as synthesis of nanomaterials, nanoscale imaging, nanostructure assembly and manipulation, device and system integration, and performance evaluation. The Nanotechnology minor draws faculty expertise and coursework from the College of Engineering and the Fulbright College of Arts and Sciences and utilizes state-of-the-art equipment and facilities at the Institute for Nanoscience and Engineering. The Nanotechnology minor is intended to prepare participating students for a career in which nanotechnology is playing an increasingly important role, and increase students' research competitiveness for graduate studies. The Nanotechnology minor is designed to be accessible to students majoring in engineering, physics, or chemistry and biochemistry. It is open to all students who have the necessary prerequisites to enroll in the courses that constitute the minor.

Requirements for the Nanotechnology Minor

Students wishing to participate in the Nanotechnology minor must declare participation formally. The students are required to meet with the faculty coordinator of an individual department who will help the student to develop a list of courses suitable for the minor and a schedule for taking those courses. Examples of model programs for each participating department are given below.

Students need to take a total of 15 credit hours, which includes 6 credit hours of required courses and 9 credit hours of elective courses and must earn a grade of "C" or better for all courses used to fulfill the requirements of the Nanotechnology minor.

Required Research Courses

Nanotechnology Research (Independent Study or Honors Thesis in nanotechnology)	6
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Students can choose from the following courses:

BENG 4500V	Special Problems
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BENG 451HV	Honors Thesis
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BMEG 450HV	Honors Thesis
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BMEG 4600V	Individual Study or BMEG 460HV Honors Individual Study
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CHEG 4880V	Special Problems
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CHEM 4000V	Chemistry Research or CHEM 400HV Honors Chemistry Research
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ELEG 4880V	Special Problems
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MEEG 490H3	Honors Mechanical Engineering Research
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MEEG 4920V	Individual Study in Mechanical Engineering or MEEG 49Honors Individual Study in Mechanical Engineering
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PHYS 3060V	Projects
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PHYS 399HV	Honors
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PHYS 4980V	Senior Thesis
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Elective Courses

A minimum of 9 hours of elective courses selected from the following: 9

BENG 31103	Measurement and Control for Biological Systems or BENG 311Honors Measurement and Control for Biological Systems
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BENG 37303	Transport Phenomena in Biological Systems
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BENG 47403	Food and Bio-Product Systems Engineering
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BENG 41203	Biosensors & Bioinstrumentation
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BENG 47403	Food and Bio-Product Systems Engineering
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BMEG 36304	Biomaterials
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BMEG 38204	Biomolecular Engineering
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BMEG 42403	Advanced Biomaterials and Biocompatibility
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CHEG 37103	Chemical Engineering Materials Technology
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CHEG 50403	Colloid and Interface Science
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CHEM 41203	Advanced Inorganic Chemistry I
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CHEM 42203	Instrumental Analysis
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CHEM 42803	Energy Conversion and Storage
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CHEM 54403	Physical Chemistry of Materials
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ELEG 42003	Semiconductor Devices
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ELEG 43003	Introduction to Nanomaterials and Devices
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MEEG 43003	Materials Laboratory
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MEEG 43103	Introduction to Tribology
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MEEG 52603	Introduction to Micro Electro Mechanical Systems
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MEEG 53403	Computational Material Science
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PHYS 32103	Electronics in Experimental Physics
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PHYS 36103	Modern Physics
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PHYS 40703	Introduction to Quantum Mechanics
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PHYS 42103	Physics of Devices
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PHYS 47103	Solid State Physics
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PHYS 47703	Introduction to Optical Properties of Materials
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or from other appropriate courses not on this list if approved first by the Nanotechnology Minor Curriculum Committee and by the course instructor.

Total Hours

15

Below are model programs for students from different participating departments. Students also have the flexibility to design their own programs according to the stated requirements above.

Model program for a student majoring in Biological Engineering

Required Courses (6 hours)

BENG 4500V	Special Problems	1-4
BENG 451HV	Honors Thesis	1-6

Elective Courses (9 hours) 9

BENG 31103	Measurement and Control for Biological Systems or BENG 311HV Honors Measurement and Control for Biological Systems	
BENG 47403	Food and Bio-Product Systems Engineering	
BENG 41203	Biosensors & Bioinstrumentation	

Total Hours 15

Model program for a student majoring in Biomedical Engineering

Required Courses (6 hours)

BMEG 450HV	Honors Thesis	1-4
BMEG 4600V	Individual Study or BMEG 460HV Honors Individual Study	1-3

Elective Courses (9 hours) 9

BMEG 36304	Biomaterials	
BMEG 38204	Biomolecular Engineering	
BMEG 42403	Advanced Biomaterials and Biocompatibility	

Total Hours 15

Model program for a student majoring in Chemical Engineering

Required Courses (6 hours)

CHEG 4880V	Special Problems	6
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Elective Courses (9 hours) 9

CHEG 37103	Chemical Engineering Materials Technology	
CHEG 50403	Colloid and Interface Science	
CHEM 42203	Instrumental Analysis	

Total Hours 15

Model program for a student majoring in Chemistry

Required Courses (6 hours) 6

CHEM 4000V	Chemistry Research or CHEM 40 Honors Chemistry Research	
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Elective Courses (9 hours) 9

CHEM 41203	Advanced Inorganic Chemistry I	
CHEM 42203	Instrumental Analysis	
CHEM 42803	Energy Conversion and Storage	

Total Hours 15

Model program for a student majoring in Electrical Engineering

Required Courses (6 hours) 6

ELEG 4880V	Special Problems	
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Elective Courses (9 hours) 9

PHYS 42103	Physics of Devices	
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ELEG 42003 Semiconductor Devices

ELEG 43003 Introduction to Nanomaterials and Devices

Total Hours 15

Model program for a student majoring in Mechanical Engineering

Required Courses

MEEG 4920V	Individual Study in Mechanical Engineering or MEEG 492H Honors Individual Study in Mechanical Engineering	3
MEEG 490H3	Honors Mechanical Engineering Research	3

Elective Courses 9

MEEG 43003	Materials Laboratory	
MEEG 43103	Introduction to Tribology	
MEEG 52603	Introduction to Micro Electro Mechanical Systems	

Total Hours 15

Model program for a student majoring in Physics

Required Courses (6 hours)

PHYS 3060V	Projects	1-3
PHYS 4980V	Senior Thesis or PHYS 399HV Honors	1-6

Elective Courses (9 hours) 9

PHYS 40703	Introduction to Quantum Mechanics	
PHYS 47103	Solid State Physics	
PHYS 47703	Introduction to Optical Properties of Materials	

Total Hours 15