



Nanoscience 2008-2009

Nanoscience is a field based on principles related to the behavior of matter at the atomic level in chemical, biological and mechanical systems. Students completing this program will be able to demonstrate proficiency in operating state-of-the-art nanofabrication equipment. They will also be able to apply the concepts of the nanofabrication process related to advanced electronics and the latest nano-level manufacturing technologies.

Career Opportunities:

The Nanoscience program will provide an entry point to nanotechnology related careers, foundational learning in Chemistry, Biology, Physics, Math and Engineering. This program prepares students for three career paths: a two-year degree program for technicians interested in the science, engineering and manufacturing of nanotechnologies; traditional engineering transfer students desiring a concentration in nanoscience; and career development for working professionals.

Units required for Major: 43-55

Units required for Certificate: 15-40

Associate Degree Requirements:

The degree can be obtained in one of three options: Nanoscience, Nanobiotechnology or Nanoscience Transfer. These degrees require the following:

- English proficiency: ENGL 1A, ESL 26, or equivalent.
- Mathematics proficiency: MATH 103/105 or equivalent.

A minimum of 90 Units including:

- General Education Requirements
- Prerequisite Skills (by option)
- Core Courses (43-55 units)
- Additional Certificate Courses
- Electives & other graduation requirements as appropriate

Program Types:

AS = Associate in Science Degree.

CA = Certificate of Achievement.

CP = Certificate of Proficiency.

Additional Information:

Prerequisites by option:

Nanobiotechnology

PHYS 10 or equivalent;

BIOL 10 or equivalent.

Nanoscience Transfer

CHEM 25 or equivalent;

PHYS 10 or equivalent;

MATH 105 or equivalent

Nanoscience

CHEM 25 or equivalent;

PHYS 10 or equivalent;

BIOL 10 or equivalent.

Core Courses: 43-55 Unit(s)

Nanobiotechnology Core Courses: 43 Units

BTEC 51A Cell Biology for Biotechnology (3 Units)

BTEC 51AL Cell Biology Laboratory for Biotechnology (3.5 Units)

BTEC 52A Molecular Biology for Biotechnology (3 Units)

BTEC 52AL Molecular Biology Laboratory for Biotechnology (3.5 Units)

CHEM 30A Survey of Inorganic & Organic Chemistry (5 Units)

CHEM 30B Survey of Organic & Biochemistry (5 Units)

NANO 51 Introduction to Nanotechnology (5 Units)

NANO 52 Introduction to Material Science (5 Units)

NANO 59 Nanobiotechnology Sciences (5 Units)

NANO 61 Introduction to Micro & Nano Fabrication Techniques (5 Units)

Nanoscience Transfer Core Courses: 50 Units + Electives 15 Units

CHEM 1A General Chemistry (5 Units)

CHEM 1B General Chemistry (5 Units)

CHEM 1C General Chemistry & Qualitative Analysis (5 Units)

NANO 51 Introduction to Nanotechnology (5 Units)

MATH 1A Calculus (5 Units)

MATH 1B Calculus (5 Units)

MATH 1C Calculus (5 Units)

PHYS 4A General Physics - Calculus (5 Units)

PHYS 4B General Physics - Calculus (5 Units)

PHYS 4C General Physics - Calculus (5 Units)

Nanoscience Transfer Electives: (15 Units)

BIOL 1A Principles of Cell Biology (6 Units)

BIOL 1D Molecular Genetics (4 Units)

BIOL 1DL Molecular Genetics Laboratory (4 Units)

ENGL 3 Technical Writing (5 Units)

ENGR 6 Engineering Graphics (6 Units)

ENGR 35 Statics (5 Units)

ENGR 45 Properties of Materials (4 Units)

NANO 52 Introduction to Materials Science (5 Units)

NANO 53 Materials Characterization (5 Units)

NANO 54 Surfaces & Thin Films (5 Units)

NANO 56 Principles of MEMS, NEMS & Sensors (5 Units)

NANO 57 Introduction to Micro & Nano Fabrication Techniques (5 Units)

NANO 58 Micro & Nano Fabrication Techniques Laboratory (5 Units)

NANO 59 Nanobiotechnology Sciences (5 Units)

NANO 60 Introduction to Clean Technology (5 Units)

Nanoscience Core Courses: 55 Units

NANO 51 Introduction to Nanotechnology (5 Units)

NANO 52 Introduction to Materials Science (5 Units)



NANO 53 Materials Characterization (5 Units)
NANO 54 Surfaces & Thin Films (5 Units)
NANO 56 Principles of MEMS, NEMS & Sensors (5 Units)
NANO 57 Introduction to Micro & Nano Fabrication
Techniques (5 Units)
NANO 58 Micro & Nano Fabrication Techniques Laboratory
(5 Units)
NANO 61 Introduction to Micro & Nano Fabrication
Techniques (5 Units)
PHYS 2A (or equivalent) General Physics (5 Units)
PHYS 2B (or equivalent) General Physics (5 Units)
PHYS 2C (or equivalent) General Physics (5 Units)

Certificates:

Certificate of Achievement: Nanoscience

40 Unit(s)

NANO 51 Introduction to Nanotechnology (5 Units)
NANO 52 Introduction to Materials Science (5 Units)
NANO 53 Materials Characterization (5 Units)
NANO 54 Surfaces & Thin Films (5 Units)
NANO 56 Principles of MEMS, NEMS & Sensors (5 Units)
NANO 57 Introduction to Micro & Nano Fabrication
Techniques (5 Units)
NANO 58 Micro & Nano Fabrication Techniques Laboratory
(5 Units)
NANO 61 Introduction to Micro & Nano Fabrication
Techniques (5 Units)

Certificate of Proficiency: Nanobiotechnology

39 Unit(s) [Non-Transcriptable]

BTEC 51A Cell Biology for Biotechnology (3 Units)
BTEC 51AL Cell Biology Laboratory for Biotechnology (3.5
Units)
BTEC 52A Molecular Biology for Biotechnology (3 Units)
BTEC 52AL Molecular Biology Laboratory for
Biotechnology (3.5 Units)
NANO 51 Introduction to Nanotechnology (5 Units)
NANO 52 Introduction to Materials Science (5 Units)
NANO 59 Nanobiotechnology Sciences (5 Units)
NANO 61 Introduction to Micro & Nano Fabrication
Techniques (5 Units)

Certificate of Proficiency: Nanofabrication

15 Unit(s) [Non-Transcriptable]

NANO 51 Introduction to Nanotechnology (5 Units)
NANO 57 Introduction to Micro & Nano Fabrication
Techniques (5 Units)
NANO 58 Micro & Nano Fabrication Techniques Laboratory
(5 Units)

Certificate of Proficiency: Characterization & Modeling

15 Unit(s) [Non-Transcriptable]

NANO 51 Introduction to Nanotechnology (5 Units)
NANO 53 Materials Characterization (5 Units)
NANO 54 Surfaces & Thin Films (5 Units)