

CURRICULUM STANDARD

Effective Term
Fall 2010
[2010*03]

Curriculum Program Title

Nanotechnology

Code

A20190

Concentration

(not applicable)

Curriculum Description

The Nanotechnology curriculum prepares students to characterize and fabricate materials for biological, textile, chemical, and electrical applications at the atomic level.

Course work includes biology, chemistry, physics, mathematics, and an extensive array of very detailed nanotechnology-specific courses, using high-tech equipment and complying with high-precision quality control and clean-room protocols with a multidisciplinary focus.

Graduates should qualify for various positions in industry and government, including research and development, materials testing and processing, optics and sensors, electron microscopy, and emerging nanotechnology industries.

*Curriculum Requirements**

[for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204 (3)]

- I. General Education.** Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of general education; 3 semester hours must be in communications. General education is optional in certificate programs.
- II. Major Hours.** AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit. *(See second page for additional information.)*
- III. Other Required Hours.** A college may include courses to meet graduation or local employer requirements in a certificate, diploma, or associate in applied science program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

**Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.*

Major Hours

[ref. 23 NCAC 02E.0204 (3)]

- A. Core.** The subject/course core is comprised of subject areas and/or specific courses which are required for each curriculum program. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the subject/course core of the AAS program.
- B. Concentration** (*if applicable*). A concentration of study must include a minimum of 12 semester hours credit from required subjects and/or courses. The majority of the course credit hours are unique to the concentration. The required subjects and/or courses that make up the concentration of study are in addition to the required subject/course core.
- C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or concentration. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

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	AAS	Diploma	Certificate
Minimum Major Hours Required	49 SHC	30 SHC	12 SHC
A. CORE	41 SHC	12 SHC	
Required Courses:			
NAN 111 Introduction to Nanotechnology	3 SHC		
NAN 112 Fundamentals of Nanoscience	3 SHC		
NAN 131 Materials, Safety, and Equipment	2 SHC		
NAN 132 Controlled Materials	2 SHC		
NAN 241 Nanofabrication of Mixtures	4 SHC		
NAN 242 Nanofabrication of Thin Films	4 SHC		
NAN 243 Atomic-Force Microscopy	4 SHC		
NAN 244 Electron Microscopy	4 SHC		
Required Subject Areas:			
Biology: Select one course.			
BIO 110 Principles of Biology	4 SHC		
BIO 111 General Biology I	4 SHC		
Chemistry: Select one set.			
CHM 131 Introduction to Chemistry &	3 SHC		
CHM 131A Introduction to Chemistry Lab	1 SHC <i>or</i>		
CHM 151 General Chemistry I	4 SHC		
Mathematics: Select one course.			
MAT 122 Algebra/Trigonometry II	3 SHC		
MAT 162 College Trigonometry	3 SHC		
Physics: Select one course.			
PHY 131 Physics – Mechanics	4 SHC		
PHY 151 College Physics I	4 SHC		
<i>Continued on next page</i>			

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B. CONCENTRATION <i>(Not applicable)</i>			
<p>C. OTHER MAJOR HOURS <i>To be selected from the following prefixes:</i></p> <p>ATR, BIO, BPM, BTC, CET, CHM, CIS, COE, CPT, CSC, CTC, CTR, CYT, EGR, ELC, ELN, ENV, HPC, ICT, ISC, LEO, MAC, MAT, MEC, MLG, NAN, NET, PHY, PLA, PTC, SGR, SUR, and WAT</p> <p><i>Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.</i></p>			