

Applied Science and Technologies

Nanoscience Technology

Nanoscience is an emerging technology that studies the composition, structure, properties and behavior of material at the molecular and atomic level. Research, observation, measurement and manipulation occur in the nanometer range; a nanometer is one-billionth of a meter.

Nanotechnicians work in a wide variety of industries including biomedicine/biotech, microelectronics/microfabrication (RFID), materials/coatings/polymers, agriculture production, food processing/value added agriculture, environmental analysis/bio-remediation and energy (H-fuel cells/biomass/solar/wind).

Green technology is associated with new manufacturing processes that produce less waste, production methods for more efficient PVC for solar energy, filtration devices for water purification, coatings for materials which extend their operational life, reduce friction and wear/tear, more efficient micro-sensors and micro-actuators produced from eco-friendly materials, and electronic components.

The Nanoscience Technology program is a collaborative effort between North Dakota State College of Science and Minnesota State Community and Technical College-Moorhead. Students may enroll and earn a degree through either college.

The first two semesters may be taken at the NDSCS campus in Wahpeton or at the MSCTC campus in Moorhead. Many of the classes are also available online. The following fall and spring semesters primarily consist of nanoscience classes taught at NDSCS-Fargo.

For additional information, please contact:
Kristi Jean
NDSCS-Fargo
Skills and Technology Training Center
1305 19th Avenue North
Fargo, ND 58102
(701) 231-6921
Kristi.Jean@ndscs.edu

| Course Code | Course Title | Credits |
|-------------|--|---------|
| CHEM 121 | General Chemistry I | 4 |
| CHEM 121L | General Chemistry I Lab | 1 |
| FYE 101 | Science of Success | 1 |
| PHYS 211 | College Physics I | 3 |
| PHYS 211L | College Physics I Lab | 1 |
| MATH 103 | College Algebra | 3 |
| NANO 208 | Nanomaterials/Coatings | 3 |
| NANO 209 | Thin Film Technology: MEMS Case Study | 3 |
| NANO 210 | Semiconductor Fabrication | 3 |
| NANO 211 | Manufacturing Quality Assurance | 3 |
| NANO 212 | Surface and Thin Film Analysis Techniques | 3 |
| ENGL 110 | College Composition I | 3 |

TOTAL REQUIRED CREDITS FOR CERTIFICATE 31

In addition to the courses listed under the certificate option, the following courses are required for the diploma:

| Course Code | Course Title | Credits |
|----------------------|--|---------|
| BIOL 150 | General Biology I | 3 |
| BIOL 150L | General Biology I Lab | 1 |
| CSCI 101 | Introduction to Computers | 3 |
| MATH 210 | Elementary Statistics | 3 |
| PHIL 213 | Societal and Ethical Implications of Technology | 3 |
| Wellness elective(s) | | 2 |
| NANO 101 | Fundamentals of Nanoscience I | 3 |
| NANO 102 | Fundamentals of Nanoscience II | 3 |
| NANO 207 | Nanobiotechnology | 3 |

TOTAL REQUIRED CREDITS FOR DIPLOMA 55

In addition to the courses listed under the certificate and diploma options, the following courses are required for the A.A.S. degree:

| Course Code | Course Title | Credits |
|-------------|--------------------------------------|---------|
| CHEM 116 | Intro to Organic and Biochem | 3 |
| CHEM 116L | Intro to Organic and Biochem Lab | 1 |
| ENGL 125 | Introduction to Professional Writing | 3 |
| NANO 197 | Internship Experience I | 1 |
| NANO 297 | Internship Experience II | 2 |

TOTAL REQUIRED CREDITS FOR A.A.S. DEGREE 65

The North Dakota State College of Science is a member of the North Dakota University System.

Admission requirements

The applicants must be high school graduates or equivalent.

Tuition information and application procedures are available from the following offices:

NDSCS Enrollment Services
800 Sixth Street North
Wahpeton, ND 58076
1-800-342-4325, ext. 3-2202
ndscs.admissions@ndscs.edu

Award

Upon successful completion of the required courses, students will be awarded a certificate, a diploma or an Associate in Applied Science (A.A.S.) degree in Nanoscience Technology.

Other Information

If students are planning on transferring to a baccalaureate program, they should consult their advisor for alternative general education science courses.

— www.ndscs.edu —

Suggested sequence of study for the A.A.S. degree

| First Semester | Second Semester |
|----------------|-----------------|
| BIOL 150 | CHEM 116 |
| BIOL 150L | CHEM 116L |
| CHEM 121 | CSCI 101 |
| CHEM 121L | ENGL 125 |
| ENGL 110 | PHYS 211 |
| MATH 103 | PHYS 211L |
| NANO 101 | NANO 102 |
| FYE 101 | NANO 197 |

| Third Semester | Fourth Semester |
|----------------|--------------------|
| NANO 207 | NANO 208 |
| NANO 209 | NANO 211 |
| NANO 210 | NANO 212 |
| MATH 210 | NANO 297 |
| | PHIL 213 |
| | Wellness electives |