

ENGINEERING



Engineers apply the principles of science and mathematics to develop economical solutions to technical problems. Their work is the link between perceived social needs and commercial applications. Engineers use computers extensively to produce and analyze designs, and to simulate and test how a machine, structure, or system operates. Computers are also used to generate specifications, monitor product quality, and control process efficiency, increasingly with nanotechnology. Most engineers specialize and earn starting salaries significantly higher than those of college graduates in other fields.

The engineering curriculum at Bismarck State College provides basic courses in science, mathematics, and other areas required by most engineering schools. Instruction is delivered in small classroom settings by faculty dedicated to student success. Students focus on analysis, problem solving, and real-life application of engineering principles. Coursework emphasizes algebra, calculus, chemistry, and university physics, along with a number of engineering electives including surveying, statics, dynamics, mechanics of materials, and geology.

Students can complete the program in two or three years, depending on their preparation in math, physics and chemistry.

OPTION 1 – Two years. Available for students who have taken college preparatory courses in math and/or science and are ready to enroll in calculus and chemistry.

OPTION 2 – Two or three years. Suggested for students who need to review math and science skills necessary to succeed in engineering.

The first semester contains courses in algebra, physical science, and pre-calculus.

For details, see bismarckstate.edu/faculty/engr

CAREERS

Careers and work activities of engineers vary widely. Among the numerous engineering branches are aerospace, agricultural, biomedical, chemical, civil, computer hardware, construction, electrical/electronic, environmental, geological, industrial, materials, mechanical, nuclear, transportation, and construction management. Work activities may include research, design, sales, manufactur-

ing, testing, installation, development, teaching, consulting, business and management. A bachelor's degree is required for most entry-level jobs.

APTITUDE/PREPARATION

Engineers should have an analytical mind, capacity for detail, creativity, ability to work as part of a team, and have good oral and written communication skills. Because of the strong emphasis on computer applications in all engineering fields, students should be proficient at keyboarding. Knowledge of word processing, spreadsheets, and computer programming is also helpful.

SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS CAREER CLUSTER

Suggested high school courses:

Algebra	Geometry
Trigonometry	Calculus
Biology	Chemistry
Physics	

Potential students should refer to the catalog of the college where they plan to complete a bachelor's degree and compare course requirements to BSC's suggested curriculum and make changes, if necessary. BSC strongly recommends that students see their advisor before registering for classes. Faculty maintain a complete four-year sample curriculum for each engineering specialty offered at North Dakota universities.

BSC students planning to transfer to North Dakota State University or the University of North Dakota should apply for dual admission to BSC and the chosen college in their sophomore year.

GRADUATION

Students completing the suggested Engineering curriculum of either Option 1 or Option 2 receive an Associate in Science degree.

Collaborative transfer agreement – BSC has agreements with North Dakota State University and the University of North Dakota to help facilitate the transfer process. Graduates who applied for dual admission may transfer with junior status to either university and compete equally for scholarships and class registration with NDSU and UND students.

EMPLOYMENT

Overall job opportunities in engineering are expected to grow as fast as the average for all occupations, but will vary by specialty, according to the U.S. Bureau of Labor Statistics. Employment in manufacturing is expected to remain steady. However, the increased hiring of engineers in faster-paced service industries will generate most new job growth. Biomedical and environmental engineering are expected to grow much faster than average, the Bureau says. Overall job opportunities should be favorable through the next decade with engineering graduates in rough balance with job openings. Continuing education will be critical for engineers wishing to enhance their value to employers as technology evolves.

FACULTY

For information about the Engineering transfer program, contact Scott Klingenstein, associate professor of engineering, at 701-224-5518, Scott.Klingenstein@bsc.nodak.edu.

HOW TO REACH US

- BSC Web site:** bismarckstate.edu
- Application information:** 1-800-445-5073 or 1-701-224-5429 or bismarckstate.edu/prospectivestudents/application.asp
- Financial Aid:** 1-701-224-5494 or bismarckstate.edu/student/financialaid
- BSC Foundation Scholarships:** 1-701-224-2486 or bismarckstate.edu/scholarships

CURRICULUM

SUGGESTED CURRICULUM FOR ASSOCIATE IN SCIENCE:

OPTION 1 - TWO YEARS FRESHMAN		CREDITS
College Composition I-II, Intro. to Professional Writing (ENGL 110 and 120 or 125)	6	
Calculus (MATH 165-166)	8	
General Chemistry I&II (CHEM 121-122)	8	
General Chemistry I&II Lab (CHEM 121L-122L)	2	
Graphical Communications (ENGR 101)	3	
Arts and Humanities Electives	6	
Enrichment	2	
Total credits	35	
SOPHOMORE		CREDITS
University Physics I-II (PHYS 251-252)	8	
University Physics I-II Lab (PHYS 251L-252L)	2	
Calculus (MATH 265)	4	
Intro. to Differential Equations (MATH 266)	3	
Applied Linear Algebra (MATH 227)	3	
Statics (ENGR 201)	3	
Engineering Electives	6-8	
Social Science Electives	6	
Fundamentals of Public Speaking (COMM 110)	3	
Total credits	38-40	

OPTION 2 - TWO OR THREE YEARS

Some students interested in a career in engineering enter college needing to review math and science skills necessary for success in the engineering field. This option allows students to take preliminary courses in science and to review algebra and trigonometry before enrolling in calculus. Since calculus is crucial for success in physics and sophomore engineering courses, these students may need up to three years of study before they are ready to transfer to an engineering college with junior status.

FIRST YEAR	CREDITS
College Composition I-II, Intro. to Professional Writing (ENGL 110 and 120 or 125)	6
Algebra (MATH 102 or 103)	3
Pre-calculus (MATH 107)	5
Physical Science I-II (SCNC 101 or 101-102)	3-6
Physical Science I-II Lab (SCNC 101L-102L)	1-2
Introduction to Computers (CSCI 101)	3
Keyboarding I (BOTE 102)	3
Arts and Humanities Electives	6
Total credits	30-34
SECOND YEAR	CREDITS
Calculus (MATH 165-166)	8
Chemistry (CHEM 115-116 or 121-122)	8
Chemistry Lab (CHEM 115L-116L or 121L-122L)	2
Graphical Communication (ENGR 101)	3
Social Science Electives	6
Enrichment	2
Fundamentals of Public Speaking (COMM 110)	3
Engineering Electives	3-6
Total credits	35-38
THIRD YEAR	CREDITS
Calculus (MATH 265)	4
Intro. to Differential Equations (MATH 266)	3
Applied Linear Algebra (MATH 227)	3
University Physics I-II (PHYS 251-252)	8
University Physics I-II Lab (PHYS 251L-252L)	2
Statics (ENGR 201)	3
Engineering Electives	4-6
Total credits	27-29

ENGINEERING ELECTIVES	CREDITS
Dynamics (ENGR 202)	3
Mechanics of Materials (ENGR 203)	3
Surveying I (ENGR 204)	3
Surveying I Lab (ENGR 204L)	1
Computer Aided Design I (CAD 211)	3
Circuit Analysis (EE 206)	4
Probability and Statistics (MATH 220)	3
Organic Chemistry I&II (CHEM 241-242)	8
Organic Chemistry I&II Lab (CHEM 241L-242L)	2
Physical and Historical Geology (GEOL 105-102)	6
Physical and Historical Geology Lab (GEOL 105L-102L)	2

For a complete four-year sample curriculum for each field of engineering offered by the state universities, contact NDSU or UND.