

Agricultural and Biosystems Engineering

Department Information

- **Department Web Site:**
www.ndsu.edu/aben/ (<http://www.ndsu.edu/aben/>)
- **Credential Offered:**
B.S.A.B.En.
- **Official Program Curriculum:**
catalog.ndsu.edu/undergraduate/program-curriculum/agricultural-biosystems-engineering/ (<http://catalog.ndsu.edu/undergraduate/program-curriculum/agricultural-biosystems-engineering/>)

The Agricultural and Biosystems Engineering (ABEN) program prepares students for careers in:

- Machine Systems Engineering – for mechanical equipment and power units such as tractors and other equipment
- Process Engineering – for food, feed, fiber, biofuels, and other bioproducts
- Natural Resources and Environmental Systems Engineering – for soil, water, air, waste, and other areas
- General ABEN - encompasses a student-selected mix of the above areas

Graduates design machines, processes, and natural resource systems. They solve problems using mathematics and applying physical, biological and engineering sciences. Agricultural and biosystems engineers address society's challenges in food, energy and water.

The Program

Agricultural and Biosystems Engineering integrates engineering topics, engineering design and biological sciences. Agricultural and biosystems engineers are uniquely qualified to use their knowledge of mathematics, biological and physical sciences, and engineering principles to solve problems relating to the:

- design, testing and production of machine systems
- production, handling and processing of crops and biological materials for food, feed, fiber and fuel
- building environmental design
- utilization and conservation of natural resources
- protection of the environment

A major in Agricultural and Biosystems Engineering can serve a broad range of career interests and can provide excellent career opportunities for students from diverse backgrounds.

The Bachelor of Science in Agricultural and Biosystems Engineering program is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the commission's General Criteria and Program Criteria for Agricultural and Similarly Named Engineering Programs, and Program Criteria for Biological and Similarly Named Engineering Programs. Agricultural and Biosystems engineering students are well-qualified for and encouraged to take the national Fundamentals of Engineering examination, which is the first step in the process of registration as a professional engineer.

ABEN class size is usually fewer than 25 students, which allows for close faculty-student interactions. Student advising for classes and career planning takes place in one-to-one meetings between a student and her or his faculty or professional adviser, and complemented by a student support professional in the department.

Internships

Although not required by the curriculum, students are strongly encouraged to take advantage of paid internships, which allow students to spend a summer or, more typically, a summer and a semester doing engineering work. Students can earn up to 3 credits of engineering or program electives related to internships. There are also opportunities to work as a research assistant in projects conducted by faculty. The intern and research assistant positions help students gain hands-on experience in engineering and open doors for employment upon graduation.

Career Opportunities

Position titles of graduates for both concentrations may include design engineer, test engineer, project engineer, plant engineer, quality control engineer, process engineer, energy adviser, consulting engineer and environmental engineer. Starting salaries are among the highest of all college graduates and are comparable to those in other fields of engineering. Recent starting salaries range from \$55,000 to \$75,000 per year with an average of \$60,000 per year. The placement of graduates has been at or near 100 percent for many years.

Career opportunities for graduates in agricultural and biosystems engineering are numerous and diverse. Graduates are employed by companies and agencies that:

- design, develop, test and manufacture agricultural power and machine systems;
- develop electrical and electronic applications for agricultural processing, and natural resources problems.
- convert bio-based resources to food, feed, fuel and other renewable products;
- design and manage irrigation, drainage, and agricultural waste management systems.

Graduates with an agricultural and biosystems engineering degree may also pursue an advanced degree in engineering, medicine, veterinary medicine, business, management or law.

Scholarships

Several Departmental, College of Engineering, and NDSU scholarships are competitively awarded to students in the ABEN program each spring. There are scholarships for freshmen who apply to the ABEN program. The departmental scholarships range in value from about \$500 to \$4,500. Scholastic achievement, financial need and extracurricular activities are considered. Scholarships are provided by industry, faculty and alumni.

Extra-Curricular Activities

Varied extracurricular programs are available to students majoring in Agricultural and Biosystems Engineering. Students are involved with the International ¼ Scale Tractor Student Design Competition, Bison Antique Tractor Club, and the Society of Women Engineers.

A Well-Equipped Teaching Facility

Laboratories are furnished with equipment used in industry and research. Computer labs have specialized software used in engineering such as Creo, MATLAB, ANSYS, ArcGIS, and AutoCAD. Most courses include labs where students get hands-on experience with data acquisition systems, analytical tools, biomaterials handling and processing equipment, environmental measurement equipment, controllers, and analog and digital test equipment.

Sample Program Guide

IMPORTANT DISCLAIMER: This guide is not an official curriculum. This guide is a sample four-year degree plan of how students might plan this major with other degree requirements to complete their education in four years. Student plans will vary from this sample due to a variety of factors, such as, but not limited to, start year, education goals, transfer credit, and course availability. To ensure proper degree completion, enrolled students should utilize Degree Map (<https://www.ndsu.edu/registrar/degreemap/>) and Schedule Planner (<https://www.ndsu.edu/onestop/degree-map-and-planning/>) in Campus Connection and consult regularly with academic advisors to ensure graduation requirements are being met.

Freshman			
Fall	Credits	Spring	Credits
ABEN 110		3 ABEN 348	1
CHEM 121		3 ME 212	3
ENGL 110		3 ME 221	3
MATH 165		4 CHEM 122	3
BIOL 150, MICR 202, BIOL 111, or BIOL 124		3 ENGL 120	3
BIOL 150L, MICR 202L, or CHEM 121L		1 MATH 166	4
		17	17
Sophomore			
Fall	Credits	Spring	Credits
ABEN 255		3 ABEN 263	3
COMM 110		3 PHYS 252	4
ME 222		3 PHYS 252L	1
ME 223		3 MATH 266	3
MATH 259		3 ME 350	3
MATH 128		1 CSCI 122, ME 213, GEOG 455, or PAG 215	3
		16	17

Junior			
Fall	Credits	Spring	Credits
IME 460 or STAT 330		3 ABEN 391	1
CE 309 or ME 352		3 ABEN 444 or 452	3
ABEN 358		3 ABEN 482	3
ABEN 479		3 ABEN 484 or 464	3
Program Elective		3 ENGL 321 (ENGL 320, 321, 324, or 459)	3
		Gen Ed - Humanities/Fine Arts	3
		15	16
Senior			
Fall	Credits	Spring	Credits
ABEN 486		2 ABEN 487	2
IME 440		3 Program Elective	6
ENGR 327		3 Gen Ed - Social/Behav/Global	3
Gen Ed - Wellness		2 Gen Ed - Social/Behav	3
Program Elective		3	
Program Elective (300/400 Engr Elective)		3	
		16	14
Total Credits: 128			