

AGRICULTURAL & BIOLOGICAL ENGINEERING, BS AND AGRICULTURAL & BIOLOGICAL ENGINEERING, BSAG

for the dual degree of Bachelor of Science in Agricultural & Biological Engineering and the Bachelor of Science in Agriculture in Agricultural & Biological Engineering

Dual Degree – Five Year Academic Program

Students who successfully complete this five-year academic program receive the Bachelor of Science with a major in Agricultural and Biological Engineering from The Grainger College of Engineering as well as the Bachelor of Science in Agriculture with a major in Agricultural and Biological Engineering from the College of ACES.

Students enroll in the College of ACES and then transfer to The Grainger College of Engineering after two years. Students then complete the ABET-accredited degree program in Agricultural and Biological Engineering in The Grainger College of Engineering while taking additional coursework in ACES to complete the requirements for the Bachelor of Science in Agriculture in Agricultural and Biological Engineering degree program in ACES. The suggested program of study that follows fulfills the additional graduation requirements for the second degree, which requires completion of the Grainger College of Engineering degree.

Agricultural and biological engineering is the application of mathematics, physical and biological science, and engineering to agriculture, food systems, energy, natural resources, the environment, and related biological systems. This program has special emphasis on environmental protection and the biological interface of plants, animals, soils, and microorganisms with the design and performance of environments, machines, mechanisms, processes, and structures. Graduates are employed by industry, consulting firms, and government for research, education, and manufacturing.

for the degree of Bachelor of Science Major in Agricultural & Biological Engineering

Agricultural and Biological Engineers apply fundamental engineering principles to problems relating to agriculture and biology. ABE students learn to design technological solutions to problems in agricultural, food, bioenergy, water, and other biological systems.

The Bachelor of Science in Agricultural and Biological Engineering (ABE) equips graduates to address grand challenges related to food, water, energy, and the environment. The program offers an ABET-accredited, flexible curriculum.

The ABE program comprises six concentrations. Students pursuing this major select one of the following concentrations:

- Bioprocess Engineering and Industrial Biotechnology Concentration (http://catalog.illinois.edu/undergraduate/eng_aces/agricultural-biological-engineering-bs/bioprocess-engineering-industrial-biotechnology/)
- Off-Highway Vehicle and Equipment Engineering Concentration (http://catalog.illinois.edu/undergraduate/eng_aces/agricultural-biological-engineering-bs/off-highway-vehicle-equipment-engineering/)
- Renewable Energy Systems Engineering Concentration (http://catalog.illinois.edu/undergraduate/eng_aces/agricultural-biological-engineering-bs/renewable-energy-systems-engineering/)
- Soil and Water Resources Engineering Concentration (http://catalog.illinois.edu/undergraduate/eng_aces/agricultural-biological-engineering-bs/soil-water-resources-engineering/)
- Sustainable Ecological and Environmental Systems Engineering Concentration (http://catalog.illinois.edu/undergraduate/eng_aces/agricultural-biological-engineering-bs/sustainable-ecological-environmental-systems-engineering/)
- Synthetic Biological Engineering Concentration (http://catalog.illinois.edu/undergraduate/eng_aces/agricultural-biological-engineering-bs/synthetic-biological-engineering/)

Each concentration (30 hours each) has its own unique body of knowledge and engineering tools and builds upon engineering fundamentals from the first two years of the program.

Current Program Educational Objectives (<https://abe.illinois.edu/undergraduate/abe-program-objectives/>)

for the dual degree of Bachelor of Science in Agricultural & Biological Engineering and the Bachelor of Science in Agriculture in Agricultural & Biological Engineering

While completing the Agricultural & Biological Engineering, B.S. the student takes additional classes in ACES for the BSAG degree. The student is in ACES in years 1 and 2, transferring to The Grainger College of Engineering for years 3 through 5. The curriculum for the additional classes to complete the BSAG degree is as follows:

Agricultural & Biological Engineering, BSAG Requirements in addition to completion of Agricultural & Biological Engineering, B.S.

Code	Title	Hours
Required coursework:		
Communication		3
CMN 101	Public Speaking	
Additional Biological Sciences Coursework. Choose an additional 4 hours from the list below (sum total will be 10 hours with the 6 hours of Biological Sciences coursework from the ABE BS requirements):		4
ANSC 100	Intro to Animal Sciences	
ANSC 221	Cells, Metabolism and Genetics	
ANSC 350	Cellular Metabolism in Animals	
ANSC 363	Behavior of Domestic Animals	
ANSC 400	Dairy Herd Management	
ANSC 401	Beef Production	
ANSC 402	Sheep and Goat Production	
ANSC 403	Pork Production	

ANSC 404	Poultry Science	IB 444	Insect Ecology
ANSC 406	Zoo Animal Conservation Sci	IB 452	Ecosystem Ecology
ANSC 450	Comparative Immunobiology	IB 482	Insect Pest Management
ATMS 201	General Physical Meteorology	IB 485	
ATMS 307	Climate Processes	IB 486	
CHEM 232	Elementary Organic Chemistry I (CHEM 232 and MCB 150 are required for the BIO concentration)	MCB 100 & MCB 101	Introductory Microbiology and Intro Microbiology Laboratory
CHEM 233	Elementary Organic Chem Lab I	MCB 150 & MCB 151	Molec & Cellular Basis of Life and Molec & Cellular Laboratory (CHEM 232 and MCB 150 are required for the BIO concentration)
CHEM 312	Inorganic Chemistry	MCB 244 & MCB 245	Human Anatomy & Physiology I and Human Anat & Physiol Lab I
CHEM 332	Elementary Organic Chem II	MCB 250 & MCB 251	Molecular Genetics and Exp Techniqs in Molecular Biol
CHEM 360	Chemistry of the Environment	MCB 252 & MCB 253	Cells, Tissues & Development and Exp Techniqs in Cellular Biol
CHEM 460	Green Chemistry	MCB 300 & MCB 301	Microbiology and Experimental Microbiology
CPSC 112	Introduction to Crop Sciences	MCB 314	Introduction to Neurobiology
CPSC 261	Biotechnology in Agriculture	MCB 316	Genetics and Disease
CPSC 265	Genetic Engineering Lab	MCB 450	Introductory Biochemistry
CPSC 270	Applied Entomology	NRES 201	Introductory Soils
CPSC 352	Plant Genetics	NRES 219	Applied Ecology
CPSC 414	Forage Crops & Pasture Ecology	NRES 348	Fish and Wildlife Ecology
CPSC 415	Bioenergy Crops	NRES 351	Introduction to Environmental Chemistry
CPSC 418	Crop Growth and Management	NRES 419	Env and Plant Ecosystems
CPSC 431	Plants and Global Change	NRES 420	Restoration Ecology
CPSC 437	Principles of Agroecology	NRES 429	Aquatic Ecosystem Conservation
CPSC 473	Mgmt of Field Crop Insects	NRES 439	Env and Sustainable Dev
FSHN 101	The Science of Food and How it Relates to You	NRES 471	Pedology
FSHN 414	Food Chemistry	NRES 475	Environmental Microbiology
FSHN 416	Food Chemistry Laboratory	NRES 487	Soil Chemistry
FSHN 471	Food & Industrial Microbiology	NRES 488	Soil Fertility and Fertilizers
FSHN 481	Food Processing Unit Operations I	PLPA 405	Plant Disease Diagnosis & Mgmt
FSHN 482	Food Processing Unit Operations I Lab		
FSHN 483	Food Processing Unit Operations II		
FSHN 484	Food Processing Unit Operations II Lab		
GEOL 107	Physical Geology		
GEOL 380	Environmental Geology		
HORT 100	Introduction to Horticulture		
HORT 341	Greenhouse Mgmt and Production		
HORT 344	Planting for Biodiversity and Aesthetics		
HORT 360	Vegetable Crop Production		
HORT 361	Small Fruit Production		
HORT 362	Tree Fruit Production		
HORT 363	Postharvest Handling Hort Crop		
HORT 421	Horticultural Physiology		
HORT 435	Urban Food Production		
IB 103	Introduction to Plant Biology		
IB 150 & IB 151	Organismal & Evolutionary Biol and Organismal & Evol Biol Lab		
IB 203	Ecology		
IB 329	Animal Behavior		
IB 335			
IB 411	Bioinspiration		
IB 420	Plant Physiology		
IB 439	Biogeography		

Agricultural Sciences Coursework (15 hours of agricultural sciences with courses from at least two subject areas other than ABE and ETMAS, and approval of advisers are required)³ 15

Free Electives (sufficient free electives selected to total minimum curriculum requirement of 158 hours. All requirements of the combined curriculum must be completed to satisfy the requirements for both degrees)

Total hours required to receive an Agricultural and Biological Engineering, BS and an Agricultural Science, BSAG 158

for the dual degree of Bachelor of Science in Agricultural & Biological Engineering and the Bachelor of Science in Agriculture in Agricultural & Biological Engineering

Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment

programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree and General Education Requirements page (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

First Year		
First Semester	Hours Second Semester	Hours
ABE 127	2 ABE 128	3
ENG 100	1 PHYS 211	4
MATH 221	4 MATH 231	3
CHEM 102	3 CHEM 104	3
CHEM 103	1 CHEM 105	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)	4 Composition I or General Education course (Humanities or SBS with Cultural Studies)	3
15		17

Second Year		
First Semester	Hours Second Semester	Hours
ABE 227	3 ABE 228	3
CS 101	3 PHYS 212	4
MATH 241	4 MATH 285	3
SE 101	3 MATH 257	3
TAM 211	3 TAM 212	3
16		16

Third Year		
First Semester	Hours Second Semester	Hours
ABE 340	3 IE 300 or STAT 400	3
ECE 205	3 Concentration course	4
Concentration course	3 Concentration course	3
Concentration course	4 Concentration course	4
Free elective	3 Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255	3
16		17

Fourth Year		
First Semester	Hours Second Semester	Hours
ABE 430	2 ABE 469	4
Concentration course	3 Concentration course	3

Concentration course	3 Concentration course	3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3 General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
Free elective	4 Free elective	3
15		16

Fifth Year		
First Semester	Hours Second Semester	Hours
CMN 101	3 Biological Sciences Coursework	4
Agricultural Sciences Coursework	3 Agricultural Sciences Coursework	3
Agricultural Sciences Coursework	3 Agricultural Sciences Coursework	3
Agricultural Sciences Coursework	3 Free elective	5
Free elective	3	
15		15

Total Hours 158

for the dual degree of Bachelor of Science in Agricultural & Biological Engineering and the Bachelor of Science in Agriculture in Agricultural & Biological Engineering

Student learning outcomes are based on learning outcomes in line with the ABET accreditation process.

Agricultural & Biological Engineering graduates will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

for the dual degree of Bachelor of Science in Agricultural & Biological Engineering and the Bachelor of Science in Agriculture in Agricultural & Biological Engineering

Agricultural & Biological Engineering

Agricultural & Biological Engineering Department website (<https://abe.illinois.edu/>)
338 Agricultural Engineering Sciences Building
1304 West Pennsylvania Avenue
Urbana, IL 61801
(217) 333-3570
abe@illinois.edu

College of Agricultural, Consumer & Environmental Sciences

College of Agricultural, Consumer & Environmental Sciences website (<https://aces.illinois.edu/>)

The Grainger College of Engineering

The Grainger College of Engineering website (<https://grainger.illinois.edu/>)

ACES Office of Academic Programs

128 Mumford Hall
1301 West Gregory Drive
Urbana, IL 61801
217-333-3380
aces-academics@illinois.edu

Advising

ABE Advising website (<https://abe.illinois.edu/academics/advising/>)
(217) 333-3570
tsm-etm-abe-advising@rt.aces.illinois.edu

Admissions

ACES Undergraduate Admissions (<https://aces.illinois.edu/admissions/>)
University of Illinois Urbana-Champaign Undergrad Admissions (<https://www.admissions.illinois.edu/>)
(217) 333-3380
visitACES@illinois.edu