

AGRICULTURAL & BIOLOGICAL ENGINEERING: OFF-HIGHWAY VEHICLE AND EQUIPMENT ENGINEERING, BS

for the degree of Bachelor of Science in Agricultural & Biological Engineering, Off-Highway Vehicle and Equipment Engineering Concentration

Graduates design, manufacture, and test equipment and control systems for off-highway vehicle industries, including agriculture, construction, and mining. These vehicle and equipment systems must be designed to operate in surroundings that present unique challenges for operating efficiency, safety and environmental impact.

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Graduation Requirements

Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours, to include a minimum of 40 hours of upper-division coursework generally at the 300 and/or 400 level. These hours can be drawn from all elements of the degree.

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. One of the Social and Behavioral Sciences (SBS) courses must include one of the following economics courses: ECON 102, ACE 100, ACE 210, ACE 251 or ACE 255. ACE 251 and ACE 255 will also meet a Cultural Studies requirement in addition to the Social Behavioral Sciences requirement. ABE 469 will satisfy a technical core course and the Campus General Education Advanced Composition requirement.

Orientation and Professional Development

Code	Title	Hours
ABE 127	Introduction to Agricultural & Biological Engineering	2
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)	1
Total Hours		3

Foundational Mathematics and Science

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4

MATH 257	Linear Algebra with Computational Applications	3
MATH 285	Intro Differential Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
Total Hours		33

Agricultural and Biological Engineering Technical Core

Code	Title	Hours
ABE 128	Applied Biology for Agricultural and Biological Engineers	3
ABE 227	Computer-Aided Problem-Solving for ABE I	3
ABE 228	Computer-Aided Problem-Solving for ABE II	3
ABE 340	Thermodynamics for Agricultural and Biological Engineering	3
ABE 430	Project Management	2
ABE 469	Capstone Design Experience	4
CS 101	Intro Computing: Engrg & Sci	3
ECE 205	Electrical and Electronic Circuits	3
SE 101	Engineering Graphics & Design	3
IE 300 or STAT 400	Analysis of Data Statistics and Probability I	3
TAM 211	Statics	3
TAM 212	Introductory Dynamics	3
Total Hours		36

Concentration Requirements: complete a minimum of 30 hours from courses below

Code	Title	Hours
Required courses		
ABE 341	Transport Processes in ABE	3
ABE 361	Functional Analysis and Design of Agricultural Machine Systems	3
ABE 425	Engrg Measurement Systems	4
ABE 466	Engineering Off-Road Vehicles	3
TAM 251	Introductory Solid Mechanics	3
TAM 335	Introductory Fluid Mechanics	4
Total Hours		20

Code	Title	Hours
Select one of the following:		
ABE 454 or ABE 426 or MSE 280	Environmental Soil Physics Principles of Mobile Robotics Engineering Materials	3

Code	Title	Hours
Select one of the following sets:		
CPSC 112 & CPSC 418	Introduction to Crop Sciences and Crop Growth and Management	7
NRES 201 & NRES 488	Introductory Soils and Soil Fertility and Fertilizers	7

Code	Title	Hours
Total Minimum Concentration Hours		30
Free Electives		10
Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives/)		
Total Hours of Curriculum to Graduate		128

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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. See the corresponding section on the Degree and General Education Requirements (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

Free Electives: Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives (<https://go.grainger.illinois.edu/FreeElectives/>), so that there are at least 128 credit hours earned toward the degree.

First Year		
First Semester	Hours	Second Semester Hours
ABE 127		2 ABE 128
ENG 100		1 PHYS 211
MATH 221 (MATH 220 may be substituted)		4 MATH 231
CHEM 102		3 CHEM 104
CHEM 103		1 CHEM 105
Composition I or General Education course (Humanities or Social & Behavioral Sciences course with Cultural Studies designation)		4 Composition I or General Education course (Humanities or Social & Behavioral Sciences course with Cultural Studies designation)
		15
		17

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

Third Year		
First Semester	Hours	Second Semester Hours
ABE 340		3 IE 300 or STAT 400
ECE 205		3 ABE 425
TAM 335		4 ABE 341
NRES 201 or CPSC 112		4 ABE 361
Free Elective course		3 Choose one course from Social & Behavioral Sciences Course list: ECON 102, ACE 100, ACE 210, ACE 251, ACE 255
		17
		16

Fourth Year		
First Semester	Hours	Second Semester Hours
ABE 430		2 ABE 469
ABE 466		3 NRES 488 or CPSC 418
TAM 251		3 ABE 454 (or ABE 426 or MSE 280)
General Education course (Humanities or Social & Behavioral Sciences course with Cultural Studies designation)		3 General Education course (Humanities or Social & Behavioral Sciences course with Cultural Studies designation)
Free Elective course		4 Free Elective course
		15
		16

Total Hours 128

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The Agricultural and Biological Engineering BS is accredited by the Engineering Accreditation Commission of ABET, Inc. (abet.org).

In accordance with the ABET educational criteria, the program has been developed so that 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.

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Agricultural and Biological Engineering Website (<https://abe.illinois.edu/undergraduate/>)

Agricultural & Biological Engineering Faculty (<https://abe.illinois.edu/directory/faculty/>)

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

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