AGRICULTURAL & BIOLOGICAL ENGINEERING: SOIL AND WATER RESOURCES ENGINEERING, BS

for the degree of Bachelor of Science in Agricultural & Biological Engineering, Soil and Water Resources Engineering Concentration

Graduates design sustainable systems to manage and conserve soil and water, control erosion and sediment, improve water quality, and minimize pollution.

for the degree of Bachelor of Science in Agricultural & Biological Engineering, Soil and Water Resources Engineering Concentration

Graduation Requirements
Minimum Overall GPA: 2.0
Minimum hours required for graduation: 128 hours.

University Requirements
Minimum of 40 hours of upper-division coursework, generally at the 300- or 400-level. These hours can be drawn from all elements of the degree. Students should consult their academic advisor for additional guidance in fulfilling this requirement.

The university and residency requirements can be found in the Student Code (https://studentcode.illinois.edu/article3/part8/3-801/) (§ 3-801) and in the Academic Catalog (http://catalog.illinois.edu/general-information/degree-general-education-requirements/).

General Education Requirements
Students must complete the campus General Education (Gen Ed) requirements (https://courses.illinois.edu/gened/DEFAULT/DEFAULT/), including the campus Gen Ed language requirement.

Code	Title	Hours
Composition I		4-6
Advanced Composition		3
fulfilled by ABE 469		
Humanities & the Arts (6 hours)		6
Natural Sciences & Technology (6 hours)		6
fulfilled by CHEM 102, CHEM 104, PHYS 211, and PHYS 212		
Social & Behavioral Sciences (6 hours)		6
fulfilled by ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255 and one other course approved as Social and Behavioral Sciences		
Cultural Studies: Non-Western Cultures (1 course)		3
Cultural Studies: US Minority Cultures (1 course)		3
Cultural Studies: Western/Comparative Cultures (1 course)		3
Quantitative Reasoning (2 courses, at least one course must be Quantitative Reasoning I)		6-10
fulfilled by CS 101, MATH 220 or MATH 221, MATH 231, MATH 241, MATH 285, PHYS 211, and PHYS 212		
Language Requirement (Completion of the third semester or equivalent of a language other than English is required)		0-15

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**

Foundational Economics

Code	Title	Hours
Select one of the following:		
ECON 102	Microeconomic Principles	3
ACE 100	Introduction to Applied Microeconomics	4
ACE 210	Environmental Economics & Policy	3
ACE 251	The World Food Economy	3
ACE 255	Economics of Food and Environmental Justice	3

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	Analysis of Data	3
or STAT 400	Statistics and Probability I	
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 454	Environmental Soil Physics	3
ABE 456	Land & Water Resources Engrg	3
TAM 335	Introductory Fluid Mechanics	4
Total Hours		**10**

Code	Title	Hours
Select one of the following:		
ABE 425	Engrg Measurement Systems	4
CEE 458	Water Resources Field Methods	4

Code	Title	Hours
Select one of the following:		
ABE 458	NPS Pollution Modeling	2
ABE 459	Drainage and Water Management	3

Code	Title	Hours
Select one of the following two sets:		
CPSC 112 & CPSC 437	Introduction to Crop Sciences and Principles of Agroecology	7
NRES 201 & NRES 475 or NRES 488	Introductory Soils and Environmental Microbiology Soil Fertility and Fertilizers	7

Code	Title	Hours
Select at least six additional hours from the following		
ABE 452	Engineering for Disaster Resilience	3
ABE 457	NPS Pollution Processes	2
ABE 458	NPS Pollution Modeling	2
ABE 459	Drainage and Water Management	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 380	Geotechnical Engineering	3

Code	Title	Hours
Total Minimum Concentration Hours		**30**

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

Code	Title	Hours
Total Hours of Curriculum to Graduate		**128**

for the degree of Bachelor of Science in Agricultural & Biological Engineering, Soil and Water Resources Engineering Concentration

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. 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	3
ENG 100	1	PHYS 211	4
MATH 221 or 220	4	MATH 231	3
CHEM 102	3	CHEM 104	3
CHEM 103	1	CHEM 105	1
Composition I or General Education course	4	General Education course or Composition I	3
	15		**17**

Total Hours 32

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**

Total Hours 32

Third Year

First Semester	Hours	Second Semester	Hours
ABE 340	3	IE 300 or STAT 400	3
ECE 205	3	ABE 425 or CEE 458	4
NRES 201 or CPSC 112	4	ABE 454	3
TAM 335	4	ABE 456	3

General Education course	3	Foundational Economics course	3
	17		**16**

Total Hours 33

Fourth Year

First Semester	Hours	Second Semester	Hours
ABE 430	2	ABE 469	4
ABE 459 or 458	3	NRES 475, 488, or CPSC 437	3
Choose 3 hours from 'Select 6 hours' list	3	Choose 3 hours from 'Select 6 hours' list	3
General Education course (choose one course that fulfills two categories)	3	General Education course	3
Language Other than English (3rd level)	4	General Education course	3
	15		**16**

Total Hours 31

Total Hours: 128

for the degree of Bachelor of Science in Agricultural & Biological Engineering, Soil and Water Resources Engineering Concentration

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 degree of Bachelor of Science in Agricultural & Biological Engineering, Soil and Water Resources Engineering Concentration

Agricultural and Biological Engineering (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/)