

ENGINEERING TECHNOLOGY & MANAGEMENT FOR AGRICULTURAL SYSTEMS: ENERGY & THE ENVIRONMENT, BS

for the degree of Bachelor of Science in Engineering Technology & Management for Agricultural Systems: Energy & the Environment concentration

Students in the Energy and the Environment concentration focus on renewable energy systems, environmental systems, or both. Students will:

1. gain an understanding of the science behind renewable energy from sunlight wind, geothermal, and biomass sources;
2. perform economic analysts of proposed systems;
3. manage energy systems to blend appropriate sources into reliable , cost-effective, and long-lasting systems; and
4. develop, construct, and operate large-scale, grid-connected renewable energy projects.

Students will also have the ability to utilize GIS and other technologies to develop and manage practices for controlling the transport of agricultural and other non-point sources of pollution in the environment, and to implement systems for sustaining and improving water quality, maintaining ecosystems, managing stormwater, and developing optimal irrigation use and drainage systems. Graduates of the Energy & the Environment concentration are prepared for careers with private consulting firms, government and environmental agencies, both small and large technology companies, or for entrance into graduate or professional school.

for the degree of Bachelor of Science in Engineering Technology & Management for Agricultural Systems, Energy & the Environment concentration

Concentration Requirements

Graduation Requirements

Minimum hours required for graduation: 126 hours.

University Requirements

Minimum of 40 hours of upper-division coursework, generally at the 300 and 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

Follows the campus General Education (Gen Ed) requirements (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>). Some Gen Ed requirements may be met by courses required and/or electives in the program.

Code	Title	Hours
	Composition I	4-6
	Advanced Composition	3
	fulfilled by AGCM 220, BADM 340, BTW 250, BTW 261, ECE 316, ESE 360, ETMA 311, NRES 419, or PLPA 200	
	Humanities & the Arts (6 hours)	6
	Natural Sciences & Technology (6 hours)	6
	fulfilled by CHEM 102, PHYS 101; and CHEM 104 or PHYS 102	
	Social & Behavioral Sciences (6 hours)	6
	fulfilled by ECON 102 or ACE 100 and one other courses 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)	6-8
	fulfilled by MATH 234, PHYS 101; and CS 105; and ACE 262, CPSC 241, ECON 202, or STAT 107	
	Language Requirement (Completion of the third semester or equivalent of a language other than English is required)	0-15

Code	Title	Hours
Department Foundation		
	ACES 101	
	Communication Option:	3 or 6
	CMN 101 Public Speaking	
	ALEC 115 Let's Talk about Food, Agriculture, and the Environment	
	CMN 111 & CMN 112 Oral & Written Comm I and Oral & Written Comm II	
	Advanced ETMA Communication Option - Select one of the following:	3-4
	AGCM 220 Communicating Agriculture	
	BADM 340 Ethical Dilemmas of Business	
	BTW 250 Principles Bus Comm	
	BTW 261 Principles Tech Comm	
	ECE 316 Ethics and Engineering	
	ESE 360 Environmental Writing	
	ETMA 311 Humanity in the Food Web	
	NRES 419 Env and Plant Ecosystems	
	PLPA 200 Plants, Pathogens, and People	
	Statistics Option - Select one of the following:	3-4
	ACE 262 Applied Statistical Methods and Data Analytics I	
	CPSC 241 Intro to Applied Statistics	
	ECON 202 Economic Statistics I	
	STAT 107 Data Science Discovery	
	MATH 234 Calculus for Business I (or equivalent)	4
	CHEM 102 General Chemistry I	4
	& CHEM 103 and General Chemistry Lab I	

PHYS 101	College Physics: Mech & Heat	5
Select one of the following:		4-5
CHEM 104 & CHEM 105	General Chemistry II and General Chemistry Lab II	
OR		
PHYS 102	College Physics: E&M & Modern	
ECON 102 or ACE 100	Microeconomic Principles Introduction to Applied Microeconomics	3 or 4
Major Core		
CS 105	Intro Computing: Non-Tech	3
ETMA 100	Technical Systems in Agr	3
ETMA 339	Optimization in Engineering Technology and Management	3
ETMA 421 or ETMA 422	Industrial and Agricultural Safety-Injury Prevention Industrial and Agricultural Occupational Illness Prevention	3
ETMA 430	Project Management	2
ETMA 439	Capstone Experience	4
Business Electives		
A total of six hours from the Business Electives list, which do not satisfy any other requirements.		
ACCY 200	Fundamentals of Accounting	3
ACCY 201	Accounting and Accountancy I	3
ACCY 202	Accounting and Accountancy II	3
ACE 210	Environmental Economics & Policy	3
ACE 221	Negotiation	2
ACE 240	Personal Financial Planning	3
ACE 310	Natural Resource Economics	3
ACE 345	Small Business Finance	3
ACE 346	Tax Policy and Finan Planning	3
ACE 432	Advanced Farm Management	3 or 4
ACE 435	Global Agribusiness Management	3
BADM 300	The Legal Environment of Bus	3
BADM 310	Mgmt and Organizational Beh	3
BADM 311	Leading Individuals and Teams	3
BADM 312	Designing and Managing Orgs	3
BADM 313	Strategic Human Resource Management	3
BADM 314	Leading Negotiations	3
BADM 320	Principles of Marketing	3
FIN 230	Introduction to Insurance	3
LER 290	Introduction to Employment Law	3
LEAD 260	Foundations of Leadership	3
LEAD 340	Leadership Ethics & Society: Addressing Contemporary Challenges	3
LEAD 425	Leading Teams	3
SE 361	Emotional Intelligence Skills	3
SE 400	Engineering Law	3 or 4
TE 230	Design Thinking/Need-Finding	3
TE 450	Startups: Incorporation, Funding, Contracts, & Intellectual Property	3

Code	Title	Hours
Energy & the Environment Concentration Core		
Introductory-Related Courses		6-8
Select two courses from this list:		
ACES 102	Intro Sustainable Food Systems	
CPSC 112	Introduction to Crop Sciences	
ENVS 101	Introduction to Energy Sources	
LEAD 260	Foundations of Leadership	
NRES 102	Introduction to NRES	
NRES 201	Introductory Soils	
ETMA Electives. A minimum of 11 hours at the advanced level are required.		20
ETMA 352	Land and Water Mgt Systems	3
ETMA 438	Renewable Energy Applications	3
Select an additional 14 hours from the list below for a total of 20 hours:		
ETMA 130	Basics of CAD	
ETMA 132	Basics of Project Management	
ETMA 232	Materials and Construction Sys	
ETMA 233	Metallurgy & Welding Processes	
ETMA 234	Wiring, Motors and Control Sys	
ETMA 295	Undergrad Research or Thesis	
ETMA 371	Residential Housing Design	
ETMA 372	Environ Control & HVAC Systems	
ETMA 396	UG Honors Research or Thesis	
ETMA 425	Managing Industrial and Agricultural Safety Risks	
ETMA 435	Elec Computer Ctrl Sys	
ETMA 464	Heavy Equipment Powertrains	
ETMA 496	Independent Study	
Concentration Electives		18
Select 18 hours from the lists below with a minimum of 12 hours at the advanced level.		
Select one of the following:		
ACE 210	Environmental Economics & Policy	
ACE 310	Natural Resource Economics	
ACE 406	Environmental Law	
ACE 410	Energy Economics and Policy	
ACE 411	Environment and Development	
Select one of the following:		
NRES 219	Applied Ecology	
NRES 370	Environmental Sustainability	
NRES 419	Env and Plant Ecosystems	
NRES 420	Restoration Ecology	
NRES 425	Natural Resources Law & Policy	
NRES 429	Aquatic Ecosystem Conservation	
NRES 438	Soil Nutrient Cycling	
NRES 439	Env and Sustainable Dev	
NRES 471	Pedology	
NRES 474	Soil and Water Conservation	
NRES 477	Introduction to Remote Sensing	
NRES 488	Soil Fertility and Fertilizers	
Select one of the following:		

UP 406	Urban Ecology
UP 446	Sustainable Planning Seminar
UP 480	Sustainable Design Principles
May select from the below list to achieve 18 hours:	
AGCM 330	Environmental Communications
CEE 320	Construction Engineering
CEE 330	Environmental Engineering
CPSC 215	
CPSC 336	Tomorrow's Environment
CPSC 415	Bioenergy Crops
CPSC 416	Native Plants, Pollinators, & Food Ecosystems
CPSC 431	Plants and Global Change
CPSC 437	Principles of Agroecology
ESE 465	Transportation & Sustainability
ESE 482	Challenges of Sustainability
GLBL 201	Energy Systems

Code	Title	Hours
Total Hours		126

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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. 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
ETMA 100	3	CHEM 102
ACES 101	1	CHEM 103
Composition I or Communication Option	4	3 Communication Option or Composition I
ECON 102 or ACE 100	4	3 MATH 234
Language Other than English (3rd level)	3	4 ETMA Elective
	13	15

Total Hours 28

Second Year		
First Semester	Hours	Second Semester
PHYS 101	5	CHEM 104 or PHYS 102
CS 105	3	CHEM 105 (or Free Elective course)
Business Elective	3	Statistics course
ETMA Elective	3	Introductory-Related course
ETMA Elective	2	ETMA Elective
		General Education course
	16	16

Total Hours 32

Third Year		
First Semester	Hours	Second Semester
ETMA 421 or 422	3	ETMA 339
ETMA 352	3	ETMA Elective
Concentration Elective	3	Business Elective
Introductory-Related Course	3	Advanced ETMA Communication
General Education course	3	General Education course
Free Elective course	1	
	16	15

Total Hours 31

Fourth Year		
First Semester	Hours	Second Semester
ETMA 430	2	ETMA 439
Concentration Elective	3	ETMA 438
Concentration Elective	3	Concentration Elective
Concentration Elective	3	General Education course
Concentration Elective	3	General Education course
General Education course	3	
	17	16

Total Hours 33

Total Hours: 126

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The Engineering Technology and Management for Agricultural Systems (formerly Technical Systems Management) program is designed to

prepare graduates for careers in management, marketing, operations, maintenance, and application of agricultural and biological engineering technologies within the realms of agriculture, food, energy, water, and the environment. Graduates are expected to understand problems and concerns in engineering technologies from production to processing through distribution and their social and cultural implications. Specific program learning objectives are:

1. Provide academic and technical knowledge and experiences needed for success in an increasingly technological agricultural industry and world.
2. Enhance students' abilities to formulate questions and find solutions both individually and as a part of a team.
3. Improve students' abilities to communication both written and oral forms.
4. Enhance the use and understanding of mathematics and calculation for analysis in technology and business.
5. Provide opportunities to learn and enhance professional and ethical values and leadership skills.
6. Understand their role in society and the social and cultural implications of practice in their profession.
7. Recognize the need for and develop the abilities to engage in life-long learning.
8. Understand the global nature of agriculture and business.

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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

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

The Grainger College of Engineering

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

College of Agricultural, Consumer & Environmental Sciences

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