

# ENGINEERING TECHNOLOGY & MANAGEMENT FOR AGRICULTURAL SYSTEMS: DIGITAL & PRECISION AGRICULTURE, BS

for the degree of Bachelor of Science Major in Engineering Technology & Management for Agricultural Systems: Digital & Precision Agriculture concentration

Students in the Digital & Precision Agriculture concentration learn the application of technology in agriculture and the larger system of production agriculture, including machinery, agronomy, and business management. Students will gain an understanding of 1) the application of advanced technology used in agriculture with an emphasis on geospatial information systems and machinery technology; 2) the functional workings and management of agricultural machinery; 3) crop and soil science and their interactions with advanced technologies; 4) numerical and scientific processes to drive agricultural management decisions; and 5) business operations and management with a focus on the agricultural industry. Graduates of the Digital & Precision Agriculture concentration are prepared for careers in industry with both small and large companies, agricultural retailers and service providers, production farming operations, government and environmental agencies, or for entrance into graduate or professional school.

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## Prescribed Courses including Campus General Education

Code	Title	Hours
<b>Composition I and Speech</b>		
Select one of the following:		6-7
RHET 105 & CMN 101	Writing and Research and Public Speaking (or equivalent (see college Composition I requirement))	
CMN 111 & CMN 112	Oral & Written Comm I and Oral & Written Comm II	
<b>Advanced Composition</b>		<b>3-4</b>
Select from the list below		
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	
LEAD 230	Leadership Communications	
NRES 419	Env and Plant Ecosystems	
PLPA 200	Plants, Pathogens, and People	
<b>Cultural Studies</b>		<b>9</b>
Select one course from Western culture, one from non-Western culture, and one from U.S. minority culture from campus approved lists.		
<b>Foreign Language</b>		
Coursework at or above the third level is required for graduation.		
<b>Quantitative Reasoning I</b>		
MATH 234	Calculus for Business I (or equivalent)	4
<b>Quantitative Reasoning II</b>		<b>3 or 4</b>
Select one of the following:		
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	
<b>Natural Sciences and Technology</b>		

CHEM 102 & CHEM 103	General Chemistry I and General Chemistry Lab I	4
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	
<b>Humanities and the Arts</b>		
Select from campus approved list.		6
<b>Social and Behavioral Sciences</b>		
ACE 100 or ECON 102	Introduction to Applied Microeconomics Microeconomic Principles	3-4
Social and behavioral sciences. Select from campus approved list.		3 or 4
<b>ACES Prescribed</b>		
ACES 101	Contemporary Issues in ACES	2
<b>ETMA Required</b>		
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
<b>Business electives</b>		
<b>6</b>		
A total of 6 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
ACCY 211	Understanding Financial Statements	3
ACCY 212	Understanding Accounting for Business Decisions	3
ACE 210	Environmental Economics	3
ACE 240	Personal Financial Planning	3
ACE 310	Natural Resource Economics	3
ACE 345	Finan Decision Indiv Sm Bus	3
ACE 346	Tax Policy and Finan Planning	3
ACE 432	Advanced Farm Management	3 or 4
ACE 435	Global Agribusiness Management	3
AGCM 270	Ag Sales and Persuasive Communication	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
BADM 322	Marketing Research	3
BADM 323	Marketing Communications	3
BADM 326	Pricing Strategy	3
FIN 221	Corporate Finance	3
FIN 230	Introduction to Insurance	3
LER 290	Introduction to Employment Law	3

LEAD 140	Harnessing Your Interpersonal Intelligence	2
LEAD 260	Foundations of Leadership	3
LEAD 340	Leadership Ethics & Society: Addressing Contemporary Challenges	3
LEAD 380	Leadership in Groups and Teams	3
LEAD 440	Interpersonal Intelligence for Professional Success	2
SE 361	Emotional Intelligence Skills	3
SE 400	Engineering Law	3 or 4
TE 230	Design Thinking/Need-Finding	3
TE 250	From Idea to Enterprise	2
TE 333	Creativity, Innovation, Vision	4
TE 360	Lectures in Engineering Entrepreneurship	1
TE 450	Startups: Incorporation, Funding, Contracts, & Intellectual Property	3

**Introductory Related Courses**

Select 2 courses from the list for your concentration. 6-8

**ETMA Electives**

A total of 20 hours from the list for your concentration with a minimum of 11 hours at the advanced level. 20

**Concentration Electives**

Select 18 hours from the list for your concentration, which do not satisfy any other requirements, with a minimum of 12 hours at the advanced level. 18

**Total Hours**

126

ETMAS majors will need 40 hours of upper-level courses (300- and 400-level) to satisfy the campus minimum requirement of 40 hours of advanced coursework.

**Concentration Requirements**

Code	Title	Hours
<b>Introductory Related Courses</b>		
CPSC 112	Introduction to Crop Sciences	
NRES 201	Introductory Soils	
<b>ETMA Electives</b>		
Required		
ETMA 103	Agricultural Machinery and Technology	
ETMA 262	Agricultural Machine Systems Management	
ETMA 363	Fluid Power Systems	
ETMA 435	Elec Computer Ctrl Sys	
ETMA 464	Engine and Tractor Power	
ETMA 467	Precision Agric Technology	
Select an additional 4 hours from the below list for a total of 20 hours with a minimum of 11 hours at the advanced level		
ETMA 130	Basics of CAD	
ETMA 132	Basics of Project Management	
ETMA 233	Metallurgy & Welding Processes	
ETMA 234	Wiring, Motors and Control Sys	
ETMA 295	Undergrad Research or Thesis	
ETMA 352	Land and Water Mgt Systems	
ETMA 381	Grain Drying & Storage Systems	
ETMA 396	UG Honors Research or Thesis	
ETMA 425	Managing Industrial and Agricultural Safety Risks	
ETMA 486	Grain Bioprocessing Coproducts	
ETMA 496	Independent Study	
<b>Concentration Electives</b>		
Select 18 hours from the list below with a minimum of 12 hours at the advanced level.		
<b>One of:</b>		
ACE 210	Environmental Economics	
ACE 222	Agricultural Marketing	

ACE 231	Food and Agribusiness Mgt
ACE 232	Farm Management
ACE 427	Commodity Price Analysis
ACE 428	Commodity Futures and Options
ACE 432	Advanced Farm Management
ACE 435	Global Agribusiness Management
<b>One set of:</b>	
GGIS 379 or GGIS 380	Introduction to Geographic Information Systems Spatial Problem Solving
OR	
GGIS 477 or GGIS 478	Introduction to Remote Sensing Techniques of Remote Sensing
OR	
NRES 454 & NRES 455	GIS in Natural Resource Mgmt and Adv GIS for Nat Res Planning
<b>One of:</b>	
NRES 438	Soil Nutrient Cycling
NRES 471	Pedology
NRES 474	Soil and Water Conservation
NRES 475	Environmental Microbiology
NRES 488	Soil Fertility and Fertilizers
<b>One of:</b>	
CPSC 212	Introduction to Plant Protection
CPSC 270	Applied Entomology
<b>One of:</b>	
CPSC 408	Integrated Pest Management
CPSC 412	Principles of Crop Production
CPSC 418	Crop Growth and Management
CPSC 426	Weed Mgt in Agronomic Crops
CPSC 473	Mgmt of Field Crop Insects

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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 General and Education Requirements page (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).*

### First Year

First Semester	Hours	Second Semester	Hours
ETMA 100		3 CHEM 102	3
ACES 101		2 CHEM 103	1
RHET 105 or CMN 101		4 CMN 101 or RHET 105	3
ACE 100		4 MATH 234	4
Language Other than English (3rd level)		4 General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	4

**Second Year**

First Semester	Hours	Second Semester	Hours
CHEM 104		3 PHYS 101	5
CHEM 105		1 ACE 262, CPSC 241, ECON 202, or STAT 107	3
CS 105		3 NRES 201	4
ETMA 103		2 ETMA 262	3
Business Elective		3 ETMA 363	2
General Education course		3	
		<b>15</b>	<b>17</b>

**Third Year**

First Semester	Hours	Second Semester	Hours
ETMA 422 or 421		3 ETMA 421 or 422	3
CPSC 112		4 ETMA 339	3
ETMA Elective		4 Concentration Elective	3
Concentration Elective		3 Business Elective	3
		General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
		<b>14</b>	<b>15</b>

**Fourth Year**

First Semester	Hours	Second Semester	Hours
ETMA 430		2 ETMA 439	4
ETMA 435		3 ETMA 464	3
Concentration Elective		3 ETMA 467	3
Concentration Elective		3 Concentration Elective	3
Concentration Elective		3 General Education course	3
General Education course		3	
		<b>17</b>	<b>16</b>

**Total Hours 126**

for the degree of Bachelor of Science Major in Engineering Technology & Management for Agricultural Systems: Digital & Precision Agriculture concentration in the Department of Agricultural & Biological Engineering.

**Agricultural & Biological Engineering**

Agricultural & Biological Engineering Website (<https://abe.illinois.edu/>)  
 1304 W. Pennsylvania Ave.  
 Urbana, IL 61801  
 217-333-3570  
 Email: [abe@illinois.edu](mailto:abe@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

**Advising**

Phone: 217-333-3570  
 Email: [tsm-etm-abe-advising@rt.aces.illinois.edu](mailto:tsm-etm-abe-advising@rt.aces.illinois.edu)  
 Advising Website (<https://abe.illinois.edu/academics/advising/>)

**Admissions**

ACES Undergraduate Admissions (<https://aces.illinois.edu/admissions/>)

visitACES@illinois.edu

217-333-3380

University of Illinois Undergrad Admissions (<https://www.admissions.illinois.edu/>)