AGRICULTURAL SYSTEMS TECHNOLOGY

The Department of Agricultural and Biosystems Engineering offers a Bachelor of Science degree in Agricultural Systems Technology (AST). Students majoring in AST choose between two options: Agricultural and Biosystems Management or Machine Systems. The department also offers a minor in Agricultural Systems Technology.

Successful AST graduates gain knowledge, skills, and abilities in solving technical problems, understanding the design process, excelling in authentic leadership, being aware of safety issues, having a quality orientation, effectively managing projects, and having a systems-thinking perspective. This translates to a holistic approach where AST graduates apply science, technology and engineering principles to manage complex agricultural and other production systems, including how the constituent sub-systems are interrelated and the broader impact of these systems.

Graduates find careers within a variety of agricultural industries, businesses, and organizations in the fields of agricultural machinery; off-road equipment; food, feed and grain processing; water quality; biorenewable resources; precision agriculture; or livestock production systems.

Common job duties of AST Agricultural and Biosystems Management graduates include:

- Technical support
- Operations management
- Production supervision
- Grain elevator management

Common job duties of AST Machine Systems graduates include:

- Precision agriculture support
- Testing or sales management
- Technical support
- Maintenance supervision

Student Learning Outcomes

Upon graduation, all AST students should be able to:

1. Apply knowledge of mathematics, science, and applied engineering to identify and solve applied science and technology problems.
2. Develop and conduct experiments and analyze and interpret resulting data.
3. Evaluate and adapt systems, components, processes to meet specified needs.
4. Function effectively on multi-disciplinary teams.
5. Communicate effectively, ethically, and professionally in written, oral, and other formats to technical and non-technical audiences.
6. Understand the potential impacts and limitations of solutions in global and societal contexts.
7. Recognize the need for, and demonstrate an ability to, engage in life-long learning.
8. Effectively apply modern scientific and technical tools necessary for professional practice to address contemporary issues in applied engineering and technology.

Upon graduation, AST students in the agricultural and biosystems management (ABM) option should be able to:

1. Design, implement, and evaluate best practices for the management of global and natural resource systems.
2. Integrate and utilize agricultural and biosystems applied engineering and technology to address contemporary issues in bio-based industries.
3. Evaluate the factors impacting the complex systems that sustain water, air, soils, food, and feed.

Upon graduation, AST students in the machine systems (M.S.) option should be able to:

1. Specify, manage, and test machine systems in the context of a complete agricultural, biological production or processing system.
2. Use and apply the technology of machine systems including power and information flows, function and interaction with biological materials.
3. Perform an energy and cost analyses of complete machine systems to ensure the success and sustainability of an enterprise.

For more information about the AST degree: http://www.abe.iastate.edu/undergraduate-students/agricultural-systems-technology (http://www.abe.iastate.edu/undergraduate-students/agricultural-systems-technology/)

Total Degree Requirement: 120 cr.

Only 65 cr. from a two-year institution may apply which may include up to 16 technical cr.; 9 P-NP cr. of free electives; 2.00 minimum GPA.

Communications Proficiency:

6 cr. of English composition with a C or better and 3 cr. of speech fundamentals with a C or better.

Communication/Library: 13 cr.

ENGL 1500	Critical Thinking and Communication	3
ENGL 2500	Written, Oral, Visual, and Electronic Composition	3
One of the following:		3
ENGL 3020	Business Communication	
ENGL 3090	Proposal and Report Writing	

ENGL 3140	Technical Communication	
AGEDS 3270	Survey of Agriculture and Life Sciences Communication	
One of the following:		3
SPCM 2120	Fundamentals of Public Speaking	
COMST 2140	Professional Communication	
AGEDS 3110	Presentation and Sales Strategies for Agricultural Audiences	
LIB 1600	Introduction to College Level Research	1
Total Credits		**13**

Mathematical, Physical, and Life Sciences: 25 cr.

MATH 1450	Applied Trigonometry	3
MATH 1510	Calculus for Business and Social Sciences	3
STAT 1040	Introduction to Statistics	3
CHEM 1630	College Chemistry	4
PHYS 1310	General Physics I	4
PHYS 1310L	General Physics I Laboratory	1
CHEM 1630L	Laboratory in College Chemistry	1
One of the following:		3
BIOL 1010	Introductory Biology	
BIOL 2110	Principles of Biology I	
BIOL 2120	Principles of Biology II	
BIOL 2510	Biological Processes in the Environment	
Life Sciences Elective from approved College of Agriculture and Life Sciences list		3
Total Credits		**25**

Business, Humanities, Ethics, and Social Sciences: 18 cr.

ACCT 2840	Financial Accounting	3
ECON 1010	Principles of Microeconomics	3
TSM 3700	Occupational Safety (Ethics)	3
Humanities course from College of Agriculture and Life Sciences list		3
International Perspectives course from University list		3
U.S. Diversity course from University list		3
Total Credits		**18**

Technical Core: 28 cr.

TSM 1100	Introduction to Technology	1
TSM 1110	Experiencing Technology	1
TSM 1150	Solving Technology Problems	3
TSM 1160	Introduction to Design in Technology	3
TSM 2010	Preparing for Workplace Seminar	1
TSM 2100	Fundamentals of Technology	3
TSM 2140	Managing Technology Projects	1
TSM 2700	Principles of Injury Prevention and Safety	3
TSM 3100	Total Quality Improvement	3
TSM 3630	Electrical Power and Control Systems for Agriculture and Industry	4
TSM 3970 or TSM 3990	Summer Internship in Technology Internship in Technology	
TSM 4150	Applied Project Management in Technology	2
TSM 4160	Technology Capstone	3
Total Credits		**28**

TSM 3970 or 399 may count toward graduation

Agricultural and Biosystems Management Option: 36 cr.

TSM 3220	Preservation of Grain Quality	3
TSM 3220L	Preservation of Grain Quality Laboratory	1
TSM 3240	Soil and Water Conservation Management	3
TSM 3250	Biorenewable Systems	3
TSM 3270	Livestock and Poultry Production: Facilities, Technology, and Management	3
TSM 3300	Agricultural Machinery and Power Management	3
TSM 4330	Precision Agriculture	3
TSM 4550	Feed Processing and Technology	3
ECON 2300	Farm Business Management	3
11 credits of free electives		11
Total Credits		**36**

Machine Systems option: 36 cr.

TSM 2160	Advanced Technical Graphics, Interpretation, and CAD	2
ABE 2710, ABE 2720, or ABE 2730		1
TSM 2400	Introduction to Advanced Manufacturing and Metals Processing	3
TSM 3300	Agricultural Machinery and Power Management	3
TSM 3350	Tractor Power	4
TSM 3370	Fluid Power Systems Technology	3
TSM 4330	Precision Agriculture	3
TSM 4430	Statics and Strength of Materials for Technology	3
TSM 4650	Automation Systems	3
11 credits of free electives		11
Total Credits		**36**

Agricultural Systems Technology, B.S. - Machine Systems

First Year

Fall	Credits	Spring	Credits
TSM 1100	1	TSM 1110	1
TSM 1160	3	TSM 1150	3
ENGL 1500	3	MATH 1510	3
LIB 1600	1	PHYS 1310	4
MATH 1450	3	PHYS 1310L	1
CHEM 1630	4	US Diversity - see list[1]	3
CHEM 1630L	1		
	16		**15**

Second Year

Fall	Credits	Spring	Credits
TSM 2010	1	TSM 2160	2
TSM 2100	3	ABE 2710, 2720, or 2730	1
TSM 2140	1	TSM 2400	3
TSM 2700	3	STAT 1040	3
ACCT 2840	3	BIOL 1010 or 2110	3
ENGL 2500	3	ECON 1010	3
	14		**15**

Third Year

Fall	Credits	Spring	Credits	Summer	Credits
TSM 3350	4	TSM 3100	3	TSM 3970 or 3990	R
TSM 3630	4	TSM 3300	3		
TSM 4330	3	TSM 3370	3		
ENGL 3020, 3090, 3140, or AGEDS 3270	3	Humanities - See list[2]	3		
		Life Science - See list[3]	3		
	14		**15**		**0**

Fourth Year

Fall	Credits	Spring	Credits
TSM 4150	2	TSM 3700	3
Elective	6	TSM 4160	3
International Perspectives - see list[1]	3	TSM 4430	3
SPCM 2120, COMST 2140, or AGEDS 3110	3	TSM 4650	3
		Elective	5
	14		**17**

1 U.S. Diversity and International Perspectives (https://www.registrar.iastate.edu/students/div-ip-guide/)

2 Humanities Course List (https://www.cals.iastate.edu/student-services/humanities/)

3 Life Sciences Course List (https://www.cals.iastate.edu/student-services/life-science/)

4 Ethics Course List (https://www.cals.iastate.edu/student-services/ethics/)

Agricultural Systems Technology, B.S. - Agricultural & Biosystems Management

First Year

Fall	Credits	Spring	Credits
TSM 1100	1	TSM 1110	1
TSM 1160	3	TSM 1150	3
ENGL 1500	3	MATH 1510	3
LIB 1600	1	PHYS 1310	4
MATH 1450	3	PHYS 1310L	1
CHEM 1630	4	ECON 1010	3
CHEM 1630L	1		
	16		**15**

Second Year

Fall	Credits	Spring	Credits
TSM 2010	1	TSM 3220	3
TSM 2100	3	TSM 3220L	1
TSM 2140	1	BIOL 1010 or 2110	3
TSM 2700	3	ECON 2300	3
ACCT 2840	3	STAT 1040	3

ENGL 2500	3	SPCM 2120, COMST 2140, or AGEDS 3110	3			
	14		**16**			

Third Year

Fall	Credits	Spring	Credits	Summer	Credits	
TSM 3250	3	TSM 3100	3	TSM 3970 or 3990		R
TSM 3270	3	TSM 3240	3			
TSM 3630	4	TSM 3700	3			
ENGL 3020, 3090, 3140, or AGEDS 3270	3	Life Science - see list[3]	3			
US Diversity - see list[1]	3	Elective	3			
	16		**15**			**0**

Fourth Year

Fall	Credits	Spring	Credits
TSM 4150	2	TSM 4160	3
TSM 4330	3	TSM 3300	3
TSM 4550	3	International Perspectives - see list[1]	3
Humanities - see list[2]	3	Elective	3
Elective	5		
	16		**12**

1 U.S. Diversity and International Perspectives (https://www.registrar.iastate.edu/students/div-ip-guide/)

2 Humanities Course List (https://www.cals.iastate.edu/student-services/humanities/)

3 Life Science Course List (https://www.cals.iastate.edu/student-services/life-science/)

4 Ethics Course List (https://www.cals.iastate.edu/student-services/ethics/)

Minor in agricultural systems technology

The Department of Agricultural and Biosystems Engineering offers a minor in agricultural systems technology which may be earned by completing a minimum of 15 credits of technology systems management courses, which includes:

TSM 1150	Solving Technology Problems	3
TSM 2100	Fundamentals of Technology	3
9 credits from:		9
TSM 3100	Total Quality Improvement	
TSM 3220	Preservation of Grain Quality	
TSM 3220L	Preservation of Grain Quality Laboratory	
TSM 3240	Soil and Water Conservation Management	
TSM 3250	Biorenewable Systems	3
TSM 3270	Livestock and Poultry Production: Facilities, Technology, and Management	
TSM 3300	Agricultural Machinery and Power Management	
TSM 3350	Tractor Power	
TSM 3370	Fluid Power Systems Technology	
TSM 3630	Electrical Power and Control Systems for Agriculture and Industry	
TSM 3930E	Topics in Technology: Chemical Application Systems	
TSM 3930F	Topics in Technology: Agricultural Safety and Health	
TSM 4330	Precision Agriculture	
TSM 4550	Feed Processing and Technology	
TSM 4570	Feed Safety, Ingredient Quality and Analytics	

• At least six (6) credits of 3000-level or higher TSM classes (from the classes listed above)

• At least nine (9) credits that are not used to meet any other department, college, or university requirement.