

**AGRICULTURAL ENGINEERING CURRICULUM**  
**LAND AND WATER RESOURCES ENGINEERING OPTION**

A total of 126 credits required for graduation  
(2024-2025 Catalog)

**I. Communications (10 credits)**

3 cr.	ENGL 1500 (FSSS)	Critical Thinking and Communication
3 cr.	ENGL 2500 (FSSS)	Written, Oral, Visual, and Electronic Composition
3 cr.	Comm. Elect.	Select one of the courses below:
	<i>ENGL 3090 (FS)</i>	<i>Proposal and Report Writing</i>
	<i>ENGL 3140 (FSSS)</i>	<i>Technical Communication</i>
	<i>SP CM 2120 (FSSS)</i>	<i>Fundamentals of Public Speaking</i>
	<i>SP CM 3120 (FS)</i>	<i>Business and Professional Speaking</i>
	<i>AG EDS 3110 (FS)</i>	<i>Presentation and Sales Strategies for Ag Audiences</i>
	<i>MKT 4500 (FS)</i>	<i>Advanced Professional Selling</i>
1 cr.	LIB 1600 (FSSS)	Introduction to College Level Research

**II. Mathematical Sciences (14 credits)**

4 cr.	MATH 1650 (FSSS)	Calculus I
4 cr.	MATH 1660 (FSSS)	Calculus II
3 cr.	MATH 2660 (FSSS)	Elementary Differential Equations
3 cr.	STAT 3050 (FSSS)	Engineering Statistics

**III. Biological, Chemical, Physical Sciences (13 credits)**

3 cr.	Biology Elect.	Select one of the courses below:
	<i>BIOL 2510 (S)</i>	<i>Biological Processes in the Environment</i>
	<i>BIOL 2110 (FS)</i>	<i>Principles of Biology I</i>
4 cr.	CHEM 1670 (FS)	General Chemistry for Engineering Students
1 cr.	CHEM 1670L (FS)	Laboratory in General Chemistry for Engineering
4 cr.	PHYS 2310 (FSSS)	Introduction to Classical Physics I
1 cr.	PHYS 2310L (FS)	Introduction to Classical Physics I Lab

**IV. Social Sciences and Humanities (12 credits)**

3 cr.	U. S. Cultures & Communities Course (Select from University-approved list).
3 cr.	International Perspectives Course (Select from University-approved list).
6 cr.	Social Science and Humanities Electives (Select from CALS-approved list).

**V. Engineering Core (23 credits)**

R cr.	ENGR 1010 (FS)	Engineering Orientation
1 cr.	A B E 1100 (S)	Experiencing Agricultural and Biosystems Engineering
3 cr.	A B E 1600 (S)	Engineering Problems with Computer Programming
3 cr.	A B E 1700 (FS)	Engineering Graphics and Introductory Design
3 cr.	A B E 3780 (FS)	Mechanics of Fluids
3 cr.	C E 2740 (FSSS)	Statics of Engineering
3 cr.	E M 3240 (FSSS)	Mechanics of Materials
1 cr.	Lab Elective	
	<i>A B E 3780L (FS)</i>	Mechanics of Fluids Laboratory (preferred)
	<i>E M 3270 (FSSS)</i>	Mechanics of Materials Laboratory
3 cr.	I E 3050 (FSSS)	Engineering Economic Analysis
3 cr.	M E 2310 (FSSS)	Engineering Thermodynamics I

**VI. Agricultural Engineering Core (21 credits)**

1 cr.	A B E 2010 (FS)	Entrepreneurship and Internship Seminar
3 cr.	A B E 2160 (F)	Fundamentals of Agricultural and Biological Engineering
2 cr.	A B E 2180 (S)	Project Management and Design
1 cr.	A B E 2730	CAD for Process Facilities and Land Use Planning
3 cr.	A B E 3160 (FS)	Computer Applications and Systems Modeling
4 cr.	A B E 3630 (FS)	Agri-Industrial Applications of Electric Power and Electronics
3 cr.	A B E 4040 (F)	Instrumentation for Agricultural and Biological Engineering
2 cr.	A B E 4150 (FS)	Agricultural Engineering Design I
2 cr.	A B E 4160 (FS)	Agricultural Engineering Design II

**VII. Land and Water Resources Engineering Option (33 credits)**

3 cr.	A B E 4310 (F)	Design and Evaluation of Soil and Water Conservation Systems
3 cr.	ABE Breadth	Select one of the courses below:
	<i>A B E 3400 (F)</i>	<i>Functional Analysis and Design of Agricultural Field Machinery</i>
	<i>A B E 3800 (S)</i>	<i>Engineering Analysis of Biological Systems</i>
	<i>A B E 4240 (S)</i>	<i>Air Pollution (Modules A, B, and E)</i>
	<i>A B E 4690 (S)</i>	<i>Grain Processing and Handling</i>
	<i>A B E 4720 (S-even)</i>	<i>Design of Environmental Systems for Agricultural Structures</i>
	<i>A B E 4780 (S-odd)</i>	<i>Design of Agricultural Structures</i>
	<i>A B E 4800 (F)</i>	<i>Engineering Analysis of Biological Systems</i>
3 cr.	AGRON 1810 (S)	Introduction to Crop Science
3 cr.	AGRON 1820 (FS)	Introduction to Soil Science
3 cr.	C E 3260 (FS)	Principles of Environmental Engineering
3 cr.	C E 3720 (FS)	Engineering Hydrology and Hydraulics
3 cr.	GEOLOGY 2010 (F)	Geology for Engineers and Environmental Scientists.
3 cr.	GIS	Select one of the courses below:
	<i>AGRON/ENSCI 2700</i>	<i>Geospatial Technologies</i>
	<i>CRP 2510 (F)</i>	<i>Fundamentals of Geographic Information Systems</i>
	<i>CRP 4510 (FSSS)</i>	<i>Introduction to Geographic Information System *last offered F16*</i>
	<i>ENSCI 4610I(SS)</i>	<i>Introduction to GIS</i>
	<i>GEOLOGY 4520 (F)</i>	<i>GIS for Geoscientists</i>
	<i>NREM 3450 (F)</i>	<i>Natural Resource Photogrammetry and Geographic Information Systems</i>
	<i>NREM 4460 (F)</i>	<i>Integrating GPS and GIS for Natural Resource Management</i>
3 cr.	Subsurface Systems	Select one of the courses below
	<i>C E 3600 (FS)</i>	<i>Geotechnical Engineering</i>
	<i>C E 4730 (F)</i>	<i>Groundwater Hydrology</i>
2 cr.	MICRO 2010 (FS)	Introduction to Microbiology
1 cr.	MICRO 2010L (FS)	Introduction to Microbiology Laboratory
3 cr.	Water Quality	Select one of the courses below:
	<i>A B E 4320 (S)</i>	<i>Non-Point Pollution and Control</i>
	<i>A B E 5370 (F-odd)</i>	<i>Total Maximum Daily Load (TMDL) Development and Implementation</i>

**Please check the current catalog and Schedule of Classes for most recent offerings.**

<sup>1</sup>Increasingly, employers in land and water resources engineering consider the Master's degree to be the entry "working degree". Students are therefore strongly encouraged to consider a concurrent BS/MS.

Also, there are many excellent and career-relevant courses at Iowa State that are not required in this curriculum, but would be good choices for a student who has the room and inclination to take them. These include (but are not limited to):

A B E 3880 (F) 3 cr. Sustainable Engineering and International Development  
 C E 1110 (FS) 3 cr. Fundamentals of Surveying I  
 EnSci 4040 (S) 3 cr. Global Change  
 EnSci 4070 (S) 4 cr. Watershed Management  
 EnSci 4110 (F) 4 cr. Hydrogeology (could be substituted for CE subsurface systems course also)  
 EnSci 4180 (Alt F13) 3 cr. Stream Ecology  
 EnSci 4630 (S) 4 cr. Soil Formation and Landscape Relationships