

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

A total of 126 credits required for graduation
(2017-2018 Catalog)

I. Communications (10 credits)

3 cr.	Engl 150 (FSSS)	Critical Thinking and Communication
3 cr.	Engl 250 (FSSS)	Written, Oral, Visual, and Electronic Composition
3 cr.	Comm. Elect.	Select one of the courses below:
	<i>Engl 309 (FS)</i>	<i>Report and Proposal Writing</i>
	<i>Engl 314 (FSSS)</i>	<i>Technical Communication</i>
	<i>Sp Cm 212 (FSSS)</i>	<i>Fundamentals of Public Speaking</i>
	<i>Ag Eds 311 (FS)</i>	<i>Presentation and Sales Strategies for Ag Audiences</i>
	<i>Mkt 343 (FS)</i>	<i>Personal Sales</i>
1 cr.	Lib 160 (FSSS)	Library Instruction

II. Mathematical Sciences (14 credits)

4 cr.	Math 165 (FSSS)	Calculus I
4 cr.	Math 166 (FSSS)	Calculus II
3 cr.	Math 266 (FSSS)	Elementary Differential Equations
3 cr.	Stat 305 (FSSS)	Engineering Statistics

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

3 cr.	Biology Elect.	Select one of the courses below:
	<i>BIOL 251 (S)</i>	<i>Biological Processes in the Environment</i>
	<i>BIOL 211(FS)</i>	<i>Principles of Biology I</i>
4 cr.	CHEM 167 (FS)	General Chemistry for Engineering Students
1 cr.	CHEM 167L (FS)	Laboratory in General Chemistry for Engineering
5 cr.	PHYS 221 (FSSS)	Introduction to Classical Physics I

IV. Social Sciences and Humanities (12 credits)

3 cr.	U. S. Diversity 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 101 (FS)	Engineering Orientation
1 cr.	A B E 110 (S)	Experiencing Agricultural and Biosystems Engineering
3 cr.	A B E 160 (FS)	Engineering Problems with Computer Applications Laboratory
3 cr.	A B E 170 (FS)	Engineering Graphics and Introductory Design
3 cr.	E M 274 (FSSS)	Statics of Engineering
3 cr.	E M 324 (FSSS)	Mechanics of Materials
1 cr.	E M 327 (FSSS)	Mechanics of Materials Laboratory
3 cr.	E M 378 (FSSS)	Mechanics of Fluids
3 cr.	I E 305 (FSSS)	Engineering Economic Analysis
3 cr.	M E 231 (FS)	Thermodynamics

VI. Agricultural Engineering Core (21 credits)

1 cr.	A B E 201 (FS)	Entrepreneurship and Internship Seminar
3 cr.	A B E 216 (F)	Fundamentals of Agricultural and Biological Engineering

2 cr.	A B E 218 (S)	Project Management and Design
1 cr.	Computer Graphics	Select two of the courses below:
	A B E 271 (FS)	<i>Engineering Applications of Parametric Solid Modeling</i>
	A B E 272 (FS)	<i>Parametric Solid Models, Drawings, Assemblies using Pro/ENGINEER</i>
	A B E 273 (FS) <i>preferred</i>	<i>CAD for Process Facilities and Land Use Planning</i>
3 cr.	A B E 316 (FS)	Computer Applications and Systems Modeling
4 cr.	A B E 363 (FS)	Agri-Industrial Applications of Electric Power and Electronics
3 cr.	A B E 404 (F)	Instrumentation for Agricultural and Biological Engineering
2 cr.	A B E 415 (FS)	Agricultural Engineering Design I
2 cr.	A B E 416 (FS)	Agricultural Engineering Design II

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

3 cr.	A B E 431 (F)	Design and Evaluation of Soil and Water Conservation Systems
3 cr.	ABE Breadth	Select one of the courses below:
	A B E 340 (F)	<i>Functional Analysis and Design of Agricultural Field Machinery</i>
	A B E 380 (S)	<i>Engineering Analysis of Biological Systems</i>
	A B E 424 (S)	<i>Air Pollution (Modules A, B, and E)</i>
	A B E 469 (S)	<i>Grain Processing and Handling</i>
	A B E 472 (S-even)	<i>Design of Environmental Systems for Agricultural Structures</i>
	A B E 478 (S-odd)	<i>Design of Agricultural Structures</i>
	A B E 480 (F)	<i>Engineering Analysis of Biological Systems</i>
3 cr.	AGRON 181 (S)	Introduction to Crop Science
3 cr.	AGRON 182 (FS)	Introduction to Soil Science
3 cr.	C E 326 (FS)	Principles of Environmental Engineering
3 cr.	C E 372 (FS)	Engineering Hydrology and Hydraulics
3 cr.	GEOL 201 (F)	Geology for Engineers and Environmental Scientists.
3 cr.	GIS	Select one of the courses below:
	AGRON/ENSCI 270X	<i>Geospatial Technologies</i>
	CRP 251X (F)	<i>Fundamentals of Geographic Information Systems</i>
	CRP 451 (FSSS)	<i>Introduction to Geographic Information System</i>
	ENSCI 370X	<i>Natural Resources Photogrammetry & Geographic Information Systems</i>
	ENSCI 461I(SS)	<i>Introduction to GIS</i>
	GEOL 452 (F)	<i>GIS for Geoscientists</i>
	NREM 345 (F)	<i>Natural Resource Photogrammetry and Geographic Information Systems</i>
	NREM 446 (S)	<i>Integrating GPS and GIS for Natural Resource Management</i>
3 cr.	Subsurface Systems	Select one of the courses below
	C E 360 (FS)	<i>Geotechnical Engineering</i>
	C E 473 (F)	<i>Groundwater Hydrology</i>
2 cr.	MICRO 201 (FS)	Introduction to Microbiology
1 cr.	MICRO 201L (FS)	Introduction to Microbiology Laboratory
3 cr.	Water Quality	Select one of the courses below:
	A B E 432 (S-odd)	<i>Non-Point Pollution and Control</i>
	A B E 436 (S-even)	<i>Design & Evaluation of Soil and Water Monitoring Systems</i>
	A B E 537 (F-odd)	<i>Total Maximum Daily Load (TMDL) Development and Implementation</i>

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

¹Increasingly, 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 388 (F) 3 cr. Sustainable Engineering and International Development
- C E 111 (FS) 3 cr. Fundamentals of Surveying I
- EnSci 404 (S) 3 cr. Global Change
- EnSci 407 (S) 4 cr. Watershed Management
- EnSci 411 (F) 4 cr. Hydrogeology (could be substituted for CE subsurface systems course also)
- EnSci 418 (Alt F13) 3 cr. Stream Ecology
- EnSci 463 (S) 4 cr. Soil Formation and Landscape Relationships