

**AGRICULTURAL ENGINEERING CURRICULUM
LAND AND WATER RESOURCES ENGINEERING OPTION***
(2016-2017 Catalog)

A total of 128 credits required for graduation

I. Communications (10 credits)

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|-------|-------------------------|---|
| 3 cr. | Engl 150 (FSSS) | Critical Thinking and Communication |
| 3 cr. | Engl 250 (FSSS) | Written, Oral, Visual, and Electronic Composition |
| 3 cr. | Communications | 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</i> | <i>Personal Sales</i> |
| 1 cr. | Lib 160 (FSSS) | Library Instruction |

II. Mathematical Sciences (14 credits)

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| 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. Physical Sciences (18 credits)

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|-------|-----------------|---|
| 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 |
| 5 cr. | Phys 222 (FSSS) | Introduction to Classical Physics II |
| 3 cr. | Geol 201 (F) | Geology for Engineers and Environmental Scientists. |

IV. Agricultural and Biological Sciences and Applications (12 credits)

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| 3 cr. | Agron 154 (FS) | Fundamentals of Soil Science |
| 3 cr. | Biology | 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> |
| 2 cr. | Micro 201 (FS) | Introduction to Microbiology |
| 1 cr. | Micro 201L (FS) | Introduction to Microbiology Laboratory |
| 3 cr. | GIS | Select one of the courses below: |
| | <i>CRP 251X (F)</i> | <i>Fundamentals of Geographic Information Systems</i> |
| | <i>CRP 451 (FSSS)</i> | <i>Introduction to Geographic Information System</i> |
| | <i>ENSCI 370X</i> | <i>Natural Resources Photogrammetry and Geographic Information Systems</i> |
| | <i>ENSCI 461I(SS)</i> | <i>Introduction to GIS</i> |
| | <i>GEOL 452 (F)</i> | <i>GIS for Geoscientists</i> |
| | <i>NREM 345 (F)</i> | <i>Natural Resource Photogrammetry and Geographic Information Systems</i> |
| | <i>NREM 446 (S)</i> | <i>Integrating GPS and GIS for Natural Resource Management</i> |

V. Social Sciences and Humanities (12 credits)

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| 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). |

VI. Engineering (3 credits)

- R cr. Engr 101 (FS) Engineering Orientation
3 cr. A B E 160 (FSSS) Engineering Problems with Computer Applications Lab

VII. Agricultural Engineering (37 credits)

- 1 cr. A B E 110 (S) Experiencing Agricultural and Biological Engineering
3 cr. A B E 170 (FS) Engineering Graphics and Introductory Design
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 & Design in Ag & Biological Systems Engr
1 cr. Computer Graphics Select one of the courses below:
 A B E 271 (FS) *Engineering Applications of Parametric Solid Modeling*
 A B E 272 (FS) *Parametric Solid Models, Drawings, and Assemblies Using Pro/ENG*
 A B E 273 (S) *CAD for Process Facilities and Land Use Planning (Preferred)*
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
3 cr. A B E 431 (F) Design and Evaluation of Soil and Water Conservation Systems
3 cr. Water Quality Select one of the courses below:
 A B E 436 (Sp-even) *Design & Evaluation of Soil and Water Monitoring Systems*
 A B E 432 (Sp-odd) *Non-Point Pollution and Control*
 A B E 537 (Fl-odd) *Total Maximum Daily Load (TMDL) Development and Implementation*
3 cr. Structures Select one of the courses below:
 A B E 472 (Sp-even) *Design of Environmental Systems for Agricultural Structures*
 A B E 478 (Sp-odd) *Design of Agricultural Structures*
3 cr. ABE Breadth Select one of the courses below:
 A B E 340 (F) *Functional Analysis and Design of Agricultural Field Machinery*
 A B E 380 (S) *Engineering Analysis of Biological Systems*
 A B E 469 (S) *Grain Processing and Handling*
 A B E 424 (S) *Air Pollution (Modules A, B, and E)*
2 cr. A B E 415 (FS) Agricultural Engineering Design I
2 cr. A B E 416 (FS) Agricultural Engineering Design II

VIII. Mechanical Engineering (3 credits)

- 3 cr. M E 231 (FS) Thermodynamics

IX. Engineering Mechanics (10 credits)

- 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

X. Civil Engineering (9 credits)

- 3 cr. C E 372 (FS) Engineering Hydrology and Hydraulics
3 cr. C E 326 (FS) Principles of Environmental Engineering
3 cr. Subsurface Systems Select one of the courses below
 C E 360 (FS) *Geotechnical Engineering*
 C E 473 (F) *Groundwater Hydrology*

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

*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 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