AGRICULTURAL ENGINEERING CURRICULUM
LAND AND WATER RESOURCES ENGINEERING OPTION

A total of 126 credits required for graduation
(2018-2019 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:
       Engl 309 (FS) Report and Proposal Writing
       Engl 314 (FSSS) Technical Communication
       Sp Cm 212 (FSSS) Fundamentals of Public Speaking
       Ag Eds 311 (FS) Presentation and Sales Strategies for Ag Audiences
       Mkt 343 (FS) Personal Sales
   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:
       BIOL 251 (S) Biological Processes in the Environment
       BIOL 211 (FS) Principles of Biology 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)  Engineering Applications of Parametric Solid Modeling
   A B E 272 (FS)  Parametric Solid Models, Drawings, Assemblies using Pro/ENGINEER
   A B E 273 (FS)  preferred  CAD for Process Facilities and Land Use Planning
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)  Functional Analysis and Design of Agricultural Field Machinery
   A B E 380 (S)  Engineering Analysis of Biological Systems
   A B E 424 (S)  Air Pollution (Modules A, B, and E)
   A B E 469 (S)  Grain Processing and Handling
   A B E 472 (S-even)  Design of Environmental Systems for Agricultural Structures
   A B E 478 (S-odd)  Design of Agricultural Structures
   A B E 480 (F)  Engineering Analysis of Biological Systems
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  Geospatial Technologies
   CRP 251X (F)  Fundamentals of Geographic Information Systems
   CRP 451 (FSSS)  Introduction to Geographic Information System *last offered F16*
   ENSCI 4611(SS)  Introduction to GIS
   GEOL 452 (F)  GIS for Geoscientists
   NREM 345 (F)  Natural Resource Photogrammetry and Geographic Information Systems
   NREM 446 (F)  Integrating GPS and GIS for Natural Resource Management
3 cr.  Subsurface Systems  Select one of the courses below
   C E 360 (FS)  Geotechnical Engineering
   C E 473 (F)  Groundwater Hydrology
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)  Non-Point Pollution and Control
   A B E 436 (S-even)  Design & Evaluation of Soil and Water Monitoring Systems
   A B E 537 (F-odd)  Total Maximum Daily Load (TMDL) Development and Implementation

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