Agricultural and Biosystems Engineering Major

Degree Requirements

Major: Agricultural and Biosystems Engineering

Degree Type: B.S.A.B.En.

Minimum Required Credits: 120

University Requirements and General Education Apply

ABEN Core Requirements

Code	Title	Credits
Core Requirements		
ABEN 110	Introduction to Agricultural and Biosystems Engineering	3
ABEN 255	Computer Aided Analysis & Design	3
ABEN 263	Biological Materials Processing	3
ABEN 348	Agricultural Technology Exposition [1]	1
ABEN 358	Electric Energy Application in Agriculture	3
ABEN 391	Seminar	1
ABEN 444	Transport Processes	3
or ABEN 452	Bioenvironmental Systems Design	
ABEN 479	Fluid Power Systems Design	3
ABEN 482	Instrumentation & Measurements	3
ABEN 484	Drainage and Wetland Engineering	3
or ABEN 464	Resource Conservation and Irrigation Engineering	
ABEN 486	Design Project I	3
ABEN 487	Design Project II	3
BIOL 150	General Biology I	3
or BIOL 111	Concepts of Biology	
or BIOL 124	Environmental Science	
or MICR 202	Introductory Microbiology	
BIOL 150L	General Biology I Laboratory	1
or CHEM 121L	General Chemistry I Laboratory	
or MICR 202L	Introductory Microbiology Lab	
CHEM 121	General Chemistry I	3
CHEM 122	General Chemistry II	3
CE 309	Fluid Mechanics	3
or ME 352	Fluid Dynamics	
CSCI 122	Visual BASIC	3
or ME 213	Modeling of Engineering Systems	
or GEOG 455	Introduction to Geographic Information Systems	
or PAG 215	Mapping of Precision Ag Data	
ENGR 327	Ethics, Engineering, and Technology	3
IME 440	Engineering Economy	3
IME 460	Evaluation of Engineering Data	3
MATH 128	Introduction to Linear Algebra	1
MATH 165	Calculus I	4
MATH 166	Calculus II	4
MATH 259	Multivariate Calculus	3
MATH 266	Introduction to Differential Equations	3
ME 212	Fundamentals of Visual Communication for Engineers	3

ME 221	Engineering Mechanics I	3
ME 222	Engineering Mechanics II	3
ME 223	Mechanics of Materials	3
ME 350	Thermodynamics and Heat Transfer	3
PHYS 252 & 252L	University Physics II and University Physics II Laboratory	5
Program Electives		
Select 13 credits from the following: (At least 3 of the 13 credits must be selected from the courses with a 3 footnote.)		13
ABEN 286	Introduction to Controlled Environment Agriculture (Natural Resource/General Focus)	
ABEN 377	Finite Element Analysis in Agricultural and Biosystems Engineering (Machinery/Natural Resource/General Focus) [3]	
ABEN 456	Biobased Energy (Processing Focus) [3]	
ABEN 458	Process Engineering for Food, Biofuels and Bioproducts (Processing/General Focus)	
ABEN 473	Agricultural Power (Machinery Focus)	
ABEN 496	Field Experience (All Focus Areas) [2]	
ABEN 478	Machinery Analysis & Design (Machinery Focus)	
ANSC 114	Introduction to Animal Sciences (Natural Resource Focus)	
ANSC 220	Livestock Production (Natural Resource Focus)	
ASM 264	Natural Resource Management Systems (Natural Resource Focus)	
ASM 323	Post-Harvest Technology (Machinery/Processing Focus)	
ASM 378	Machinery Principles and Management (Machinery Focus)	
BME 220	Introduction to Biomedical Engineering (Processing Focus)	
CFS 210	Introduction to Food Science and Technology (Processing Focus)	
CFS 370	Food Processing I (Processing Focus)	
CE 204	Surveying (Natural Resource Focus)	
CE 316	Soil Mechanics (General Focus) [3]	
CE 343	Structural Engineering and Analysis (General Focus) [3]	
CE 408	Water Resources and Supply (Natural Resource Focus) [3]	
CE 417	Slope Stability and Retaining Walls (General Focus) [3]	
CE 421	Open Channel Flow (Natural Resource Focus) [3]	
CE 446	Basic Dynamics of Structures (General Focus) [3]	
CE 477	Applied Hydrology (Natural Resource Focus) [3]	
CHEM 240	Survey of Organic Chemistry (Processing Focus)	
ECE 275	Digital Design (Machinery Focus)	
ECE 301 & ECE 306	Electrical Engineering I and Electrical Engineering Lab I (Machinery Focus) [3]	
IME 330	Manufacturing Processes (Processing Focus) [3]	
IME 335	Welding Technology (Machinery Focus) [3]	
IME 456	Program and Project Management (All Focus Areas) [3]	
ME 331	Materials Science and Engineering (Machinery Focus) [3]	
ME 421	Theory of Vibrations (Machinery Focus) [3]	
ME 435	Plastics and Polymer Processing in Manufacturing (Processing Focus) [3]	
ME 442	Machine Design I (Machinery Focus) [3]	
PAG 115	Introduction to Precision Agriculture (Machinery/Natural Resource Focus)	
PAG 315	Electronic Systems in Precision Ag (Machinary Focus)	
PAG 454	Applications of Precision Agriculture (Machinery Focus)	
PLSC 110	World Food Crops (Processing/Natural Resource Focus)	
PLSC 225	Principles of Crop Production (Processing/Natural Resource Focus)	
SOIL 210	Introduction to Soil Science (Natural Resource Focus)	
SOIL 410	Soils and Land Use (Natural Resource Focus)	
Total Credits		**105**

[1] ABEN 348 - AG Tech Exp (1 add'l cr.) may be used as a Program Elective.

[2] ABEN 496 - Field Exp./Internship (1 - 3 cr.) may be used as a Program Elective. A maximum of three credits of ABEN 496 Field Exp./Internship may be counted towards degree requirements.

[3] Students must select at least 3 cr. of upper-division College of Engineering courses to satisfy the 13 cr. Program Elective requirement.

Degree Requirements and Notes

SUGGESTED FOCUS AREAS: Consult with adviser when making selections.

- **Machinery Focus** - Select electives with emphasis on machine, power, robotic/autonomous, and electrical/electronic systems.
- **Natural Resource Focus** - Select electives with emphasis on areas that contribute to solving problems in environmental engineering, natural resources management, hydrology, irrigation, watershed management, and waste management.
- **Processing Focus** - Select electives with emphasis on combining engineering, biological, and physical sciences in the application of engineering principles to handling and processing of biomaterials for food and non-food products.
- **General Focus** - Select electives from any of the above focus areas. Includes courses in structural and environmental aspects of agricultural facilities.

Degree Requirements for the Accelerated M.S. Program in Agricultural and Biosystems Engineering

Students pursuing an accelerated master's degree in ABEN must complete the following requirements:

- 30 credits after the B.S is required. However, a maximum of 15 graduate credits earned during the combined/accelerated degree program may also be counted toward the graduate degree.
- 20-24 credits are from didactic course work, while 6-10 credits are typically devoted for a master's thesis based on research
- A minimum of 6 credits of NDSU ABEN courses numbered 601-689 and 700-789 is required.
- ABEN Graduate Seminar (ABEN 790).