# General Education Requirements

## First Year Experience (F):
- **ABEN 189**  
  Skills for Academic Success (Students transferring in 24 or more credits do not need to take ABEN 189.)

## Communication (C):
- **ENGL 110**  
  College Composition I  
  3
- **ENGL 120**  
  College Composition II  
  3
- **One Course in Upper Level Writing.** Select one of the following:
  - **ENGL 321**  
    Writing in the Technical Professions  
    3
  - **ENGL 324**  
    Writing in the Sciences  
    3
  - **ENGL 459**  
    Researching and Writing Grants and Proposal  
    3
- **COMM 110**  
  Fundamentals of Public Speaking  
  3

## Quantitative Reasoning (R):
- **MATH 165**  
  Calculus I  
  4

## Science & Technology (S):
- **CHEM 121**  
  General Chemistry I  
  3
- **CHEM 122**  
  General Chemistry II  
  3
- **PHYS 252**  
  University Physics II  
  5
- **& 252L**  
  University Physics II Laboratory  
  5

### Humanities & Fine Arts (A):
Select from current general education list  
6

### Social & Behavioral Sciences (B):
Select from current general education list  
6

### Wellness (W):
Select from current general education list  
2

### Cultural Diversity (D):
Select from current general education list  
2

### Global Perspectives (G):
Select from current general education list  
2

## Total Credits
- 42

# Major Requirements - Agricultural Option

## General Education Requirements

### ABEN Core Courses:
- **ABEN 110**  
  Introduction to Agricultural and Biosystems Engineering  
  2
- **ABEN 255**  
  Computer Aided Analysis & Design  
  3
- **ABEN 263**  
  Biological Materials Processing  
  3
- **ABEN 377**  
  Numerical Modeling in Agricultural and Biosystems Engineering  
  3
- **ABEN 482**  
  Instrumentation & Measurements  
  3
- **ABEN 486**  
  Design Project I  
  2
- **ABEN 487**  
  Design Project II  
  2
- **ABEN 491**  
  Seminar  
  1
- **ABEN 496**  
  Field Experience  
  1
ABEN 300-400 Electives: Select 9 credits from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>ABEN 358</td>
<td>Electric Energy Application in Agriculture</td>
</tr>
<tr>
<td>ABEN 383</td>
<td>Structural Design for Biosystems</td>
</tr>
<tr>
<td>ABEN 444</td>
<td>Transport Processes</td>
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<tr>
<td>ABEN 450</td>
<td>Bioprocess Engineering</td>
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<tr>
<td>ABEN 452</td>
<td>Bioenvironmental Systems Design</td>
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<tr>
<td>ABEN 456</td>
<td>Biobased Energy</td>
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<tr>
<td>ABEN 458</td>
<td>Process Engineering for Food, Biofuels and Bioproducts</td>
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<tr>
<td>ABEN 464</td>
<td>Resource Conservation and Irrigation Engineering</td>
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<tr>
<td>ABEN 473</td>
<td>Agricultural Power</td>
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<tr>
<td>ABEN 478</td>
<td>Machinery Analysis &amp; Design</td>
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<tr>
<td>ABEN 479</td>
<td>Fluid Power Systems Design</td>
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<tr>
<td>ABEN 484</td>
<td>Drainage and Wetland Engineering</td>
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MATH Courses:

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 128</td>
<td>Introduction to Linear Algebra</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
</tr>
<tr>
<td>MATH 259</td>
<td>Multivariate Calculus</td>
</tr>
<tr>
<td>MATH 266</td>
<td>Introduction to Differential Equations</td>
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ME Courses:

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<thead>
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<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>ME 212</td>
<td>Fundamentals of Visual Communication for Engineers</td>
</tr>
<tr>
<td>ME 221</td>
<td>Engineering Mechanics I</td>
</tr>
<tr>
<td>ME 222</td>
<td>Engineering Mechanics II</td>
</tr>
<tr>
<td>ME 223</td>
<td>Mechanics of Materials</td>
</tr>
<tr>
<td>ME 350</td>
<td>Thermodynamics and Heat Transfer</td>
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</tbody>
</table>

Additional Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CE 309</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>CE 310</td>
<td>Fluid Mechanics Laboratory</td>
</tr>
<tr>
<td>ECE 301</td>
<td>Electrical Engineering I</td>
</tr>
<tr>
<td>ENGR 402</td>
<td>Engineering Ethics and Social Responsibility</td>
</tr>
<tr>
<td>IME 440</td>
<td>Engineering Economy</td>
</tr>
<tr>
<td>IME 460</td>
<td>Evaluation of Engineering Data</td>
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</table>

or STAT 330

Program Electives:

The following program electives may be selected from courses listed in the Program Electives Tab located at: http://bulletin.ndsu.edu/undergraduate/colleges/engineering/agricultural-biosystems-engineering/agricultural-biosystems-engineering/#programelectivestext

Computer Electives

Select a minimum of 3 credits from the following department website: www.ndsu.edu/aben/academics

Business or Communication Elective

Choose one course from the following prefix options: BUSN, COMM, ACCT, AGEC, ECON, MGT, MIS, MRKT

Chemistry/Biological Science Electives

Select a minimum of 9 credits from the following department website: www.ndsu.edu/aben/academics

Technical Electives

Select a minimum of 8 credits from the Ag Option Area Tab or following department website: www.ndsu.edu/aben/academics

Total Credits 133

* The course used for this business or communication elective cannot double-count as General Education.

SUGGESTED EMPHASIS AREA for the Agricultural Engineering Option: Consult with adviser when making selections. Emphasis electives found at: http://bulletin.ndsu.edu/undergraduate/colleges/engineering/agricultural-biosystems-engineering/agricultural-biosystems-engineering/#emphasisareastext

- **Agricultural Systems** - Select electives with emphasis on machine, power, structural, and electrical/electronic systems to solve problems involving engineering aspects of food, feed, and fiber production.
- **Environmental Systems** - Select electives with emphasis on areas that contribute to solving problems in environmental engineering, natural resources management, hydrology, irrigation, watershed management, and waste management.
- **Biomaterial Systems** - 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.

**Degree Requirements and Notes**

A student must complete at least 60 semester credits of professional level course work in his/her program while in residence and enrolled in the college. Students transferring into the college from programs with professional accreditation are exempt from this residency requirement but are subject to the residency requirement of NDSU.