

# Agricultural and Biosystems Engineering

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## Department Information

- **Department Chair:**  
Leon Schumacher, Ph.D.
- **Graduate Coordinator:**  
Igathinathane Cannayen, Ph.D.
- **Department Location:**  
Agricultural and Biosystems Engineering Building
- **Department Phone:**  
(701) 231-7261
- **Department Web Site:**  
[www.ndsu.edu/aben/](http://www.ndsu.edu/aben/) (<http://www.ndsu.edu/aben/>)
- **Application Deadline:**  
International applications are due May 1st for fall and August 1 for spring. Domestic applications must be received at least one month prior to the start of the semester.
- **Credential Offered:**  
Ph.D., M.S.
- **English Proficiency Requirements:**  
TOEFL ibt 79; IELTS 6.5; Duolingo 105

## M.S. Degree

The M.S. degree program requires completion of 30 semester credit hours beyond the baccalaureate degree as detailed below. A Plan of Study (PoS) is developed with the adviser by the end of the first semester of work. An oral examination covering the research-based paper or thesis and the student's understanding and ability to apply the subject matter to the research is required. Students typically require two years to complete the M.S. degree. A cumulative GPA of 3.0 or higher is required.

Code	Title	Credits
<b>Didactic Course Work (601-689, 691; 700-789, 791; 800-889 and 891)</b>		<b>16</b>
ABEN 790	Graduate Seminar	
Additional Credits (as needed to complete 30 total credits)		
ABEN 798	Master's Thesis	6-10
<b>Total Credits Required</b>		<b>30</b>

Code	Title	Credits
<b>Accelerated M.S. in Agricultural and Biosystems Engineering</b>		
Students pursuing an accelerated master's degree in ABEN must complete the following requirements:		
Didactic Course Work (601-689, 691; 700-789, 791; 800-889 and 891)		20-24
ABEN 798	Master's Thesis	6-10
ABEN 790	Graduate Seminar	1-3
Total Credits		30

A maximum of 15 graduate credits earned in the accelerated degree program may be used towards the undergraduate and graduate degree.

\* Minimum of 6 credits of NDSU ABEN courses numbered 601-689, 691; 700-789, 791

## Ph.D. Degree

Ph.D. candidates are encouraged to indicate their research interests when applying for admission and to select an adviser before entering the program. Typically, 3-4 years are required to complete the Ph.D. program after the completion of an M.S. degree.

The degree requirements are in accordance with the NDSU Graduate College requirements. The student's academic adviser is usually assigned during the acceptance process. Prior to the end of the first academic year, the student and academic adviser will arrange for appointment of a supervisory committee.

Code	Title	Credits
Didactic credit (601-689, 691; 700-789, 791; 800-889 and 891)*		27
ABEN 899 and ABEN 790		30-45
Additional Credits (as need to complete 60 credits (post-master's) or 90 credits (post-bachelor's))		
Total credits		60-90

\* at least 15 credits of which must be 700-800 level and a minimum of 9 credits must be ABEN courses.

- 60 credits after the M.S. or 90 credits after the B.S.
- A minimum of 30 credits of NDSU ABEN dissertation and graduate seminar after the M.S. or 45 credits after the B.S.
- A minimum of 9 credits of NDSU ABEN courses numbered 601-689 or 700-789, 15 credits if entering with other than an ABEN B.S.
- It is expected that one or more journal articles will be submitted for publication prior to the award of the degree.

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## Examinations

### Comprehensive examinations

Both a written and an oral examination will be taken after completion of the greater portion of the course work phase of the Ph.D. program. The written examination will test the student's understanding and ability to apply the subject matter related to the chosen research area(s). The format and sequence of the written and oral examinations are dependent on the academic adviser and the examining committee. The examination will be graded pass, fail or marginal pass. If the student does not pass the written component of the comprehensive examination, the student will receive another opportunity to pass the examination. If the student does not pass the written examination second time, the student must wait one semester before taking the examination for the third time. Failure of the third attempt will prevent the student from proceeding further in the Ph.D. program.

The academic adviser also coordinates the oral examination. In this examination, the student will be required to provide a short presentation of the research progress to the date of the oral examination. The format of the examination is dependent on the academic adviser and the examining committee. This examination is to assess the student's ability to communicate the research problem, and how he/she is applying scientific and engineering principles to solve the research problem. The committee may further use this examination to ascertain the student's level of understanding of subject matter as observed from the written examination. This examination is graded pass or fail. If a student fails the oral examination, the student is notified of the deficiencies and given a second opportunity to pass the examination. Should both attempts to pass an examination result in failure, the candidate may request to take the examination a third time. A request for a third examination requires the support of the supervisory committee, the department chair, and the Dean of the Graduate College after consultation with the Graduate Council. Failure of the third attempt will prevent the student from proceeding further in the Ph.D. program.

Successful completion of both written and oral examinations will formally admit the student into candidacy for the Ph.D. in Agricultural and Biosystems Engineering. At least one semester must elapse between admission to candidacy and final Ph.D. oral final examination on the dissertation.

### Final examination

After the research work is completed, the student will write a Ph.D. dissertation following the guidelines of the Graduate College. The final oral Ph.D. examination will be arranged after the approval of the academic adviser. The student must distribute the complete Ph.D. dissertation to the examining committee members a minimum of one week before the final examination. The student will present the complete research work during this final examination. After passing the final examination, the student will complete all the appropriate suggested changes of the committee. The student will follow the procedures as defined by the Graduate College to complete the submission of the Ph.D. dissertation.