

Agricultural and Biosystems Engineering

www.ndsu.edu/aben/

Department Chair: Dr. Sreekala Bajwa

Graduate Coordinator: Dr. Shafiqur Rahman

Department Location: Agricultural and Biosystems Engineering Building

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Telephone Number: (701) 231-7261

Degrees Offered: Ph.D., M.S.

Application Deadline: Applications are accepted for fall, spring and summer semester admission. International application materials must be received before May 1 for the fall semester and prior to August 1 for spring and summer semesters. Domestic applications must be received at least one month prior to the start of the semester. Applications will be reviewed on a rolling basis and decisions are typically made within 3 months of application receipt.

English Proficiency TOEFL iBT 79

Requirements: IELTS 6.5

Program Description

The Department of Agricultural and Biosystems Engineering offers graduate study leading to M.S. and Ph.D. degrees. The program emphasizes solving engineering problems for agricultural production, food and biofuels processing, and environmental resources management. Advanced work may involve specialized training in the following areas: irrigation and drainage engineering; agricultural hydrology; soil and water resources management; livestock waste management; process engineering for food and biofuels, and other bioproducts; agricultural machine systems; precision agriculture; machine vision and intelligent sensors for biological systems; and post-harvest handling and storage of biomass feedstocks and other biological materials.

Student research and academic programs are tailored to individual student needs and interests. Interdisciplinary approaches to agricultural and biosystems engineering programs are fostered.

Admission Requirements

The Department of Agricultural and Biosystems Engineering graduate program is open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full standing to the program, the applicant must meet the Graduate School's admission requirements and have a baccalaureate degree in engineering or have taken the equivalent of the basic undergraduate engineering courses.

Any student receiving an MS or PhD degree from the NDSU ABEN department must have taken the following fundamental courses prior to attaining the graduate degree. If the courses (or their equivalent) were not taken prior to matriculating at NDSU, they should be taken in addition to other coursework required for the graduate degree.

- Mathematics through Differential Equations (NDSU: MATH 266)
- Statics (NDSU: ME 221) and Dynamics (NDSU: ME 222); these two may be substituted by a calculus-based Physics I class
- Thermodynamics (NDSU: ME 350); may be substituted with ABEN 644 which may also count toward graduate degree

- Fluid Mechanics (NDSU: CE 309 or ME 352)
- Physics II/Electricity and Magnetism (NDSU: PHYS 252)

Financial Assistance

Research assistantships are available and dependent on the grant funding of faculty research programs. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. Students must be accepted into the Graduate School before they are eligible for an assistantship.

M.S. Degree

The M.S. degree program requires completion of 30 semester credit hours beyond the baccalaureate degree. 20-24 credit hours are from course work while 6-10 credit hours are typically provided for a master's thesis. A Plan of Study should be 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 their MS degree. An overall GPA of 3.0 or higher must be maintained.

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 MS degree.

The degree requirements are in accordance with the NDSU Graduate School requirements. The student's academic advisor will usually be selected during the acceptance process. Prior to the end of the first academic year, the student and academic advisor will arrange for appointment of a Graduate Advisory Committee.

The student and major advisor will prepare a plan of study by the end of the first year in residence. The student's Graduate Advisory Committee, the ABEN Department Chair, and the Graduate School Dean shall approve the program of study. The plan of study must be filed in the Graduate School of NDSU. An overall GPA of 3.0 or above must be maintained.

The ABEN Ph.D. program requirements are:

- 60 credits after the M.S. or 90 credits after the B.S.
- A minimum of 27 credits from NDSU courses numbered 601-689 and 700-789, at least 15 credits of which must be numbered 700-789
- 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 and 700-789, or 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

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 be conducted to 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 advisor 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 be provided 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 not allow the student to proceed further in the Ph.D. program.

The oral examination will also be coordinated by the academic advisor. 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 advisor and the examining committee. This examination is to assess the student's ability to communicate his/her research problem, and how he/she is applying scientific and engineering principles to solve the research problem. This examination may be used by the committee to further 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 will be advised of the deficiencies and will be 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 School after consultation with the Graduate Council. Failure of the third attempt will not allow the student to proceed 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 examination of the dissertation.

Final Examination: After the research work is completed, the student will write a Ph.D. dissertation following the guidelines of the Graduate School. The final oral Ph.D. examination will be arranged after the approval of his/her academic advisor. The complete Ph.D. dissertation will be distributed 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 School to complete the submission of the Ph.D. dissertation.

Sreekala G. Bajwa, Ph.D.

University of Illinois at Urbana-Champaign
Research Interests: Remote Sensing, Modeling, Precision Agriculture, Air Quality, Water Quality, Waste Utilization, Bio-composites

Thomas Bon, Ph.D.

North Dakota State University, 2003
Research Interests: Machine Systems, Electronics and Instrumentation

Ganesh Bora, Ph. D.

Kansas State University, 2005
Research Interests: Precision Agricultural Technology; Machinery Systems Engineering; Agricultural Systems Management; Mechanical Harvesting; Agricultural Energy; Instrumentation

Igathinathane Cannayen, Ph.D.

Indian Institute of Technology, 1997
Research Interests: Biomass Harvest, Storage, Collection and Pre-Processing

Kenneth J. Hellevang, Ph.D.

North Dakota State University, 1989
Research Interests: Post Harvest Technology

Xinhua Jia, Ph.D.

University of Arizona, 2004
Research Interests: Soil and Water Engineering, Hydrology

Zhulu Lin, Ph.D.

University of Georgia, 2003
Research Interests: Water and Soil Resources, Environmental Modeling

Scott W. Pryor, Ph.D.

Cornell University, 2005
Research Interests: Biorenewable Products and Bioprocessing

Shafiqur Rahman, Ph.D.

University of Manitoba, 2004
Research Interests: Livestock Waste Management

Thomas S. Scherer, Ph.D.

University of Minnesota, 1986
Research Interests: Soil and Water Resources Management, Irrigation Systems

Halis Simsek, Ph.D.

North Dakota State University, 2012
Research Interests: Water and wastewater treatment, Animal and agricultural waste management

Dean D. Steele, Ph.D.

University of Minnesota, 1991
Research Interests: Irrigation and Environmental Engineering

Dennis P. Wiesenborn, Ph.D.

Rice University, 1989
Research Interests: Food and Added Value Process Engineering for Food, Biofuels, and Other Bioproducts