



UNIVERSITY OF NEBRASKA-LINCOLN

2019-20

# Graduate Handbook

Graduate Programs in  
Agricultural and Biological Systems Engineering,  
Biological Engineering and Mechanized Systems  
Management

Biological  
Systems  
Engineering  
Department



UNIVERSITY OF  
**Nebraska**  
Lincoln

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## Introduction

Welcome to the Department of Biological Systems Engineering at the University of Nebraska–Lincoln! As a new student who has researched graduate programs and chosen UNL, you are likely aware that our Biological Systems Engineering Department consistently ranks in the top 10 nationally. Our professors publish in the highest esteemed journals, support their achievements with a solid base of federal and industry grants, and serve as keynote speakers at major conferences and as experts before Congress. Students here have the opportunity to work alongside award-winning faculty on groundbreaking research and to apply classroom and lab learning to the real world. They launch their careers working at universities, medical centers, government agencies and companies such as Archer Daniels Midland (ADM), Cargill, Cerner Corporation, Caterpillar, CLAAS, Hormel, John Deere, Kawasaki and Novozymes. With the success of our students in mind, we have prepared this handbook to help you make the most of your UNL experience and reach your full potential.

This handbook outlays the policies and procedures of our department. All graduate students should refer to it as a reference throughout their program. **Keep in mind this handbook is not a replacement for the current UNL [Graduate Studies Catalog](#)**, which contains current information on graduate program requirements, thesis guidelines, and deadlines. The information in this handbook and other University catalogs, publications, or announcements is subject to change without notice. University offices can provide current information about possible changes, and students should visit the UNL Graduate Studies [website](#) for the most current information. We are here to guide you and help you succeed in your chosen path.

## **Graduate Program Organization**

### **Graduate Committee**

The mission of the Graduate Committee is to maintain excellence in the departmental graduate program. The Committee consists of nine faculty members, including the Chair, who are appointed by the Department Head. The Graduate Committee reviews applications and approves admission to the graduate program. The Committee also deals with program policies and student concerns. The Graduate Committee Chair leads the activities of the committee, signs student forms, and consults the Department Head regarding teaching assistant (TA) assignments.

### **Advisor**

Each graduate student must have a major advisor. It is also permissible to have a co-advisor. Major advisors advise students regarding course work and general academic requirements and guide students through their chosen research program. A student's major advisor will serve as the chair of the student's Supervisory Committee.

### **Supervisory Committee**

The primary function of the Supervisory Committee is to assist the student in developing a program of study that is compatible with the goals of the student. In addition, the Supervisory Committee will also monitor the progress of the student and provide counsel if problems arise during the program. The Supervisory Committee ultimately functions to ensure that the student has reached a satisfactory level of academic and research achievement. This committee is responsible for conducting comprehensive and final examinations prior to conferring M.S. and Ph.D. degrees.

## **Programs of Study**

Both M.S. and Ph.D. programs of study have required courses but remain flexible to meet the educational objectives of students and build on previous academic experiences. In designing their M.S. and Ph.D. programs, students should consult with their advisor and Supervisory Committee and refer to the Graduate Studies Catalog. Course descriptions and Office of Graduate Studies minimum requirements are presented in the Catalog.

### **M.S. Programs of Study**

The Department of Biological Systems Engineering offers students two programs for completing a Master of Science (M.S.) degree: Agricultural and Biological Systems Engineering and Mechanized Systems Management. There are three options available for completing an M.S. degree. Students have 10 years from the oldest course listed on their Memorandum of Courses to complete the degree. Courses exceeding this limit

may not be used toward a master's degree. All students are required to complete successfully a final **oral** comprehensive examination. Final exams are administered and chaired by the student's major advisor and consists of three or more Graduate Faculty Members or Associates. The criteria for Graduate Faculty Members and Associates are in the UNL Graduate Catalog.

**Option I** is designed to prepare students for careers in research and scholarly work or in college or university teaching. Option I requires 30 total credit hours of coursework and completion of a thesis. A minor option is available in this program. Coursework should follow these guidelines:

1. Between 6 and 10 credit hours are required in the master's thesis (AGEN/BSEN 899) course and students must complete a master's thesis (see additional requirements for Option I) .
2. At least half of the required coursework (including master's thesis hours) must be in the major (AGEN, BSEN or MSYM prefix).
3. Students must receive a passing grade in the AGEN/BSEN 889, Seminar I course (enrolled as pass/no pass).
4. Eight credit hours, in addition to the thesis course, must be earned in courses open exclusively to graduate students (900 level or 800 level without 400 or lower counterpart).

**Option II** is generally for students who do not intend to pursue a graduate degree beyond a master's degree. Option II is a non-thesis option requiring 36 total credit hours in courses representing a major and either one or two minors. Coursework should follow these guidelines:

1. Twelve credit hours must be earned in courses open exclusively to graduate students (900 level or 800 level without 400 or lower counterpart).
2. At least one minor is required.
3. Students must receive a passing grade in the AGEN/BSEN 889, Seminar I course (enrolled as pass/no pass).
4. A program consisting of a major and one minor must include no fewer than 18 hours in the major and nine hours in the minor. If two minors are selected, the major must total at least 15 hours and the minors at least nine hours each.
5. Six credit hours are required in the master's project class (AGEN/BSEN 897) and a master's project must be completed.

**Option III** is also generally for students who do not intend to pursue a graduate degree beyond a master's degree. Option III is a non-thesis option requiring 36 total credit hours in courses representing a major with no minor. Coursework should follow these guidelines:

1. Eighteen credit hours must be earned in courses open exclusively to graduate students (900 level or 800 level without 400 or lower counterpart).
2. No minor is can be completed under Option III.
3. Students must receive a passing grade in the AGEN/BSEN 889, Seminar I course (enrolled as pass/no pass).
4. At least half of the required coursework must be in the major.

5. Six credit hours are required in the master's project class (AGEN/BSEN 897) and a master's project must be completed.

The program of study for the M.S. degree (all options) is established by filing a "Memorandum of Courses" form with the Office of Graduate Studies. **The Memorandum of Courses must be filed before the student has received grades in more than half of the prescribed program (15 hours for Option I and 18 hours for Options II and III).** After approval by the Supervisory Committee, the Memorandum of Courses must be approved and signed by the major advisor, the Graduate Committee chair, and by the Graduate Committee Chair in the student's minor (if applicable). The form can then be submitted to the Dean of Graduate Studies. **A student may NOT file a Memorandum of Courses and graduate in the same semester.**

### **Additional Requirements for Option I**

Option I M.S. candidates must complete an M.S. thesis. Specifics concerning the organization and preparation of the document are published in the [Graduate Studies Bulletin](#). Additional information on form and style can be obtained from the "Guidelines for Preparing your Thesis or Dissertation" available from the UNL Office of Graduate Studies. Due dates for the relevant academic year can also be obtained from the Office of Graduate Studies website: <http://www.unl.edu/gradstudies/current/degrees>.

**The following policy pertains to the submission of the master's thesis to the Supervisory Committee prior to a candidate's oral defense:**

Following review of the thesis by the major advisor, the student will submit review-ready copies of it to the Supervisory Committee chair. The Supervisory Committee chair will then be responsible for distributing the copies to the Supervisory Committee members. **The copies must be received by the Supervisory Committee chair no less than two calendar weeks prior to the scheduled date of the final examination. Although the Office of Graduate Studies allows students to submit readers' copies one week prior to the final exam for summer graduation, the departmental requirement is still two weeks.**

### **Final Examination**

**Option I:** The final oral examination is conducted by the student's Supervisory Committee and deals principally with presentation and defense of the thesis. The student must deliver written copies to the Supervisory Committee not less than two weeks (unless otherwise approved) prior to the scheduled defense. The first part of the examination consists of a seminar on the student's thesis research. This is a public seminar open to faculty, graduate students, and guests. After completion of the seminar, the remainder of the examination is conducted by the Supervisory Committee.

It is the responsibility of the student to work with the Supervisory Committee to determine a date for the final examination that will allow all members of the Supervisory Committee to attend (unless otherwise approved). Supervisory Committee members may attend via web conference. The student is also responsible for reserving a location for the oral exam. If the Supervisory Committee chair does not receive thesis copies in acceptable format at least two weeks prior to the scheduled date, he/she will automatically notify the Supervisory Committee that the examination has been canceled for that date. It will be the responsibility of the student to reschedule the examination. The student must make every effort to provide Supervisory Committee members ample time for review of his/her thesis, especially during summer months when conferences and vacations may be occurring.

After successful completion of the final M.S. examination, the student should follow the Office of Graduate Studies instructions for submitting required items. It is also expected that the student will provide the major advisor with a bound copy of the thesis.

Students are strongly encouraged to schedule their thesis seminars on a day and time that allows for as much attendance as possible. **In particular, students should avoid scheduling their exam during times when required Biological Systems Engineering classes are held.**

**Option II and III:** The final oral examination shall consist of a presentation and defense of the major project completed by the student.

## **Ph.D. Programs of Study**

The Biological Engineering doctoral program follows and meets all of the requirements set forth for a Doctor of Philosophy (Ph.D.) degree by the Office of Graduate Studies. Ninety credit hours beyond the B.S. degree are required. A maximum of 30 credit hours from an M.S. degree may be applied to the Ph.D. degree. **A program of studies must be developed and approved by the student's Supervisory Committee and the Dean of Graduate Studies before a doctoral student has accumulated 45 credit hours, including credit hours from an M.S. degree.** The Ph.D. degree in Biological Engineering requires two groups of core courses (18 credit hours) which are given as:

**Group A:** Mathematics. 12 credit hours are required, with at least three credit hours in each of two areas:

1. Statistics
2. Numerical Analysis (including linear algebra, advanced calculus, complex variables, and partial differential equations)

**Group B:** Support Sciences (non-engineering). Six credit hours are required:

1. Biological Science (e.g., plant/animal physiology, microbiology)
2. Earth Science (e.g., soil physics, climatology)
3. Chemistry (e.g., biochemistry, physical chemistry)

All students pursuing a Ph.D. in Biological Engineering are required to complete AGEN/BSEN 899 and AGEN/BSEN 989, Seminar I and Seminar II, respectively. In addition to the seminar requirements, all Ph.D. students must complete their graduate program with at least three credit hours from departmental courses that are open exclusively to graduate students. These requirements do not supersede the Office of Graduate Studies' requirements.

### **Appointment of Supervisory Committee**

At the time of a student's admission to the Biological Engineering doctoral program, an advisor for the student is assigned by the Department's Graduate Committee Chair. Upon recommendation of the Graduate Committee, the Dean of Graduate Studies appoints, for each student, a Supervisory Committee of at least four Graduate Faculty Members or Associates. **The Supervisory Committee must be appointed before a doctoral student has accumulated 45 credit hours using the Appointment of Supervisory Committee form.**

The different members of the Supervisory Committee have designated roles as follows:

- Chair: The advisor of the student chairs the Committee. The Chair may not serve as an outside representative and must be a Graduate Faculty member appointed to the Department of Biological Systems Engineering. Adjunct faculty and courtesy faculty affiliated with the department may not serve as the Chair, but may co-chair the Committee.
- Member: Members of the Committee vote on admission to candidacy, extension requests, and the outcome of the dissertation defense.
- Reader: Two members of the Committee are designated as Readers. The Chair and the Readers revise the dissertation draft to determine if the dissertation is ready to defend.
- Outside Member: At least one Committee member external to the Biological Systems Engineering faculty that is a member of the Graduate Faculty must be included. When the student is pursuing a minor, a Graduate Faculty member from the minor department must be on the Supervisory Committee. The Supervisory Committee member from the minor department may serve as the outside representative. The Outside Representative may also serve as a Reader.
- Courtesy Member: Faculty external to the University of Nebraska system may serve as a fifth member of the Committee. The Courtesy Member may serve as a reader, but not as outside representative.

### **Ph.D. Comprehensive Examination**

Ph.D. students are required to complete a comprehensive examination that consists of a written and oral examination. The Supervisory Committee must arrange for the comprehensive examination at least seven months prior to the final oral examination (defense).

For the comprehensive examination, the student will be required to write and orally defend a research proposal describing his/her dissertation research. Research proposals should follow the format for project narratives used by the USDA, NIH, or NSF, as determined by the Supervisory Committee. It is not necessary to include the budget, conflict of interest, current and pending support, or other forms. **The major advisor should be involved in the planning and development of the project but should not edit or rewrite the document prior to submission to the Supervisory Committee. Thus, this document should be an accurate representation of the student's writing and reasoning abilities.**

**The written proposal must be submitted to the Supervisory Committee chair at least two weeks prior to the date of the oral defense of the proposal. The chair will then distribute the proposal to the Supervisory Committee. Proposals submitted less than two weeks before the scheduled defense, or proposals that do not meet the guidelines outlined in this handbook, will not be accepted.**

The student will present the proposal in the form of a seminar to the Supervisory Committee. The Committee will then examine the student on the research proposal. Areas to be evaluated include the student's knowledge of the science and methods to be used in the project and the student's ability to express his/her ideas orally and to answer questions related to the proposed project.

Following successful completion of the comprehensive examination, the student may submit the **“Application for Admission to Candidacy”** for the doctoral degree, noting the dates of completing the comprehensive examination(s). The application must be filed at least seven months prior to the final oral examination (dissertation defense).

Following admission to candidacy, the student must register for at least one credit hour during each academic-year semester until the doctoral degree is conferred, even if the student has already met the total dissertation hours in his/her approved program of study.

## **PhD Dissertation**

All PhD students must write a dissertation. Specifics concerning the organization and preparation of the document are published in the [Graduate Studies Bulletin](#). Additional information on form and style can be obtained from the “Guidelines for Preparing your Thesis or Dissertation” available from the UNL Office of Graduate Studies. Due dates for the relevant academic year can also be obtained from the Office of Graduate Studies website: <http://www.unl.edu/gradstudies/current/degrees>.

**The following policy pertains to the submission of the doctoral dissertation to the Supervisory Committee prior to a candidate's final exam:**

Following review of the dissertation by the major advisor, the student must provide the Reading Committee at **least two weeks** to review the dissertation and determine that it is acceptable for submission to the student's Supervisory Committee. The student will revise the dissertation based on corrections or recommendations by the Reading Committee, which consists of the Supervisory Committee Chair and two readers. The student will then complete the "Application for Final Oral Examination" form and present this form along with a rough draft of the complete dissertation to the doctoral program specialist in the Office of Graduate Studies for preliminary review **at least two weeks** before the final oral examination. The student will also provide an electronic version of the dissertation to the Supervisory Committee chair, who **will then distribute this version to the Supervisory Committee members. Note that the dissertation must be received by the Supervisory Committee chair not less than two calendar weeks prior to the scheduled date of the final examination.** If the Supervisory Committee chair does not receive dissertation copies in acceptable format at least two weeks prior to the scheduled date, he/she will automatically notify the Supervisory Committee that the examination has been canceled.

**Thus, Ph.D. students must allow a total of four weeks for the actual review of their dissertation**, two weeks for review by the reading committee and two weeks for the full Supervisory Committee.

### **Direct-to-Ph.D. Option**

Students having a B.S. degree can apply directly for the Ph.D. program. Only exceptional applicants will be considered. It is expected that the exceptional applicant have outstanding grades and GRE scores, prior research experience, and superior letters of reference. When students are considering applying directly for the Ph.D. program, we recommend they upload their research articles, reports, abstracts, conference proceedings, awards, recognitions, and so forth in their application package. When students are currently pursuing a master's degree in and want to switch to the PhD program, they will need to submit the following to the Department's graduate Committee: (1) an updated curriculum vitae, (2) a letter of recommendation from the advisor, (3) a current transcript, and (4) a letter of intent stating why they would like to switch to the PhD program.

### **Graduate Student Teaching/ Extension Experiences**

All graduate students that receive an assistantship, fellowship, or hourly wage that is administered by the Department of Biological Systems Engineering must complete a short-term assignment in the Department's teaching and/or extension program unless they had an equivalent or more extensive experience before entering UNL. The objective is for graduate students to gain experience in the application of teaching or extension methodology. Students pursuing an M.S. degree must have one experience in teaching or extension. Ph.D. students must have two experiences and can select from either teaching or extension, or a combination of the two. The scope of each

experience is intended to be relatively short term (a minimum of one to two weeks of effort on the part of the student). Grading papers or performing remedial tasks in teaching laboratories will not satisfy the educational experience requirement. In concert with their advisor, students should submit an educational experience plan to the Graduate Committee Chair for approval using the form that can be obtained from the Graduate Chair.

## Maintaining Active Status, Full-Time Certification

All graduate students must maintain full-time active status while completing the requirements of the M.S. or Ph.D. degree. Graduate students are considered full-time when registered for 9 credit hours during the spring or fall semester, whether or not they hold a graduate assistantship. If a student must suspend enrollment, he/she should consult with the Office of Graduate Studies regarding an Academic Leave of Absence.

Doctoral students in candidacy or master's students in the Option I degree program are allowed to be underenrolled for a certain time limit while earning their degrees. They need to request to be full-time certified (maintain full-time active status) each semester they are underenrolled. To be eligible for full-time certification, students must be registered for at least one credit hour in the current fall or spring semester (or summer, if needed) and have been registered at least half time (that is, at least 4 credits) in the fall and spring terms prior to the initiation of the full-time certification status. To request full-time certification, students should activate the form at <http://research.unl.edu/gradstudies/fulltime/>.

Master's students may use the full-time certification no longer than 12 months; doctoral candidates may use the full-time certification no longer than 24 months from first use. All students using the form have to be registered (that's a requirement for the form) regardless of whether they are master's or doctoral students. Students pursuing an Option II or III degree are not eligible to use the form.

Graduate students do not need to enroll in classes during the summer; however, they will not have access to some campus facilities or services such as online libraries, the recreation center, or certain buildings.

## Assistantships

Many Biological Systems Engineering graduate students receive a research assistantship (RA). These RAs are awarded on a very competitive basis. With these awards comes the expectation that the student will be fully committed to their academic program. **This means graduate students are expected to work during academic holidays such as spring break, semester break, and so on in the same manner as the support staff (i.e., whenever the University is open). The University offers no vacation benefit for graduate students. Therefore, time off must be negotiated**

**with the major advisor.** Assistantship awards are renewable based on satisfactory performance by the student (see Annual Reviews and Expected Student Performance).

## **Research Areas**

Graduate students are expected to pursue an academic area and conduct research consistent with the interests of the major advisor. Research projects enable students to pursue their thesis/dissertation objectives and to satisfy the research objectives of the major advisor. **The expected result is a thesis or dissertation for the student, the completion of grant objectives for the major advisor, and manuscripts published in scientific journals jointly authored by the student and major advisor.**

In addition to conducting their thesis/dissertation research, all RAs are expected to assist their major advisor with special projects, to train other students, and to perform other relevant academic duties.

Note that in order to make satisfactory progress in research and coursework, students receiving an assistantship are not permitted to accept outside employment, unless approved by the student's major advisor and the departmental Graduate Committee.

## **Graduate Student Offices**

Students with assistantships or fellowships are provided a desk, office area, and access to computers for use in performing academic duties and for routine study purposes. As a general rule, graduate students are assigned offices based on their research area or advisor. Students not on assistantships or fellowships may be given office space if such facilities are available.

## **Tuition Benefits and Registration Requirements**

All graduate students receiving an assistantship qualify for a tuition waiver. Students should consult the Graduate Studies Bulletin for current guidelines on requirements for eligibility. Students holding assistantships may not exceed established registration limitations. During regular academic semesters, students holding full assistantships (0.49 FTE) must register for a minimum of 9 credits and a maximum of 10 credits, while students with 0.33 FTE assistantships may enroll for a maximum of 12 credits. Students who do not hold an assistantship may enroll for up to 15 credits per semester.

## **Summer Registration**

Students do not have to be registered during the summer. If a graduate student has a qualifying assistantship that includes a summer tuition benefit, the student may choose to register in the summer terms (for a total of 4 credit hours--2 credit hours in the first session, which lasts eight weeks, and 2 credit hours in the third session, which lasts five weeks; or 2 credits in each of the second and third sessions, which each last five

weeks) but is not required to do so. When students don't enroll, they have limited access to such university facilities as the health center and campus recreation. International students should visit with the International Student Scholar Office to determine how summer enrollment affects the status of their visa. For additional information, see the [Guidelines for Good Practice in Graduate Education](#) on the Office of Graduate Studies website.

## Expected Student Performance

Graduate students are expected to make satisfactory progress in course work and research activities at all times. The Graduate College has the following scholarship requirements that must be satisfied to receive graduate credit:

1. A minimum grade of B is required in all 800-level BSE courses.
2. A minimum grade of C or P (pass) is required for 800-level courses in the student's minor, collateral, or supporting areas of work. Note: If a student receives a B-, C+ or a C in a minor course, a minor comprehensive exam will be required.
3. A minimum grade of C or P (pass) is required for 900-level courses, or 800-level courses without 400 counterparts.
4. A grade of D or lower in any course is sufficient for removal from the graduate programs administered by the Department of Biological Systems Engineering.

BSE courses at the 900 level, or 800 level without 400 counterparts, may be taken on a pass/no-pass (P/N) basis. Also, 800-level courses with 400 counterparts in minor, collateral, or supporting areas of work, can be taken on a P/N basis.

In the event that the student's academic and/or research performance has been unsatisfactory, the major advisor will notify the student and Supervisory Committee and make recommendations for further action. Students who receive an unsatisfactory progress report may be permitted to continue, but their assistantship will not be renewed if their performance continues to be unsatisfactory during the next semester. Students who were originally admitted on a provisional basis and who receive an unsatisfactory rating will not be permitted to continue in the graduate program.

## Assessment of Learning Outcomes

Assessment of student performance and learning is largely the responsibility of the student's Supervisory Committee. Performance in courses and the comprehensive exam are used to assess student comprehension of advanced knowledge within the degree and field of specialization. The chair of the Supervisory Committee and chair of the Graduate Committee are informed by the Office of Graduate Studies if a student is not performing satisfactorily in coursework.

The ability to apply this knowledge and conduct original research is demonstrated in the development of the Ph.D. dissertation proposal, the completion of the dissertation research, and the development and submission of the results in the appropriate refereed journals. The comprehensive exam and development of the dissertation research proposal are usually complete by the end of the second year (four semesters) of the Ph.D. program. In general, students follow the “paper format” for their dissertation, i.e., the dissertation is presented as a series of papers that are appropriate for publication in refereed journals. It is expected that one or more journal articles pertaining to the dissertation research be submitted by the time that the dissertation is defended.

The student’s readiness to perform teaching or extension functions is assessed by the sponsor(s) of the student’s two teaching/extension experiences. The sponsor must determine if the student has successfully fulfilled this requirement in his or her program.

## **Deadlines and Filing of Forms**

Forms and specific dates needed to meet graduation deadlines, schedule final examinations, deposit final copies of a thesis or dissertation, and so on can be obtained from the [Office of Graduate Studies](#)’ website. Forms specific to Biological Systems Engineering, such as the “Preparatory Curriculum for Engineering Graduate Students” and the “Graduate Student Teaching/Extension Experience,” can be obtained from the Department and are included in Appendix V.

## **Checklist for M.S. Programs**

- A “Memorandum of Courses” form for the master’s degree must be received by the Graduate College before the completion of one half (by 3<sup>rd</sup> semester) of the program of study.
- Students must file an “Application for Graduation” early in the semester in which they intend to graduate. The Application for Graduation may be submitted electronically via MyRED or by contacting the Office of the University Registrar, 107 Canfield Administration Building South. A diploma will not be ordered unless this form is filed.
- A “Final Examination Report” form must be submitted to the Office of Graduate Studies at least four weeks prior to the final examination. Receipt of this form generates the final examination check.
- Copies of the thesis must be submitted to the Graduate Committee chair and a copy e-mailed to the master’s degree specialist in the Office of Graduate Studies at least two weeks prior to the scheduled final examination. Graduate students are expected to provide their advisor with one bound copy of their completed thesis or dissertation. For Option II and III students, the a report on the master’s project must be submitted to the advisor at least two weeks prior to the schedule final oral examination.

## Checklist for Ph.D. Programs

- An “Appointment of the Supervisory Committee” form must be filed with the Office of Graduate Studies at least three weeks prior to the initial committee meeting. If needed, the Change of Supervisory Committee and Appointment of Courtesy Committee Member forms are also available on the Office of Graduate Studies’ website.
- A “Program of Studies” form must be submitted to the Graduate College before the student has completed 45 credit hours (including M.S. or transfer credits) and during the same semester as the Appointment of the Supervisory Committee is filed.
- A comprehensive examination must be completed. The “Application for Admission to Candidacy” must be filed with the Graduate College after the student has successfully completed the comprehensive examination and at least seven months prior to the final examination.
- Students must file an “Application for Graduation” (available through MyRED) early in the semester in which they intend to graduate. Applications for Graduation may be submitted electronically via MyRED or by contacting the Office of the University Registrar, 107 Canfield Administration Building South. A diploma will not be ordered unless this form is filed.
- Within one month of the beginning of the semester in which they wish to graduate, students must file a “Doctoral Hooding Participation” form.
- Copies of the dissertation must be presented to the Reading Committee for review and comments, at least **two weeks** prior to submission to the Office of Graduate Studies and to the Supervisory Committee.
- An “Application for Final Oral Examination” along with a copy of the dissertation and abstract approved by the Reading Committee, must be submitted to the Office of Graduate Studies at least **two weeks** prior to the date of the final oral examination.
- Dissertation copies must be submitted to the Graduate Committee chair, after approval by the Reading Committee, for distribution to the Supervisory Committee (at least three weeks before the scheduled date of the final examination). Graduate students are expected to provide their advisor with one bound copy of their completed thesis or dissertation.

## Miscellaneous Information

**Research or Thesis Credits.** All graduate students enrolled for Master’s Thesis (AGEN/BSEN 899) or Doctoral Dissertation (BSEN 999) credits should register on a pass/no-pass (P/N) basis.

**Building Security.** Students should secure their personal belongings when they are in the building and remember to lock all doors during nonbusiness hours. Students should call **campus police (2-2222)** to report suspicious individuals or activities.

**E-mail and E-mail lists.** Students receive a new e-mail account when they enroll at UNL. Please make sure that the BSE graduate program specialist has your current e-mail as this is our primary means of communication.

**Awards and Scholarships.** Numerous scholarships and fellowships are available to graduate students (see Appendix IV). Graduate students are especially encouraged to apply for travel scholarships (Larrick/Whitmore Graduate Student Travel Grants) that are awarded to students presenting their research at conferences and industry conventions. Students should contact their major advisor, the Graduate Committee chair, the [Office of Graduate Studies](#), or the departmental office for details on applying for these and other awards. For some awards, students must be nominated by their advisor.

**Minors in Biological Systems Engineering.** Students in related disciplines may earn a minor in Biological Systems Engineering. Requirements for a minor include: (1) completion of 9 (M.S. programs) or 16 (Ph.D. programs) graduate credits in Biological Systems Engineering and (2) a departmental representative on the student's Supervisory Committee. The courses could be of the student's choosing, but must be actual Biological Systems Engineering courses. All grades in the minor must be at least a B (no B-) or a written comprehensive exam will be required. For Ph.D. minors, at least 6 credits must be graduate-only courses. The program of study must also be approved by the Biological Systems Engineering Graduate Committee.

**Health Insurance.** Any student registered for at least 3 credit hours each semester is eligible to purchase health insurance. Graduate assistantships will automatically provide basic individual student health insurance at a reduced rate. The student and the University will share in the cost of the premium. Approximately 21% of the annual cost of the health insurance premium will be billed directly to the student's account. Students are notified at a later date of the amount for which they will be responsible. If a student does not require the University health insurance, the student needs to complete a Waiver of Insurance form online each semester. If the Waiver of Insurance has not been submitted within 14 days of the start of the semester, the student's account will be charged for the basic student health insurance. The student also has the option of purchasing additional health insurance for family members from the same plan by contacting the business office at the University Health Center. International students are always required to have student health insurance coverage, unless proof of comparable insurance from an outside source is provided.

**Termination of Assistantship.** If the student wishes to terminate the assistantship, a 30-day written notice must be given. Likewise, if the Department decides to terminate the assistantship, the student will be given a 30-day written notice. If the assistantship is terminated before the student completes 120 continuous days of employment within the

semester dates, all tuition and health benefits will be forfeited and the entire cost for those benefits for that semester will be billed to the student.

**Student Code of Conduct:** See link regarding professional conduct and student code of conduct within the program at <http://stuafs.unl.edu/dos/code>

**IRB/CITI Guidelines:** For information on the IRB/CITI requirement, go to <http://research.unl.edu/researchresponsibility/human-research-protections-programirb-forms-policy-and-guidance-page/>)

## Glossary

**ABET** - Accreditation Board for Engineering and Technology.

**Academic residency** - The requirement to enroll in a specified number of credit hours related to the degree within a specific time frame to provide cohesiveness to the educational experience.

**Advisor** - The faculty member appointed to mentor and guide a student through the completion of a graduate degree.

**Assistantship** - A merit-based, University-funded award whereby a student receives a financial stipend for services rendered. This may include a tuition scholarship.

**Candidacy** - The final stage in a doctoral student's education, which primarily involves conducting research and writing the dissertation.

**Comprehensive exam** - An exam administered by the student's academic major program to discover whether the student's knowledge of the subject areas of study is sufficient to advance to the dissertation writing stage. It may be written and/or oral.

**CV** - Also called a curriculum vitae, or just "vita," the CV is used to apply for college and university teaching positions as well as for fellowships and industrial research jobs. Individuals applying for administrative positions in academe may be asked for either a résumé or a CV.

**Defense** - Final requirement for a dissertation or thesis and the final oral examination on a doctoral candidate's dissertation.

**Depositing a thesis or dissertation** - Uploading the thesis or dissertation in its final form and then submitting the required materials to the appropriate office(s) to place it in the archives of the institution.

**Dissertation** - A substantial academic paper that details independent, original research and analyses demonstrating high scholarly achievement and advancing a new point of view. It's usually presented as one of the final requirements for the doctorate.

**Dissertation proposal or prospectus** - A statement of the dissertation topic, how the research will be conducted, what it will entail, and what it will accomplish.

**Doctoral Committee** - Also called the Dissertation Committee. A committee of graduate faculty members of professorial rank (full, associate, or assistant). The number of members and makeup of the Committee are dictated by the Department and the Office of Graduate Studies. This Committee guides the student through the process of determining a program of study, choice of research topic, and final approval of the dissertation.

**Fellowship** - A study grant of financial aid usually awarded to a graduate student without requiring services in return. It may include tuition benefits and can be from either an external source (government, private) or an internal funding source.

**Full-time** - Refers to enrollment in a minimum of graduate-level credits per semester. At UNL, the minimum number of hours of graduate-level courses needed to be a full-time student is 9.

**Full-time certification** - The process of certifying the student's enrollment status while he/she is less than full-time (9 hours) enrolled. This allows the student to maintain full-time enrollment status while working on dissertation research or the master's thesis. Different rules apply for doctoral or master's.

**GA** - Graduate assistant. A graduate student who is being paid 13 to 20 hours per week working with administrative units on the university campus. This may be specifically teaching (TA) or research (RA).

**[Graduate Bulletin](#)** - A policy handbook for graduate study, with links to lists of available programs and courses. All graduate students and the faculty and staff who work with them should familiarize themselves with the Graduate Bulletin.

**Graduate Committee** - A departmental faculty committee responsible for the maintenance of regulations concerning the Department's graduate program. Members of it are typically also responsible for reviewing applications from prospective students and making admission decisions.

**Graduate Chair** - A faculty member designated to advise students and represent the Office of Graduate Studies in matters pertaining to graduate study. The chair makes departmental decisions that pertain to the University's policies and serves as a liaison to the Office of Graduate Studies.

**GRE** - **[Graduate Record Exam](#)**. A standardized test required for admission to many graduate programs and intended to gauge aptitude for graduate study.

**Hooding** - An official ceremony celebrating the completion of a doctoral degree program, the highest level of educational achievement. At this ceremony, graduating students receive their doctoral hood. Each institution has a doctoral hood unique to them. At UNL, hooding is part of the commencement ceremony.

**IELTS** (**[International English Language Testing System](#)**) - One of the exams applicants can use to demonstrate English proficiency, if required. See also TOEFL.

**IRB** - Institutional Review Board. An internal administrative body of the University of Nebraska-Lincoln responsible for reviewing and authorizing study protocols for research involving human subjects.

**Memorandum of courses** - Also known as a plan of study. At UNL, it must be filed before the student has received grades (letter grades, no reports, or incompletes) in more than one half of the prescribed program, and must be approved by the student's advisor, the departmental Graduate Committee, the Graduate Committee(s) in the student's minor(s) in other departments, and the Dean of Graduate Studies.

**Non-degree** - A broad category in which students may be admitted and enroll at the graduate level without a graduate degree as their objective. Subcategories exist for those pursuing graduate certificates, obtaining or renewing state teaching certifications, or visiting from other institutions. It can also be a way to take a few courses for personal enrichment or (in some fields) to try out an area of study while deciding whether to pursue a degree. Coursework completed as a non-degree student is often but not always applicable toward a later degree program.

**Orals** - Essentially final exams for graduate school, common for doctoral degrees and sometimes required for master's programs. These comprehensive exams are presented verbally and usually graded by a small committee of professors who will require you to demonstrate mastery of the concepts you've covered in your studies.

**PFF** - Preparing Future Faculty. A program that helps advanced doctoral students prepare for academic careers.

**Post-baccalaureate** - After completion of a bachelor's or equivalent degree.

**Postdoc** - Postdoctoral fellow. Someone who holds the Ph.D. (or M.D., other doctorate, or the equivalent) and goes to a university, research center, industrial

business, or other institution with the purpose of engaging in research or participating in advanced training programs. Postdocs receive appointments for a specified number of years. We urge candidates to look at particular positions to be sure they will indeed be receiving professional development rather than merely serving as underpaid laboratory workers.

**Prelims** - Preliminary examinations. Usually required by the [Office of Graduate Studies](#). They may be oral or written or both, depending on the unit's policy. Designed to evaluate overall and specific knowledge in the field. Usually also include an oral presentation to review the feasibility and appropriateness of a student's dissertation research proposal. Practices vary by department.

**[Program of studies](#)** - An outline or plan of coursework to be taken fulfilling the requirements of a doctoral degree. May include transfer credits from a previous master's degree or graduate work. Approved by the doctoral committee.

**Qualifying exam** - Also known as "quals." Common to many science and math graduate departments. Students who have completed coursework for a doctoral degree must pass an examination before embarking on the dissertation. A qualifying examination may be oral, written, or both, and must be passed in order for the student to continue.

**RA** - Research assistant. A graduate student paid to work 13 to 20 hours a week conducting research for the professor under which the student is employed.

**Research compliance** - Students who intend to engage in research that involves humans or animals, radiation, biohazardous agents, or any of a number of such subjects are required by federal law to receive approval of their research procedures before beginning to collect data. Consult the [Office of Research Responsibility](#) to ensure compliance.

**[Residency for tuition](#)** - A student's status as either Nebraska Resident or Non-Resident, in part determining that student's tuition rate.

**Rolling admission** - An application review schedule in which reviews and admission decisions are made on a continuous basis throughout the year rather than at fixed application deadlines. Many programs have deadlines instead of rolling admission. Applicants should check their program's requirements.

**Satisfactory progress** - Demonstrating good academic standing and overall performance in program requirements, based on an approved graduate program time frame.

**Specialization** - A well-developed area of study formally established within one or more major-degree programs. It displays on a transcript. Some programs may offer "emphases" or "concentrations", but those are not approved by the [Graduate Council](#) or recognized on transcripts.

**Supervisory Committee** - A faculty committee that advises the student on academic matters and is usually the examining committee for the master's/doctoral comprehensive and/or defense-of-thesis/doctoral examinations.

**TA** - Teaching assistant. A graduate student who is being paid 13 to 20 hours a week to assist in teaching undergraduate courses, grading, or conducting laboratory sessions.

**Thesis** - A substantial master's level paper presenting independent work, but not necessarily original research. It need not make a unique and independent contribution to the literature.

**TOEFL ([Test of English as a Foreign Language](#))** - One of the exams applicants can use to demonstrate English proficiency, if required. See also IELTS.

**Transcript** - An official record of a student's enrollment, grades, and any degrees awarded.

**Tuition waiver** - A benefit of eligible assistantships that grant students full-time tuition remission for the academic semester of employment.

## Appendix I. Fellowships and Scholarships

BSE graduate students are eligible for numerous competitive fellowships and scholarships. Some are offered through the Department, College, or University, whereas others are from professional societies or other organizations. The BSE graduate program specialist tries to keep track of these competitions and announce their availability through e-mails and the Department website. However, it is up to you to pursue such opportunities, ensure your eligibility, and submit the required materials by the specified time. Below is a list of some scholarships and fellowships for which BSE graduate students may be eligible:

Chancellor's, Edgren, and Othmer Fellowships (faculty selects from newly admitted students) <http://www.unl.edu/gradstudies/prospective/money/fellowships>

College of Engineering Graduate Student Conference Travel Grant (GSCTG) <http://engineering.unl.edu/graduate-programs/graduate-student-travel/>

Cooper/Sharpless Fellowship (faculty nominates from prospective students) <http://casnr.unl.edu/pictures/PDFs/Undergradforms/CooperSharplessInfo.pdf>

William J. Curtis Fellowship (awarded through the Doctor of Plant Health [DPH] program) <http://dph.unl.edu/doctor-plant-health-fellowship-opportunities>

Dean's Fellowship <http://www.unl.edu/gradstudies/current/funding/fellowships>

Folsom Distinguished Master's Thesis and Doctoral Dissertation Awards (faculty nominates) <http://www.unl.edu/gradstudies/facstaff/awards>

Fling Fellowship <http://www.unl.edu/gradstudies/current/funding/fellowships>

Elenore Gakemeier Swarts Outstanding Graduate Student Awards (faculty selects from domestic students)

Elenore Gakemeier Swarts Travel Awards (student application available from graduate program specialist in BSE)

Graduate Travel Awards Program—ASUN <http://www.unl.edu/gsa/graduate-travel-awards-program-gtap>

Great Plains Graduate Fellow <http://www.unl.edu/plains/graduate-fellows-program#GFP>

Hardin Distinguished Graduate Fellowship (faculty nominates) <http://ard.unl.edu/graduate-fellowships>

Larrick/Whitmore Graduate Student Travel Grants <http://ard.unl.edu/funding-students/larrickwhitmore-graduate-student-travel-grants>

Milton E. Mohr Awards Program (Engineering Dept.)  
<http://biotech.unl.edu/scholarships-fellowships-and-awards>

Milton E. Mohr and Farmers National Fellowships (CASNR)  
<http://casnr.unl.edu/graduate-students>

Moseman Fellowship (open to agronomy and horticulture students only)  
<http://ard.unl.edu/graduate-fellowships>

National Needs Fellowship (awarded through the Doctor of Plant Health [DPH] program) <http://dph.unl.edu/national-needs-fellows>

National Science Foundation (NSF) Graduate Research Fellowships  
<http://www.nsf.gov/pubs/2012/nsf12599/nsf12599.htm#elig>

Nebraska Engineering Recruitment Fellowship--NERF (awarded to a first-year engineering student)

Outstanding Graduate Research & Creative Activities Award through the Office of Graduate Studies (students apply by making their interest known to faculty members who can write letters of nomination and support)  
<http://www.unl.edu/gradstudies/facstaff/awards>

Outstanding Graduate Teaching Assistant Award through the Office of Graduate Studies (tenure-line faculty members nominate)  
<http://www.unl.edu/gradstudies/facstaff/awards>

Presidential Fellowship <http://www.unl.edu/gradstudies/current/funding/fellowships>

Earl Raun Fellowship (awarded through the Doctor of Plant Health [DPH] program)  
<http://dph.unl.edu/doctor-plant-health-fellowship-opportunities>

Shear-Miles Agricultural Scholarship/Fellowship (open to graduate research assistants only) <http://ard.unl.edu/graduate-fellowships>

Skala Fellowship (open to graduate assistants only) <http://ard.unl.edu/graduate-fellowships>

Special Projects Grants Program <http://www.unl.edu/gsa/special-project-grants-program-spgp>

Bill A. and Rita L. Stout Outstanding International Graduate Student Award (advisors nominate)

Widaman Distinguished Graduate Assistant Award (open to graduate research assistants only) <http://ard.unl.edu/graduate-fellowships>

## **Appendix II. Checklist of Things to Do for New Graduate Students**

To get started at the university, please check your profile in MyRed (you uploaded your transcript through this program when you applied) to make sure the university has your current Lincoln address, phone number, and email. You may also want to get a huskers.unl.edu email address at <http://huskers.unl.edu/liveedu/>. (You will be able to use this even after you complete your degree at UNL.) You should always keep your most current information and emergency contact information listed with Amanda Lager-Gleason, the graduate program specialist in the Biological Systems Engineering Department, and in MyRed. You will have an office assigned to you while you are a graduate student at UNL. Amanda Lager-Gleason assigns office space for our department.

The following checklists were prepared by the Office of Graduate Studies to help you orient yourself to graduate school. You will definitely want to meet with your advisor to choose which classes to enroll in. The enrollment process is all online, and you will complete it through MyRed.

### **Domestic Students**

Follow the checklist on the Office of Graduate Studies' website at <http://www.unl.edu/gradstudies/welcome/checklist?us>

If you have an assistantship, you will want to visit the BSE business center in Chase Hall to get on the payroll. Please bring your driver's license, your social security card, and a voided check.

### **International Students**

Follow the checklist on the Office of Graduate Studies' website at <http://www.unl.edu/gradstudies/welcome/checklist?i>

If you have an assistantship, you will want to visit the BSE business center in Chase Hall to get on the payroll. Please bring your passport, your I-94, your social security card, and a voided check.

## Appendix III. Forms

**Biological Systems Engineering Department**  
**Graduate Student Teaching/Extension Experience Form**



**Student:** \_\_\_\_\_

**Date:** \_\_\_\_\_

### Summary and scope

The student will do the following:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Approval Plan (include signatures and dates)

Student \_\_\_\_\_

Advisor \_\_\_\_\_

Sponsor (can be advisor) \_\_\_\_\_

Graduate Committee Chair \_\_\_\_\_

### Verification of Completion (include signature and date)

Sponsor \_\_\_\_\_

Once this form is completed, please give it to the graduate program specialist.

The latest version of the preparatory curriculum is available at:  
[http://engineering.unl.edu/downloads/files/Grad\\_PrepCurriculum.pdf#page=1&zoom=auto,-265,542](http://engineering.unl.edu/downloads/files/Grad_PrepCurriculum.pdf#page=1&zoom=auto,-265,542)

**PREPARATORY CURRICULUM FOR ENGINEERING GRADUATE STUDENTS**

To: \_\_\_\_\_ Date \_\_\_\_\_

NU ID: \_\_\_\_\_

The Department of Biological Systems Engineering administers a Masters and Ph. D. program in Agricultural and Biological Systems Engineering. To succeed as engineers, a core of mathematics, science and engineering courses is required. Students who have not graduated from an ABET accredited engineering program should complete the following courses to be fully admitted graduate students: the list of courses taken shall be determined by the student's graduate advisory committee. The list includes courses offered at the University of Nebraska-Lincoln. Equivalent substitutes from other institutions will be accepted. Selected undergraduate courses, including a design class, may also be required in your area of study.

Course Title	Dept.	Course Number	Credit Hours	Requirement Met (Y/N), or, List Any Substitutes
Analyt. Geom. and Calc. I	MATH	106	5	_____
Analyt. Geom. and Calc. II	MATH	107	5	_____
Analyt. Geom. and Calc. III	MATH	208	4	_____
Differential Equations	MATH	221	3	_____
General Physics I (calc. based)	PHYS	211	4	_____
Fundamentals of Chemistry	CHEM	109/113	4	_____
Cell Structure and Function, or Organismic Biology	BIOS	102, or 103	4	_____
Fourth Science Class:				
General Physics II (calc. based), or Fundamentals of Chemistry II	PHYS CHEM	212 110/114	4 4	_____
Statics †	ENGM	223	3	_____
Dynamics	ENGM	373	3	_____
Mechanics of Elastic Bodies, or Principles of Process Engineering, or Introduction to Biomedical Engineering, or Introduction to Environmental Engineering	ENGM AGEN/BSEN BSEN BSEN/CIVE	325, or 303, or 317, or 326	3 3 3 3	_____
Transport Processes	AGEN/BSEN	344	3	_____
Thermodynamics	AGEN/BSEN MECH CHME	244, or 200, or 322	3 3 3	_____
Fluid Mechanics	MECH/CIVE CHME	310, or 332	3 3	_____
Electrical/Electronic Engr.	ELEC	211/215	3	_____

The following courses are also required for your area of study:

† Note: Students that have taken a Physics course that did not require calculus as a prerequisite must attain a grade of B or better in Engineering Mechanics 223 to continue in the program.

\_\_\_\_\_  
Graduate Advisor

\_\_\_\_\_  
BSE Graduate Committee Chair

I understand that I must complete these requirements.

\_\_\_\_\_  
Student

cc: Student File

## Appendix IV. Graduate Courses Offered in 2019/20

\*courses expected to be offered in Spring 2020 are based on instructor availability

### Fall 2019

AGEN 824 (together with AGEN 424) – Machine Design in Agricultural Engineering  
AGEN 953 – Advanced Irrigation and Drainage Systems  
AGEN/BSEN 841 (together with AGEN/BSEN 441) – Animal Waste Management  
AGEN/BSEN 853 (together with AGEN/BSEN 453) – Irrigation and Drainage Systems  
AGEN/BSEN 860 (together with AGEN/BSEN 460) – Instrumentation and Controls  
AGEN/BSEN 889 – Seminar I  
AGEN/MSYM 836 (together with AGEN/MSYM 436) – Embedded Controls for Agricultural Applications  
BSEN 814 (together with BSEN 414) – Medical Imaging Systems  
BSEN 816 (together with BSEN 816) – Introduction to Biomaterials  
BSEN 845 (together with BSEN 445) – Bioprocess Engineering  
BSEN 855 (together with BSEN 955) – Nonpoint Pollution  
BSEN 858 (together with BSEN 458) – Groundwater Engineering  
MSYM 816 (together with MSYM 416) – Sensor and Control Systems  
MSYM 852 (together with MSYM 452) – Irrigation Systems Management  
MSYM 869 (together with MSYM 469) – Bio-Atmospheric Instrumentation

### Spring 2020\*

AGEN/BSEN 951 – Advanced Mathematical Modeling  
AGEN/BSEN 989 – Seminar II  
BSEN 818 (together with BSEN 418) – Tissue Engineering  
BSEN 822 (together with BSEN 422) – Pollution Prevention  
BSEN 846 (together with BSEN 446) – Unit Operations in Bioprocessing  
BSEN 879 (together with BSEN 479) – Hydroclimatology  
BSEN 957 – Modeling Vadose Zone  
MSYM 833 (together with MSYM 433) – Equipment and Tractor Testing  
MSYM 855 – Advanced Irrigation Management  
MSYM 862 (together with MSYM 462) – Equipment Systems  
MSYM 865 (together with MSYM 465) – Food Engineering Unit Operations  
MSYM 869 (together with MSYM 469) – Bio-Atmospheric Instrumentation  
MSYM 875 (together with MSYM 475) – Water Quality Strategy