

Graduate Student Handbook 2016-2017



Department
of Food Science
and Technology

UNIVERSITY OF
Nebraska
Lincoln

TABLE OF CONTENTS

About This Manual	2
Introduction.....	2
Graduate Program Organization	3
Department Graduate Committee	3
Advisors.....	3
Supervisory Committee	3
Programs of Study.....	4
M.S. Programs of Study	4
Ph.D. Programs of Study.....	5
Seminars	6
Teaching Experience.....	6
Assistantships	7
Summer Registration.....	8
Annual Reviews.....	8
Comprehensive Examinations.....	9
M.S. Option I	9
M.S. Option II & III	10
Ph.D.	10
Thesis and Dissertation.....	12
Final Examinations	13
Summary of Graduate College and Departmental Deadlines	13
Checklist for M.S. Programs.....	14
Checklist for Ph.D. Programs	15
Miscellaneous Information.....	16
Appendix I - FDST Course Descriptions	18
Appendix II - Special Events and Workshops	21
Appendix III - Fellowships and Scholarships.....	22
Appendix IV – New Student Checklist.....	23

About This Manual

The purpose of this manual is to provide a summary of policies and procedures of the Food Science and Technology graduate program. All graduate students should refer to this manual as a reference throughout their program. **This manual, however, is not a replacement for the current UNL Graduate Studies Bulletin**, 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.

Introduction

Welcome to the Department of Food Science and Technology at the University of Nebraska–Lincoln and congratulations on your acceptance into our graduate program!

As you will soon discover, the Food Science and Technology program at UNL is one of the best in the U.S, with cutting-edge research programs, outstanding teachers, and dedicated mentors. The faculty has received national awards for excellence in research, teaching, advising, and service. Our research programs on food allergens, food safety, gut health, genomics and molecular microbiology, nutraceuticals, microbial modeling, image analysis, analytical chemistry, cereal biochemistry, and bioprocess engineering are outstanding. Our professors receive federal and industry grants, publish in high impact journals, and are invited to present seminars at major national and international conferences. After graduation, our students have accepted industry positions at General Mills, Nestle, Kraft, ConAgra, Cargill, Unilever, and other major food companies. Other graduates have obtained research positions at the USDA, CDC, or other research institutions. Many graduates have gone the academic route, obtaining postdoctoral appointments at the University of Minnesota, Colorado Health Science Center, Harvard University, the University of Washington, and North Carolina State University. Several of our graduates are now professors at major research universities, as well as smaller liberal arts colleges, including the University of Nebraska, University of Missouri, Auburn University, Texas A & M, BYU, Wayne State College, and Chadron State College.

The Department of Food Science and Technology is very student-oriented. All food science classes, including laboratory sections, are taught by professors. Our professors are also dedicated mentors, and you are encouraged to meet with your advisor often, to attend seminars outside the department, and to meet with visiting scientists when they are on campus for seminars and meetings. You are strongly encouraged to take advantage of the many other enrichment opportunities that exist on the UNL campus. In addition, you will conduct your research in modern, state-of-the-art laboratories that contain equipment and instruments rarely available to food science students.

It is our hope that your experiences at UNL and in our department will allow you to reach your educational and professional goals. Our Department's past successes have occurred as a result of the hard work performed by the many excellent students who have graduated from our program. Future success, however, depends on you. The more you put into your graduate work, the more you will gain. You will be the benefactor in your preparation for a professional career. Please let us know how we can help you succeed.

Graduate Program Organization

Department Graduate Committee

The mission of the Graduate Committee is to maintain excellence in the departmental graduate program. The Departmental Graduate Committee consists of four Food Science and Technology faculty members, including the Chair, that are elected by the departmental faculty. 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 is responsible for signing forms, making TA assignments, and distributing thesis copies to Supervisory Committees.

Advisors

Each graduate student must have a major advisor. It is also permissible to have a co-advisor. The major advisor advises the student regarding course work and general academic requirements, but most importantly, guides the student through their research program. The major advisor also serves as the chair of the student's degree committee and assists the student in selecting committee members.

Supervisory Committees

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 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 Oral examinations prior to conferring the M.S. and Ph.D. degrees.

M.S. Committee. The Supervisory Committee for M.S. students consists of a minimum of **three members**. Faculty from other departments may serve on the M.S. Supervisory Committee, but at least two must be Food Science and Technology faculty. The student's major advisor serves as the Committee chair. The Supervisory Committee must be formed and meet before one-half (i.e., 15 credits - third semester) of the student's program of study has been completed. However, it is strongly recommended that this meeting occurs sooner, before the end of the student's second semester. There is no form required for this step.

Ph.D. Committee. The Supervisory Committee for Ph.D. students consists of at least **four faculty members**, including at least **one external** to the Department of Food Science and Technology but within the University of Nebraska System. It is beneficial to have five members on the committee in the event one member is on sabbatical or is otherwise unavailable. The committee should be formed before the end of the second semester or before a total of 45 graduate credit hours, including M.S. degree credits (if applicable), have been completed. The student must then submit the "**Appointment of the Supervisory Committee**" form to the Graduate Committee chair for his or her signature. After approval by the Graduate Committee Chair, this form is then given to the Department's graduate secretary and forwarded to the Dean of Graduate Studies for final approval. Once established, the Supervisory Committee must meet within three weeks to review and act on the student's proposed course program and research topic. Also, it is at this meeting when two "Readers" are assigned. The readers must be members of the Supervisory Committee, exclusive of the Chair(s).

Eventually, it will be the readers' responsibility to review and approve the dissertation prior to the Final Oral Examination (see below). Students seeking a minor are required to have a graduate faculty member from the minor program on their Supervisory Committee. The minor representative may serve as the Outside Representative on the committee. To assist you in selecting faculty members for your committee, please view current faculty and their interests at <http://foodsci.unl.edu/faculty>.

Programs of Study

Both M.S. and Ph.D. programs of study consist of courses considered necessary for the respective degree program for that student. Programs of study are intended to be flexible to meet the educational objectives of the student and to build on previous academic experiences. In preparing M.S. and Ph.D. programs, students should consult with their advisor and supervisory committee, and should also refer to the current [Graduate Studies Bulletin](#). Course descriptions and Graduate College minimum requirements are presented in the Bulletin. Course descriptions of Food Science and Technology courses are also included in Appendix I of this document. Only courses with 800 or 900 level course numbers can be counted for graduate credit.

According to Department policy, all M.S. and Ph.D. students should be proficient in the core areas of food science, namely, food microbiology, food chemistry, food analysis, and food engineering. Therefore, unless the student has already taken the appropriate core course or its equivalent, programs of study should include Food Microbiology (FDST 805), Food Chemistry (FDST 848), Advanced Food Analysis (FDST 858), and Heat and Mass Transfer (FDST 363). Whether or not the labs for these classes should be taken is up to the student's supervisory committee. Note that FDST 363 is not a graduate level course, so those 3 credits are not counted on the program of study. However, it is perfectly permissible to take FDST 363 on a Pass/No Pass basis.

In general, programs of study should also include at least one graduate level course in statistics and biochemistry. It is up to the Advisor and the Supervisory Committee to determine if the program of study satisfies these requirements. Beyond these courses, the student, along with the Supervisory Committee, should select whatever additional courses best support the student's research and overall academic program.

M.S. Programs of Study

There are three degree options for the M.S. program, Option I, Option 2, and Option 3. The Option I degree is the thesis or research option and is the one most M.S. students in Food Science and Technology pursue. This is the option that should be followed by students preparing for careers in research or who are considering a Ph.D. Options II and III are non-research options, no thesis is required, and both are considered terminal degrees. Course requirements for the M.S. options are described in detail in the Graduate Bulletin and are summarized as follows:

Option I: Students must earn a minimum of 30 semester hours of graduate credit consisting of at least 20-24 credits of regular course work (including seminar and teaching assistant credits), and 6-10 thesis research credits (FDST 899). Within the coursework, 8 hours of credit, must be earned in courses open exclusively to graduate students (900 level or 800 level without 400 counterparts). At least one-half of the required work, including thesis credits, must be in Food Science and Technology.

The remaining work may be in supporting courses or in a minor consisting of a minimum of 9 semester hours. Students pursuing a minor should consult with the department issuing the minor to select appropriate courses.

Option II: This non-thesis/non-research option is primarily pursued by students who are not pursuing graduate study beyond the M.S. degree and do not intend to be involved in a research-oriented career. Under this option a student must earn a minimum of 36 credit hours in courses representing a major and a minor. Included in the 36 credits are at least 18 in FDST and 9 in the minor. At least 12 of the 36 hours must be earned in courses open exclusively to graduate students (900 level or 800 level without 400 counterpart). A faculty member from the Minor department must be represented on the Supervisory Committee. In addition, the Minor department should be consulted for specific course requirements.

Option III: This non-thesis or non-research option is similar to the Option II, in that the student must still earn a minimum of 36 semester hours of credit. In addition, at least 18 credits must be earned in courses open exclusively to graduate students (i.e. 900 or 800 level without 400 counterparts). The program must also include not fewer than 18 hours in FDST. However, no minor is required.

The program of study for the M.S. degree (all options) is established by filing a "**Memorandum of Courses**" form with the Graduate Studies office. **The Memorandum of Courses must be filed before the student has received grades in more than one-half of the prescribed program.** 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 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.** Course work exceeding ten years will not apply toward the partial fulfillment of the degree requirements for the master's degree at the University of Nebraska-Lincoln.

Ph.D. Programs of Study

Guidelines for the Ph.D. Program of Study are described in detail in the Graduate Bulletin. A minimum of 90 semester hours of graduate credits, beyond the B.S. degree, is required. At least 45 of those credits must be completed at the University of Nebraska. A minimum academic residency at UNL is also required (students completing part of their Ph.D. program at another institution should consult the UNL Graduate Studies Bulletin for details).

At least one-half of the graduate credits must be completed in Food Science and Technology. If a student declares a minor field of study, a minimum of 15 credits must be completed in the minor, including 6 hours in courses open exclusively to graduate students. Students should consult with the department issuing the minor to select appropriate courses.

Students should be aware that other than the 90 total credit requirement, there is no specific requirement for actual course credits for the Ph.D. beyond including a minimum of 12 hours of dissertation (999) credits. However, in general, Ph.D. programs in Food Science and Technology normally include about half, or 45-50 credits in actual courses, and 40-45 dissertation credits (FDST 999).

Students that have a M.S. degree are generally able to transfer 30 credits toward the 90 needed for the Ph.D., but this is subject to approval by the student's Supervisory Committee and the Dean of Graduate Studies.

The program of study must be submitted to the Graduate Studies office before the student has completed 45 credit hours. The Supervisory Committee should meet within the same semester of its appointment to review and approve the program of study and general area of research for the dissertation. A "**Program of Studies for the Doctoral Degree**" is then forwarded to the Graduate Studies office. Any subsequent changes in the program or in the dissertation topic must be approved by the Supervisory Committee and the action reported to Graduate Studies. The student's doctoral program is to be completed no later than 8 years from the filing of the Program of Studies with the Office of Graduate Studies.

Seminars

Seminars are a very important part of graduate education. Seminars provide the opportunity to develop skills in organizing and presenting technical information to a group of peers and cultivate awareness of current research in food science. **Therefore, all M.S. and Ph.D. students will be expected to enroll for graduate seminar (FDST 951) every semester.** The only exception will be for those rare situations where another class is held at the same time as FDST 951.

There are two sections of FDST 951 listed in the Course Bulletin. Section 001 is intended for students who will present a research seminar during that semester. Section 002 is for students who will attend the seminar but will not be making a presentation. Typically, most students will enroll in section 002, and only when they have sufficient data to present a research seminar will they enroll in section 001. M.S. students must present one seminar during their program of study, and Ph.D. students must present two research seminars. **Note:** Ph.D. students that presented a seminar during their M.S. degree in FDST need only to present once. During all other semesters, students should register for section 002. Students receive a letter grade for section 001 and a Pass/No Pass grade for section 002.

Option II and Option III M.S. students are expected to attend seminar (section 002), but are not required to present a seminar.

Teaching Experience

According to departmental policy, all regularly enrolled students seeking the M.S. or Ph.D. are expected to obtain experience as a teaching assistant (TA). All M.S. students are required to complete a one-semester laboratory assignment. All Ph.D. candidates are required to complete a one-semester laboratory assignment **and** a one-semester lecture assignment. However, all TA assignments are subject to departmental needs (see below). On occasion, some students may be assigned to serve as a TA for two laboratory courses. TA assignments for both first and second semesters are made in June or July. Students should include in their program of study one credit of FDST 896 for each TA experience. **Note:** Ph.D. students that served as a TA during their M.S. degree in FDST need only to earn 1 additional TA credit.

A special section of FDST 896 for TA credit is listed in the Schedule of Classes, and students must register on a **Pass/No Pass** basis. In addition, a "TA Record of Completion" form must be filled out by the student, signed by the instructor and major advisor, and submitted to the Graduate Secretary to verify completion of the assignment. Policies for appointment of TA's, responsibilities, and evaluations are discussed elsewhere in this document.

The TA assignments are made by the Chair of the Graduate Committee, after consultation with the faculty. These assignments are made around June and are based primarily on course needs, with laboratory courses given preference. The Graduate Committee Chair will try to match each potential TA's previous training, stated interest, and background with a course of similar content. Students will be asked to provide this information and to indicate their preference for assignment. After the selection process, the student is informed of the assignment (around June/July).

All TA's should expect to make an average time commitment of at least 10 hours per week. The actual teaching responsibilities vary depending upon the course, the TA, and the professor. Prior to the beginning of the semester, the professor in charge of the course and the TA should meet to discuss the responsibilities that each will have in the course. TA contributions to discussions, laboratories, short-term lecture assignments, etc., should be determined at this time. If laboratory sections require information presented in the lecture and the professor expects the TA to attend lectures, this should be specified as a responsibility.

Student evaluations of the TA at the completion of the course are strongly encouraged. Formal and informal evaluations and constructive criticism by the supervising professor will also help the TA improve his/her teaching skills. A standard TA evaluation form is posted in the Appendix.

Assistantships

General Policies. Almost all FDST graduate students receive a Graduate Research Assistantship (RA). These RA's 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 is a year-round commitment that requires a full-time (not full time if only paid for 19.6 hrs/week) effort. This means graduate students are expected to work during academic holidays such as spring break, semester break, etc. 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). Students on fellowships have the same requirements.

Research Areas. Graduate students are expected to pursue an academic area and conduct research consistent with the interests of the major advisor. The research project enables the student to pursue his/her thesis/dissertation objectives and to satisfy the research objectives of the major advisor. **The expected end result is a thesis for the student, the completion of grant objectives for the professor, 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 also 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 Research 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 may be given office space provided such facilities are available.

Tuition Benefits and Registration Requirements

All graduate students receiving an assistantship qualify for 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 8-week session and 2 credit hours in the 2nd five-week session) but is not required to do so. If you do not enroll, you will have limited access to university facilities, such campus recreation, health center, etc. International students should visit with the International Student Scholar Office to determine status of VISA. For additional information see the Guidelines for Graduate Assistants on the Graduate Studies website.

Annual Reviews

Annual Reviews and Expected Student Performance

All Ph.D. and M.S. Option I students are required to complete the “**Graduate Student Annual Progress Report form**” and meet annually with their major advisor and supervisory committee. At these reviews, the student will present a summary of his/her academic and research accomplishments during the previous year, and the committee will determine whether or not the performance was satisfactory. The signed form should be presented to the FDST Graduate Support Staff by June 15 for inclusion in the student’s file.

In the event that the student's academic and/or research performance has not been satisfactory, the major advisor will notify the student and the Graduate 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.

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 FDST courses.
2. A minimum grade of C or P (Pass) is required for 800-level courses in minor, collateral, or supporting areas of work. Note: If a student receives a B- 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.

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

A student failing to receive a minimum acceptable grade for graduate-level credit may not continue his/her program of studies without permission of the supervisory group or the departmental graduate committee. Unacceptable grades must be reviewed and a recommended course of action submitted by the supervisory committee and approved by the Department Graduate Committee before continuing a graduate program.

Comprehensive Examinations

M.S. Students - Option I

The M.S. Comprehensive Examination consists of a research proposal on the student's intended project that the student will write and then orally defend in front of the student's Supervisory Committee. This presentation should be made prior to completion of 20 credit hours of graduate course work. The defense involves preparation of a written research proposal that meets the following guidelines:

- 8-12 double-spaced pages, exclusive of literature citations. The written proposal should include the following sections:
- Summary – A brief (less than one page) overview of the full proposal.
- Justification, Objectives, Hypotheses, and Significance – A short statement (about one page) of why the research is being done, the overall and specific objectives, the hypotheses being tested, and what the significance of the anticipated results will be.
- Literature Review – The review (2-4 pages) should be confined to the most relevant articles and be as current as possible. This is not expected to be a comprehensive review, but should establish a basis for the intended research.
- Preliminary Results – Include any relevant data (tables, figures).
- Materials and Methods – Specific procedures, including experimental design, analytical methods, and statistical methods for evaluation of data, should be described (3-4 pages). Standard or well-established methods need not be listed, but should be referenced. Procedures should be listed in an order corresponding to the objectives.

- Expected Outcomes – a short description (less than one page) of the major results and their significance.
- Literature Cited – A standard journal format should be used as approved by the supervisory committee.

The major advisor should be involved in 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 Graduate Committee Chair at least two weeks prior to the date of the oral defense. The Committee Chair will then distribute the proposal to the Supervisory Committee. Proposals submitted less than two weeks before the scheduled defense or that do not meet the guidelines outlined above, will not be accepted.

The student will present the proposal in the form of a 20 – 30 minute seminar to their 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. An “**Evaluation of Research Proposal and Defense**” form will be used by committee members to provide constructive feedback to the student. The student is responsible for distributing the form to the committee members. The Supervisory Committee may recommend unconditional approval of the project, conditional approval (the committee may specify remedial action to improve writing skills, additional course work to improve knowledge in a technical area critical to the research, or other action as necessary), or may recommend that the proposal not be approved. In this latter case, the student will be given a second opportunity to prepare and defend a revised proposal.

M.S. Students – Options II and III

Option II students are required to write a literature review paper to indicate their ability to understand and summarize the literature in the field of Food Science. This review paper should be 10-12 double-spaced pages, exclusive of literature citations, in a form suitable for publication. The topic should be agreed upon by the student and his/her major advisor. If the student has performed laboratory research, a research paper suitable for publication is acceptable. In either case, the student should register for 1 credit of FDST 896 during the term that the paper is written or the research is done. The review paper must be presented to the major advisor at least two weeks prior to the anticipated graduation date. In addition, the student is also required to present a seminar on his/her review or research paper during the regularly scheduled FDST 951 seminar series. **There is no final oral examination for Option II students. Note that on the **Final Examination Report** form, the review paper serves as the "Written Comprehensive Examination" and that the "Final Oral Examination" is waived.**

Ph.D. Students

Ph.D. students are required to complete both a Written and an Oral Comprehensive Exam.

The Written Comprehensive Exam should be taken prior to completion of 50 credit hours. According to the Graduate Bulletin, “the written comprehensive examination is not a repetition of course examinations but is an investigation of the student’s breadth of understanding of the field of knowledge of which his/her special subject is a part.”

The Ph.D. Written Comprehensive Exam will consist of four to five questions related to the student’s research area that the advisor will solicit from the members of the student’s Supervisory Committee. Each faculty member will then grade the student’s answer to their question. A passing grade (B or better) is required for all questions.

Answers receiving a grade of less than B will be reviewed by a second faculty grader. If the second grader is in agreement, the student will be given the opportunity to answer another question from that committee member. However, in the event that a non-pass grade (less than a B) is received on three or more Comprehensive Examination questions, the student will not be permitted to proceed in the Food Science Ph.D. program. If a student receives less than a grade of B on any of the re-tested questions (see above), he/she will not be allowed to proceed in the Ph.D. program.

The Ph.D. Oral Comprehensive Exam can be taken following successful completion of the Written Comprehensive Exam. For the Oral Comprehensive Examination, the student will be required to write and orally defend a research proposal describing his/her thesis research. The Oral Comprehensive Examination must be accomplished within eight months of the completion of the Written Comprehensive Examination.

Research proposals should follow the format used by the USDA, NIH, or NSF. 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 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 Graduate Committee Chair at least two weeks prior to the date of the oral defense. The Committee 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 policy manual will not be accepted.

The student will present the proposal in the form of a 30 minute seminar to their 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. An “**Evaluation of Research Proposal and Defense**” form will be used by committee members to provide constructive feedback to the student. The student is responsible for distributing the form to the committee members. The Supervisory Committee may recommend unconditional approval of the project, conditional approval (the committee may specify remedial action to improve writing skills, additional course work to improve knowledge in a technical area critical to the research, or other action as necessary), or may recommend that the proposal not be approved. In this last case, the student will be given a second opportunity to prepare and defend a new proposal.

Following successful completion of the Oral 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 he/she receives the doctoral degree, even if the student has already met the total dissertation hours on their approved program of study.

Thesis and Dissertation

Option I M.S. candidates must complete a M.S. thesis and all Ph.D. candidates must complete a Ph.D. 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 UNL Graduate Studies. Due dates for the relevant academic year can also be obtained from the 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 by the major advisor, copies of a thesis in a format ready for reading and review by the supervisory committee will be submitted by the student to the Graduate Committee Chair. The Graduate Committee Chair will then be responsible for distributing the copies to the Supervisory Committee members. **The copies must be received by the Graduate Committee Chair not less than two calendar weeks prior to the scheduled date of the final examination. Although the Graduate Studies office allows students to submit readers' copies one week prior to the defense for summer graduation, the Departmental requirement is still two weeks.**

It is the responsibility of the student to notify the Graduate Committee Chair of the scheduled date for the final examination. If the Graduate 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 advisor 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 committee members ample time for review of his/her thesis, especially during summer months when conferences and vacations may be occurring.

The following policy pertains to the submission of the Doctoral dissertation to the Supervisory Committee prior to a candidate's oral defense:

Following review of the dissertation by the major advisor, the student must then 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. 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 then provide hard copies of the dissertation to the Graduate Committee Chair who **will then distribute those copies to the Supervisory Committee members. Note, the copies must be received by the Graduate Committee Chair not less than three calendar weeks prior to the scheduled date of the final examination.** If the Graduate Committee Chair does not receive dissertation copies in acceptable format at least three weeks prior to the scheduled date, he/she will automatically notify the advisor that the examination has been canceled.

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

M.S. degree

Final Examinations

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 first part of the examination consists of a 25-30 minute 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.

After successful completion of the final M.S. examination, the student should follow the 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 food science classes are held.**

Option II: The final oral examination is waived for Option II students. However, as stated above (see Comprehensive Examinations), the student is required to present a seminar on the review or research paper during the regularly scheduled FDST 951 seminar course.

Ph.D. degree

The final oral examination is conducted by the student's Supervisory Committee and deals principally with presentation and defense of the dissertation. The first part of the examination consists of a 35–40 minute seminar on the student's research results. 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.

After successful completion of the final Ph.D. examination, the student should follow the 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 dissertation.

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 food science classes are held.**

Summary of Graduate and Department Deadlines

Links to most forms are shown in Appendix I. Forms are also available from the Graduate Studies Coordinator in the department office, from the [Office of Graduate Studies](#), or from the [Department](#) web sites. Specific dates for graduation deadlines, scheduling final examinations, depositing final copies of thesis or dissertation, etc. can be obtained from the Graduate Studies website. Graduate students are expected to provide their advisor with one bound copy of their completed thesis or dissertation.

Graduate students are encouraged to use the checklists on the following pages to make certain that the appropriate steps and forms have been completed within the prescribed times.

Checklist for M.S. Programs

- The “**Memorandum of Courses**” for the Master’s Degree form must be received by the Graduate College before the completion of one-half (by 3rd semester) of the program of study.
- Option I students must complete the Comprehensive Examination research proposal prior to the completion of 20 credit hours of graduate course work, exclusive of deficiency and research credits.
- Each Spring, complete the “**Graduate Student Annual Progress Report form**” and meet with your supervisory committee.
- Students must file an “Application for Graduation” early in the semester in which they intend to graduate. 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. Note that, for the purpose of this form, the Research Proposal serves as the “Written Comprehensive Exam”.

- Copies of the thesis must be submitted to the Graduate Committee Chair and a copy emailed to the master’s degree specialist in the Office of Graduate Studies at least two weeks prior to the scheduled final examination. For Option II students, the review or research paper must be submitted to the advisor at least two weeks prior to the intended graduation date.

Checklist for Ph.D. Programs

- "Appointment of the Supervisory Committee" must be filed with the Graduate Studies Office at least three weeks prior to the initial committee meeting, preferably during the first semester of the program.
- A "Program of Studies for the Doctoral Degree" must be submitted to the Graduate College before the student has completed 45 credit hours (including M.S. or transfer credits).
- Each Spring, complete the **Graduate Student Annual Progress Report form** and meet with your Supervisory Committee.
- The written Comprehensive Examination must be completed prior to completion of 25 credit hours (including research credits) beyond the M.S. degree (35 credits if the student has a M.S. in a field other than Food Science).
- The Comprehensive Examination includes a written and oral defense of the research proposal which must be accomplished within eight months of completion of the initial written examination.
- The "Application for Admission to Candidacy" must be filed after the student has successfully completed both phases of the Comprehensive Examination. This report must be filed with the Graduate College at least seven months prior to the final examination.
- Students must file an "Application for Graduation" 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.
- 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).

Miscellaneous Information

Research or Thesis Credits. All graduate students enrolled for Master's Thesis (FDST 899) or Doctoral Dissertation (FDST 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 non-business 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 Graduate Studies Coordinator has your current e-mail as this is our primary means of communication.

Awards and Scholarships. A limited number of scholarships and fellowships are available to graduate students to supplement research assistantships (see Appendix IV). Graduate students are especially encouraged to apply for travel scholarships (Larrick Scholarships) that are awarded to students presenting their research at conferences and industry conventions. Students should contact their major advisor, the Graduate Committee Chair, Graduate Studies Office 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 Food Science and Technology. Students in related disciplines (e.g., Nutritional Sciences, Animal Sciences, Biological Systems Engineering, and Biological Sciences) may earn a Minor in Food Science and Technology. Requirements for a Minor include: (1) completion of 9 (M.S. programs) or 16 (Ph.D. programs) graduate credits in Food Science and Technology and (2) a departmental representative on the student's supervisory committee. The courses could be of the student's choosing, but must be actual Food Science and Technology courses (i.e., taught by Food Science and Technology faculty) and must include at least one core course (either Food Chemistry, Food Microbiology, Food Engineering, or Food Analysis). 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 Food Science and Technology 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. The student will be notified at a later date of the amount for which they will be responsible. If the student does not require the University health insurance, the student will need 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 it is expected that a 30-day written notice 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 completing 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 IRB/CITI requirement go to <http://research.unl.edu/researchresponsibility/human-research-protections-programirb-forms-policy-and-guidance-page/>)

Appendix I. Food Science and Technology Course Descriptions

(Note: Graduate level courses are 800 and above)

363. Heat and Mass Transfer (3 cr I) Lec 2, rec 1. Prereq: MATH 104 or 106; MSYM 109 or PHYS 141 or 151. Fundamentals of food engineering including material and energy balances, fluid mechanics, heat transfer, and mass transfer.

803. Food Quality Assurance (3 cr II) Lec 3. Prereq: FDST 205; STAT 218. Quality related issues as they pertain to manufacturing, processing and/or testing of foods, with a major emphasis on food regulations, statistical process control, and Hazard Analysis of Critical Control Points (HACCP).

805. Food Microbiology (BIOS 845) (3 cr I) Lec 3. Prereq: BIOS 312; CHEM 251; BIOC 321; or permission. Ecology, physiology, molecular biology, and interactions of microorganisms in foods. Organisms that cause food borne disease and spoilage, the effect of food processing on the microbiota of foods, kinetics of killing microorganisms and food preservation, foods produced by microorganisms, and regulations and quality control practices.

806. Food Microbiology Laboratory (BIOS 846) (2 cr I) Lab 6. Prereq: Parallel registration in FDST /805 or permission. Laboratory study of the microorganisms in foods and the methods used to study them as discussed in FDST 805.

812. Cereal Technology (3 cr II) Lec 2; lab 3. *Offered spring semester of even-numbered calendar years.* Chemistry and technology of the cereal grains. Post-harvest processing and utilization for food and feed. Current industrial processes and practices, with an explanation of the theoretical basis for these operations.

815. Molds and Mycotoxins in Food, Feed, and the Human Environment (3 cr I) Lec 2, lab 3. Prereq: FDST 405/805/ BIOS445/846; and FDST 406/806/ BIOS 446/845. Offered fall semester of odd-numbered calendar years. Occurrence, growth, and mycotoxin production of molds in human foods, animal feeds, and the environment. Spoilage, mycotoxin production conditions, toxicity, and pathological effects. Culture media, methods and techniques for enumerating and identifying molds; analytical methods for mycotoxins, and effects of food and feed processing on mycotoxin stability.

825. Food Toxicology (2 cr II) Lec 2. Prereq: FDST805, BIOC321, or equivalent, or permission. *Offered spring semester of odd-numbered calendar years.* Toxic substances that may be found in foods with emphasis on bacterial toxins, mycotoxins, and naturally occurring toxicants of plants, animals, and seafoods. Basic toxicological methodology and the effects of food processing and handling on foodborne toxicants.

829. Dairy Products Technology (3 cr II) Lec 2, Lab 3. Prereq: Introductory course in food science. *Offered spring semester of odd-numbered calendar years.* Physical, chemical, and microbiological properties of milk. Fluid milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.

830. Sensory Evaluation (STAT 430/830) (3 cr I) Lec 2, lab 3. Prereq: Introductory course in statistics. *Offered fall semester of odd-numbered calendar years.* Food evaluation using sensory techniques and statistical analysis.

848. Food Chemistry (3 cr I) Lec 3. Prereq: CHEM 251, BIOC 321. Molecular components of various foods and the reactions of these components during the processing of foods.

849. Food Chemistry Laboratory (1 cr I) Lab 3. Prereq: FDST 848 (or parallel); BIOC 321. Experiments involving the isolation, purification, and characterization of the molecular components of foods.

855. Microbiology of Fermented Foods (2 cr II) Lec 2. Prereq: FDST 805. *Offered spring semester of even-numbered calendar years.* Physiology, biochemistry, and genetics of microorganisms important in food fermentations. How microorganisms are used in fermentations and the effects of processing and manufacturing conditions on production of fermented foods.

855L. Microbiology of Fermented Foods Laboratory (1 cr II) Lab 3. Prereq: FDST 805 and parallel FDST 855. *Offered spring semester of even-numbered years.* Companion course to FDST 455/855. Must be enrolled concurrently in FDST 455/855.

858. Advanced Food Analysis (3 cr II) Lec 2, lab 3. Prereq: FDST 848 and FDST 849. Theory and application of molecular and atomic spectroscopy, immunochemistry, and thermal methods to the analysis of foods. Theory and application of chemical separation techniques to the isolation of food constituents.

860. Food Product Development Concepts (3 cr II) Lec 2, lab 3. Prereq: FDST 805 and FDST 848. Develop a commercially viable food product using chemical, microbiological and sensory analysis principles, and marketing and packaging sciences.

865. Food Engineering Unit Operations (MSYM 465/865) (3 cr II) Lec 2, lab. 3. Prereq: FDST 363. Unit operations and their applications to food processing.

870. Nutraceuticals and Functional Foods (3 cr II) Lec 3. Prereq: BIOC 321 or BIOC/CHEM/BIOS 431/831. FDST 870 is offered in odd-numbered calendar years. Impact of natural compounds on human health. Inflammation, cancer, heart disease, and the impact of gut micro-flora on health.

880. Advanced Food Science: Selected Topics (2-8 cr). Lec 2. Topics offered on a rotating basis, in alternate years, as indicated:

- A. Food Carbohydrates (2 cr II) Prereq: FDST 848, CHEM 431/831 or permission. *Offered spring semester of odd-numbered calendar years;*
- E. Food Flavors (2 cr I), Prereq: FDST 848 or equivalent. *Offered fall semester of even-numbered calendar years;*
- L. Food Lipids (2 cr I), Prereq FDST 848 or equivalent. *Offered fall semester of odd-numbered calendar years;*
- P. Food Proteins (2 cr II), Prereq: FDST 848 or CHEM 431/831 or permission. *Offered spring semester of even-numbered calendar years.*

896. Independent Study in Food Science and Technology (1-5 cr) Prereq: 12 hrs Food Science and Technology or closely related areas or permission.

899. Master's Thesis (1-10 cr).

908. Advanced Food Microbiology (2-8cr). Current topics in food microbiology, offered on a rotating basis in alternate years, as indicated:

- B. Foodborne Pathogens (2 cr II) Lec 2. Prereq: FDST 805 (BIOS 845), BIOS 820, or permission. BIOC 831 and 832 recommended. *Offered spring semester, odd-numbered calendar years.* Survey of current research topics in the molecular biology of agents of foodborne disease. Includes structure-function analyses of toxin molecules and other virulence determinants; genetic mechanisms of phenotypic variation, coordinate regulation or virulence gene expression; mobile genetic elements that contribute to pathogenesis; invasion of host tissues; and stress-response systems.
- D. Food Mycology (2 cr I) Lec 1, lab 1. Prereq: FDST 805 (BIOS 845), FDST 806 (BIOS 846), or permission. *Offered fall semester, odd-numbered calendar years.* Foodborne filamentous micro-fungi or molds. Includes culture media and methods, and techniques

for enumerating and identifying molds belonging to the genera *Aspergillus*, *Penicillium*, *Fusarium*, *Alternaria*, *Cladosporium*, *Rhizopus*, *Mucor*, and others. Food spoilage by molds, mycotoxin production, and pathological effects.

- E. Readings in Food Microbiology (2 cr II) Lec 2. Prereq: FDST805 (BIOS845) or permission. *Offered spring semester, even-numbered calendar years.* Primarily a literature course that focuses on current topics in food microbiology. Articles from food microbiology, as well as other applied and basic microbiology journals reviewed and discussed. Recent advances in methodology and microbiological techniques emphasized.
- J. Gastrointestinal Microbiology (2 cr I) Lec 2. Prereq: BIOS 312 (General Microbiology). *Offered fall semester of even-numbered calendar years.* Introduction to the complex microbial populations that inhabit the gastrointestinal tracts of human and non-ruminant animals, and how they impact their hosts. Aspects of gut microbiota having medical or agricultural applications.

951. Advanced Food Science Seminar (1 cr, I, II, max 2).

996. Research in Food Science and Technology (1-8 cr).

999. Doctoral Dissertation (cr arr).

Appendix II. Workshops/Short Courses/Certificate Programs

The Department of Food Science and Technology and the Food Processing Center (FPC), the industry outreach arm of the Department, offer numerous short courses and workshops that students are eligible to enroll in and to **receive academic credit (FDST896)**. The following are offered at various times though the year (check with The Food Processing Center website: <http://fpc.unl.edu/>).

Better Process Control School

The course equips professionals with a scientific understanding of thermal processes and strategies of pathogen control, first and foremost *clostridium botulinum*. Each processor of low-acid or acidified foods is required to operate with a certified supervisor on hand at all times during processing. This course leads to appropriate certification that does not expire.

Applied Extrusion for Human and Pet Food Manufacturing

An intensive, hands-on workshop combining extrusion theory and techniques with extrusion exercises emphasizing real-world problem development. Participants will have access to a Wenger Manufacturing, Inc. TX-57 twin screw and an X20 single screw extruders, industry experts and faculty from the Department of Food Science and Technology.

Molds and Mycotoxins in Foods Short Course

This course is designed to address the concerns of the food industry in regard to molds and mycotoxins in foods. It will provide a basic understanding of the molds and mycotoxins that occur in cereal and other food products and the practical methods available for their detection, identification, and quantification.

Ingredients and Ingredient Functionality Workshop

The major ingredient classes (proteins, lipids, carbohydrates, and water) plus spices, flavors, colors, preservatives, and vitamins are discussed in morning lectures. In the afternoons, participants apply the science of ingredients in 2-hour laboratory sessions and 2-hour pilot plant sessions. The laboratory sessions emphasize hands-on bench top experiences demonstrating the functionality of various ingredients. The pilot plant sessions highlight ingredient functionality in a production environment.

Food Safety and Defense Certificate Program.

The Food Safety and Defense graduate certificate program serves the needs of industry and agencies that must protect the human food supply from accidental or deliberate contamination with pathogenic microbes and/or toxicants. In an era of terrorism and global food systems, effective control of food borne hazards requires advanced education. This certificate is aimed at professionals with a bachelor's degree who are working in a food industry related field and interested in furthering their knowledge of food safety and defense. Please visit http://www.unl.edu/gradstudies/prospective/programs/Cert_FoodSafety for more information.

Appendix III. Scholarships and Fellowships

FDST graduate students are eligible for numerous competitive scholarships and fellowships. Some are offered through the Department, College, or University, whereas others are from professional societies or other organizations. The FDST Graduate Studies Coordinator tries to keep track of these competitions and will make every effort to announce the availability of these fellowships in a timely manner via emails, newsletters, and the department website. However, it is up to you to make sure you are eligible and that you submit the required materials by the specified time. Below is a list of some of the Scholarships and Fellowships for which food science graduate students are eligible:

Administered by UNL:

The Henningsen Fellowship is a one-time award given to graduate students conducting research in poultry food science. Nominations are due about mid-February.

The Widaman Trust Graduate Fellowship is awarded to students conducting research in agriculture and medicine. Nominations are generally due late June.

Larrick Graduate Student Travel Grants support graduate student travel to professional and scientific meetings. The deadlines for submissions are May 15 and Nov. 15.

The Shear-Miles Fellowship is awarded annually to outstanding graduate students. Nominations are generally due late June.

The Skala Fellowship provides stipends to M.S. and Ph.D. students engaged in research related to industrial uses of agricultural products.

The Milton Mohr Program offers Graduate Fellowships for graduate students enrolled in biotechnology-oriented programs. Applications are due around mid-March.

Administered by Professional Organizations:

The Institute of Food Technologists (IFT) provides numerous fellowships for outstanding graduate students, as well as paper competitions at the annual meeting.

The American Society for Microbiology (ASM) provides travel fellowships to attend the annual meeting, as well as competitive fellowships for microbiology students. ASM also offers the Watkins Fellowship for students from underrepresented populations.

The American Chemical Society (ACS) provides numerous fellowships and scholarships for outstanding graduate students.

The American Association of Cereal Chemist (AACC) provides scholarships for graduate students and travel scholarships to the annual meeting.

International Association for Food Protection (IAFP) provides student travel scholarships to attend the annual meeting.

Appendix IV. New Graduate Students Checklist of Things to Do

- Obtain N-card, parking pass and/or bus pass
- Obtain building access and keys
- Update e-mail, address, phone and other information with the main office
- Locate departmental mailbox
- Get on the payroll (see Human Resources in the Department's Business Office) (U.S. Citizens need to bring driver's license, social security card and voided check)
(International students need to bring passport, I-94, social security card and voided check)
- Make sure you have health insurance

International Students

- International Student and Scholar Office:
 - To receive information on obtaining a Social Security number for tax purposes.
 - Take the English Language Test (ELT)
 - Check in at Graduate Studies to enable registration.