

Graduate Handbook

***Department of Food Science
University of Massachusetts
Amherst***

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Getting Started

- Order a building (Chenoweth) and lab key with the lab technician (ask your advisor who is your lab technician) for your lab.
- International students: Visit International Programs Office 70 Butterfield Terrace, Amherst. Link to the IPO website: <http://www.umass.edu/ipo/iss/>
 - Fall 2022 Mandatory International Student Orientation (ISO) is August 30 through September 1, 2022.
 - Check your UMass email for the messages from International Programs Office (IPO).
- Get a campus ID card from Whitmore room #168.
- Activate your UMass email address (<https://www.umass.edu/it/accounts/activate-your-account>).
- Give Moriah (mafahey@umass.edu) and your advisor the email address you check daily.
- Discuss and get approval for course selection for your degree with your advisor. Enroll the courses through <https://www.spire.umass.edu/>
- Discuss with your advisor your expected lab working hours and timing for your degree
- Sign up for and attend lab, fire, and biological safety (ask your advisor if this one is needed) trainings with environmental health and safety. A link to upcoming classes is here: <http://www.ehs.umass.edu/index.html>.
Check with your advisor to register for additional required safety course(s) that are required.
- If you are receiving a Graduate Assistantship, sign paperwork with Moriah (mafahey@umass.edu) so you can start getting paid.
- You may choose to order business cards from Print Services: http://www.umass.edu/print/products/business_cards.html.
- Learn how to use Science Citation, library resources, GraphPad/Origin/Sigmaplot data analysis software, and RefWorks/Endnote/Mendeley bibliography software. Check with your advisor on which software you should get and learn.
- Some suggested reading to get you started with independent research and technical writing:
 - Chapters 1, 4, 5, and 6 of *At the Bench, A Laboratory Navigator*;
 - George Whitesides' paper on writing a technical journal article: <http://onlinelibrary.wiley.com/doi/10.1002/adma.200400767/pdf>.
 - Purdue Online Writing Lab for *Avoiding Plagiarism*: (<http://owl.english.purdue.edu/owl/resource/589/01/>). Generally speaking, you must ALWAYS cite any reference you use in a text, and you must NEVER write word-for-word what someone else has already published (on the internet, in a book, or in a journal article). You must rephrase it and cite the original source. If you have any questions on what plagiarism is, contact your PI. Our library has a subscription to Turnitin, a software to detect plagiarism. It is a good idea to submit papers to Turnitin to ensure you're not 'accidentally' plagiarizing.
 - English Communication for Scientists from nature education (<https://www.nature.com/scitable/ebooks/english-communication-for-scientists-14053993/>)
- Other places on campus you may want to check out: Recreation Center for gym membership; Campus Center for campus store and Blue Wall Café; Peoples Market for snacks and coffee; Mullins Center for hockey and basketball games and shows; University Health Services for doctor appointments.
- Other useful University links:
 - Graduate Student Handbook from the Graduate School: <http://www.umass.edu/gradschool/policies-forms/graduate-student-handbook>
 - Tuition and Fee information: <http://www.umass.edu/bursar>

Graduate Student Information

University Costs

UMass Amherst tuition, fees, room and board rates are established each spring for the following academic year. [Learn more about university costs.](#)

Eligibility

There are several requirements that you must meet in order to be eligible for financial aid. [Learn more about eligibility.](#)

Student Employment Office

Most graduate students at UMass Amherst are hired through the graduate appointment process as teaching assistants, research assistants, interns, etc. Your best option for finding a research assistantship is to contact individual faculty. Visit [Student Employment](#) for more information.

Full-time Status

Students who completed all courses and thesis/dissertation requirements and take less than 9 credits in a semester, should request an override for full-time status. This can be done by e-mailing to Moriah (mafahey@umass.edu) in the main office and has to be done in the beginning of every semester you enrolled by both US and non-US students.

Procedure for handling problems arising between a graduate student and the faculty mentor

If a graduate student is dissatisfied with mentorship by his/her advisor, the student should bring this up with any Food Science faculty and/or lab technicians.

Master's Degree with Thesis

Course requirements

- The standard M.S. degree in Food Science involves the completion of total 30 graduate course credits. The minimum GPA (final) required for graduation is 3.0.
- Students must get approval from their advisor on course selection.
- Students should complete the following courses from different categories:
 - **Category 1:** At least 6 credits of Food Science courses at the 600- or 700- level are required excluding Thesis, Independent Study or Journal Club. One of the courses must be Research Methods (FS797R).
 - **Category 2:** One credit of seminar (FS791A) is required.
 - **Category 3:** Minimum 6 to a maximum of 10 thesis credits. Maximum 9 thesis credits can be registered per semester. Register for thesis credits every semester (16 maximum credits, class + thesis credits per semester) until all are taken.
- *Category 1:* Typically, two 700-level Food Science courses are offered each semester. Each graduate course is usually offered once every two years except Research Methods (FS797R) is offered every Fall semester.
- Students with a background in Food Science and previously took the following courses (or equivalent) need not repeat them but may enroll in other 500-level or above courses to fulfill their requirements.
 - Food Chemistry (FS541, FS542) or Food Analysis (FS581)
 - Food Microbiology (FS567) or Food Quality (FS590B)
 - Food Processing (FS561) or Elements of Food Process Engineering (FS575)

One course (3 or 4 credits, 400- level or above) may be from courses outside the Department. Note, if you take a 400-level course, this course must be outside the Department.

- Graduate students can take Teaching Experience (FS796T), an additional seminar with SAT (satisfactory grade, no presentation), or 1 credit journal club toward their degree requirements (either letter grade or SAT) toward their degree requirements (20 course credits). Note, the maximum journal club credits you can take is 2.
- Students should complete a thesis defense at the completion of their research project. The advisor may require a thesis proposal. The format of the proposal and thesis should be discussed with the advisor.

Credit transfer

- Maximum 6 Graduate credits can be transferred from a BS degree or another MS degree, if they were not required for the respective degree. To transfer, you will need to submit a correct form to the Graduate School. These forms can be found at <https://www.umass.edu/graduate/policies/forms-documents>
- For students completing 5-year BS/MS program (Accelerated Masters), an additional 6 credits can be transferred from the BS degree (double counted). Please submit a form for 'Transfer credits, Accelerated Masters'

- For students transferring unused credits from the previous MS program from another institution, please submit a form for 'Transfer credits, External'. Transfer credits should be done in the 1st semester

Establish thesis committee

- Student requests advisor should send an email to GPD requesting the appointment of thesis committee (at least 2 faculty members including the advisor) at least one month before the final defense.

Defense notification

- Student requests Moriah to send defense notification to all members of the department 1-2 days prior to scheduled defense.

After completion of defense

- Student requests advisor to send e-mail to GPD for results of defense, date passed, and committee names.
- Student submits the signed thesis signature sheet and signed Master's degree eligibility form (ask Moriah for template and set up DocuSign) to the graduate school after completion of successful defense.
- Student files thesis electronically to ScholarWorks@UMass Amherst

Checklist for Master's degree (with thesis)

| To do | Note | √ |
|---|---|---|
| All information details can be found at: https://www.foodsci.umass.edu/graduate/msphd-requirements/ms-thesis | | |
| Course requirement | <ul style="list-style-type: none"> • Students must get approval from your advisor on course selection • A total of 30 graduate course credits are required • Minimum GPA (final): 3.0 | |
| Thesis credits | <ul style="list-style-type: none"> • Minimum 6 to a maximum of 10 thesis credits • Maximum 9 thesis credits per semester • Register for thesis credits every semester (16 maximum credits, class + thesis credits per semester) until all are taken | |
| Category 1 | <ul style="list-style-type: none"> • At least 6 credits of Food Science courses at the 600 or 700 level are required • Must include Research Methods (FS797R) • Excluding Thesis, Independent Study, or Journal Club. | |
| Category 2 | <ul style="list-style-type: none"> • 1 credit of seminar (FS791A) for letter grade | |
| Category 3 | <ul style="list-style-type: none"> • Select one course in each area (total 9 credits) <ul style="list-style-type: none"> ✓ Food Chemistry (FS541, 542, or Food Analysis 581) ✓ Food Microbiology (FS567) or Food Quality (FS590B) ✓ Food Processing (FS561) or Elements of Food Process Engineering (FS575) • Students who took the above courses (or equivalent) do not repeat but instead enroll in other 500-level or above courses. • One course (3 or 4 credits, 400- level or above) can be from courses outside the Department. Note, the 400- level course must be outside the Department. • Students can take Teaching Experience (FS796T), an additional seminar with SAT (satisfactory grade, no presentation), or journal club (either letter grade or SAT) toward their degree requirements (20 course credits). | |
| Transfer credits | <ul style="list-style-type: none"> • Maximum 6 qualifying credits can be transferred from a BS degree or another MS degree, if they were not used for the requirements of that degree. To transfer, you will need to submit a form to the Graduate School. Forms can be found at: https://www.umass.edu/graduate/policies/forms-documents • For students completing 5-year BS/MS program (Accelerated Masters), an additional 6 qualifying credits can be transferred from the BS degree (double counted). Please submit a form for 'Transfer credits, Accelerated Masters' to the Graduate School. • Transfer credits should be done in the 1st semester | |
| Continuous Enrollment | <ul style="list-style-type: none"> • Students who take less than 9 credits in a semester or are in continuous enrollment (GRADSCH999) must request an override for full-time status by e-mailing Moriah Fahey (mafahey@umass.edu). This needs to be done at the beginning of each semester. | |
| Form thesis committee | <ul style="list-style-type: none"> • Student requests advisor to send e-mail to GPD requesting the appointment of thesis committee (at least 2 faculty members including the advisor) at least one month before defense. | |
| Defense notification | <ul style="list-style-type: none"> • Student requests Moriah to send defense notification to all members of the department 1-2 days prior to scheduled defense. | |
| Defense | <ul style="list-style-type: none"> • Student requests advisor to send e-mail to GPD for results of defense, date passed, and committee names. | |
| | <ul style="list-style-type: none"> • Student submits the signed thesis signature sheet and signed Master degree eligibility form (ask Moriah for template and set up DocuSign) to the graduate school after completion of successful defense. | |
| | <ul style="list-style-type: none"> • Student files Thesis electronically to ScholarWorks@UMass Amherst | |

One-Year Professional Master's Degree in Food Science (Non-thesis)

The 1-Year Professional Master's Degree in Food Science is designed for applicants who have earned a B.S. degree in a field of science other than food science.

Enrollment is highly selective and limited to applicants with a B.S. degree from a U.S. college/university and who have the necessary prerequisites. If you have not completed any of the courses/lab work below you will need to discuss this with your advisor.

Prerequisites

- 1) GPA of 3.0 or above
 - 2) Completed courses
 - A. General Chemistry with lab
 - B. Organic Chemistry with lab
 - C. Biochemistry with lab
 - D. Microbiology with lab
 - 3) Statistics
- The non-thesis M.S. degree in Food Science involves the completion of a total 30 graduate course credits.
 - **Category 1:** At least 12 credits of Food Science courses at the 600- or 700- level are required.
 - **Category 2:** Student should take one course from each of following:
 - Food Chemistry I, Food Chemistry II, or Food Analysis
 - Food Microbiology or Food Quality
 - Food Processing or Food Engineering
 - **Category 3:** One credit of seminar (FS791A) is required, either letter grade or SAT (satisfactory grade, no presentation). An additional seminar can be taken with SAT and this credit can be used for degree requirement.
 - To complete the degree, student should take a **general exam** after discussion with the advisor. The format of the general exam is determined by your advisor.

SUGGESTED COURSES FOR 1-YEAR (minimum 30 credits)

| FAL | | SPRIN | | SUMMER |
|---------------------------------------|---------|--------------------------------|---------|---|
| Course | Credits | Course | Credits | |
| Food Chem 542 (A) | 3 | Food Chem 541 (A) or Elective* | 3 | Independent study*** (Food Science 696) up to 6 credits. |
| Food Microbiology or Food Quality (B) | 3 | Food Processing (C) | 3 | |
| Graduate course ** | 3 | Graduate course** | 3 | |
| Elective* | 3 | Elective* | 3 | |
| | | Seminar FS791A | 1 | |

** Two 700-level Food Science courses are offered each semester. Each is offered every two years except Research Methods (FS797R, offered Fall semesters). Incoming students are strongly suggested to take Research Methods (FS797R) as a part of Category 1.

* Suggested Electives: Plant & Soil Science 661 (Biometry/Statistics) or other outside-Departmental courses

(400-level or above). One 400-level course from the outside department (3 or 4 credits) will be accepted.

* Students can use 1 credit Teaching Experience (FS796T), journal club credits (up to 2 credits), toward their degree requirements, either letter grade or SAT.

*** Independent study can be registered for Spring semester. Student should discuss topics and timing of independent research projects with his/her advisor

Please note that students in this program do not qualify for graduate research assistantships and admission is competitive. Applicants interested in a career in laboratory research or who plan to continue their graduate education should consider the standard thesis option.

Ph.D. Degree in Food Science

Requirements

- Course requirements (listed below)
- Comprehensive exam (information in pages 13, 19, & 20)
- Prospectus (information in pages 14-15)
- Defense (information in pages 16-17)
- Checklist (page 18)

Course requirements

The PhD coursework is dependent on the student's background and level. Students must get approval from your advisor on course selection.

- 18 dissertation credits are required to complete the degree. A maximum of 9 dissertation credits can be registered per semester. The dissertation credits can be used to reach the maximum of 16 credits per semester.
- Students should meet the following requirements for courses taken during the degree:

Category 1 (all students)

- 3 credits Research Methods (FS797R)

Category 2 (all students)

- 1 credit Teaching Experience (FS796T)

Category 3 (all students)

- 2 credits Graduate Seminar (FS791A/792A, 1 credit each, 2 separate semesters). A minimum 1 letter grade seminar (require presentation)

Category 4a (Students with Food Science MS)

- 6 credits from courses within the Department ≥ 600 level
- One ≥ 600 level can be outside department upon advisor's approval

Category 4b (Students with Food Science BS)

- 9 credits from courses within the Department ≥ 600 level
- One 500 level can be used to replace ≥ 600 level upon advisor's approval

Category 4c (Students with non-Food Science MS)

- 6 credits from courses within the Department ≥ 600 level
- 6 credits 500 level (any two of Food Chemistry, Food Microbiology, or Food Processing/Engineering, both courses cannot be in the same area, e.g. Food Chem)
- One ≥ 600 level can be outside department upon advisor's approval

Category 4d (Students with non-Food science BS)

- 9 credits from courses within the Department ≥ 600 level
- 6 credits 500 level (any two of Food Chemistry, Food Microbiology, or Food Processing/Engineering, both courses cannot be in the same area, e.g. Food Chem)
- One ≥ 600 level can be outside department upon advisor's approval
- One 500 level can be used to replace ≥ 600 level upon advisor's approval

Category 4e (Students with UMass Food Science MS)

- Teaching Experience (FS796T) and 1 credit of seminar (FS791A, letter grade)

Residency Requirements

- The Graduate school requires two consecutive semesters of residency for graduation, fulfilled by registering and earning **9 or more credits in two consecutive semesters**. Most students complete this requirement during their first 2 semesters.

Required Processes and Forms

1. *Comprehensive oral exam*: Student requests advisor to form the comprehensive oral exam committee (at least 4 faculty). The exam should be completed within 18 months of starting the degree. The chair of the Comprehensive Exam Committee (should not be the advisor) sends the nomination (results of comprehensive exam) to GPD.
2. *Appointment of dissertation committee*: Student requests advisor to send email to GPD requesting the appointment of dissertation committee (should include at least 3 internal members, including advisor, and 1 external member).
3. *Submission of prospectus*: Student submits signed prospectus/outline signature sheet to graduate school after completion of prospectus (*At least 6 months before defense*).
4. *Notification of final defense*: Student requests advisor to send e-mail to GPD for a memo with dissertation defense date, time, location, and title of dissertation. This should be done at least **one month prior to defense date**.
5. *Final defense*: After completing the final defense, the student requests advisor to send e-mail to GPD for results of defense, date passed, and committee names.
6. *Submission of dissertation*: Student submits the **signed dissertation signature sheet** (ask Moriah for template and set up DocuSign) and the **Doctoral degree eligibility form** to the graduate school after completion of successful defense.
7. *Archiving of dissertation*: Student submits dissertation electronically to [ScholarWorks@UMass Amherst](mailto:ScholarWorks@UMassAmherst).

Notes

- Specific timing depends on individual student's progress.
- Additional information can be found at <https://www.umass.edu/graduate/form/doctoral-degree-checklist-requirements-graduate>
- Prof. Lili He, lilihe@umass.edu, (344 Chenoweth Lab) is the Food Science GPD.

Comprehensive Exam

The goal of the comprehensive exam is to determine the level of understanding of your own research and relate it to how it contributes to fundamental food science understanding in chemistry, microbiology, and processing.

Student will prepare a hypothesis-driven written research proposal based on format suggested (NIH or USDA). Topic will be determined by the advisor with agreement with committee. This should be based on her/his current research project, preferably with preliminary data available with agreement with the advisor. The written proposal should be provided to the committee one week prior to the exam date.

The advisor will form a committee with at least 4 faculty members (one outside departmental member is allowed, but not required). The advisor cannot serve as a chair for the comprehensive exam. The chair of the comprehensive exam committee will determine the exam outcome as (1) pass, (2) conditional pass, or (3) fail. If student has a conditional pass, student will receive comments from the committee and revise the proposal accordingly. If the student fails, student will have one additional chance to complete the comprehensive exam. The student is considered a Ph.D. candidate once the comprehensive exam is passed.

The oral comprehensive exam consists of **two parts**: a written grant proposal and an oral examination in which you present and defend the written grant proposal.

- *Written proposal*: The format of the written grant proposal will follow the guidelines of a government grant proposal (such as NIH R21 in page 19 or USDA in page 20, to be determined by the advisor).
- *Oral exam*: The format of the oral examination will be a ~20 minute prepared presentation and defense of the grant proposal. Expect to be interrupted with questions; total exam time 1– 1.5 hrs. The oral comprehensive presentation will be closed, meaning only committee members may attend.

Timeline

It is strongly encouraged that the student takes this oral comprehensive exam by the end of the second year of study.

- Week 0: Your advisor gives you a topic for the grant proposal
- Week 0 - Week 3: Student can seek feedback from the advisor as needed during this time.
- Week 3: At the end of the third week, you should submit an independently written grant proposal to your committee.
- Week 4 or availability of the Committee: Present an oral presentation of the grant proposal to the committee.

Once the student passes the comprehensive exam, the advisor will form a dissertation committee. The advisor should provide the names of the dissertation committee to the graduate program director. The purpose of the prospectus meeting is to have the student, the advisor, and the committee agree to a reasonable scope and timeline for the doctoral dissertation. Students are encouraged to convene their committees yearly thereafter informally to provide progress updates.

NOTE: Current students who have not completed the comprehensive exam shall take this exam if Advisor and student agree.

Dissertation Prospectus/Outline Exam

Content

- Details on formatting guidelines are available from the Graduate School.
- The Dissertation Prospectus/Proposal Exam consists of two parts: a written Dissertation Prospectus/Outline and an oral examination in which you defend your Prospectus/Outline.
- The format of the written Prospectus/Outline will follow that of the Dissertation. Plan to use “paper format” in which each of your publications is formatted into a chapter, with summarizing introduction/conclusion sections. Include a table of abbreviations. A sample outline follows:
 - Chapter 1 – Introduction (if written, a review paper can serve as the introduction)
 - Chapter 2 – first publication
 - Chapter 3 – second publication
 - Chapter X – work yet to be completed

Note that the format can be different from the above. For example if there are no publications/manuscripts prepared at the time of the Dissertation Proposal presentation, the proposal can include sections comprised of Review of Literature, Specific Objectives, Materials and Methods, Preliminary Results and Future Work. This format is acceptable to the Graduate School. **Your advisor will provide guidance specific to their expectations.**

- The format of the oral exam will be a 20-30 minute presentation of the Prospectus/Outline. Expect to be interrupted with questions. The entire exam should be 1 – 1.5 hrs.
- The prospectus presentation will be closed, meaning only committee members may attend.
- Your advisor may help with organizing the presentation outline, but will not thoroughly edit the presentation – the presentation itself is part of the exam.
- Be able to verbally defend HOW and WHY you did (or plan to do) every aspect of your research.

Timeline

- Once the committee is selected by your advisor, the advisor emails the Graduate Program Director to appoint the committee.
- Once your advisor approves your written prospectus/outline, it must be submitted to the committee before the exam (typically 1 week prior to scheduled prospectus).
- Student must send reminder about location and date/time of exam a few days before the exam.
- The timing for the Dissertation Prospectus/Outline Exam varies widely, depending on students’ progress. It is recommended to have at least 1 publication and a significant amount of self-directed laboratory research by the time of the prospectus.
- The Dissertation Prospectus/Outline Exam should be passed 6 months prior to the Dissertation Exam (although this can be waived if needed by a memo from your advisor to GPD).

Notes

- The Dissertation Prospectus exam committee will consist of your advisor and at least two additional

members, one each from within and outside of the Food Science Department.

- After passing the Prospectus exam, the cover sheet of the prospectus must be signed by all committee members and the department head or graduate program director, and submitted to the graduate school by the candidate.

Final Dissertation Defense

Content

- The Final Dissertation Defense consists of two parts: a written Dissertation and an oral examination in which you present and defend your Dissertation.
- Details on formatting guidelines are available from the Graduate School. Templates can be downloaded from OIT: <http://www.oit.umass.edu/support/workshops-training/format-a-thesis-or-dissertation-microsoft-word>.
- Plan to use “paper format” in which each of your publications is formatted into a chapter, with summarizing introduction/conclusion sections. Include a table of abbreviations. A sample outline follows:
 - Chapter 1 – introduction (if written, a review paper can serve as the introduction)
 - Chapter 2 – first publication
 - Chapter 3 – second publication
 -
 - Chapter X – overall conclusions, and recommendation for future work on topic
- The format of the Dissertation will be a 30-40 minute prepared presentation of the Dissertation. The presentation will be open, followed by general audience questions. After the open question period, the audience will leave and the committee will ask addition questions.
- Your advisor may help with organizing the presentation outline, but will not thoroughly edit the presentation – the presentation itself is part of the exam.
- Be able to verbally defend HOW and WHY you did every aspect of your research. It cannot be over-emphasized that you need to know what and why you did everything you present.

Timeline

- **A memo requesting announcement of the defense must be submitted to the graduate school one month before the defense date.** The advisor should send following information to GPD:
 - Student’s full name & identification number, the degree, day of week/date/time/place of the exam, major, and title of dissertation. Once submitted, the defense is announced in the UMass News & Media Relations, and the final checklists of degree requirements are emailed to the student.
- Once your advisor approves your written draft dissertation, it must be submitted to the committee before the defense (typically 1-2 weeks prior to defense date).
- Student requests Moriah to send defense notification in the department 1-2 days prior to scheduled defense.
- The dissertation defense should be the *last step* in getting the Ph.D. This means that you should have submitted first drafts of each publication you intend to submit prior to defending your dissertation.
- There are three deadlines per year for awarding of PhDs (posted on the graduate school website). Generally, mid-December for a February degree; mid-April for a May degree; and the last working day of August for a September degree. These deadlines are firm.

However, you can defend your dissertation on any date – this just means if you submit your final paperwork in January, you will have a May date on your diploma. This doesn’t mean you have to stay in Amherst until May.

Notes

- The Dissertation defense committee will be the same as your Prospectus/Outline exam committee members.
- After passing the Dissertation defense, the signature page of the Dissertation must be signed by all committee members and the department head or graduate program director, and submitted to the graduate school. This must be on acid-free, 20 lb weight, white, 8.5 x 11” paper.
- The dissertation must be submitted electronically to the graduate school (see the graduate school website for details).
- Student should prepare the doctoral Degree Eligibility Form must be completed including signatures of the Department Head and Graduate Program Director, and then submit it to the graduate school.
- A bound copy of your dissertation should be given to your committee chair (optional). Binding can be done through Copy Cat, acmebook.com, UMI, or a number of book binderies.
- More information can be found: <http://www.umass.edu/gradschool/current-students/doctoral-degree-requirements-and-dissertation-information>.

PhD Checklist

| To do | Note | √ |
|---|--|---|
| All information details can be found here: https://www.foodsci.umass.edu/graduate/msphd-requirements/phd-requirements | | |
| Residency requirements | <ul style="list-style-type: none"> Register 9 or more credits in two consecutive semesters, maximum 16 credits per semester can be registered | |
| Dissertation credits | <ul style="list-style-type: none"> 18 total dissertation credits (FS 899), maximum of 9 credits of dissertation credits per semester. Use dissertation credits to maximize to 16 credits per semester | |
| Course requirement | <ul style="list-style-type: none"> Students must get approval from your advisor on course selection | |
| Category 1 (all students) | <ul style="list-style-type: none"> 3 credits Research methods (FS797R) | |
| Category 2 (all students) | <ul style="list-style-type: none"> 1 credit Teaching Experience (FS796T) | |
| Category 3 (all students) | <ul style="list-style-type: none"> 2 credits Graduate Seminar (FS791A/792A, 1 credit each, 2 separate semesters) A minimum 1 letter grade seminar (require presentation) | |
| Category 4a (Students with Food Science MS) | <ul style="list-style-type: none"> 6 credits from courses within the Department ≥ 600 level One ≥ 600 level can be outside department upon advisor's approval | |
| Category 4b (Students with Food Science BS) | <ul style="list-style-type: none"> 9 credits from courses within the Department ≥ 600 level One 500 level can be used to replace ≥ 600 level upon advisor's approval | |
| Category 4c (Students with non-Food Science MS) | <ul style="list-style-type: none"> 6 credits from courses within the Department ≥ 600 level 6 credits 500 level (any two of Fd Chem, Fd Micro, or Fd Proc/Eng, both courses cannot be in the same area, e.g. Fd Chem) One ≥ 600 level can be outside department upon advisor's approval | |
| Category 4d (Students with non-Food science BS) | <ul style="list-style-type: none"> 9 credits from courses within the Department ≥ 600 level 6 credits 500 level (any two of Fd Chem, Fd Micro, or Fd Proc/Eng, both courses cannot be in the same area, e.g. Fd Chem) One ≥ 600 level can be outside department upon advisor's approval One 500 level can be used to replace ≥ 600 level upon advisor's approval | |
| Category 4e (Students with UMass Food Science MS) | <ul style="list-style-type: none"> FS796T and 1 credit of seminar (FS791A, letter grade) | |
| Continuous Enrollment | <ul style="list-style-type: none"> Students who take less than 9 credits in a semester or in continuous enrollment (GRADSCH999) must request an override for full-time status by e-mailing Moriah Fahey (mafahey@umass.edu). This needs to be done at the beginning of every semester. | |
| Comprehensive exam | <ul style="list-style-type: none"> Student requests advisor to form the comprehensive exam committee (at least 4 faculty). The exam should be completed within the 18 months. Chair of the Comprehensive Exam Committee to send nomination (results of comprehensive exam) to GPD. | |
| Form dissertation committee | <ul style="list-style-type: none"> Student requests advisor to send e-mail to GPD requesting the appointment of dissertation committee (should include at least 1 outside member). | |
| Prospectus | <ul style="list-style-type: none"> Student submits signed prospectus/outline signature sheet to graduate school after completion of prospectus (At least 6 months before defense). | |
| Defense notification | <ul style="list-style-type: none"> Student requests advisor to send e-mail to GPD for a memo with dissertation defense date, time, location and title of dissertation. This should be done at least one month prior to defense date. | |
| | <ul style="list-style-type: none"> Student requests Moriah to send defense notification in the department 1-2 days prior to scheduled defense. | |
| Defense | <ul style="list-style-type: none"> Student requests advisor to send e-mail to GPD for results of defense, date passed, and committee names. | |
| | <ul style="list-style-type: none"> Student submits the signed dissertation signature sheet (ask Moriah for template and set up DocuSign) and the Doctoral degree eligibility form to the graduate school after completion of successful defense. | |
| | <ul style="list-style-type: none"> Student files Dissertation electronically to ScholarWorks@UMass Amherst | |

Graduate course list

All courses carry 3 credits unless otherwise specified. Two 700-level Food Science courses are offered each semester. Each is offered every two years. Check in Spire for when they are offered.

541 Food Chemistry I

Overview of the chemical, physical, and biological properties of food components including water, proteins, lipids, and carbohydrates. Consequences of the properties of food components and their reaction products to health and nutrition also emphasized. Prerequisite: organic chemistry.

542 Food Chemistry II

Chemistry of minor components in food - minerals, vitamins, nutraceuticals - and food additives e.g., colors, flavors, preservatives, texture modifiers, stabilizers, etc. The interaction between the major components of food and the application and regulation of food additives are also emphasized. Prerequisite: organic chemistry.

561 Food Processing

Basic principles of current technology and equipment of food processing. Raw material preparation, thermal processing, dehydration, cooling, freezing, mechanical processing.

563 Food Processing Laboratory

Laboratory component of Food Processing 561. *Credit, 1.*

566 Food Microbiology Laboratory

Laboratory exercises emphasize quality control and experimental approaches to food microbiology. Labs teach basic culture methods, in addition to chemical, immunological, and molecular techniques employed for the microbiological analysis of foods. Prerequisites: MICROBIO 312 and concurrent registration in FOOD-SCI 567 or consent of instructor. *Credit 2.*

567 Food Microbiology

This course will provide an overview of food microbiology, focusing upon fundamental principles and considerations related to microbial properties and behavior, and how they influence food safety, quality, and production. Specific topics in the course include, but are not limited to: foodborne disease, traditional and emerging laboratory detection methods, fermentation, food quality assurance, sanitation, and other microbiology related topics. This course will also include a survey of current food microbiology-related topics and problems being addressed by research at UMass and elsewhere. Prerequisites: MICROBIO 310 or FOOD-SCI 466 and concurrent registration in FOOD-SCI 566, or consent of instructor. 3 Credits.

575 Elements of Food Process Engineering

Topics include unit conversion, mass and energy balance, the principles of fluid flow, viscosity, heat transfer, refrigeration, evaporation, drying. Emphasis on industrial implementations in equipment and process calculations.

581 Analysis of Food Products

Physical, chemical, and biological techniques in food analysis: proximate analysis, extraction, densimetry, spectroscopy, rheology, microscopy, refractometry, polarimetry, chromatography, nuclear magnetic resonance, enzymatic and immunological assays, and sensory evaluation methods emphasizing theoretical basis of measurements and laboratory calculations. Prerequisite: CHEM 312 or equivalent. *Credit, 3.*

583 Food Analysis Laboratory

Laboratory component of Analysis of Food Products, 561. *Credit, 1.*

590 Food Quality

This course will provide an overview of food quality assurance and regulation while training students to obtain quality control certification. Upon successful completion of the course, students will obtain FSPCA Qualified Individual Certifications.

699 Master's Thesis

Individual research. *Credit, 6-10.*

741 Lipid Chemistry

Composition and chemical properties of edible fats and oils. Physical characteristics/plasticity, polymorphism, melting, solidification. Technology of industrial fats-extraction, refining, hydrogenation, inter-esterification. Deteriorative reactions oxidation, thermal degradation. Biological significance. New methods of analysis. Review of current literature. Consent of instructor required.

745 Food Biochemistry

Effects of storage and processing on food quality changes at the cellular and molecular levels. Morphology, concentration, and compartmentalization of cellular components; consequences of cellular disruptions; stabilizing and destabilizing events; role of membranes and their deterioration; mitochondrial respiratory processes; biological, chemical, and physical aspects of oxidative processes and strategies to control.

761 Physical Phenomena in Foods

Physical and functional properties of foods: origin and modification of surface forces; electrophysical phenomena; colloidal aggregates and dispersions; stability of emulsions and foams; adsorption phenomena; properties of food polymers in solution; interfacial charge effects; structure and formation of gels.

781 Advanced Food Analysis

This course includes lectures of fundamental and application of Raman, Infrared and X-ray

Fluorescence Spectroscopy in food, agricultural and environmental analysis. It also offers hands-on training of these techniques, supported by the Raman, IR and XRF core facility.

791A Seminar

Reports and discussions on current literature in area of food science. *Credit, 1 per semester.*

797R Research Methods

An orientation course for graduate students, designed for the first-year graduate students who have limited research experience and is required for first-year graduate students. The aim of the course is to help the students bridging the undergraduate education to the research activities in the graduate school. Will cover experimental design, grant writing, paper writing, and scientific presentation in this course.

797V: Special Topics in Biosensors and Pathogen Detection

This is a weekly journal club that is relatively flexible in terms of specific topics related to biosensors and microbial detection. The scope of topics and articles covered will be generally broad, and include: different classes of microfluidic biosensors, viral detection, bacterial detection, fungal detection, toxin detection, and portable next generation sequencing. A secondary interest of the class will involve detection in complex samples, especially with relevance to point-of-care and in-field detection applications. The specific article content will be chosen to reflect the interests of those enrolled in the class. Prerequisites: None. 1 Credit.

899 Doctoral Dissertation

Credit, 18.

Summary of Guidelines for NIH R21 Proposal

- Format
 - Arial, 11 point or larger, 6 lines per vertical inch or fewer, 0.5 inch margin

- Specific aims (1 page)
 - Executive summary of whole project
 - Includes motivation, objectives, expected outcome

- Research proposal (6 pages, not including references)
 - Significance
 - Innovation
 - Approach
 - For each specific aim: introduction, justification, research design, expected outcomes, potential problems & alternate strategies
 - Timeline
 - Future Directions
 - References

- See *The Grant Application Writer's Workbook: National Institutes of Health Version* for format details / writing style guidelines.

Summary of Guidelines for USDA NIFA Proposal

- Format
 - Times New Roman, 12 point, 6 lines per vertical inch or fewer, 1 inch margin
- Project Narrative (18 pages, not including references)
 - Introduction

Include a clear statement of the long-term goal(s) and supporting objectives of the proposed project. Summarize the body of knowledge or past activities that substantiate the need for the proposed project. Describe ongoing or recently completed activities significant to the proposed project including the work of key project personnel. Include preliminary data/information pertinent to the proposed project.
 - Rationale and Significance

Concisely present the rationale behind the proposed project. The potential long-range improvement in and sustainability of U.S. agriculture and food systems should be shown clearly. Any novel ideas or contributions that the proposed project offers should also be discussed in this section
 - Approach
 - a) *A description of the activities proposed and the sequence in which the activities are to be performed;*
 - b) *Methods to be used in carrying out the proposed project, including the feasibility of the methods;*
 - c) *Expected outcomes;*
 - d) *Means by which results will be analyzed, assessed, or interpreted;*
 - e) *How results or products will be used;*
 - f) *Pitfalls that may be encountered;*
 - g) *Limitations to proposed procedures;*
 - h) *A full explanation of any materials, procedures, situations, or activities related to the project that may be hazardous to personnel, along with an outline or precautions to be exercised to avoid or mitigate the effects of such hazards; and*
 - i) *A timeline for attainment of objectives and for production of deliverables that includes annual milestones with specific, measurable outcomes.*
- See a recent USDA NIFA RFA for details (italicized portions are reproduced from the 2013 RFA)

Travel Guidelines

- Ph.D. students are encouraged to present their research at scientific conferences and meetings. Examples of meetings include Experimental Biology, PittCon, Institute of Food Technologists, American Chemical Society, American Oil Chemists' Society, American nutrition Society, Gordon Research Conferences among many others. Deadlines for abstract submissions vary and must be sought out by the student. Students must give their advisor ample time (~1 week) to review their abstract prior to approval and submission.¶
- Travel to a conference is considered part of work – you must behave professionally and participate in the conference beyond your individual presentation. It is not a paid vacation.¶
- Guidelines for what research can be presented (ie: published? submitted? about to be submitted?) must be agreed upon with your advisor.¶
- Guidelines for what type of presentation is supported must be agreed upon with your advisor. Generally, junior graduate students can present posters, but senior graduate students are encouraged to present oral presentations (except at conferences that don't have an oral option, e.g. Gordon Research Conferences).¶
- Forms: Prior to travel, fill out a pre-travel authorization form at least 2 weeks in advance: <https://travelregistry.umasscs.net/>¶
- Funding: The Department of Food Science will support Ph.D. student travel for accepted abstracts in the amount of ~\$300-400 per student per year. The student's advisor is expected to fund an additional \$300 toward the travel costs. *Travel costs exceeding \$600 are expected to be covered by the student – it is therefore recommended to be thrifty.* All receipts must be submitted to Mary immediately after the trip.¶
- Travel Scholarships: Many national conferences offer travel grants to students who are finalists in graduate research competitions (IFT, ACS, and others). Students are encouraged to seek these out. In addition, there are limited funds by the Graduate School to support student travel. Your advisor may nominate you for one of these awards, usually \$300 per award, with preference to students who are finalists in a competition, near the end of their program, and who have not yet received a Graduate School travel award.

Annual Report

(Period of July 1 to June 30)

NOTE: Not all advisors require an annual report.

Student: _____ Starting Semester: _____ Degree: _____

Committee Members: _____

Expected Degree Completion Date: _____

PhD Exam Timeline:

Oral Comprehensive Expected Date: _____ OR Completed Date: _____

Dissertation Proposal Expected Date: _____ OR Completed Date: _____

Dissertation Defense Expected Date: _____

Information to be provided by student (no more than two pages):

1. List of accomplishments (publications submitted/accepted/published, courses completed, seminars/research presentations, awards received (including being a finalist), involvement in on and off campus activities). Use the following citation format:

Publications

Bastarrachea, LJ, Peleg, M, McLandsborough, LA, Goddard, JM. 2013. "Inactivation kinetics of Listeria monocytogenes on polyethylene modified by antimicrobial N-halamine multilayer deposition". Journal of Food Engineering. 117 (1): 52-58. DOI: 10.1016/j.jfoodeng.2013.02.004.

Presentations

Talbert, JN and Goddard, JM. "Lactase Conjugation on Magnetic Nanoparticles." Gordon Research Conference on Biocatalysis. July 8-12, 2012. Bryant University, Smithfield, RI.

2. BRIEF summary of research progress (i.e. what has worked; what has not worked; what would make it work better; equipment that would help your project?)
3. BRIEF summary of plans for the coming year, both in terms of your research and your intended "accomplishments."

Please email the electronic document by June 30th to your advisor

Scholarships/Awards

FOOD SCIENCE DEPARTMENT

Herbert Hultin Graduate Scholarship (TBD)

Oral research competition (10min)
Should submit abstract in advance
The winners will receive a cash award

F. Jack Francis Graduate Scholarship (TBD)

Pre-Competition (3min Oral) & Final competition (Poster)
The winners will receive a cash award

The Micha Peleg International Travel Grant

This award will be \$1,500 US dollars that should be used for reimbursement of travel expenses of international conference (Do NOT include those hold in United States).

UMASS GRADUATE SCHOOL

Travel Grant

Approximately \$300. Ask your advisor for nomination

Predissertation Research Grant (\$250-\$1000)

These competitive grants offer early career graduate students the opportunity to evaluate the feasibility of planned dissertation research, generate pilot data, or establish the necessary networks to carry out planned dissertation research, among other activities
October and March.

Dissertation Research Grant (up to \$1000)

This program recognizes the research and accomplishments of our outstanding graduate students and provides funds to assist recipients in completion of their dissertation.
October and February.

Link: <http://www.umass.edu/gradschool/funding-support>

Three-minute thesis competition (February)

<https://www.umass.edu/graduate/professional-development/three-minute-thesis>

ACS/AGFD (AMERICAN CHEMICAL SOCIETY/AGRICULTURE & FOOD DIVISION)

Teranishi GRADUATE fellowship

One-time fellowship award of \$2,500

Deadline February 1

outstanding GPA and show promise of an excellent graduate research career

Withycombe-Charalambous GRADUATE Student Symposium

Travel expenses up to \$1000

Cash Award of \$1000

Deadline: October 31

Link: <http://agfd.sites.acs.org/awards.htm>

IFT (INSTITUTE OF FOOD TECHNOLOGISTS)

IFT Awards

Awards for students with outstanding academic and non-academic achievements with

promising contribution to the profession

Prize: ranging from \$500 to \$2,000 per recipient

Link: <http://www.ift.org/community/students/scholarships/graduate-scholarships.aspx>

Northeast Institute of Food Technologists (NEIFT) Graduate Scholarship (February)

Awards for students with outstanding academic and non-academic achievements with promising contribution to the profession

Prize: ranging from \$500 to \$3,000 per recipient

Link: http://neift.org/NEIFT/Pages/Scholarship_Home.html

PHI TAU SIGMA

Student Achievement Scholarship (\$1000; Feb. 1st)

Exceptional scholastic achievement and a dedication to Phi Tau Sigma

Founders' Scholarship (\$1000; Feb. 1st)

Original research, carefully selected, to solve vexing problems of the food industry.

Dr. Gideon "Guy" Livingston Scholarship (\$1000; Feb. 1st)

Student's scholastic achievements and dedication to Phi Tau Sigma.

Dr. Daryl B. Lund International Scholarship (\$2000; Nov. 30th)

Supplement international travel for educational purposes.

Link: <http://phitausigma.org>

- **You need to be a member for a year to apply for these awards. To become a Phi Tau Sigma member, please contact David Sela (davidsela@umass.edu)**

AOCS (AMERICAN OIL CHEMISTS' SOCIETY)

Hans Kaunitz Award

Recognizes a student conducting research in the sciences relating to fats, oils and detergent technology. (\$1000) Nov.1

Ralph H. Potts Memorial Fellowship

Recognizes a graduate student conducting research related to the chemistry of fats and oils and their derivatives. (\$2000) Nov.1

Peter and Clare G. Kalustian Award

is awarded to a graduate student doing research towards an advanced degree. (\$1000) Nov.1

Manuchehr Eijadi Award

is awarded to a graduate student engaged in research pursuant to an advanced degree. (\$1000) Nov.1

Honored Students Award

recognizes graduate students in any area of fats and lipids. (\$500 travel allowance, and complimentary lodging and registration.) Nov.1

Thomas H. Smouse Memorial Fellowship

is awarded to a graduate student doing research in areas of interest to AOCS. (\$10,000 stipend + \$5,000 research and travel funds) Feb.1

Division travel grants, awards, and poster competitions:

offers funding assistance through travel grants to attend the AOCS Annual Meeting. Nov.1

Link: <https://www.aocs.org/network-and-connect/awards-x1888#student-only-awards>

OTHERS

NMPF (National Milk Producers federation) Dairy Products (April 6)

Link: <http://www.nmpf.org/nmpf-national-dairy-leadership-scholarship-program>

Food Safety Auditing Scholarship & Education Travel Grant (Sep, 7)

Link: <http://scholarship-positions.com/food-marketing-institute-undergraduate-graduatescholarship-usa-2017/2016/05/25/>

GWIS: Graduate Women in Science (January, 11)

Link: https://www.gwis.org/page/fellowship_apcheck19

Scholarship Time Schedule*:

February

Northeast Institute of Food Technologists (NEIFT) Graduate Scholarship

Feeding Tomorrow Graduate Scholarship

Student Achievement Scholarship

Founders' Scholarship

Dr. Gideon "Guy" Livingston Scholarship

Thomas H. Smouse Memorial Fellowship

Dissertation Research Grant

March

The Micha Peleg International Travel Grant

Predissertation Research Grant

April

F. Jack Francis Graduate Scholarship

NMPF (National Milk Producers federation) Dairy Products

September

Department graduate students' competitions (time TBD)

Teranishi GRADUATE fellowship

Food Safety Auditing Scholarship & Education Travel Grant

October

Withycombe-Charalambous GRADUATE Student Symposium

Hans Kaunitz Award

alph H. Potts Memorial Fellowship

Peter and Clare G. Kalustian Award

Manuchehr Eijadi Award

Honored Students Award

Division travel grants, awards, and poster competitions:

Predissertation Research Grant

Dissertation Research Grant

November

Dr. Daryl B. Lund International Scholarship

**Note, some deadlines may differ each year. Check sponsor's website for updated information.*