GRADUATE PROGRAM HANDBOOK

Department of Food Science

The Pennsylvania State University

Volume I
Academic Procedures

Academic Year 2018-2019

Department of Food Science
202 Food Science Building
The Pennsylvania State University
University Park, PA 16802

The University is committed to equal access to programs, facilities, admission and employment for all persons. It is the policy of the University to maintain an environment free of harassment and free of discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the University's educational mission, and will not be tolerated. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Office, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901, Email: aao@psu.edu, Tel (814) 863-0471.

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INTRODUCTION

Welcome to the Department of Food Science! Our strategic plan specifically states that the department will be recognized internationally for innovative research in the context of graduate education and you are an integral part of our program.

This **Graduate Program Handbook** presents information important to students enrolled in the M.S. and Ph.D. programs in the Department. The Graduate School of The Pennsylvania State University has general requirements that every Penn State graduate student must satisfy for admission and the awarding of a M.S. or Ph.D. degree. In addition, each graduate major has specific coursework requirements, thesis research criteria, and established policies that are appropriate to the program. Procedures and rules have the goal of assuring uniform and high standards of performance, and it is the responsibility of each graduate student to become familiar with them.

Graduate education involves more than satisfactory completion of coursework and thesis requirements. Informal and frequent contact with the entire faculty and other graduate students is highly recommended. There are several opportunities for graduate students to get actively involved with the Department, College and the University while they are in graduate school through participation on departmental and university committees, the Food Science Club, Institute of Food Technologists, Graduate Students' Association, etc.

This handbook is intended to serve as a guide as you navigate through your graduate program. The ultimate responsibility for the program resides with you. Please let me know if you have any suggestions on this handbook.

I wish you much success as you embark on your graduate degree program.

Greg Ziegler
Director of Graduate Studies
August 6, 2018

DEPARTMENTAL EXPECTATIONS OF GRADUATE STUDENTS

M.S. STUDENTS

A student in the M.S. degree program will be knowledgeable about the field of food science in general. This knowledge will be acquired primarily through satisfactory completion of required coursework. Additionally, our students will develop the ability to learn independently by determining, finding, and using necessary resources. Our students will also develop the ability to make decisions and judgments based on their knowledge. Furthermore, the student will be capable of addressing a research problem through a series of sustained, logical experiments and bring his or her work to a satisfactory conclusion in the form of a M.S. thesis. Finally, it is expected that the thesis research will be of publishable quality and, as a minimum, will be communicated through at least one oral presentation or poster session at a scientific meeting.

Ph.D. STUDENTS

In addition to the expectations described above for our M.S. students, a student in the Ph.D. degree program will develop the ability to determine and conceptualize a research problem, design the scientific approaches and experiments to address it, and bring his or her work to a satisfactory conclusion in the form of a Ph.D. dissertation. Finally, it is expected that the dissertation research will be of publishable quality and, as a minimum, will be communicated through an oral presentation or poster session at a regional or national scientific meeting and through at least one publication in a peer-reviewed journal.

REQUIREMENTS FOR A DEGREE IN FOOD SCIENCE

GENERAL DEGREE REQUIREMENTS

General Coursework Requirements: Students receiving a M.S. or Ph.D. in Food Science must have satisfactorily completed (Grade C or above) FD SC 500A, FD SC 500B, FD SC 500C, FD SC 500D, and FD SC 501. Refer to Tables 1 - 3 for more information.

Teaching Experience: All Food Science graduate students have an academic requirement of obtaining teaching experience for their graduate degree. Non-Food Science graduate students advised by Food Science faculty members are expected to serve as TA's as if they were Food Science graduate students. It is the responsibility of all international graduate students to register for the Penn State American English Oral Communicative Proficiency Test (AEOCPT) their first semester (http://aplng.la.psu.edu/programs/about-the-aeocpt). The Graduate Program Coordinator will register you for this exam.

Assistantships/Time Limitations: Departmental Assistantship appointments are normally ½ time and made on an annual basis. Renewal of the assistantship is contigent on satisfactory academic progress.

Grade-Point Average: A minimum grade-point average of 3.0 for work done at the University is required for graduation.

Thesis Research Seminar: All Food Science graduate students are required to present a seminar on their completed research before their final defense. The presentation is to be 30-45 minutes in length with an abstract and bibliography made available to the audience. This presentation is viewed as a professional obligation to the department and is considered a general FD SC graduate degree requirement. The seminar should be scheduled preferably during the weekly Departmental Seminar Series. The scheduling of this seminar is administered by the student's advisor in conjunction with the Graduate Program Coordinator.

M.S. DEGREE REQUIREMENTS

The graduate school requirements for the M.S. degree are described in detail in the Graduate Bulletin (http://bulletins.psu.edu/bulletins/whitebook/index.cfm). The Food Science Faculty has determined additional general and specific requirements and recommendations. An overview of these requirements is presented in Table 1.

Graduate Committee: Any member of the Penn State Food Science graduate faculty with at least assistant professor rank may advise a master's student. In addition, the Department of Food Science requires an M.S. committee of at least three members, to include one additional member of the Food Science Graduate Faculty other than the adviser. If a minor has been selected, a faculty member representing the minor field must be appointed to the committee. Please complete the Masters Committee Appointment Signature Form (see back of handbook) to appoint and/or revise the Masters Thesis Committee and file this form with the Graduate Program Coordinator as soon as the committee is finalized or changed. MS students in consultation with their advisor shall establish a thesis committee by the end of their second semester in the graduate program. All graduate students shall have a minimum of 1 formal thesis committee meeting annually. This meeting will be reported as part of the annual graduate student evaluation form and will be a factor in determining if adequate progress to degree is being made.

Thesis Seminar: Prior to the Final Oral Exam, the student will present a seminar to the department. See the Graduate Program Coordinator to set up time and room for seminar and and to submit abstract via email at least two weeks prior to the seminar. The thesis seminar must be scheduled so that the student's committee can attend.

Final Oral Examination/Thesis Defense: A copy of your thesis must be given to each member of your committee two weeks prior to the scheduled Final Oral Examination. The thesis must be in the format acceptable for submission to the Graduate School. A hard copy should be made available to those committee members desiring one. The majority of the committee members must agree to proceed with the defense, one week prior to the scheduled Final Oral Examination.

Electronic Submission of Dissertation and Thesis (ETD): Electronic submission of the final dissertation (eTD) became a requirement for all doctoral candidates at Penn State starting in fall semester 2006. Master's candidates now have the choice of submitting the final thesis either in the traditional paper format or as an electronic document. (It cannot be submitted as both.) Formatting requirements are essentially the same for a paper copy and an eTD, but the submission process itself is somewhat different . For additional information on the mechanics of eTD preparation, visit the eTD Web site (http://gradschool.psu.edu/current-students/etd/about-etds/).

Time Limitations: A Master's student must complete his/her program requirements within eight years of first enrollment as a Master's student.

Continuing onto Ph.D. Program after the M.S. Degree: Students may consider continuing onto the Ph.D. program upon completion of their M.S. degree. To activate their application for the Ph.D. program a student must complete the Resume Study/Change of Graduate Degree or Major form along with an updated Statement of Purpose, a letter of recommendation from the student's advisor to the Graduate Program Coordinator. **Successful completion of the M.S. degree does not guarantee admission to the Ph.D. program.**

Department of Food Science
M.S. Graduate Program Checklist

Year 1

_____ Attend orientation, Get keys, Set up email account

_____ Take AEOCPT Exam for international students only, (during 1st semester)
http://aplng.la.psu.edu/programs/about-the-aeocpt

_____ Take Laboratory Safety and Laboratory Hazard Communication – University Park Laboratory Safety (initial) @ http://www.ehs.psu.edu

_____ Schedule FD SC 500 A, B, C, and D, and FD SC 501

_____ Schedule other 400 and 500 level courses in consultation with advisor

_____ Research

_____ Appoint thesis committee – see Master's Thesis Appointment Form in back of handbook

_____ Develop a coursework plan in consultation with thesis committee

_____ Develop thesis proposal & present to thesis committee

_____ Complete SARI (as part of FD SC 501)

_____ Schedule FD SC 602

Year 2

_____ Serve as TA

_____ Schedule other 400 and 500 level courses per your coursework plan

_____ Research

_____ Write thesis & manuscript(s)

_____ Activate "Intent to Graduate" the semester you plan to graduate (through LionPATH)

_____ Thesis format review with Graduate School Thesis Office

_____ Schedule Thesis Seminar (see the Graduate Program Coordinator to reserve room)

_____ Schedule Thesis Defense (inform Graduate Program Coordinator of date, time and location no later than one month prior to defense)

_____ Give thesis to Department Head (allow one week for review & signature). Provide thesis To the Graduate Program Coordinator . Due to the Department Head's travel obligations, we recommend you inquire about his schedule prior to submitting thesis.

_____ Schedule Exit Interview with Department Head

_____ Submit one hard bound copy of thesis to the Graduate Program Coordinator

_____ Complete Termination/Transfer Checklist (see back of handbook)
Return keys, purchase card, and equipment. Complete ERS reports, vacate office

Notify Graduate Program Coordinator no later than one month prior to your planned departure date

Table 1. MINIMUM REQUIREMENTS for M.S. DEGREE IN FOOD SCIENCE AT PENN STATE
(as approved at the Faculty meeting on 6/7/11, corrected by GPC 10/17/13)

	# Cr
MINIMUM GRADUATE SCHOOL REQUIREMENTS[1]	
Total 400-500-600 level credits needed to graduate	30
Maximum Transfer credits allowed (needs approval)	10
Maximum Non-degree credits allowed (needs approval)	15
Minimum 400-500 level coursework in major	12
Minimum 500-600 level credits required	18
Minimum Thesis research credits	6
Minimum GPA needed to graduate	3.0
Thesis	Yes
Time limit (# years from date of admission)	8
MINIMUM DEPARTMENTAL REQUIREMENTS (which will also fulfill minimum Graduate School Requirements)	
FD SC 500A, FD SC 500B, FD SC 500C, FD SC 500D	4
FD SC 501	2
FD SC 602[2]	1
Other 500-level FD SC courses[3]	6
FD SC 600 credits (minimum needed)	6
Additional 400-500 level courses	6
Statistics (STAT 500 or equivalent) [4]	√
Graduate committee	Yes
Thesis seminar	Yes
Thesis defense	Yes

1 University Bulletin on Graduate Degree Programs (http://bulletins.psu.edu/bul letins/whitebook)

2 Beginning with 2nd year, M.S. students are required to assist with one course each academic year as a Teaching Assistant (TA). This 1-credit hour for FD SC 602 does not count toward the Graduate School 18 credit requirement of 500-600 level credits, nor towards the total 30 credits required to graduate.

3 3 credits of the requirement can be satisfied by 400 level Food Science courses with permission of the advisor.

4 Students receiving a M.S. in Food Science must have satisfactorily completed at least one 400-500 level course in each of these areas, during their undergraduate or graduate program. If you have already taken these courses at another institution, please send a memo (countersigned by your advisor) and a copy of the syllabi to the Director of Graduate Studies.

WORKSHEET DESCRIBING HOW M.S. REQUIREMENTS WERE SATISFIED

This form must be submitted to the Graduate Program Coordinator, 207 Food Science Building, before thesis defense date can be scheduled.

Name: _____ Date: _____

GRADUATE SCHOOL REQUIREMENTS **COURSE(S) TAKEN TO MEET REQUIREMENTS**

Total 400-500-600 level credits taken (30)

Transfer credits (maximum 10)
Non-degree credits (maximum 15)

400-500 level coursework in major (minimum 12)
500-600 level credits (minimum 18)
Thesis research credits (minimum 6)

Current GPA (minimum 3.0)
years from date of admission (maximum 8)

DEPARTMENTAL REQUIREMENTS

FD SC 500A (1 cr)
FD SC 500B (1 cr)
FD SC 500C (1 cr)
FD SC 500D (1 cr)
FD SC 501 (2 cr)
FD SC 602 (1 cr)
Other 500-level FD SC courses (6 cr)

FD SC 600 credits (6 cr)

Additional 400-500 level courses (6 cr)
Statistics (STAT 500 or equivalent)

Please also attach the following:

- Publications resulting from your thesis work (please list complete citation for articles published and also list titles and authorship of manuscripts planned or in preparation).
- Presentations at scientific meetings based on your thesis work (please list title and authorship on presentations, both oral and poster sessions, at regional or national scientific meetings).
- Awards (please list awards received at professional meetings and all scholarships and fellowships awarded during your graduate studies at Penn State).
- Please provide title and location of your employment after graduation.

_____ _____
Student Signature Date

_____ _____
Advisor Signature Date

Ph.D. DEGREE REQUIREMENTS

The graduate school requirements for the Ph.D. degree are described in detail in the Graduate Bulletin (http://bulletins.psu.edu/bulletins/whitebook/index.cfm). The Food Science Faculty has determined additional general and specific requirements and recommendations. An overview of these requirements is presented in Table 2. It should be noted by all students admitted into the Ph.D. program that according to the Graduate School, the graduate student has no official status as a doctoral student and no assurance of acceptance as a doctoral candidate until the qualifying examination has been passed.

The Doctor of Philosophy degree is the highest mark of achievement of the University for creative scholarship and research. Doctoral study develops the student's capacity to make significant contributions to knowledge. Except in special cases, a M.S. degree in Food Science is earned before pursuing a Ph.D. degree.

English Competence Examination: See section *on English Competency Examination*.

Qualifying Examination: See section *on Qualifying Examination Committee and its Activities*.

Graduate Committee: See section on *Doctoral Committee*.

Comprehensive Examination: See section on *Comprehensive Examination.*

Final Oral Examination/Thesis Defense: See section on *Final Oral Examination/Thesis Defense*.

Electronic Submission of Dissertation and Thesis (eTD): Electronic submission of the final dissertation (eTD) became a requirement for all doctoral candidates at Penn State starting in fall semester 2006. For additional information on the mechanics of eTD preparation, visit the eTD Web site (http://gradschool.psu.edu/current-students/etd/about-etds/).

Residence: There is no required minimum number of credits or semesters of study, but over some twelve-month period during the interval between admission to the Ph.D. program and completion of the Ph.D. program, the candidate must spend at least two semesters (summer sessions are not included) as a registered full-time student engaged in academic work at the University Park campus, the Penn State Milton S. Hershey Medical Center, or Penn State Harrisburg. Full-time University employees must be certified by the department as devoting half-time or more to graduate studies and/or thesis research to meet the degree requirements. Students should note that 601 cannot be used to meet the full-time residence requirement.

Continuous Registration: It is expected that all graduate students will be properly registered at a credit level appropriate to their degree of activity. After a Ph.D. candidate has passed the comprehensive examination, the student must register continuously for each fall and spring semester until the final oral examination is passed. (Students who are in residence during summers must also register for summer sessions if they are using University facilities and/or faculty resources, except for Graduate Lecturers/Researchers, who are not required to enroll for any credits unless they are first-semester graduate students, or are required to be enrolled by their graduate program.)

Post-comprehensive Ph.D. students can maintain registration by registering for credits in the usual way, or by registering for noncredit 601 or 611, depending upon whether they are devoting full time or part time to thesis preparation. Students may take 601 plus up to 3 additional credits of course work for audit by paying only the dissertation fee. Students wishing to take up to 3 additional credits of course work for credit, i.e., 590, 602, etc., with 601 may do so by paying the dissertation fee and an additional flat fee. Enrolling for either 3 credits for audit or credit will be the maximum a student may take with SUBJ 601 without special approval by the Graduate School. NOTE: Registration for additional credits above this will incur an additional charge at the appropriate tuition per-credit rate (in state or out of state). Students wishing to take more than 3 additional credits of course work must register for 600 or 611 (i.e., not for 601, which is full-time thesis preparation). Note that the least expensive way for a student to maintain full-time status while working on research and thesis preparation is to register for 601. This clearly is the procedure of choice for international students who need to maintain status as full-time students for visa purposes. If a Ph.D. student will not be in residence for an extended period for compelling reasons, the director of Graduate Enrollment Services will

consider a petition for a waiver of the continuous registration requirement. The petition must come from the doctoral committee chair and carry the endorsement of the department or program chair.

Time Limitations: A student devoting half-time (9 to 12 credits per semester) to graduate studies will normally require three years beyond the Master's degree to earn the Ph.D. degree. In no case may a student take more than eight years to complete the program from the date of acceptance as a Ph.D. candidate.

Department of Food Science
Ph.D. Graduate Program Checklist

Year 1

_____ Attend orientation, Get Keys, Set up Email account

_____ Take AEOCPT Exam for international students only, (during 1st semester)
http://aplng.la.psu.edu/programs/about-the-aeocpt

_____ Take Laboratory Safety and Laboratory Hazard Communication – University Park Laboratory Safety (initial) @ http://www.ehs.psu.edu

_____ Schedule FD SC 500 A, B, C, D and FD SC 501

_____ Schedule other 400 and 500 level courses in consultation with advisor

_____ Research

_____ Develop a coursework plan in consultation with thesis committee

_____ Schedule Qualifying Exam/English Competency during first semester

_____ Schedule Qualifying Exam/Science Competency

_____Complete SARI (as part of FD SC 501)

_____ Schedule FD SC 602

Year 2

_____ Schedule FD SC 602 (along with your TA assignment)/Serve as TA

_____ Schedule other courses per your coursework plan

_____ Research

_____ Appoint Ph.D. thesis committee. See draft form in back of handbook. Do not obtain signatures until form is reviewed and processed by Graduate Program Coordinator.

_____ Develop thesis proposal & present to thesis committee

_____ Schedule Comprehensive Exam

Year 3

_____ Serve as TA

_____ Research

_____ Write thesis & manuscript(s)

_____ Activate "Intent to Graduate" the semester you plan to graduate (through LionPATH)

_____ Schedule Thesis Seminar (see the Graduate Program Coordinator to reserve room)

_____ Schedule Thesis Defense (inform the Graduate Program Coordinator of date, time and location one month prior to defense)

_____ Give thesis to Department Head (allow at least one week for review & signature). Please provide thesis to Graduate Program Coordinator. To accommodate Department Head's travel schedule, please confirm with Graduate Program Coordinator prior to submitting thesis.

_____ Schedule Exit Interview with Department Head

_____ Submit one hard bound copy of thesis to Graduate Program Coordinator

_____ Complete Termination/Transfer Checklist (see back of handbook)

_____ Return keys, purchase card, and equipment. Complete ERS reports, vacate office

Notify Graduate Program Coordinator no later than one month prior to your planned departure date

Table 2. MINIMUM REQUIREMENTS for Ph.D. DEGREE IN FOOD SCIENCE AT PENN STATE WHEN ENTERING WITH AN M.S. DEGREE OR EQUIVALENT

(as approved at the Faculty meeting on 06/7/2011)

		# Cr
MINIMUM GRADUATE SCHOOL REQUIREMENTS[1]		
Maximum Non-degree credits allowed (needs approval)		15
Maximum Transfer credits allowed (needs approval)		10
Qualifying exam	Yes	
Comprehensive exam		Yes
Thesis		Yes
Residency (# semesters)[2]		2
Minimum GPA needed to graduate		3.0
Time limit (# years from date of passing qualifying exam)	8	

The Graduate School has no minimum credit hour requirement for the Ph.D. program. However, the Department of Food Science requires that the following list of courses be completed.

MINIMUM DEPARTMENTAL REQUIREMENTS (which will also fulfill minimum Graduate School Requirements)	
FD SC 500A, FD SC 500B, FD SC 500C, FD SC 500D[3]	4
FD SC 501[3]	2
FD SC 602[4]	2 semesters of 1 cr. each
Statistics (STAT 500 or equivalent) [5]	√
Additional 500-level courses[6]	6
Qualifying exam	Yes
Doctoral committee	Yes
Comprehensive exam	Yes
Thesis seminar	Yes
Thesis defense	Yes

1 University Bulletin on Graduate Degree Programs (http://bulletins.psu.edu/bulletins/whitebook)

2 Two semesters within a 12-month period; summer session is not considered a semester.

3 Not needed if student received credit for course during masters degree program at Penn State.

4 Beginning with 2nd year, Ph.D. students are required to assist with one course per academic year as a Teaching Assistant (TA).

5 Students receiving a Ph.D. in Food Science must have satisfactorily completed at least one 400-500 level course in each of these areas, during their undergraduate or graduate program.

6 3 credits of the requirement can be satisfied by 400 level Food Science courses with permission of the advisor.

WORKSHEET DESCRIBING HOW PH.D. COURSEWORK REQUIREMENTS WERE SATISFIED FOR STUDENTS ENTERING PH.D. PROGRAM WITH AN M.S. DEGREE

This form must be submitted to the Graduate Program Coordinator before thesis defense date can be scheduled.

Name: _____ Date: _____

GRADUATE SCHOOL REQUIREMENTS[1]	**COURSE(S) TAKEN TO MEET REQUIREMENTS**
Non-degree credits (maximum 15)	
Transfer credits (maximum 10)	
Qualifying exam	Yes
Comprehensive exam	Yes
Thesis	Yes
Residency (minimum 2 semesters)	
Current GPA (minimum 3.0)	
# years from date of passing qualifying exam (Maximum 8)	

DEPARTMENTAL REQUIREMENTS

FD SC 500A (1 cr)
FD SC 500B (1 cr)
FD SC 500C (1 cr)
FD SC 500D (1 cr)
FD SC 501 (2 cr)
FD SC 602 (2 semesters x 1 cr)

Statistics (STAT 500 or equivalent)

Additional 500-level courses (6 cr)

Date of Qualifying exam
Date of Comprehensive exam

Please also provide the following information:

- Publications resulting from your thesis work (please list complete citation for articles published and also list titles and authorship of manuscripts planned or in preparation).
- Presentations at scientific meetings based on your thesis work (please list title and authorship on presentations, both oral and poster sessions, at regional or national scientific meetings).
- Awards (please list all scholarships and fellowships awarded during your graduate studies at Penn State).
- Please provide title and location of your employment after graduation.

_____ _____
Student Signature Date

_____ _____
Advisor Signature Date

ENGLISH COMPETENCY EXAMINATION

Candidates for all doctoral degrees are required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the doctorate. Graduate programs are expected to establish mechanisms for assessing and improving competence of both domestic and international students. Assessments should include pieces of original writing. Programs and advisers should identify any deficiencies before or at the qualifying examination and direct students into appropriate remedial activities. Competence must be formally attested by the program before the doctoral candidate's comprehensive examination is scheduled. (Note: Passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a doctoral degree candidate and for conferral of a doctorate from Penn State.) All Ph.D. students must pass the English Competency Examination. The Food Science Department defines the level of speaking competency as the ability to convey scientific and general information in an understandable manner, and the level of writing competency as the ability to relate scientific information in clear and easy-to-understand language that uses correct English grammar, syntax, spelling and punctuation. All Ph.D. students must take this exam, including domestic and international students.

The Director of Graduate Studies will conduct the assessment of speaking and writing competency at the beginning of Fall and Spring semesters. Within the first month of their first semester in residence in the Food Science program, all new Ph.D. candidates will be asked to:

1. Write a one-page summary on a subject within Food Science in one hour to test writing competency. The Director of Graduate Studies will determine the topic and supervise the administration of this writing exercise. The writing will be evaluated by the Director of Graduate Studies.

2. Complete a half-hour oral interview with the Director of Graduate Studies to test speaking competency.

The Director of Graduate Studies will evaluate each candidate's performance within two weeks and report the outcome to the candidate.

Improvement of English Competency by Students with Deficiencies

A Ph.D. candidate must satisfactorily complete both parts of the English competency examination. In case of unsatisfactory performance in one or more parts, a recommendation to take appropriate remedial course(s) will be made. Those students whose writing is judged below acceptable standards will be required to take one or more appropriate technical writing courses. Those students whose speaking is judged below acceptable standards will be required to take ESL 116G, 118G or other appropriate courses.

Attainment of Competency

For candidates who performed unsatisfactorily during one or both parts of the English competency examination, assurance of acceptable writing and/or speaking competency will be based on a second evaluation of his/her performance on the written and oral portions of the Comprehensive Examination.

Request for Exemption from English Competency Examination

The student must submit a one page petition justifying the exemption to the Qualifying Examination Committee along with evidence for speaking competency and writing competency. For example, the student may have published a research paper (in English) as primary author, and the student may have recently presented an oral presentation (in English) at a scientific meeting. A copy of the manuscript and presentation abstract should be attached to the petition. Furthermore, the student's major advisor will also be required to sign the petition. By signing the petition, the advisor is attesting to the fact that the student has attained a level of speaking and writing competency in English.

QUALIFYING EXAMINATION COMMITTEE AND ITS ACTIVITIES

Committee Composition: The Ph.D. Qualifying Examination Committee (Committee) will be composed of four Food Science faculty members representing the diversity of disciplines within Food Science. Members will be appointed by the Head for a period of four years and will become Chair of the committee in their fourth year. All Committee members will have equal rights and voting privileges. When a member of the

Committee has a conflict of interest (e.g. advisor of the Ph.D. student being evaluated) that member will be responsible for finding a substitute within the Food Science Faculty in the field they represent, and notifying the Committee and the student of the change. In the event the Chair of the Committee has a conflict of interest, the next senior member of the Committee will act as Chair.

Protocol and Evaluation: The Qualifying Examination must be taken within three semesters of entry into the doctoral program. All Ph.D. students must have a M.S. degree or have completed at least 18 credits of graduate coursework beyond a Baccalaureate degree, prior to taking the Qualifying Examination. Approximately two months before conducting the Qualifying Examination, the Chair of the Qualifying Examination Committee will ask all Food Science graduate students to inform the Chair of their intent to take the Qualifying Examination. Approximately one month prior to the Qualifying Examination, the Qualifying Examination Committee will meet collectively with those students scheduled to take the Qualifying Examination to clarify the protocol and evaluation criteria.

Students must pass the Qualifying Examination to be considered a Ph.D. candidate. The Qualifying Examination will be administered consistent with the policy of the Graduate School. The general guidelines are described in the Graduate Degree Programs Bulletin (http://bulletins.psu.edu/graduate/degreerequirements/).

All graduate students are required to have a **minimum grade-point average of 3.00** for work done at the University at the time the qualifying examination is given, and may not have deferred or missing grades.

What follows is a description of the specific evaluation criteria as developed by the Graduate Faculty in Food Science and administered by the Qualifying Committee under the direction of the Department Head, who is also Head of the Food Science Graduate Program.

The Qualifying Examination will be administered during January and May, preferably when classes are NOT in session. The chair of the Qualifying Committee will meet with the students in December and April to explain the procedures and expectations for the exam.

Before taking the Qualifying Examination, students should have knowledge of the following areas with an emphasis on principles/concepts rather than details:

1. The scientific method, including hypothesis development, basic experimental design and methods of data analysis.
2. Scientific ethics and academic integrity.
3. How to effectively communicate scientific research information to a wide variety of audiences.
4. Principles of chemistry and biochemistry of foods, including food ingredients and food systems from raw materials to during and after processing.
5. Principles of food microbiology, including beneficial and detrimental aspects of microorganisms in foods, as well as methods used for detection, enumeration and control of microorganisms important in foods.
6. Principles of nutrition with emphasis on aspects of human physiology and metabolism, nutrient intake and utilization, nutrition surveillance and dietary recommendations, and the impact of food intake patterns on health.
7. Principles of food engineering, including fluid flow and heat transfer, as applied to unit operations in food processing and manufacture.

Two weeks before the Qualifying Examination, the student shall submit to the department's Graduate Program Coordinator the following:

1. A copy of the master's thesis and any relevant published work.
2. Transcripts of undergraduate and graduate course work and GRE scores.
3. Statement of purpose for Ph.D. studies (professional goals, major research interests and plan for completing Ph.D.).
4. A list of courses taken and to be taken at Penn State.

All of the materials will be made available in a file in the main office for review by the Qualifying Examination Committee prior to the Qualifying Examination.

The Qualifying Examination will consist of an oral examination. The Qualifying Examination is used to evaluate a student's potential for Ph.D. research, including the student's ability to think critically, analyze research problems, and communicate means to approach and examine these problems. This examination serves to validate the transformation in the student's status from graduate student accepted to work toward the Ph.D. to graduate student recognized as a candidate for the Ph.D. in the Food Science Graduate Program. In general, as administered in the Food Science Graduate Program, this examination is designed to test two things: 1) the student's ability to engage in critical thinking within the field of food science, and 2) the student's knowledge in broad areas of the field, with an emphasis on understanding central principles and concepts rather than specific factual detail.

Two weeks prior to the Qualifying examination, the student will be given a research paper of broad relevance to Food Science. This paper will be selected by the Qualifying Examination Committee. An ideal research paper will describe food science research and be published in a core food science journal (e.g. Journal of Food Science, Journal of Agricultural & Food Chemistry, Food Microbiology, Journal of Food Engineering, American Journal of Clinical Nutrition). The research paper should be broadly comprehensible to all members of the committee and should have some flaws that the student can identify and criticize.

The exam will begin with the student presenting a **30** minute critique of the research paper. The student shall share a copy of the presentation with the Qualifying Committee members. Students may use visuals aids and notes, but a written draft that could be read from will not be permitted. After the presentation, the committee will have the opportunity to ask questions regarding information presented in the paper, primarily to evaluate overall understanding of the work and how it is related to other areas in Food Science. The aim of these questions is to determine the student's ability to show a clear understanding of the data presented and to demonstrate competency in explaining research data to a scientific group in a logical and precise manner. It is expected that the student will have a thorough understanding of all aspects of the research paper including background literature and all methodology used.

Decision of the Qualifying Examination Committee and Communication of Results: The primary outcome of the examination is either pass, fail with an opportunity for a re-examination, or fail. To pass, the student must receive at least 3 out of 4 positive votes from the Committee. If the decision is to fail the student (less than 3 of 4 positive votes from the Committee) the Committee will then vote to determine whether or not the student may retake the Qualifying Examination. At least 3 out of 4 positive votes are required to allow a retake and, they must take the Qualifying Examination the following January or May. Students will only be given one opportunity to retake the Qualifying Examination.

The result of the Qualifying Examination (pass, fail with the opportunity to retake, or fail with no opportunity to retake) will be communicated to each student immediately after their Qualifying Examination. Within a week after all of the Qualifying Examinations are finished, each student taking the Qualifying Exam, their advisor(s), all members of the Qualifying Examination Committee, the Department Head and the Director of Graduate Studies will be notified in writing as to the outcome of the Qualifying Examination, whether the Qualifying Examination Committee perceived any specific deficiencies and what coursework and/or other work are recommended to remedy the perceived deficiencies.

DOCTORAL COMMITTEE

1. Each Ph.D. student shall have an appointed Dissertation Committee to guide their research training.
2. Dissertation Committee Appointment: A student's Dissertation Committee shall be nominated to the Graduate School by the student's major Graduate Program Head as soon as possible after the student has secured an adviser, but in no event later than one calendar year following the date of the student's successful completion of the Qualifying Examination unless an alternative timing is approved through the Graduate Council's curricular review process.
    a. The guiding principle for members of the Dissertation Committee is the success of the student.
    b. While it is expected that the Graduate Program Head will consult with the student, the student's adviser, and as appropriate the dual-title and/or minor Graduate Program Head, the Graduate Program Head is responsible for nominating members of the Dissertation Committee to the Graduate School, designating Dissertation Committee member roles, and ensuring appropriate Dissertation Committee composition that is in the best interests of the

student and the completion of their dissertation. Dissertation Committees must be approved by the Dean of the Graduate School.

c. The Dean of the Graduate School may appoint one or more members to the Dissertation Committee in addition to those recommended by the Graduate Program Head.

3. Minimum Dissertation Committee Membership: A student's Dissertation Committee shall consist at minimum of four members of the Graduate Faculty, each of whom shall be in a position to contribute substantially to the student's education. At least two of these four members shall be from the student's major graduate program.
4. Dissertation Committee Member Roles: Each Committee shall have a Dissertation Committee Chair, Outside Field Member, Outside Unit Member, and include the student's Dissertation Adviser. The Dissertation Committee Chair and Dissertation Adviser may be one and the same. For students pursuing a graduate minor, the Dissertation Committee shall include a Minor Field Program Member representing each graduate minor. Dissertation Committees may also include other participants who are not members of the Graduate Faculty but are otherwise qualified and have particular expertise in the student's research area. All Dissertation Committee Members are expected to participate fully in the affairs of the Dissertation Committee.
    a. Dissertation Committee Chair: The Dissertation Committee Chair shall be a member of the Graduate Faculty and the student's major Graduate Program. The Dissertation Committee Chair is responsible for arranging and conducting all Dissertation Committee Meetings, ensuring that all Graduate Program, Graduate Council, and Graduate School standards and requirements relative to the doctoral degree are met, and that any conditions set by the Dissertation Committee are fulfilled.
        i. For students pursuing dual-title degrees, either the Dissertation Committee Chair or a co-Chair must be a Graduate Faculty member of the dual-title program.
    b. Dissertation Adviser: Each Committee shall include the student's Dissertation Adviser. The Dissertation Adviser is responsible for the day-to-day guidance of the student's dissertation research, and academic and professional development.
        i. Where day-to-day guidance is shared by two members of the Graduate Faculty, both may be appointed to the Dissertation Committee as co-Advisers.
        ii. Co-advisers are jointly and severally responsible for the day-to-day guidance of the student's dissertation research, and academic and professional development.
        iii. A Dissertation Advisor may also serve as the Dissertation Committee Chair (or co-Chair).
    c. Outside Field Member: Each Dissertation Committee shall have appointed at least one Outside Field Member. The Outside Field Member must have a disciplinary expertise different from the student's primary field of study, and is responsible for broadening the disciplinary perspective available to the student and the Dissertation Committee. The Outside Field Member may be from student's graduate program, but may not also serve as a major program member. In cases where the candidate is also pursuing a dual-title program, any dual-title Graduate Faculty member of the Dissertation Committee may serve as the Outside Field Member.
    d. Outside Unit Member(s): Each Dissertation Committee shall have appointed at least one Outside Unit Member. The Outside Unit Member is responsible for bringing to the attention of the student and the Dissertation Committee [non-academic] issues (including, for example, conflicts of interest) that may impact a student's progress. Outside Unit Members must have their primary academic appointment in an administrative unit different than the Dissertation Committee Chair(s) and Dissertation Adviser(s).
    e. Minor Program Member(s): Dissertation Committees assigned to students pursuing graduate minors shall include at least one Minor Program Member for each graduate minor. Each graduate minor pursued by a student shall be represented by at least one Minor Program Member who is a member of the Graduate Faculty and a member of that minor graduate program. Minor Program Members are responsible for providing the student and the Dissertation Committee with information, advice and perspective on student progress in fulfilling the graduate minor requirements in the graduate program they represent.
    f. Special Members: Dissertation Committees may include Special Members who are not members of the Graduate Faculty but are otherwise qualified and have particular expertise in the student's research area. Special Members do not have to be affiliated with Penn State.
5. Annual Review of Dissertation Committee Membership: It is crucial that all committee members remain actively engaged in the guidance of the student through the completion of their program. The

Graduate Program Head of the student's major program shall review annually each student's Dissertation Committee to ensure that all Dissertation Committee members continue to qualify for service in their designated roles. The Graduate Program Head is responsible for promptly making any necessary changes and informing the Graduate School.

6. When Dissertation Committee Members Retire or Become Emeritus
    a. Dissertation Committee Members who retire or become emeritus may continue to serve for the duration of the student's program if they were appointed to the Dissertation Committee in this role prior to retirement, and they have the continuing approval of the student's Graduate Program Head and the Graduate School. (In the case of students pursuing a dual-title degree, the dual-title Graduate Program Head must also approve.)
    b. As specified in 5 (above) it is the responsibility of the Graduate Program Head to ensure that all Dissertation Committee members continue to qualify for service in their designated roles. The Graduate Program Head will review the committee membership whenever any committee member retires to ensure that students receive expert faculty guidance through their dissertation project.
7. When Dissertation Committee Members Leave the University: Dissertation Committee Members in any role who leave Penn State for reasons other than retiring or becoming emeritus may maintain their committee appointment for up to one year with the approval of the student's Graduate Program Head and the Dean of the Graduate School.
8. Other Changes in Dissertation Committee Membership: If the need for Dissertation Committee membership change is required, whether at the time of an annual review or otherwise, the student's major Graduate Program Head will promptly make the necessary changes and notify the director of Graduate Enrollment Services.

The committee is responsible for:

1. Approving the broad outline of the student's program of course work and research.
2. Approving the student's communication abilities.
3. Approving the student's plan of research.
4. Administering and evaluating the comprehensive and final examinations, and approving the thesis.

PhD students in consultation with their advisor shall establish a thesis committee within 1 month of completing the qualifying examination. All graduate students shall have a minimum of 1 formal thesis committee meeting annually. This meeting will be reported as part of the annual graduate student evaluation form and will be a factor in determining if adequate progress to degree is being made.

COMPREHENSIVE EXAMINATION

The Ph.D. comprehensive exam is a thorough test of the student's knowledge and intellectual capability. The student is expected to demonstrate a mastery of Food Science and be able to utilize that knowledge to interpret research and creatively solve problems.

Candidates are required to have a minimum grade-point average of 3.0 for work performed at Penn State and must be registered as a graduate degree student at the time the comprehensive exam is given. The examination is officially scheduled and announced by the Office of Graduate Enrollment Services following recommendation by the doctoral committee chair through the Department Head. The scheduling form is available in 202 Food Science Building, and must be completed at least two weeks prior to the oral examination.

The examination shall consist of both a written and oral section. The written portion will consist of a research proposal not to exceed 20 pages in length. The format and topic of the written proposal will be determined by the thesis advisor(s), in consultation with the committee and the candidate. The proposal will be distributed to each member of the student's committee at least two weeks prior to the oral portion of the examination. The oral examination should be comprehensive in nature and not merely focus on the student's thesis research (questions are not limited to the narrow subject matter under investigation).
A favorable vote of at least two-thirds of the members of the committee is required for passing. Based on the student's performance, the committee may recommend to the Dean of the Graduate School one of the following actions:

1. That the candidate be passed,
2. That the candidate be re-examined at a later date,

3. That the candidate be failed and dropped from the Ph.D. program.

Students who pass their comprehensive exam can register for FD SC 601 (Ph.D. dissertation full time) for zero credits. Tuition is not charged for this course but there is a Ph.D. Dissertation Fee.

THESIS SEMINAR

Prior to the Final Oral Exam, student will present a seminar to the Department. See the Graduate Program Coordinator to set up a time and room for the seminar and submit an abstract via email at least two weeks prior to the seminar. The student's committee should attend.

FINAL ORAL EXAMINATION/THESIS DEFENSE

A copy of your thesis must be given to each member of your committee two weeks prior to the scheduled Final Oral Examination. The thesis must be in the format acceptable for submission to the Graduate School. A hard copy should be made available to those committee members desiring one. The majority of the committee members must agree to proceed with the defense, one week prior to the scheduled Final Oral Examination.

The doctoral candidate who has satisfied all other requirements for the degree will be scheduled by the Office of Graduate Enrollment Services, on recommendation of the doctoral committee through the Department Head, to take a final examination. The final examination may not be scheduled until at least three months have elapsed after the comprehensive examination was passed, unless permission is granted by the Director of Graduate Enrollment Services. The deadline for holding the examination prior to commencement is listed in the Graduate School calendar. The examination is oral, open to the public, and related in large part to the thesis. The final examination must be scheduled with the Office of Graduate Enrollment Services at least two weeks before the examination is to be held.

The final thesis with all of the signatures of the committee members should be submitted to the head of the department, for signature, at least one week prior to submission to the Graduate School

Table 3 contains a worksheet that can be used as a guideline to ascertain if all requirements for the Ph.D. degree have been fulfilled and must be completed and submitted to the Graduate Program Coordinator before the final oral examination can be scheduled. It is the responsibility of the student to insure that all appropriate requirements for a degree have been met.

ENTRY INTO THE Ph.D. PROGRAM WITHOUT FIRST OBTAINING A M.S. DEGREE

General Policy Statement

Although most applicants to the Ph.D. program have already obtained a Master's degree in Food Science or a related program, the M.S. degree is not a prerequisite for entrance into the doctorate program. The Graduate Program Committee will consider requests from exceptionally qualified students who have received or anticipate receiving a B.S. degree, and from students currently enrolled in the Food Science M.S. program who wish to transfer into the Ph.D. program without first completing the M.S. requirements. Final approval of all applications will be made by the Department Head upon recommendation of the Graduate Program Committee.

New applicants with only a B.S. degree or equivalent who are not accepted into the Ph.D. program may apply for entrance into the M.S. program. Accepted students who subsequently fail the Qualifying Examination with no opportunity for retake or who fail the exam twice, may transfer to the M.S. program. In this case, credits earned while enrolled in the Ph.D. program may apply to course requirements for the M.S. degree.

Current M.S. students who are not approved for transfer into the Ph.D. program may continue their M.S. studies without penalty. Accepted transfer students who subsequently fail the Qualifying Examination with no opportunity for retake or who fail the exam twice, may return to the M.S. program. In this case, credits earned while enrolled in the Ph.D. program may apply to course requirements for the M.S. degree.

Application Procedures

New applicants who wish to enter the Ph.D. program with only a B.S. degree or equivalent must submit the following:

- All information, test scores, and fees currently required for M.S. to Ph.D. applicants
- A section within the personal statement that describes his/her justification for bypassing the M.S. degree

Current M.S. students who wish to transfer into the Ph.D. program without first completing all M.S. requirements must submit the following:

- Their original complete M.S. application file
- A letter written by the student that describes his/her justification for bypassing the M.S. degree
- A letter from the students advisor
  The student's advisor must provide a letter to the Graduate Program Committee recommending transfer. This letter would generally be submitted within two semesters after admission of the student into the M.S. program. A second letter of recommendation must also be provided by another faculty member from Penn State supporting the student's transfer into the Ph.D. program. This letter must be submitted to the Graduate Program Committee at the same time that the advisor's letter is submitted. It is suggested that this second letter be provided by a faculty member who has had the student in at least one graduate level course (400 level or above).

Recommendations

Note that according to the Penn State Graduate School, "the student has no official status as a doctoral student and no assurance of acceptance as a doctoral candidate until the Qualifying Examination has been passed." Therefore, it is strongly advised that applicants be informed of the procedural requirements and evaluation criteria necessary for passing the Qualifying Examination. These include taking the exam within 3 semesters after official entry or transfer into the Ph.D. program (summer sessions do not count towards this requirement) and after having earned at least 18 credits earned in graduate courses beyond the baccalaureate.

Table 3. MINIMUM REQUIREMENTS for PH.D. DEGREE IN FOOD SCIENCE AT PENN STATE WITHOUT FIRST RECEIVING AN M.S. DEGREE

(as approved at the Faculty meeting on 06/7/2011, corrected by GPC 10/17/13)

		# Cr
MINIMUM GRADUATE SCHOOL REQUIREMENTS[1]		
Maximum Non-degree credits allowed (needs approval)		15
Maximum Transfer credits allowed (needs approval)		10
Qualifying exam	Yes	
Comprehensive exam		Yes
Thesis		Yes
Residency (# semesters)[2]		2
Minimum GPA needed to graduate		3.0
Time limit (# years from date of passing qualifying exam)	8	

The Graduate School has no minimum credit hours requirement for the Ph.D. program. However, the Department of Food Science requires that the following list of courses be completed.

MINIMUM DEPARTMENTAL REQUIREMENTS (which will also fulfill minimum Graduate School requirements)

FD SC 500A, FD SC 500B, FD SC 500C, FD SC 500D		4
FD SC 501		2
FD SC 602[3]		2
Other 500-level FD SC courses[4]		6
FD SC 600 credits (minimum needed)		6
Additional 400-500 level courses		6
Statistics (STAT 500 or equivalent) [5]		√
Qualifying exam	Yes	
Doctoral committee		Yes
Comprehensive exam		Yes
Thesis seminar		Yes
Thesis defense		Yes

[1] University Bulletin on Graduate Degree Programs (http://bulletins.psu.edu/bulletins/whitebook)

[2] Two semesters within a 12-month period; summer session is not considered a semester.

[3] Beginning with 2nd year, Ph.D. students are required to assist with one course each academic year as a Teaching Assistant (TA).

[4] 3 credits of this requirement can be satisfied by 400 level Food Science courses with permission of the advisor.

[5] Students receiving a Ph.D. in Food Science must have satisfactorily completed one 400-500 level course in each of these areas, during their undergraduate or graduate program.

WORKSHEET DESCRIBING HOW COURSEWORK REQUIREMENTS WERE SATISFIED FOR STUDENTS ENTERING PH.D. PROGRAM <u>WITHOUT</u> AN M.S. DEGREE

This form must be submitted to the Graduate Program Coordinator before thesis defense date can be scheduled.

Name: _____ Date: _____

GRADUATE SCHOOL REQUIREMENTS	**COURSE(S) TAKEN TO MEET REQUIREMENTS**
Non-degree credits (maximum 15)	
Transfer credits (maximum 10)	
Qualifying exam	Yes
Comprehensive exam	Yes
Thesis	Yes
Residency (minimum 2 semesters)	
Current GPA (minimum 3.0)	
# years from date of passing qualifying exam (Maximum 8)	

DEPARTMENTAL REQUIREMENTS

FD SC 500A (1 cr)
FD SC 500B (1 cr)
FD SC 500C (1 cr)
FD SC 500D (1 cr)
FD SC 501 (2 cr)
FD SC 602 (2 semesters x 1 cr)
FD SC 600 (6 cr)

Other 500-level FD SC courses (6 cr)

Additional 400-500 level courses (6 cr)
Statistics (STAT 500 or equivalent)

Date of Qualifying exam
Date of Comprehensive exam

Please also provide the following information:

- Publications resulting from your thesis work (please list complete citation for articles published and also list titles and authorship of manuscripts planned or in preparation).
- Presentations at scientific meetings based on your thesis work (please list title and authorship on presentations, both oral and poster sessions, at regional or national scientific meetings).
- Awards (please list all scholarships and fellowships awarded during your graduate studies at Penn State).
- Please provide title and location of your employment after graduation.

_____ _____
Student Signature Date

_____ _____
Advisor Signature Date

FOOD SCIENCE GRADUATE COURSES OFFERED

400. FOOD CHEMISTRY (4) Chemical properties of food constituents as influenced by processing and storage. Selected experiments and demonstrations to illustrate chemical reactions of importance in foods. Prerequisite or concurrent: CHEM 202, BMB 211, BMB 212 Coupland

404. SENSORY EVALUATION OF FOODS (2) Sensory evaluation of food, methods of test analysis, panel selection and training, taste sensation theory, consumer testing methods. Prerequisite: STAT 250. Junior standing. Hayes

405. FOOD ENGINEERING PRINCIPLES (3) Engineering principles of importance to food manufacturing, including units, dimensions, mass and energy balance, fluid flow, rheology, heat transfer, and psychrometrics. Prerequisites: MATH 110, PHYS 250 Anantheswaran

406. PHYSIOLOGY OF NUTRITION (3) Physiological mechanisms involved in thirst and appetite, digestion, absorption, utilization of nutrients, respiration, and body temperature regulation. Prerequisite: B M B 211 Lambert

407. Food Toxins (2) Microbiological and chemical aspects of food poisoning; toxicological principles; case histories and prevention of problems. Prerequisite: Senior standing in food science or related majors. Lambert

408. FOOD MICROBIOLOGY (2) Significance of microorganisms in food commodities, microbial spoilage, food-borne infections, and intoxications; methods of preservation, processing, and control. Prerequisite: MICRB 201, 202. Dudley

409W. FOOD MICROBIOLOGY LABORATORY (3) Methods of isolation and detection of spoilage and pathogenic microorganisms in foods; effects of processing and preservation on survival of food microorganisms. Prerequisite: MICRB 202. Prerequisite or concurrent: FD SC 408. Kovac

410. CHEMICAL METHODS OF FOOD ANALYSIS (3) Qualitative and quantitative determination of food constituents. Prerequisite: BMB 212, FD SC 400. Hopfer

411. MANAGING FOOD QUALITY (3) Statistical tools for the control and improvement of food quality. Prerequisite: STAT 250. Ziegler

413. SCIENCE AND TECHNOLOGY OF PLANT FOODS (3) Physical and chemical behavior of plant-based raw materials and ingredients, with emphasis on parameters influencing finished product quality. Prerequisite: FD SC 400, 405, 408, 410. Elias

414. SCIENCE AND TECHNOLOGY OF DAIRY FOODS (3) Physical and chemical behavior of dairy-based raw materials and ingredients, with emphasis on parameters influencing finished product specifications. Prerequisite: FD SC 400, 405, 408, 410. Harte

415. SCIENCE AND TECHNOLOGY OF MUSCLE FOODS (3) Physical and chemical behavior of muscle food commodities, with emphasis on muscle-based ingredients in formulated foods. Prerequisite: FD SC 400, 405, 408, 410. Mills

460. FOOD SYSTEMS IN ITALY (2). Food Science Study tour in Northern Italy. Course will compare food and agricultural systems between the US and Italy. Hopfer/Kovac

497. SPECIAL TOPICS (1-9) Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest. Several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student's transcript.

497. NEW PRODUCT DESIGN (3) This course provides upper-level undergraduate students in the Food Science major with a formal learning experience in new product design (NPD). Azzara/Anantheswaran

500A FUNDAMENTALS OF FOOD SCIENCE – MICROBIOLOGY (1) Intensive overview of the field of Food Science with the focus on microbiology.

500B FUNDAMENTALS OF FOOD SCIENCE - ENGINEERING (1) Intensive overview of the field of Food Science with the focus on Food Engineering. Anantheswaran

500C FUNDAMENTALS OF FOOD SCIENCE – CHEMISTRY (1) Intensive overview of the field of Food Science with the focus on chemistry. Coupland

500D FUNDAMENTALS OF FOOD SCIENCE - NUTRITION (1) Intensive overview of the field of Food Science with the focus on nutrition. Keller

501 RESEARCH METHODS IN FOOD SCIENCE (2) Planning and conducting research in food science including: problem definition, experimental design, collecting and recording data, and effective communication. Lambert

507 ADVANCED FOOD MICROBIOLOGY (3) Roles of microorganisms in food preservation, spoilage, health and disease. Recent advances in detection, tracking and control of foodborne pathogens. Prerequisite: FD SC 408 or FD SC 500 , and a 400-level course either biochemistry or molecular biology.

514 FOOD PHYSICAL CHEMISTRY (3) Physical principles underlying food structure and quality. Prerequisite: FD SC 400 or FD SC 500C Coupland

515 SENSOMETRICS (3) Students in this course will familiarize themselves with different data analysis methods for analyzing uni- and multivariate data sets from the Sensory & Consumer Sciences. Hopfer

521 FOOD DEFENSE: PREVENTION PLANNING FOR FOOD PROCESSORS (3) Course prepares current and aspiring professionals to learn, recognize and apply measures to prevent intentional contamination of the food supply. Prerequisite: AGBIO 520 Cutter

526 MICROBIAL PHYSIOLOGY OF FOODBORNE ORGANISMS (3) A current literature-based course investigating the mechanisms by which foodborne bacteraia (beneficial and pathogenic) grow, survive, and react to environments encountered in foods and during food processing. Dudley

534 (NUTRN 597G) READINGS IN INGESTIVE BEHAVIOR (1) Students lead discussion of original research in the field of ingestive behavior with a focus on food intake in particular. Hayes

555 FOOD RHGEOLOGY (3) This course provides a broad exploration of rheology in the context of food materials. Harte

596 INDIVIDUAL STUDIES (1-9) Creative projects, including nonthesis research, that are supervised on individual basis and fall outside the scope of formal courses. A specific title may be used in each instance and will be entered on the student's transcript. Multiple offerings may be accommodated by the use of suffixes a, b, etc. The student must have a GPA greater than or equal to 3.0 in order to register for FD SC 596 and should submit also CONTRACT FOR FOOD SCIENCE SPECIAL PROBLEMS COURSES (FD SC 596).

597 SPECIAL TOPICS. (1-6) Formal courses given on a special interest subject which may be offered infrequently; several different topics may be taught in one year or semester. A specific title may be used in each instance and will be entered on the student's transcript.

600 THESIS RESEARCH. (on campus). FD SC 600 cannot be taken for a letter grade.

A master's candidate is not required to register for the final semester in order to graduate or in order to make minor revisions to the thesis and/or to take a final examination for the degree, unless required to do so by the program. However, international students should be registered each semester to meet F-1 Visa requirement, including the semester they defend.

601 Ph.D. DISSERTATION

602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING

610 THESIS RESEARCH. (off campus)

611 Ph.D. DISSERTATION. (part time)

601. Ph.D. DISSERTATION.

Registration requirements for FD SC 601

International Students

1. Ph.D. students who have passed their qualifying exam must be continually registered until the semester that they defend their thesis.
2. Students who need to be registered after they have passed their comprehensive exam, should register for FD SC 601.
3. After the defense, in order to remain in the U.S. on a legal status, the student should apply for OPT/CPT. Students are urged to contact DISSA for appropriate guidance.
4. International students must retain their health insurance to retain their F-1 Visa status. If they would like to purchase insurance elsewhere, they must work with the Student Insurance Office to get approval.

Domestic Students

1. Ph.D. students who have passed their qualifying exam must be continually registered until the semester that they defend their thesis.
2. Students who have passed their Comprehensive Exam should register for FD SC 601.
3. Students should be formally registered during the semester (including summer) they intend to defend their thesis.

602 SUPERVISED EXPERIENCE IN COLLEGE TEACHING

Supervised and graded experience in the organization and conduct of lectures and/or laboratories at the undergraduate level and the evaluation and counseling of students. Preparation for performing TA duties.

General Policy - Enrollment in this course is limited to graduate students in their first year and Ph.D. students serving as a TA in food science for the first time. Registration will generally be limited to one credit per semester. Credit for this course shall be counted as a part of the normal credit load for all students (including those on assistantships). However, credit for this course shall not be counted when calculating the grade-point average or in fulfilling any specific credit requirement for the M.S. and/or Ph.D. degree.

Teaching Assistant Selection - The Head of the Department, in consultation with the Director of Graduate Studies and the faculty, is responsible for annual assignment of TAs. Students are asked to indicate their preferences for assignment and encouraged to provide information about their interests, background, and any previous instructional experience. Instructors of the various courses are also asked for their preferences for TAs. After the selection process, the TAs are informed of the assignment in a notification letter.

Course Requirements - Enrollment in FD SC 602 implies additional educational activity by the student. Duties carried out in the normal course of TA assignments are not sufficient to fulfill FD SC 602 requirements.

Grade - The grade for this course will be assigned jointly by the instructor for FD SC 602 and the instructor for the course for which the student is the TA.

AEOCPT (American English Oral Communicative Proficiency Test)

All International students who plan to be a teaching assistant must take the AEOCPT exam that is offered through the Department of Applied Linguistics.

The score you receive on this test will determine when you may assume teaching duties as a teaching assistant. Also effective January 1995, an American English Oral Communicative Proficiency Test Score is required for enrollment in ESL 115G, ESL 117G, and ESL 118G. Students who have not taken the oral proficiency test will not be permitted to enroll in these courses.

The American Oral English Communicative Proficiency Test consists of four sections of questions and activities. Your responses to these are evaluated on the way you express your ideas, not the actual ideas.

In the first section, you are asked to explain a common term from your field. You should explain the term, using examples or analogies if appropriate, and its importance. The second section consists of a role play. You will interact with one of the evaluators about a topic that you should be able to discuss easily. In the third section, you are asked to respond to three questions of general interest. One of the evaluators will ask you the questions. They will not be in written form. In the fourth section, you are given information, which you are then asked to "present" to a group of students. You are able to refer to the information printed in the test booklet. You are given time to prepare you answers and should answer as completely as possible.

You will be evaluated on three important aspects of your English language proficiency. These include: pronunciation (the articulation of specific sounds, and the stress and intonation of your speech); fluency (the rate and appropriateness of pauses in your speech); and comprehensibility (how extensive and appropriate is your use of vocabulary and grammar).

You will be tested by two evaluators (trained graduate students in the Department of Applied Linguistics). One of the will give you instructions, but both will be evaluating your English language proficiency. The test will be tape recorded. If there is a test discrepancy, a third rater will listen to the tape to score your test. Tapes are destroyed after six months.

Before the evaluators begin the test, one of them will explain procedures to you and ask you informal questions about yourself. This "warm-up" conversation is meant to help you relax. It is not graded, even if it is recorded.

One of the evaluators will give you a booklet so you can follow the instructions in writing as the evaluator reads them to you. You are allowed to ask questions about the instructors or the content of the test throughout. You will NOT be penalized for asking questions.

The test takes approximately 25 minutes to complete. Within one week of taking the test, you should check with the Graduate Program Coordinator to receive your score. Scores range from 0-300. Effective August 1999, a score of 250 or higher allows an international student to assume teaching responsibilities with no restrictions. Scores under 250 require additional coursework in English. The following scores and interpretations constitute the guidelines followed by the Department of Applied Linguistics.

AEOCPT SCORE	**REQUIRED COURSE**	**PROGNOSIS**
250-300	None	Student may assume teaching duties with no restrictions.
230-249	Enroll in **ESL 118G** before assuming teaching duties.	After one semester, student should be able to assume teaching duties with no restrictions. Students enrolled in ESL 118G must receive a grade of "B" before they assume teaching duties with no restrictions.
200-229	Enroll in ESL 117G	Will require at least two semesters before student is recommended to teach. Students enrolled in ESL 117G must receive a grade of "B" before they will be allowed to enroll in ESL 118G.
below 200	Enroll in ESL 115G	Will require at least three semesters before student is recommended to teach. Students enrolled in ESL 115G must receive a grade of "B" before they will be allowed to enroll in ESL 117G.

500 LEVEL FOOD SCIENCE COURSES

Even Years (2014, 2016, 2018)

Fall Semester

- FD SC 500A (1) Fundamentals of FD SC-Micro (Dudley)
- FD SC 500B (1) Fundamentals of FD SC-Eng (Anantheswaran)
- FD SC 514 (3) - Food Physical Chemistry (Coupland)
- FD SC 521 (3) - Food Defense (Cutter, on-line)
- FD SC 534 (1) - Readngs in Ingestive Behavior (Hayes)
- FDSC 597 (1) - Food Rheology (Harte)

Spring Semester

- FD SC 500C (1) Fundamentals of FD SC-Chem (Cockburn)
- FD SC 500D (1) Fundamentals of FD SC-Nutr (Keller)
- FD SC 501 (2) Research Methods in FD SC (Lambert)
- FD SC 534 (1) - Readngs in Ingestive Behavior (Hayes)
- FD SC 597(1) – Sensometrics (Hopfer)

Odd Years (2013, 2015, 2017)

Fall Semester

- FD SC 500A (1) Fundamentals of FD SC-Micro (Dudley)
- FD SC 500B (1) Fundamentals of FD SC-Eng (Anantheswaran)
- FD SC 514 (3) - Food Physical Chemistry (Coupland)
- FD SC 521 (3) - Food Defense (Cutter on-line)
- FD SC 534 (1) - Readngs in Ingestive Behavior (Hayes)
- FDSC 597 (1) Food Rheology (Harte)

Spring Semester

- FD SC 500C (1) Fundamentals of FD SC-Chem(Coupland
- FD SC 500D (1) Fundamentals of FD SC-Nutr(Keller)
- FD SC 501 (2) Research Methods in FD SC(Lambert)
- FD SC 534 (1) - Readngs in Ingestive Behavior (Hayes)
- FD SC 597(1) – Sensometrics (Hopfer)

CONTRACT FOR FOOD SCIENCE SPECIAL PROBLEMS COURSES (FD SC 596)

Please complete this form and submit to Graduate Program Coordinator to complete registration.

Student's Name _____
(print)

Professor's Name _____
(print)

Semester and Year _____

Course Number and Name _____

Number of Credits _____

_____ _____
Student's Signature Date

_____ _____
Professor's Signature Date

Comments:

SUGGESTED NON FOOD SCIENCE COURSES THAT MAY BE USED TO FULFILL GRADUATE DEGREE REQUIREMENTS

The list is only a suggestion. Choice of courses is a decision based on input from advisor, committee members and the interests of the students.

A. ENGINEERING

ABE 513	Applied Finite Element, Finite Difference and Boundary Element Methods
ABE 559	Agricultural and Biological Systems Simulation
ABE 562	Boundary Element Analysis
ABE 568	Food Safety Engineering
CH E 446	Introduction to Transport Phenomena
CH E 544	Transport Phenomena
CH E 545	Transport Phenomena I
CH E 546	Transport Phenomena II
ME 411	Heat-Exchanger Design
ME 420	Compressible Flow I
ME 421	Viscous Flow Analysis and Computation
ME 512	HEAT TRANSFER--Conduction
ME 513	HEAT TRANSFER--Convection
E MCH 560	Finite Element Analysis

B. BIOCHEMISTRY/CHEMISTRY

BMB 400	Molecular Biology of the Gene
BMB 401	General Biochemistry
BMB 402	General Biochemistry
BMB 443W	Laboratory in Protein Purification and Enzymology
BMB 464	Molecular Medicine
BMMB 525	Proteins and Enzymes
CHEM 410	Inorganic Chemistry
CHEM 452	Physical Chemistry
CHEM 525	Analytical Separations
CHEM 526	Spectroscopic Analysis

C. MICROBIOLOGY

MICRB 412	Medical Microbiology
MICRB 413	Microbial Diversity
MICRB 416	Microbial Biotechnology
MICRB 421W	Laboratory of General and Applied Microbiology
MICRB 422	Medical Microbiology Laboratory
MICRB 450	Microbial/Molecular Genetics

D. NUTRITION

NUTR 445	Nutritional Metabolism-I
NUTR 446	Nutritional Metabolism-II
NUTR 451	Nutritional Throughout the Life Cycle
NUTR 452	Nutritional Aspects of Disease
NUTR 453	Diet in Disease
NUTRN 511	Maternal and Infant Nutrition
NUTRN 513	Atherosclerosis and Nutrition
NUTRN 514	Prostaglandins and Leukotrienes
NUTRN 515	Mathematical Modeling in Nutrition

E. STATISTICS

AG 400	Biometry/Statistics in the Life Sciences
ENT 597G	Applied Statistics Technology
R SOC 573	Survey Data Analysis
STAT 460	Intermediate Applied Statistics
STAT 462	Applied Regression Analysis
STAT 480	Introduction to STATS
STAT 500	Applied Statistics
STAT 501	Regression Methods
STAT 502	Analysis of Variance and Design of Experiments

	STAT 503	Design of Experiments

F. OTHERS

AG BM 460	MANAGING THE FOOD SYSTEM
HORT 412W	Post-harvest Physiology
MAT SE 441	Polymeric Materials I
MAT SE 442	Polymer Synthesis
MAT SE 443	Introduction to Materials Science of Polymers
MAT SE 444	Solid State Properties of Polymeric Materials
MAT SE 501	THERMODYNAMICS OF MATERIALS

MASTERS COMMITTEE APPOINTMENT AND SIGNATURE FORM

Student Name: _____

Advisor: _____

Committee Chair

_____ _____ _____
Name Signature Date

Committee Members

_____ _____ _____
Name Signature Date

_____ _____ _____
Name Signature Date

_____ _____ _____ (Optional)
Name Signature Date

Please return to Graduate Program Coordinator

Doctoral Committee Appointment Form Worksheet

Student Name: _____

Advisor: _____

Committee Chair/Co-Chair*

_____
Name

_____
Name

Dissertation Advisor/Co-Advisor*

_____
Name

_____
Name

Major Program Members*

_____
Name

_____
Name

Outside Field Member(s)*

_____ _____
Name Program

_____ _____
Name Program

Minor Field Member(s)

_____ _____
Name Program

_____ _____
Name Program

Special Field Member(s)

_____ _____
Name Program

_____ _____
Name Program

*Required Field
Please return to Graduate Program Coordinator

Examination Request Worksheet

Student Name: _____

Advisor: _____

Date of Examination: Time: Location:

Committee Chair/Co-Chair*

_____
Name

_____
Name

Major Program Members*

_____
Name

_____
Name

Outside Field Member(s)*

_____ _____
Name Program

_____ _____
Name Program

Minor Field Member(s)

_____ _____
Name Program

_____ _____
Name Program

Special Field Member(s)

_____ _____
Name Program

_____ _____
Name Program

*Required Field
Submit no later than 3 weeks prior to desired examination date.
Please return to Graduate Program Coordinator

Resume Study/Change of Graduate Degree or Major
http://www.gradschool.psu.edu/faculty-and-staff/forms/ges/#Student_Forms

Registration Drop/Add Form
http://www.registrar.psu.edu/student_forms/dropadd_form.cfm

Concurrent Graduate Degrees
http://www.gradschool.psu.edu/forms-and-documents/ges-owned-forms-and-documents/concurrentgraduatedegreeprogramsplanofstudy/

Transfer of Credit forms
http://www.gradschool.psu.edu/forms-and-documents/ges-owned-forms-and-documents/xfercredit2pdf/

FOOD SCIENCE
GRADUATE STUDENT GRADUATION/TRANSFER
CHECK-OUT SHEET

Food Science graduate students should follow the procedure listed below before leaving the University to ensure that they are in good standing at the time of their departure. The procedure consists of obtaining the signature of the following individuals, ascertaining that the student has fulfilled all obligations in the Food Science Department. This form should be returned to the Graduate Program Coordinator.

Student's Name _____ **Today's Date** _____

Thesis/Paper Status: Complete/Incomplete (circle one) Submitted/Not Submitted (circle one)

Thesis Title: _____

_____

Schedule of Thesis Defense (schedule with the Graduate Program Coordinator) _____

_____

Have you activated your intent to graduate through LionPATH? Yes or No Graduation Date:_____

_____

The signatures below confirm the student named above has fulfilled all obligations in the following areas:

	Signature	Date
1. **Advisor:** • Oral presentation of thesis • Name removed from computer accounts • All borrowed equipment returned • Arrangements made for completion of thesis, etc.	_____	_____
2. **Director of Graduate Studies & Dept. Head** • Certification of all degree requirements and transmission of information to the Graduate School	_____	_____
3. **Accounting Assistant** • Returned Purchasing Card • Submitted all paperwork for P-Card, Travel expenses, petty cash, etc. • Cancelled dept. copier access • Cancelled eBuy Access *(UDBA processed)*	_____	_____
4. **Return Keys, Vacate office** • Return **all** keys to Room 116 Ag. Admin. • Receive key deposit refund	_____	_____
5. **Schedule Exit interview with Department Head:** (Schedule with Graduate Program Coordinator At least 7 days in advance)	_____	_____
6. Submit one hard bound copy of thesis to Svend Pedersen	_____	_____

7. Forwarding address:

_____

_____

Employer Name & Address:

_____

_____

Transfer/Separation Checklist

Covered Individual Information	
Name (Last, First, Middle Initial):	PSU Employee ID #:
Job Title & Appointment Type:	Last Day Employed/Engaged or Date of Transfer:
Work Unit & Department:	Name of Supervisor/University Contact:

Part I – University Property				
Item	*Yes*	*No*	*N/A*	*Comments*
Keys/Access Cards obtained/Card Swipe access disabled (building/department/office/filing cabinets/desk/etc.)				
Second Factor Authentication Token				
ID Card/Security Badge				
Purchasing Card				
Parking Permit				
Cellular Phone/Phone Card				
Books/Supplies/Training Materials				
Laptop/Tablet/Other Computer Equipment (include storage devices and other media)				
Any property for which the individual is listed as custodian in the				
Other Dept./Area Specific Items (Please specify & attach additional documentation if necessary)				

Part II – System Access				
Item	*Yes*	*No*	*N/A*	*Comments*
Access Account				
IBIS				
ISIS				
Local IT Accounts and Network Access (including shared drives				
Database Access				
Other Dept./Area Specific Items (Please specify & attach additional documentation if necessary)				

Part III – Miscellaneous				
Item	*Yes*	*No*	*N/A*	*Comments*
Resignation letter obtained				
Time & attendance verified				
EAP information provided				
Employee Benefits Division contact info provided				
Personal files from computer cleared/personal belongings removed				
Work files moved to a shared drive				
Telephone forwarded /coverage obtained/discontinued				
Email autoreply created/email forwarded/listserv admins				
Departmental email alias(es) removed				
Termination/Transfer Form Processed				
Salary, short-term or travel advances collected				
Long-term advances independently verified and transferred to				
ERS travel reports finalized				
Other Dept./Area Specific Items (Please specify & attach additional documentation if necessary)				

Part IV – Preparer's Signature – (Please Print & Sign)

_____ _____

(Print) (Sign) (Date)