

KANSAS STATE UNIVERSITY

**FOOD SCIENCE
GRADUATE PROGRAM**

Graduate Student Guide

(Rev. Summer 2008)



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LETTER FROM THE PROGRAM CHAIR

It's my privilege on behalf of the Food Science Graduate program to extend you a warm welcome!

The Food Science Graduate Program is interdisciplinary and is administered by the Food Science Institute (FSI). The FSI is composed of Faculty with a breadth of food science expertise and facilities that would be impossible to collect as a single entity. There are over 50 faculty from 11 departments representing 5 colleges actively involved with the FSI. The faculty encourages you to take full advantages of our program with its diverse resources.

The Food Science Graduate Program maintains an enrollment of more than 100 students dispersed amongst the departments. The faculty encourages you to get to know your professors and fellow graduate students through such organizations as the Food Science Club and the Kansas City Section of the Institute of Food Technologists (KC-IFT) as well as through your courses and research activities. There are a wide selection of extracurricular activities (both educational and social) available on campus awaiting your participation.

You have been assigned a major professor. This person is a key to the progress in your program. Therefore, it's imperative that you keep in constant contact with your major professor.

The Graduate School provides an extensive Graduate Handbook (www.ksu.edu/grad) which covers all the official university policies and procedures. Please consult this handbook or contact the Graduate School Office if questions or as concerns arise. The intention of the Food Science Graduate Handbook is to be a resource for food science graduate students at K-State. The handbook provides basic procedural information and others topics of interest that will assist you during your sojourn through graduate school.

Should you need the services of the chair, please feel free to call or stop by my office, room 208 Call Hall.

Again, best wishes for a successful and rewarding experience.

Best Regards,



J. Scott Smith, Ph.D.
Professor and Coordinator
Food Science Graduate Program

I. THE FOOD SCIENCE INTERDEPARTMENTAL GRADUATE PROGRAM

History and Mission

The Food Science program at Kansas State University has a unique history that began almost 40 years ago. Below are excerpts from a feature article written by Dr. Richard Bassette, Professor Emeritus, entitled, "Reflection of the Development of the KSU Food Science Graduate Program." The article has been revised slightly to complete the history to the current time.

The graduate-level Food Science Program at KSU did not just happen; many dedicated people worked very hard to initiate the concept. The activities leading to the formal acceptance of the program occurred more than 30 years ago. Nineteen faculty members met with Associate Dean of Agriculture Duane Acker on May 26, 1964 to consider the establishment of an interdisciplinary graduate program in food science.

As an outgrowth of that meeting with Dean Acker, an eight-member committee was appointed with Professor Ross Mickelsen (Department of Dairy and Poultry Science) serving as chairman and Dr. Don Kropf (Department of Animal Sciences and Industry) as a member to prepare a draft proposal that would eventually be considered by the various University administrative groups. The following excerpt from Dean Acker's May 29, 1964 letter outlined the responsibilities of that committee.

"Your charge is restricted to graduate programs, and does not include consideration of an undergraduate program

or of departmental structure. Your proposal should include (1) major requirements for the M.S. and Ph.D. degrees, (2) a list of likely minors and description of requirements for minors, (3) titles and descriptions of courses presently available that would likely be used in the programs, (4) titles and descriptions of courses (if any) that would need to be developed for the programs, (5) faculty and faculty competencies that would likely be involved in the programs, (6) brief descriptions of departmental research activities that may serve as bases for theses and dissertations, and (7) other items deemed appropriate by the committee."

Even before the 1964 meetings to consider the food science graduate program, there were several informal meetings among faculty and administrators interested in food science. Drs. Mickelsen, Tom Claydon, and Richard Bassette, all from the old dairy manufacturing curriculum, had visited with C. L. Norton, head of the Dairy Science Department, and Dean Acker late in 1963 to attempt to get an undergraduate program started. The general feeling from those meetings was that the climate was not right for an undergraduate program, but perhaps if a graduate program were initiated, the undergraduate program would follow. This meeting paved the way for the May 26, 1964 meeting.

Through the excellent work of the committee appointed by Dean Acker, the draft of the graduate Food Science Program was approved by the graduate faculty on November 17, 1964, by the Faculty Senate on December 8, and then by the Board of Regents in November 1965. On December 16, 1965, about 36 faculty members were assembled from the Colleges of Agriculture, Engineering, and Home Economics and

invited to participate in the interdisciplinary program. This was the first graduate food science faculty. Professor Mickelsen was selected as the first chairman.

The first degree under the new program was received by one of Dr. Bassette's students, B.E. Loney, who received his M.S. degree in 1966. He later received a Ph.D. degree from KSU and became Vice President of Technology for Lawry Foods, Inc. The second Ph.D. degree was conferred on Dr. David Mugler, who served as the Director of Resident Instruction and Associate Dean in the College of Agriculture at KSU.

Administration of the graduate Food Science Program was directed by the Dean of the Graduate School during the first five years of existence. The coordinating committee was selected by the Dean, and Ross Mickelsen was appointed as the chairman. Dr. Mickelsen had very ably guided the new program and through his leadership and work on the coordinating committee brought food science to a position of prominence at KSU. Within two years there were 30 graduate students in the program. In August 1969, Dr. Harold Tuma, Department of Animal Sciences and Industry, was appointed as chairman to replace Dr. Mickelsen for a three-year term. Although Dr. Tuma left the University after serving for only two years, under his leadership provisions were made to put administration of the program more in the hands of the graduate food science faculty.

The first elected chairman of the coordinating committee was Dr. David Lineback from the Department of Grain Science and Industry. He served from January 1971 to July 1973. Dr. Lineback took the lead in mustering support of KC-IFT for the KSU Food Science Program. In April 1972, the first KC-IFT award was

made to a food science graduate student. As a result of his leadership, student numbers increased to between 35 and 40, and food science faculty numbered 42.

Dr. Howard Mitchell, succeeding Dr. Lineback as chairman, served from July 1973 to June 1975. During this period the program ran smoothly. As described by Dr. Mitchell in an annual report, in the spring of 1975 there were 19 M.S. and 18 Ph.D. candidates, of which 19 percent were female students and 67 percent were international students.

In June 1975, Dr. Robert J. "Robby" Robinson was elected chairman. During Dr. Robinson's term, a review team of seven renowned scientists were invited to the campus to evaluate the administrative structure at KSU. In November 1976 this review team scrutinized all aspects of food science at KSU, from undergraduate and graduate teaching to research and extension. This was a difficult period for food science because in the aftermath of the review, those who supported a strong administrative food science structure were opposed by a much larger group that saw food science as a threat that would weaken existing programs. On November 19, 1976, Vice President for Agriculture Roger Mitchell sent a letter to heads of the Departments of Animal Sciences and Industry, Grain Science, and Dairy and Poultry Science stating that he was going to propose to the Board of Regents the establishment of a Department of Food Science. On November 29, Vice President Mitchell proposed merging the Departments of Animal Sciences and Industry (AS&I) and Dairy and Poultry Science. There was much vocal opposition among agriculture faculty to the planned realignment, and particularly to the formation of a food science department. After nearly a year of various deliberations

and increased opposition from the Department of Foods and Nutrition and several departments in the College of Agriculture, on September 22, 1977 the concept of a food science department was voted upon at a College of Agriculture faculty meeting. The vote was decisively against such a concept.

In August 1977, prior to the agriculture faculty meeting, Dr. Dick Bassette was elected as chairman of the Food Science Coordinating Committee. The election was held at that time because the chairman was to begin a four-year term of office, as per recommendations of the review team. Dr. Bassette resigned as chairman on July 1, 1979 and Dr. Daniel Y.C. Fung, a member of the Department of Animal Sciences & Industry, was elected to complete Dr. Bassette's term of office. Dr. Fung served two four-year terms. During this time, six USDA National Needs Fellowships were awarded to KSU totaling \$250,000; this created much interest and excitement in the Food Science Graduate Program at KSU. The Program continues to compete for these important fellowships to attract the best U.S. students to come to KSU for Ph.D. degree training.

In April 1987 the office of the chairman was revised to limit service to two consecutive three-year terms. Dr. Jon Faubion (Grain Science and Industry) became chair in July 1987 and served until July 1990. Dr. Leniel H. Harbers (Animal Sciences and Industry) succeeded Dr. Faubion in 1990 and served until June 30, 1997. During this period, the number of faculty remained fairly constant although a large faculty turnover occurred due mainly to retirement. The membership invitation was expanded to include faculty from Agronomy and Veterinary Medicine. Graduate students substantially increased in number because of the increased funding for

food safety and job opportunities. Internet websites were used for recruiting and other communication purposes as the University utilized more advanced computer software programs. Dr. Ike J. Jeon's term as Director of Graduate Studies was between July 1, 1997 until January 31, 2002. During this time Dr. Jeon maintained a strong program. More importantly he was instrumental in drafting and moving forward the formation of the Food Science Institute (FSI). The Food Science Faculty, together with Dr. Ronald Trewyn, Dean of the Graduate School and Dr. Marc Johnson, Dean of the College of Agriculture, served as the administrative forces that brought the FSI to fruition. The FSI was officially dedicated in October 2001. Dr. Curtis Kastner was appointed as the Institute's first director. Dr. Tom Herald was elected as Chair of the Food Science Graduate Program and took office February 1, 2002. Within the same year a proposal was put forward to embrace a food science distance education graduate program. The intent of the initiative was to offer graduate level courses to working professionals. Within five years the distance graduate program grew to 70 students. In 2006, the Graduate School initiated electronic submission for dissertations, theses, and reports. The electronic technology allows for immediate sharing of Kansas State University research with scientists from around the world. Dr. J. Scott Smith, elected Graduated Chair in Spring 2008, is currently working in making many documents for Master and Ph.D. studies available on the website.

Food Science – From The Graduate School Catalog

Information about the Food Science Interdepartmental Degree Program, including a program description, listing of graduate faculty, admission criteria, courses,

etc., appears in the KSU Graduate Catalog (available online at <http://www.ksu.edu/grad>). Please note that the GRE examination is now required for admission.

The Food Science Graduate Program involves the interrelationships of approximately 50 professionals from 13 departments. Faculty from five colleges (Agriculture, Arts and Sciences, Engineering, Human Ecology, and Veterinary Medicine) have participated in the interdisciplinary Food Science masters and doctoral programs since 1965. Graduate faculty are located in the Departments of Agriculture Economics, Animal Sciences, Biochemistry, Biological and Agricultural Engineering, Communications, Chemical Engineering, Entomology, Geography, Grain Sciences, Hospitality, Management and Dietetics, Human Nutrition, Journalism and Mass Communication, and Veterinary Diagnostic Medicine.

Graduate students conduct their research in one of the participating departments. The food science faculty are involved in research on the chemical, microbiological, sensory, and nutritional aspects, functional characteristics, and processing of foods. Faculty with expertise in chemical analysis, instrumental analysis, sensory analysis, systems analysis, biochemistry, dietetics, statistics, microbiology, thermodynamics, rheology, biochemical engineering, and food engineering participate in the food science program.

Research facilities related to animal products include complete dairy and red meat processing facilities; well-equipped research laboratories for red meat, poultry and dairy research; and food chemistry and food microbiology research laboratories, including state of the art GC-MS and HPLC-

MS instruments. Research facilities for cereals include a complete pilot plant for milling grain into flour, complete baking research facilities, equipment for extrusion research, well-equipped laboratories for cereal chemistry, a specialized cereal science library, and other supporting facilities. Flavor and sensory evaluation laboratories and instrumentation for physical, histological, and biochemical analysis of food products are also available. Laboratory facilities for food engineering research include a well equipped thermal processing laboratory, ultrafiltration cells, industrial fermentors, an elemental analyzer, and an environmental chamber. Special facilities for food safety studies are available.

Graduate Degree Options

Additional information about Food Science degree options is available from the Food Science Institute website (<http://www.foodsci.k-state.edu>) and from the KSU Graduate Catalog (available online at <http://www.ksu.edu/grad>).

Current Food Science graduate degree options include the following (available on-campus and by distance, unless otherwise noted):

- Graduate certificate
- MS – thesis, report, or non-thesis (coursework-only)
- PhD – on campus only

II. GETTING STARTED

Using This Guide

This publication is issued to each incoming graduate student in Food Science. The program is interdepartmental, so students in

the Food Science curriculum are assigned a major advisor (or possibly co-advisors) who is part of a department within the University. Thus, guidelines relating to that department will pertain to a student's graduate experience as well. The Food Science Graduate Program is responsible for admission, programs of study, preliminary examinations, final orals, etc. The program functions as the direct pipeline to the graduate school; therefore, only those items relating to the graduate school are the responsibility of this program. All other items, such as departmental policy and all finances, are the purview of the advisor's department. Please refer to the guidelines of the advisor's department, in addition to specifics outlined in this guide.

Arriving on Campus

Most students arrive on campus just prior to the beginning of a semester. You may or may not be familiar with the campus, crowds are everywhere, everyone is very busy, and faculty may have duties that keep them from their offices. You should have received informational brochures titled "Getting Started at K-State" and "Moving to Manhattan" from the Graduate School.

Food and housing are of primary importance on arrival. If you have not already made housing arrangements and wish to use a dormitory, contact housing in the Pittman Building (785-532-6453). If you are married and wish to use family housing (Jardine Terrace), contact Family Housing (785-539-2097). The Jardine Terrace may also be available for single graduate students if space is available. For help in off-campus housing, contact the Dean of Student Life (785-532-6432). International students should have attended orientation and visited with the International Student Center (785-532-6448) for counseling and to start a file

of their visas, etc. Health insurance is available for students and their families. If insurance is needed, contact the Lafene Health Center (785-532-6544).

Starting School

After arrival, contact the Graduate School at 102 Fairchild Hall (785-532-6191). Your file will be activated, and you will be provided information on enrollment and a graduate school calendar (graduation deadlines only) for the semester. The graduate school will have your enrollment form. The enrollment flag needs to be lifted by the major advisor. If for some reason you do not have an advisor or cannot find him/her, contact the specific department head and/or see the Food Science Graduate Chair.

You are required to visit with the Food Science Graduate Program Chair. At the present time the chair is Dr. J. Scott Smith (785-532-1219) located in 208 Call Hall.

International students will be required to take an English proficiency test if their TOEFL score is less than 600 (250 on the computer based). Contact Mrs. Mary Wood, English Language Program (785-532-7324) at 205 Fairchild Hall.

Degree Requirements

Academic Degree requirement information is available from these resources:

- K-State Graduate Catalog (online at <http://www.ksu.edu/grad>)
- Graduate School, 103 Fairchild Hall
- Food Science Institute - 216 Call Hall

General information about graduate study is available in the Kansas State University Graduate Catalog. The Graduate School

(Fairchild 103) and the K-State website also provide detailed information regarding the requirements for Master's and Doctoral degrees, including how to prepare a Program of Study. This publication highlights important points from these sources and presents the program requirements.

Program Requirements

Requirements for entering graduate study in food science are: (1) mathematics, including college algebra, calculus and statistics; (2) biochemistry and organic chemistry; (3) a course in physics; (4) an introductory course in microbiology; and (5) a course in botany, zoology, or biology.

The student's supervisory committee will resolve course deficiencies. When the student's committee believes it necessary, the student will be required to take additional undergraduate courses to prepare more completely for the individual program.

Candidates for degrees are expected to select courses that provide adequate coverage in several food science areas, with primary emphasis in one or more areas.

The M.S./Ph.D. program usually includes courses in biochemistry, statistics, food microbiology, food chemistry, and food processing/food engineering. To encourage multidisciplinary education, the student and his/her supervisory committee can consider course offerings from a variety of departments. Restrictions are imposed on the number and type of 500-level course credits that may be included. One credit of a graduate seminar course for the M.S. degree, and two credits for the Ph.D. degree, shall be included. Seminar requirements may be met by Food Science seminar, or an equivalent seminar in the student's residing department or area of study. There is no

foreign language requirement.

Course requirements will be evaluated by the student's supervisory committee. The Chairman of the Food Science Graduate Program must approve members of the student's advisory committee and the program of study.

The Food Science Graduate Seminar

The Food Science graduate seminar (FDSCI 850) is designed to give graduate students experience in oral presentation of their research and educational interests. For many students, the seminar presentation is similar to that given in their final examination.

Graduate students are encouraged to attend as many departmental seminars as possible, whether formally enrolled or not.

Enrollment Procedures

Enrolling. New students should meet with their advisor to discuss courses appropriate for their academic program. After selecting courses, students can enroll through the KATS system or go to the Enrollment Center in Willard Hall, Room 210.

Course Schedule. The list of course offerings is published online each semester and is usually available a few months before the beginning of the next semester. To access the online course schedule, select "Academics" from the KSU home page (<http://www.ksu.edu>). This site also provides links to a semester calendar, a campus map, the fee payment schedule, and the final examination schedule.

Number of Hours Per Semester. Students must enroll and pay fees each semester. Students making use of faculty time and

university facilities should be enrolled. Each student must be enrolled in the term in which the degree is awarded. A doctoral student admitted to candidacy must be continuously enrolled for at least one hour per term (except for summer absences) to maintain candidacy.

Students who do not have assistantships should consult with their advisor and the Graduate School about the number of credit hours required per semester.

For students who do have assistantships, during spring and fall semesters a minimum of 6 credit hours is required; maximum enrollment is 12 hours for a 0.4 FTE appointment and 10 hours for a 0.5 FTE appointment. During the summer, research and teaching assistants must enroll in at least 3 credit hours. (See Section III. Graduate Assistantships for additional information.)

Some students find it efficient to complete classes first and then concentrate on research. Check with your major professor about the best approach for you and which classes you should complete. You may want to include courses in your Program of Study from other departments such as Agricultural Economics or Human Nutrition (course descriptions can be found in the KSU Graduate Catalog, available online).

Even though students are required to take a certain number of research hours (*e.g.*, 6 hours FDSCI 899 for a Master's thesis), those hours may be divided over several semesters. For example, a student may take 2 hours during the semester to write the literature review, 3 hours the next semester to gather data, and 2 hours in a subsequent semester for writing the thesis (this is just an example). Very often graduate students save one or more research hours for the last semester because they must be enrolled the

semester they graduate. The number of research hours taken during a semester should generally reflect the student's research efforts.

Drop/Add. Students wishing to add or drop a course should obtain a DROP/ADD form from the major professor and take the completed form to the Enrollment Center (Willard 210). Deadlines for adding or dropping courses are posted online.

Probation and Dismissal

Probation. Students who fail to make satisfactory progress in their graduate programs are subject to probation and may be denied continued enrollment in the Graduate School. Any of the following conditions may warrant a probation:

- a. A grade lower than B on 6 or more credit hours;
- b. A grade point average lower than 3.0;
- c. The advice of the major professor that the student's progress is unsatisfactory.

Dismissal. A graduate student may be denied continued enrollment at Kansas State University for any of the following reasons:

- a. Failure to satisfy conditions for removal from probation.
- b. Accumulation of 9 or more credit hours with grades lower than B, exclusive of problems course, practical internships, research, or other individualized study.
- c. Failure to meet published departmental requirements or to maintain satisfactory progress toward a graduate degree.
- d. Failure in qualifying examinations (if

required by the program), preliminary examinations, or final degree examinations. Although students may be permitted to retake such examinations upon recommendation of the supervisory committee, in borderline cases a single adverse result in such examinations is sufficient to deny continued enrollment.

- e. Demonstrable lack of diligence in the removal of deficiencies, as evidenced by receipt of grades lower than B in assigned deficiency courses.
- f. Failure to acquire mastery of the methodology and content in a field sufficient to complete a successful thesis or dissertation.

Semester Report

At the conclusion of each semester, all Food Science graduate students are required to complete a semester report. This report is documentation of progress toward the completion of the degree. Additionally, the report will help faculty identify individuals that are deserving of recognition at the local and national level. If the semester report is not filed at the designated time, the individual will not be able to enroll for the next semester.

Award of Degrees

Degrees are typically awarded in either May or December. Recognizing that a number of students may not finish all degree requirements under the regular schedule for each term, the Graduate Council and the Faculty Senate provide for degree awards in October and March as well. Those who require degree certification before receipt of diplomas can obtain such statements from the Graduate School.

Common Food Science Courses

Following is a brief list of courses that are often included on a Food Science Program of Study. Students may include other courses from a variety of departments as well, and should confer with their advisor for guidance and additional details. Information about currently available courses can be found online in the course schedule and Graduate Catalog. Information specific to distance education or online courses is available from the K-State Division of Continuing Education website (<http://www.dce.k-state.edu/courses/>).

Food Science

FDSCI 600 Microbiology of Food
FDSCI 603 Food Science Internship
FDSCI 607 Food Microbiology
FDSCI 630 Food Science Problems
FDSCI 690 Principles of HACCP
FDSCI 694 Food Plant Management
FDSCI 695 Quality Assurance of Food Products
FDSCI 713 Rapid Meths. & Auto. Microbiology
FDSCI 725 Food Analysis
FDSCI 727 Chemical Methods of Food Analysis
FDSCI 728 Physical Methods of Food Analysis
FDSCI 730 A Multidisciplinary Overview of
Food Safety and Security
FDSCI 740 Research and Development of Food
Products
FDSCI 791 Advanced Application of HACCP
Principles
FDSCI 811 Food Fermentation
FDSCI 815 Advanced Food Chemistry
FDSCI 840 Public Health Field Experience
FDSCI 850 Food Science Graduate Seminar
FDSCI 898 Master's Report in Food Science
FDSCI 899 Master's Research in Food Science
FDSCI 907 Food Dispersion
FDSCI 915 Food Toxicology
FDSCI 961 Graduate Problem in Food Science
FDSCI 999 Doctoral Research in Food Science

Animal Sciences and Industry

ASI 605 Fresh Meat Operations
ASI 608 Dairy Foods Processing and
Technology

ASI 610 Processed Meat Operations
ASI 640 Poultry Products Technology
ASI 671 Meat Selection and Utilization
ASI 690 Principles of HACCP
ASI 713 Rapid Methods and Automation in Microbiology
ASI 777 Meat Technology
ASI 791 Adv. Appl. HACCP Principles in Meat and Poultry Industry
ASI 902 Topics in Animal Science
ASI 930 Advanced Meat Science

Biochemistry

BIOCH 521 General Biochemistry
BIOCH 755 Biochemistry I
BIOCH 756 Biochemistry I Laboratory
BIOCH 790 Physical Biochemistry
BIOCH 840 Intermediary Metabolism
BIOCH 910 Lipids
BIOCH 930 Proteins
BIOCH 940 Chemistry of Carbohydrates
BIOCH 950 Enzyme Chemistry

Biological and Agricultural Engineering

ATM 540 Introduction to Food Engineering
ATM 541 Intro to Food Engineering Laboratory Exercises
BAE 575 Fund. Agric. Process Engineering
BAE 625 Thermal Processing Operations in Food Engineering
BAE 635 Food Plant Design
BAE 700 Agricultural Process Engineering

Biology

BIOL 670 Immunology
BIOL 675 Genetics of Microorganisms
BIOL 690 Microbial Physiology and Metabolism
BIOL 730 General Virology
BIOL 805 Advanced Mycology
BIOL 830 Advanced Virology
BIOL 888 Electron Microscopy Technique

Chemistry

CHM 545 Chemical Separations
CHM 922 Advanced Separations Laboratory
CHM 942 Advanced Analytical Chemistry

Chemical Engineering

CHE 530 Transport Phenomena 1

CHE 531 Transport Phenomena 2
CHE 550 Chemical Reaction Engineering
CHE 626 Bioseparations
CHE 715 Biochemical Engineering
CHE 805 Sel. Topics Biochemical Engineering

Grain Science and Industry

GRSC 500 Milling Science I
GRSC 602 Cereal Science
GRSC 625 Flour and Dough Testing
GRSC 635 Baking Science I
GRSC 636 Baking Science I Laboratory
GRSC 651 Food and Feed Plant Sanitation
GRSC 661 Qual. of Feed and Food Ingredients-Fall
GRSC 710 Fundamentals of Grain Storage
GRSC 720 Extrusion Proc. Food and Feed Ind.
GRSC 730 Milling Science II
GRSC 734 Milling Proc. Technol. Management
GRSC 737 Baking Science II
GRSC 738 Baking Science II Laboratory
GRSC 805 Nutr. Proper. Cereals and Legumes
GRSC 811 Principles of Food Analysis
GRSC 815 Fund. of Processing Grains for Food
GRSC 820 Adv. Extrusion Processing
GRSC 840 Adv. Grain Processing Technology
GRSC 901 Starch Chemistry and Technology
GRSC 902 Carbohydrates in Food
GRSC 905 Enzyme Application
GRSC 906 Food Proteins
GRSC 915 Advanced Cereal Chemistry

Horticulture, Forestry, and Recreation Resources

HORT 725 Postharvest Technol. Physiol.
HORT 800 Horticulture Physiology

Hotel, Restaurant, Institution Management and Dietetics

HRIMD 640 Consultations in Hotel/Restaurant Management
HRIMD 705 Computer Implementation in Foodservice and Hospitality
HRIMD 805 Food Production Management
HRIMD 880 Procurement for Foodservice and Hospitality Operations
HRIMD 890 Administration of Foodservice and Hospitality Organizations
HRIMD 895 Cost Controls in Foodservice Systems

Human Nutrition

HN 550 Nutrient Metabolism
HN 660 Nutrition and Food Behavior
HN 701 Sensory Analysis of Foods
HN 702 Nutrition in Developing Countries
HN 741 Consumer Response Evaluation
HN 780 Problems in Human Nutrition
HN 810 Bionutrition
HN 812 Advanced Micronutrient Metabolism
HN 819 Food Systems
HN 821 Practicum in Sensory Analysis
HN 831 Descriptive Sensory Analysis
HN 844 Nutritional Epidemiology

Statistics

STAT 703 Statistical Methods for Natural Scientists
STAT 704 Analysis of Variance and Covariance
STAT 705 Regression and Correlation Analyses
STAT 720 Design of Experiments
STAT 730 Multivariate Statistical Methods

III. GRADUATE ASSISTANTSHIPS

This section contains key information excerpted from the Graduate School website. In addition, students are strongly encouraged to refer to and become familiar with the "Graduate Student Employment Guidelines" available from the Division of Human Resources (from the Graduate School website, click "Current Students" then "Employment Guidelines" or go to <http://www.k-state.edu/hr/infomgmt/imgradstud.htm>).

GTAs and GRAs

Graduate teaching and research assistantships are available on a limited basis and are administered by the individual departments. Award of assistantships is based on the student's ability and promise and is usually made for either nine or twelve months. The maximum appointment is for half time (0.5), but appointments for lesser

fractions also may be made. Continuation of appointments is subject to availability of funds and academic performance in "good standing" in the Graduate School (GPA 3.0 or greater).

Benefits and obligations of an assistantship depend on the precise appointment (e.g., whether GRA or GTA) and percent time (e.g., 0.4 or 0.5 time).

Students holding assistantships are expected to devote, on average, 16-20 hours per week, depending on the appointment (the student should confer with his/her advisor). These hours are in addition to the student's own research. It is the responsibility of the adviser to designate the workload. Students holding a GRA or fellowship are not allowed any other stipend from the University. Outside employment is strongly discouraged.

Tuition Benefits

Students are eligible for tuition benefits for each term in which they hold an appointment of at least 0.4 time. Graduate research assistants pay tuition at the staff rate; in addition, those who have been on appointments for at least 0.4 time during the spring term are eligible for staff fees during the following summer term, even though they may not hold assistantships. Graduate teaching assistants receive a full tuition waiver for spring and fall semesters in which they hold at least a 0.4 appointment. These waivers are not available in the summer, but, like research assistants, teaching assistants pay staff fees for the term if they have held at least a 0.4 appointment in the previous spring. Funds are provided for tuition benefits only; students will be responsible for campus privilege fees (student health, activity fees, etc.).

Enrollment Criteria

To be eligible for tuition benefits, students must be enrolled for a minimum of 6 graduate credit hours in a fall and spring semester; the maximum enrollment for graduate assistants is 10 hours for 0.5 and 12 hours for 0.4 appointments. During a summer semester, minimum enrollment is 3 graduate credit hours; maximums for a summer term are 5 hours for 0.5 appointments and 6 hours for 0.4 appointments.

Residency

Since GRAs are not exempt from paying tuition, it is important that GRAs establish Kansas residency as soon as possible after arriving in the state. Graduate students and advisors needing more information on establishing Kansas residency should check with the Office of Admissions (785-532-6250).

Resources

Useful information for graduate assistants is available in the “Resources” section of the Graduate School website. Additionally, teaching assistants may find the course EDCI 943, Principles of College Teaching, to be useful.

For additional information about graduate student employment guidelines, see the Graduate School website (click “Current Students” then “Employment Guidelines”).

IV. THE MAJOR PROFESSOR AND SUPERVISORY COMMITTEE

The Major Professor (Advisor)

Selection of a major professor is usually

based on mutual research interests. Graduate students are assigned to a major professor before they arrive. Your major professor will help you select an appropriate program of study (coursework) and provide direction in your research. Although many faculty will contribute to your learning process here, you should be working most closely with your major professor.

Faculty must be Food Science “Graduate” faculty members to serve as major professors and on student committees. This means that they have met research requirements established by the Graduate School. Additionally, graduate faculty members must be “certified” to direct Ph.D. students.

The Supervisory Committee

Composition of the Supervisory Committee. You and your major professor should select a supervisory committee during your first semester.

An M.S. candidate will have at least three committee members: the major advisor will serve as Chair, at least one other Food Science graduate or ancillary faculty member, and a third graduate faculty member who does not necessarily have to be a Food Science graduate or ancillary faculty member. The committee members will be from at least two different departments.

A Ph.D. candidate will have at least four committee members plus an outside chair. The committee will include the major advisor, two other Food Science graduate or ancillary faculty members, and one graduate faculty member from outside the Food Science program (this fourth member may be on the Food Science graduate faculty but in another department). Additionally, the Graduate School will select a faculty

member from outside the Food Science program who will serve as chair of the final oral defense (outside chair).

Popular “outside” departments include, but are not limited to Animal Sciences and Industry, Diagnostic Medicine and Pathology, Human Nutrition, Grain Sciences and Industry, Biochemistry, Kinesiology, Psychology, Statistics, Human Development and Family Studies, and Anatomy and Physiology.

Selecting and Communicating with the Supervisory Committee. Selection of supervisory committee members is based on their availability, expertise, and ability to contribute to the research or educational experience. After the student has discussed possibilities with their advisor, the student contacts each committee member to establish their willingness to serve, then sets up an initial meeting for the supervisory committee. In preparation for the initial supervisory committee meeting, usually the student prepares a tentative Program of Study and a brief outline or description of the proposed research, both of which have been reviewed by the major professor prior to the meeting. Some major professors prefer that the student review this information with the committee members 1-2 weeks before the meeting. At the meeting, the supervisory committee discusses the proposed Program of Study and research, makes recommendations, and/or gives its approval. The Program of Study form, once approved, is signed by all committee members. The Chair of the Food Science Graduate Program must also sign. The student should then make six copies and take them to the Graduate School. The formal Program of Study should be submitted to the Graduate School Office by the end of the second term of study which includes the summer session.

It is the responsibility of the graduate student to check with each committee member and schedule a time and place for oral examinations. After completing the Program of Study and research, the thesis or dissertation is submitted to the committee at least two (2) weeks prior to the final oral examination.

The Chair of the Food Science Graduate Program, the major professor’s department Head and that faculty, committee members, and Food Science program faculty are to be notified two (2) weeks in advance of the final oral examination. This can be accomplished via email and a flyer to be posted in all buildings with a Graduate or Ancillary Food Science faculty member. A record of course work completed and grades received in these courses should be submitted to all committee members at least three (3) days prior to the examination. The graduate student will be responsible for obtaining appropriate forms from the Graduate School Office and returning the signed form within two (2) working days after the oral examination.

If the student is a doctoral candidate, the preliminary examinations are conducted at least 7 months prior to the final oral examination.

The procedures required for graduation are detailed by the Graduate School in the current catalog.

V. OBTAINING THE MASTER’S DEGREE IN FOOD SCIENCE

In addition to the information provided here, students should refer to the graduate catalog, the graduate calendar, and guidelines on writing theses/dissertations provided by the

Graduate School. Students are responsible for meeting applicable deadlines. As stated in the Graduate Catalog, “It is the responsibility of students to know and observe all regulations and procedures relating to the program they are pursuing, as well as those of the University and Graduate School. A regulation will not be waived nor an exception granted because students plead ignorance of, or contend that they were not informed of, the regulations or procedures.”

Current information from the Graduate School (catalog, calendar, guidelines, etc.), is available online via the KSU Graduate School website (<http://www.ksu.edu/grad>) or the KSU home page (<http://www.ksu.edu/>). Additional program information is available online at the Food Science Institute website (<http://foodsci.k-state.edu>).

Overview of Forms

- a. Program of Study: Masters - The program of study must be completed and signed by the student, supervisory committee, and the Food Science Graduate Program Chair.
- b. Semester Report – To be completed by the student and signed by the major advisor at the conclusion of **each** semester.
- c. Approval to Schedule Final Examination: Masters - The supervisory committee and Food Science Chair must sign this document.
- d. Program/Committee Change Form - The supervisory committee and Food Science Chair must sign this document. Use this form for changes only.
- e. Request to Retake a Graduate Course –

Used in the event that a student is on probation and received less than 3.0 in a course listed on the program of study.

- f. Admissions Update - This form is applicable only if a student has been absent from the graduate school for more than twelve months. The Food Science Graduate Program Chair will submit this form (signed by the student), indicating the program is willing to readmit.
- g. Application for Admission to Doctoral Program - Continuing Master’s Graduate.
- h. Title Page – Designates the format for the title page of thesis or report.

Summary of Requirements

For the MS degree in Food Science candidates must:

1. Spend one year in academic residency.
2. Form a committee of at least three Graduate Faculty members, with the major professor serving as chair. Submit a form to the Graduate School for approval of the supervisory committee. This supervisory committee will approve a student’s thesis or report, Program of Study, research plan, and final oral examination.
3. Earn a significant majority of their credit hours in courses numbered 700 or above. Therefore, of the 30 to 32 credit hours normally required for the master’s program of study, at least 18 hours should be at the 700 level and above, including the thesis/research hours required by the thesis. Courses at the 600-level may be included, but 500-level courses in the student’s major area are

expected to have been completed as undergraduate prerequisites to graduate study or as undergraduate deficiency courses assigned upon admission. The use of 500-level supporting courses in master's programs is restricted as follows: (1) no course in the student's major area may be at the 500 level, and (2) normally no more than 6 credit hours may be at the 500 level. No more than 3 hours in problems or other individualized courses may be applied to the master's degree.

4. Pass an oral examination defending the thesis and displaying competency in appropriate areas of expertise. Be prepared to give a presentation about the research and answer questions. The student should also be able to discuss the scientific principles that support this research or related investigations. Be well versed in the subject.

MS Degree Options

Refer to the Graduate Catalog for the most current listing of degree options and requirements. Note: Requirements are equivalent for on-campus and distance programs.

Thesis option. Minimum of 30 credit hours with at least 24 course credit hours with at least 18 hours at 700 level including FDSCI 850 Graduate Seminar and 6 credit hours of FDSCI 899.

Report option. Minimum of 30 credit hours with at least 28 course credit hours with at least 18 hours at 700 level including FDSCI 850 Graduate Seminar and 2 credit hours of FDSCI 898.

Non-Thesis (course-work only) option. Minimum of 34 credit hours with 19 core

credits (11 elective credits) and at least 18 hours at the 700 level.

Core Courses:

ENGL 604 Expository Writing Workshop-Writing/Food Science (2cr.)
FDSCI 600 Food Microbiology (2 cr.)
FDSCI 690 HACCP (2 cr.)
FDSCI 695 Quality Assurance (3 cr.)
FDSCI 725 Food Analysis (3 cr.)
FDSCI 815 Advance Food Chemistry (3 cr.)
FDSCI 850 Food Science Graduate Seminar (1 cr.)
STATS 703 Statistics for Natural Scientists (3 cr.)

VI. OBTAINING THE DOCTORAL DEGREE IN FOOD SCIENCE

In addition to the information provided here, students should refer to the graduate catalog, the graduate calendar and guidelines on writing thesis/dissertations provided by the Graduate School. Students are responsible for meeting applicable deadlines. As stated in the Graduate Catalog, "It is the responsibility of students to know and observe all regulations and procedures relating to the program they are pursuing, as well as those of the University and Graduate School. A regulation will not be waived nor an exception granted because students plead ignorance of, or contend that they were not informed of, the regulations or procedures."

Current information from the Graduate School (catalog, calendar, guidelines, etc.), is available online via the KSU Graduate School website (<http://www.ksu.edu/grad>) or the KSU home page (<http://www.ksu.edu/>). Additional program information is available online at the Food Science Institute website (<http://foodsci.k-state.edu>).

Overview of Forms

- a. Program of Study: Doctoral - The student, supervisory committee, and

Food Science Graduate Program Chair must sign this document.

- b. Semester Report – To be completed by the student and signed by the major advisor at the conclusion of **each** semester.
- c. Request for Preliminary Examination Ballot – Signed by the major professor. The Food Science Graduate Program Chair need not sign this document.
- d. Program/Committee Change Form - The supervisory committee and Food Science Graduate Program Chair must sign this document. Use this form for changes only.
- e. Approval to Schedule Final Examination - Doctoral. The supervisory committee (including the outside chair person) and Food Science Graduate Program Chair must sign this document.
- f. Request to Retake a Graduate Course - Used in the event that a student is on probation and received less than 3.0 in a course listed on the program of study.
- g. Admission Update - This form is applicable if a student has been absent from the graduate school for more than twelve months. The Food Science Graduate Program Chair will submit this form (signed by the student), indicating the program is willing to readmit. Refer to the graduate catalog regarding registration following successfully completing the preliminary examination.
- h. Dissertation Title Page – Designates the format for the dissertation title page.

Summary of Requirements

For a Ph.D. in Food Science, candidates must:

1. Spend a minimum of one year in academic residency. The PhD typically requires three years of study beyond the MS.
2. Form a committee of at least four Graduate Faculty members, with the major professor serving as chair and one member from another department. Submit a form to the Graduate School for approval of the committee. This group of faculty will approve the student's dissertation, Program of Study, research plan, preliminary examination, and final oral examination.
3. Earn a significant majority of course work credit hours that are numbered 800 or higher. Although supervisory committees have considerable latitude in providing an appropriate program of study for their students, they are encouraged to use these guidelines:
 - a. Of the 24 to 30 hours of course work credit hours beyond the master's degree normally required by the supervisory committee, 15 credit hours should be at the 800-level or above, in addition to doctoral research credit hours.
 - b. For course work beyond the master's degree, no more than 6 (six) credit hours of 500-level courses are permitted in a Ph.D. program. No 500-level course from within the student's major field of study (*e.g.*, Department) may appear on the program of study.
 - c. For students who bypass the master's degree, the program of study must

include at least 15 credit hours at the 800-level or above, in addition to doctoral research credit hours. No more than 12 credit hours of 500-level courses are permitted in a Ph.D. program. No 500-level course from within the student's major field of study (*e.g.*, Department) may appear on the program of study.

- d. Not more than 6 hours of problems courses or other individualized courses should ordinarily appear on the program of study for the Ph.D.
4. Pass a written and oral preliminary exam after completing 2/3 of the student's course work. The supervisory committee will administer the exam. Students should check with the major professor regarding format.
5. Pass an oral examination defending the dissertation and displaying competency in appropriate areas of expertise. Be prepared to give a presentation about the research and related areas. The Graduate School will appoint an outside chair (faculty member from a department other than those associated with FSI) to administer the final examination. Students will be notified in writing of this appointment.

VII. RESEARCH

Hints

A common objective of graduate programs is to develop the capacity for independent study and research. As you begin your graduate program, your area of research is determined by you and your major professor. You may be asked to work on a continuing project, help to design a new

project, and/or conduct preliminary investigations.

There are many ways to approach a research project and your major professor will advise you in how to conduct your investigations. In general, you will need to be familiar with the statistical design of your experiments; analytical procedures; data collection, analysis and interpretation; and scientific writing. Each graduate degree (MS or PhD) requires that you communicate your results in a seminar presentation and that you prepare a draft for publication in a scientific journal or other appropriate forum.

As you conduct your work, you will need to operate within the accepted standards of behavior in your laboratory and the department. Most everyone agrees that, at times, graduate school demands more effort from you than you feel capable of putting forth. Thus, it is a stressful time for many people. Try to be considerate of others around you by being a responsible worker. Learn how to use equipment before using it. Keep your work areas clean and safe. Arrange for repair or replacement if you break something. Do not borrow items without asking. We are all here to perform jobs to the best of our ability. Your cooperation is appreciated.

Tentative Time Frame

Identify an advisor and a research topic as soon as possible after admission. The specific expertise of the faculty can be identified by consultation with the Graduate Program director or department head. Allow 2-3 months for writing the review of literature, then develop a plan and conduct your research.

Choosing a Research Topic

1. Choose a topic in which you have a strong interest. A research paper involves a commitment of time and energy on your part and choosing a topic in which you have a strong interest will help motivate you to complete your work.
2. Think about the amount of time you have available for completing the study. Some topics require longer periods of time for completion. Consider whether or not the sample you want to study is available. Is the equipment you need available?
3. You may be able to use an instrument (e.g., a published questionnaire, food frequency form, food processing technique, etc.) that has already been developed with a new or different type of sample. Developing a method is a major task and if you can use one that already is validated your research may be of more value.
4. Identify a position you would like to have after you complete graduate school. Choose a topic that will help you get a job.
5. Discuss possible topics with your major professor. Selection of a major professor usually implies that you have common research interests. The major professor usually has ongoing research involving other graduate students and may have suggestions regarding possible topics. Some professors have concrete ideas on what they would like to see you do; others allow students more freedom and flexibility in selecting research projects.
6. Read current journals in your field of interest. Most articles include

recommendations for further study. Examples of food science journals are: Journal of Food Science, Journal of Cereal Science, Journal of Textural Studies, Journal of Food Technology, and Journal of Food Protection. Your research may be published in one of these journals, so it is important to become familiar with them.

7. Check indexes and abstracts in the food science area. They are in the reference area of Hale Library on the first floor. Read the entries in the Dissertation Abstracts related to your interests. The idea is to determine what has already been done before and what merits future investigation.

A wealth of online search tools are available through the K-State libraries. Students are strongly encouraged to seek guidance from Subject Librarians (see the Libraries website for a listing of subject librarians by department).

Keeping a Lab Notebook

Lab notebooks are the official documentation of your research and serve as the basis for your thesis, dissertation, or patent application. In addition, the act of keeping a notebook prompts you to stop and think about your research, an essential component of investigative science.

1. Use a bound notebook with consecutively numbered pages. *These can be obtained from the K-State Union.*
2. Make notebook entries in ink. Sign and date each entry.
3. Allow a few pages in the front of the notebook for a Table of Contents.

4. Write with enough detail so that another scientist could refer to your notebook and repeat the experiment.
5. Note appropriate literature citations, numbers of analytical methods, and any modifications to the previously described procedures. Sketches of equipment set-up or sample appearance may be useful.
6. Record the data collected in a table or other easy-to-read format. Attach computer printouts of spreadsheets, graphs, photos, etc.
7. Set aside time to make notebook entries. Record your thoughts regarding experimental results and the implications for future work. The act of writing often prompts new ideas.

VIII. WRITING THE THESIS OR DISSERTATION

Students will prepare a thesis or report (MS) or dissertation (PhD) for approval by their Supervisory Committee. As of Fall 2007, graduate students are required to submit their thesis, dissertation, or report in **electronic form**; the Graduate School no longer accepts paper copies. The Graduate School provides specific guidelines for the format of a thesis or dissertation; students should obtain these requirements before beginning to write.

It may be helpful to refer to a recent thesis or dissertation as a guide. These are often available in electronic form through the library. Hard copies are also available through the library, or through the student's home department. Be prepared to devote a significant amount of time and effort toward this writing endeavor. Ask your major

professor and fellow students for resources that may be helpful to you. Your major professor will advise if you should prepare manuscript(s) for journal publication and use this as the basis for your thesis or dissertation.

Most graduate students consider the writing of a thesis or dissertation to be the most difficult aspect of their graduate education. The following points may be helpful (*Adapted from: "How to Avoid Writer's Block and Procrastination on Long Papers," 1988. Susan Palo, University of California-Davis Campus Writing Center, Davis, CA 95616*).

1. Productive writers break their manuscript into smaller tasks and use a variety of strategies to approach the task at hand. For example, concentrate on one section at a time (methods, appendices, etc.). Plan to spend time analyzing or graphing data and time at the library gathering literature.
2. The more frequently you write, the easier it becomes. Schedule time for writing regularly. Keep a notepad handy to write down thoughts (e.g., pick up dry-cleaning), ideas for other parts of the manuscript, or a reference needed from the library. Some people write better in the morning, others at night. You might plan to spend mornings writing and afternoons in the library or producing graphics.
3. Outline your entire manuscript (headings and subheadings), and use this outline as a map to guide the writing process. Refer to it often and modify as needed. Begin by outlining general sections and fill in the details as you prepare to write that section.

4. Consider beginning with the materials and methods sections. These are organized by experiments and may be easier for you to write.
5. Keep a sample thesis or dissertation for reference. If you experience writer's block, this sample document may be helpful.
6. Try organizing the introductory literature review by stacking your references by subject matter and in the order in which you will write about them. Then simply move through the stacks. Alternatively, try taking notes from the references. Paraphrasing often helps get you started.
7. If you find yourself staring at the computer screen, print out the portion of the manuscript you are writing and try doing some writing by hand. When you have regained your train of thought, return to the word processor.
8. Procrastination may be the result of unreasonable writing goals. Productivity increases when you get your thoughts on paper in the form of a rough draft and then edit to improve the draft. Keep telling yourself, "It's just a draft" and push on.
9. Use the thoughts recorded in your lab notebook. These notes will remind you of the purpose for an experiment, why you chose a particular method, etc. Also, consult progress reports and presentations for ideas you have already put into words.
10. Try looking at your data in different forms. Plot a graph, make a means table, look for trends. Consider how your results fit into the whole area of investigation.

VIX. COMMONLY ASKED QUESTIONS

These are some questions commonly asked by incoming graduate students.

1. I have never done research before.

How do I get started?

Talk with your major professor and other students in your lab. Read the scientific literature in your area of investigation. Consider various statistical designs for experiments and analytical methods. Write a research proposal with clearly stated objectives. Talk to other students about their research and ask questions to solicit input for your project.

2. Which statistical design is best for my experiment?

First, consult with your major professor. You should also meet with a statistician. The Statistic Department is located in Dickens Hall and consultation services are available to graduate students. You might consider including a statistician on your Supervisory Committee. Statistical programs such as SAS® and SPSS® are sometimes available in Departmental computer labs.

3. I am not familiar with how computers are used in research projects. What can the computers on campus do for me?

Computers are indispensable for data collection, analysis, and management. Most students own a personal computer, or Departments may provide computers for Graduate Research/Teaching Assistants. Ask the reference desk at Hale Library to tell you about the literature search tools

available online. Departments often have software to do word processing, data processing, and presentation preparation. Many students learn to use the slide software (e.g., Power Point) when they prepare for a seminar presentation.

4. I need to improve my writing skills. Where can I get help?

Helpful books include How to Write & Publish a Scientific Paper (by Day and Gastel) and Handbook of Technical Writing (by Alred, Brusaw, and Oliu); recent editions of these books are available in the K-State library. Furthermore, courses designed to improve writing skills are sometimes available (see current course listing). Refer to a well-written manuscript or thesis as an example. Ask your major professor for suggestions. See the section on writing behavior in this guide.

5. I am a PhD student ready to take my Preliminary Examination. How do I prepare for the exam?

The Preliminary Exam may be taken after a student completes 2/3 of their course work and should be scheduled a minimum of 7 months prior to the date of graduation. The format of the preliminary exam is determined by the student's committee and may include both written and oral components. Individual committee members may choose to administer a written exam (closed book or open book) in the topic areas identified as areas of expertise prior to the oral part of the examination. On the day of the oral exam, committee members might ask the student questions about the answers previously submitted. Alternatively, students may be asked to prepare a proposal designed to answer an original research question posed by the committee. Proposal preparation usually takes about 4 weeks and is followed by an oral exam about the proposal. Students

should schedule the oral portion of the Preliminary Exam with their committee members and the Graduate School. The Graduate School will prepare a ballot for committee members to sign. A 3/4 vote of the committee is required in order for a student to pass the exam. Students should seek guidance from their major professor in preparing for the exam. The major professor organizes and administers the preliminary exam.

6. I am preparing for my Final Oral Defense. What do I need to do?

You should allow the members of your Supervisory Committee ample time (at least 10 business days) to review the thesis or dissertation. Make the changes requested by the committee and have the revisions reviewed. Consider the basis for your conclusions. Formulate plausible explanations for any unanswered results and analytical methods. Try to truly understand your work. Consider the contribution to the current knowledge base, as well as its limitations. Present a practice defense to your lab group. Schedule the defense with your committee members and the Graduate School.

7. I need something and I do not know where to get it. What do I do?

ASK. Start with your major professor and other students in your lab.

X. ORGANIZATIONS

The KSU Food Science Club

The objectives of the KSU Food Science Club are: to acquaint students with areas of interest in food science and technology, to promote greater interest in this profession, to encourage leadership, and to foster a closer relationship among students and faculty in

the Food Science Program at KSU.

The Food Science Club consists of undergraduates and graduate students in Food Science and affiliated areas. The group is very active in promoting the programs locally and at the IFT annual meetings. They have facilities to feed different groups as a means of generating income used by members for travel to meetings. On-campus and outside speakers comprise their monthly meetings. The group is also active in the College Bowl activities of IFT.

Institute of Food Technologists

The Institute of Food Technologists (IFT) was created in 1939 by a group of scientists who wished to meet the needs of food science and technology. The original intent was to periodically discuss and exchange critical research topics. However, IFT definitely expanded far more than initially expected as it represents industry, academia, and government in addition to research. Today, IFT members are united in the cause of "promoting the application of food science and technology to improve the production, distribution, evaluation, and utilization of foods".

Student members of IFT automatically become members of the Student Association. The Student Association offers special services and activities including scholarships, employment referral services, newsletters, area meetings, special programs at the IFT Annual Meeting, research paper competitions, food product development competitions, and a College Bowl. IFT membership offers you opportunities for networking - starting with your own desktop guide, the IFT Membership Directory. This directory contains over 25,000 professional contacts throughout the world! Membership

enables you to meet professionals from differing backgrounds on common ground. Moreover, it encourages free exchange of ideas and opinions.

If you're interested in joining IFT, simply pick up an application form from Dr. Hunt, Phebus, or Dr. Smith. It's definitely one of the best career investments you can make! For more information, see the poster next to the FSC bulletin board in Call Hall.

Kansas City Section of IFT

A local section of IFT meets periodically at various locations. This is a good place to meet industry people and visit various food plants, etc. There will generally be a tour, dinner, and a speaker. The section gives one award yearly for the outstanding graduate student. A van is provided for transportation and student meals are usually half-price.

Phi Tau Sigma Honorary Society

Phi Tau Sigma is a national organization affiliated with the Institute of Food Technologists as the Honorary Society of Food Science. There are many chapters of Phi Tau Sigma around the country. The KSU chapter was initiated by the tireless efforts of Dr. Frank Cunningham in 1984. Currently, there are about 75 members in the KSU chapter with most of the active members residing in Manhattan, Kansas.

The chapter promotes excellence in Food Science. Every year it holds a Spring initiation tea recognizing new Full Members and Associate Members. Outstanding undergraduate, outstanding graduate, and outstanding food scientist awards are given during this ceremony. An outstanding food scientist is also invited to give a timely talk on a food science related topic. In conjunction with the "Excellence in Food

Science" day, the winner of the Phi Tau Sigma Outstanding Food Scientist award presents a lecture in the Fall.

Membership into the society is highly selective. A Full Member shall be an individual who has distinguished himself or herself by demonstrating noteworthy achievements in food science and technology. An Associative Member shall be either a senior (GPA 3.3) or graduate student (GPA 3.5) who shows promise for making significant scientific contribution to Food Science. Associate members may be promoted to full membership upon completion of their degree and upon demonstration of significant achievement in the work force.

XI. SCHOLASTIC AND PROFESSIONAL ACTIVITIES

Food Science Seminar Series

Since 1980 an excellent lecture series was initiated by faculty members in Food Science Graduate Program. Funds are obtained by contributions from Food Industries in Kansas as well as in corporate headquarters. Each year 5-7 outstanding Food Scientists are invited to KSU to present timely topics in Food Science Technology. All students, faculty, university, and the food science community are invited.

Excellence in Food Science

One day in late September has been dedicated for recognition of the importance of food science in Kansas and the day is called Excellence in Food Science. During the day educational tours will be conducted in the early afternoon at 4:00 p.m. The winner of the Phi Tau Sigma Outstanding Food Scientist Award will give a scholarly lecture. After the lecture a picnic organized by the Food Science Club will commence. The entire program is free and is supported by the Food Science Seminar Series Fund and the Kansas State University Rapid Methods and Automation in Microbiology Workshop. The first program was held in 1991.

APPENDIX A. USEFUL PHONE NUMBERS

Office	Location	Phone Number
ON-CAMPUS		
Campus Phone Information		785-532-6011
Dept. of Animal Sciences & Industry	Call Hall	785-532-5654
Dept. of Animal Sciences & Industry	Weber Hall 134	785-532-1262
Dept. of Human Nutrition	Justin Hall 213	785-532-5508
Enrollment Center	Willard 210	785-532-6321
Food Science Institute	Call Hall 216	785-532-4057
Graduate School	Fairchild Hall 102	785-532-6191
ID Center	Union, 1 st Floor	785-532-6399
International Student Center	International Student Center	785-532-6448
Lafene Health Center	1105 Sunset Ave.	785-532-6544
Postal Center	Dykstra Hall	785-532-6306
Registrar	Anderson 118	785-532-6254
Union Copy Center	Union, 1 st Floor	785-532-6596
OFF-CAMPUS		
Copy Services	FedEx Kinkos (1329 Anderson)	785-537-7340
	Copy Co (1223 Moro)	785-537-2679
Internal Revenue Service (income tax information)		1-800-829-1040
Manhattan Area Chamber of Commerce	501 Poyntz Ave.	785-776-8829
Manhattan Phone Information (Directory Assistance)		9-1411 (when on campus) 1411 (when off campus)
Mercy Regional Health Center	1823 College Ave.	785-776-3322
Notary	SGA Office, Union (Free)	785-532-6541
	Dean's Office, Justin Hall	
Riley County Motor Vehicle Drivers License	110 Courthouse Plaza	785-537-6320
Social Security Information		785-539-4681
State of Kansas Social & Rehabilitation Services – Manhattan (child care, day care homes, group care)	2709 Amherst Ave.	785-776-4011
Time & Temperature		785-776-3111

APPENDIX B. IMPORTANT WRITING TIPS FOR GRADUATE STUDENTS

Chapters 1-4 in Kate Turabian's A Manual for Writers cover many grammatical and style issues.

A student who has difficulty with grammar also should purchase a good grammar rule book; choose one that has many examples. Keep a dictionary (and medical dictionary) handy to check spelling. If you are preparing your thesis on a computer, Word and Wordperfect both have spelling checks. Other good spell-check software include Grammatic IV, Turbo Lightening, and Wordfinder. One word of caution, however, most spell-check programs do not recognize abbreviations used in scientific literature such as DNA, Vit A, or USDA and they are picked up as "errors." Consequently, many writers do not use these programs.

Proofread work before giving it to research advisor. Some of the rules are listed below:

A. COMMON POINTS OF GRAMMAR CONFUSION

1. **The manuscript is written in THIRD PERSON, past tense. Present tense may be used if a statement is generally true.**

example: Smith (1980) reported that the urban elderly surveyed in Washington, D.C., 1978, had income ranging from \$550 to \$35,000. (specific research study so third person, past tense)

example: The elderly are a heterogeneous group and generalizations about income are difficult to make (generally accepted true statement so present tense is used).

2. **Keep parts of compound verb together do not separate parts with an ADVERB.**

example: Johnson (1975) also has reported...
NOT
Johnson (1975) has also reported...

3. **Use a colon only if the section of the sentence before the colon has subject, verb and object: do not use a colon if the list is the sentence predicate.**

example: The following choices are possible: 1. ___ 2. ___ 3.

OR

The results are: 1. ___ 2. ___ 3.

tip: the words "follows" or "following" usually indicate that a colon will be used.

4. **Use a semicolon only (a) between two complete sentences that are related, (b) or in a series that already has commas; do not use a semicolon between unequal sentence fragments.**

example: (a) The sentence above is an example of incorrect usage.

(b) Samples were found in liver of bats, mice and turkeys: kidneys of eagles, rats and porcupines and hypothalamus of alligators.

5. **Use a pronoun only if the antecedent is very near.**

example: the book. It is excellent.

example: Faulty reference pronoun. It must be remembered that the elderly are a heterogenous group. Note: "It" does not refer to anything. Also the phrase "It must be remembered that" is wordy. Just leave off the phrase and state, "The elderly are heterogenous."

6. **Avoid dangling participles, phrases and prepositions.**

example: The book, loaded with examples, is excellent.

Notice how the modifying phrase "loaded with examples" follows its antecedent directly.

7. **Use apostrophes to indicate possessives, not plurals.**

example: the students' books.

Exception: Its (indicating possessive) has no apostrophe. It's a contraction for "it is" or "it has".

8. **Avoid contractions in formal writing.**

For example, try not to use isn't, aren't, or can't.

9. **"Percent" is one word: it is used with a number**

example: Eighty percent of the items...

"Percentage" is a noun indicating relation to 100

example: The percentage of the items...

10. **Make series of parallel construction**

Example: Grandma likes gardening, sewing, and feeding the chickens.

NOT

Grandma likes to garden, sew, and feeding the chickens

11. **Refrain from use of laboratory jargon, abstract words, colloquialisms, and expressions like "etc.," "along that line," "in the case where," "more or less," "the situation in regard to."**

12. **"Effect" is usually a NOUN meaning result, purpose, realization. "Affect" is a verb meaning to influence or produce an effect.**

example: The effect of treatment was not significant.

"Effect" can occasionally be used as a verb meaning "brought about."

example: Dietary adequacy was affected by income.

13. **Strive for a straight forward logical writing style.** If a sentence rambles, make two sentences.

14. **Noun-verb agreement**

A common writing mistake is failure to have agreement between subject and verb for singular and plural cases. If a problem exists, ask someone to proofread papers

15. **Proofread papers before submission to research advisors.**

The first time read for general logic, order of presentation and smooth transition between topics. The second time read for spelling, grammar and punctuation (you may have to read twice for this until you develop proficiency). The final check should be for consistency with Turabian's style.

16. **REMEMBER: Keep a Copy!**

APPENDIX C. WORD USAGE IN SCIENTIFIC MANUSCRIPT WRITING

Adapted From: A Style and Writing Guide for Experiment Station Authors. Agriculture and Home Economics Experiment Station. Iowa State University, Ames, Iowa.

The following glossary includes some of the most frequently troublesome items and expressions which appear in term papers, reports, or manuscripts submitted for publication. Any glossary of word usage assumes that what is acceptable for some uses may not be for others. Try to avoid expressions that are trite, colloquial or not idiomatic. Some expressions are worn out cliches and have outlived their usefulness. Other expressions and items, though not incorrect, are not desirable because their meanings are ambiguous or clouded. The use of first person voice may be used at appropriate points in the manuscript, *i.e.*, conclusion or summary. Inappropriate use of this voice may result in a paper which is too "folksy." The overall style and purpose of the paper becomes the important consideration.

Above (as in sections above, mentioned above, etc.) -- Often you are referring to something preceding, but not necessarily above; a loose reference, convenient for writers, but not for readers. Be more specific! You know exactly what and where you mean, but your reader has to search -- often through much preceding material.

Agree to, agree with -- You agree to a proposal; you agree with a person.

All of -- Just use "all" in most instances.

And (to begin a sentence) -- The last time you were told not to do this probably was in grade school; your teacher's purpose was to keep you from writing fragmentary sentences! Either and or but may be used to begin complete sentences. And both are useful transitional words between sentences.

And/or -- A military and legal use. Try item 1, item 2, or both; or item I or item 2, or both. "And (or)" is gaining acceptance.

Apparently (apparent) -- mean obviously, clearly, plainly evident, but also means seemingly or ostensibly. Ambiguity is the result; you know the intended meaning but your readers won't. Why not use evident(ly), obvious(ly), seeming(ly), etc.?

As -- Dialectal when used in place of that or whether. Don't use as to mean because or since.

At the present time -- Say "at present" or "now" (if necessary at all).

Attention is called -- Nonsense! If a sentence doesn't make its point without this device, the sentence needs rewriting.

Below -- See comment about "above."

But (to begin a sentence) -- Quite proper (see "and" and "however").

By means of -- By will serve and save words.

Case -- Can be ambiguous, misleading, or ludicrous because of medical and container connotations; *e.g.*, "In the case of bacillary dysentery, we encounter several difficulties." "Case" is a frequent offender in padded, drawn-out sentences. For "in this case", try "in this instance."

Commas and punctuation -- Not precisely a work-usage matter except in considering how words are put together. The trend is toward less punctuation, particularly fewer commas, but this demands careful writing, without misplaced or dangling elements. Lawsuits have been won or lost for lack of a comma to separate elements or to provide a pause needed to make an intended meaning unmistakably clear.

Compare to, compare with -- Compare means to represent as similar; compare with means to examine differences and similarities. Most often, you'll compare with or contrast to.

Comprise -- Not if you mean constitute or compose; comprise means to contain or include.

Consensus of opinion -- Acceptable, but consensus alone means the same thing.

Differ from, differ with -- One thing differs from another, but you may differ with your colleagues.

Different from, Different than -- No choice here; different from is correct.

Due to -- Make sure that you don't mean because of. Due is an adjective modifier and must be directly related to a noun -- not to a concept or series of ideas extracted from the rest of a statement. "Due to the fact that.." is an attempt to "weasel out". (Because of defective equipment, no data were obtained.).

During the course of -- Just use during.

Either...or, neither...nor -- Apply to no more than two items. Similarly, former and latter refer only to the first and second of two ideas.

Equally as good -- Say equally good or just as good.

Felt -- The investigators felt, I felt. Try believe.

Etc. -- Use at least two items or illustrations before "and so forth" or "etc."

Freight-train wording -- A technique first used by engineers, but unfortunately gaining enthusiastic followers in the social, physical, and biological sciences. With this technique, a thermometer and a barometer become "a function-oriented operational air-temperature, air-density variation sensing measurement and observation system." A word definition, spelling, and usage reference device consulting process was utilized" can be used to vaguely suggest that someone used a dictionary.

Generally -- Or, do you mean only usually?

However -- Try placing it more often within a sentence or major clause rather than at the beginning or end. (But serves better at the beginning of a sentence.)

Imply, infer -- Imply if you wish, but let your reader infer.

In as a matter of fact -- All right for casual use, but you can weaken your report by implying that your other statements are not "in fact".

Initial, initially -- Use first once in a while for simplicity and variety.

In order to -- For brevity, just use to; use the full phrase, however, in order to achieve useless padding.

In the event that -- If will work just as well and save space.

In view of the fact that -- Do you mean simply since or because?

Interesting, interesting to note -- Subjective. Interesting to whom? If something is interesting, let your reader decide for himself.

Irregardless -- No such word! Regardless.

It was found, it was determined, it was deemed, it was felt, etc. -- are you being evasive? Why not state it frankly and straightforwardly? "It" - must always refer to a noun or noun phrase. If not, this word becomes a faulty reference pronoun.

It should be mentioned (noted, pointed out, emphasized, etc.) -- Omit the preamble, and get on with it.

Less, few -- Less refers to quantity, fewer, to number.

Majority, vast majority -- See if most will do as well or better.

Methodology -- This is the science of method or arrangement, NOT the particular method, arrangement, technique, or procedure used in a specific piece of research.

Non -- a prefix, usually not hyphenated; sometimes a handy analytical designation, but avoid overuse. "Non" defines things only by what they are not, not by what they are. (On non-Sundays, you may have non lunch food for breakfast, get to work by nonrail transport, enter your office through a nonwindow opening, and read reports typed in non pink ink, for sense or nonsense.) Don't use "non" to substitute for other prefixes or where "not" will suffice; e.g., use incorrect or not correct, unreliable, not significant, rather than noncorrect, nonreliable, nonsignificant.

Predominate, predominant -- Predominate is a verb. Predominant is an adjective; as an adverb, predominantly.

Present writer, Present writing -- False modesty, both are pretentious and pendent.

Principle, Principal -- They're different; make sure which you mean.

Prior to, previous to -- Bad usage is most instances; before nearly always is better.

Proven -- Use as an adjective only, the past participle of prove is proved.

Provided, providing -- Provided is the conjunction (usually followed by "that"); providing is the participle.

Reason why -- Omit "why" if reason is used as a noun. The reason is ...; or, the reason is that ... (i.e., the reason is the "why").

Respective, respectively -- Try omitting them when you can.

Small in size, rectangular in shape, green in color, etc. -- Redundant.

That and which -- If the clause can be omitted without leaving the noun it modifies incomplete (or if the clause could be enclosed in parentheses), use which; otherwise, use "that".

The author, the authors -- Affected if you mean you. Unless your manuscript is an anonymous contribution, why hide? Say "I" or "we" as appropriate.

To be -- Frequently unnecessary. "Motivation was (found to be) lacking."

Until such time as -- Until.

Utilize, utilization -- Now so overused and stretched that use is more impressive.

Whether (or not) -- If?

Which is, which are, that were, etc. -- Often unnecessary and wasted wordage.

While -- Preferably not if you mean and, but, or although.

Wise -- (as in percentagewise, timewise, pricewise, etc.) -- Ouch!

Remember that a research report should communicate and record information as accurately and concisely as possible. Excess wordage, tortuous construction, unnecessary detail and data, duplication and repetition, passive pseudo-objectivism, etc., obstruct communication and waste effort, time, pages, and money.

Beware of misplaced modifiers and pronoun-antecedent problems! The difficulty here is that you, as the author, may know precisely to what each has reference. But your reader does not have this advantage, and the results may be confusing, misleading, or ludicrous.

EXAMPLES:

"The mothers of pre-teen children who had been divorced and remarried..."

"Walking down the street, a huge building was seen."

Antecedents: Those nasty little its and theirs seem altogether clear to you, but a reader may have to search through sentences or even paragraphs to find out what you mean. Make sure each pronoun has a clearly defined antecedent. Be especially wary of the "it" sentence -- a sentence that contains impersonal its, plus its with antecedents.

Another problem occurs then the pronoun doesn't agree with its antecedent. Do not write:

"The children that need this help are found in the ghetto."

"Everyone to their own taste."