

Food Science: bachelor's, master's and doctorate, CIP Code: 01.1001

The mission of the Food Science and Industry program is to provide education, service and leadership to Kansas, and to the national and international stakeholders through development, interpretation and dissemination of knowledge pertaining to quality, quantity, safety and bio-security of the US food production system. The Food Science and Industry bachelor of science program is an interdepartmental program and it is the only one of its kind in the Kansas Board of Regents System. The degree is also central to Kansas, where 24 percent of the gross state product is provided by food-related industry. The Meat and Poultry magazine annually ranks Universities as to their contribution to the meat industry. The Food Science program at KSU has repeatedly been ranked in the top three or four meat science programs. The established reputation of the Food Science faculty in food safety research was a major factor in KSU becoming the home of the new Bio-security Research Institute. The program is nationally recognized and accredited by the Institute of Food Technologists. In addition to the undergraduate program, the graduate degrees offered in Food Science, both M.S. degrees and a Ph.D., allow students to fully explore a chosen subject, which may include classes from multiple departments. The graduate program is an integral part of the University and forms a unique functional relationship among five colleges and 13 departments across campus. Additionally, many students in related disciplines (cereal science, meat science, sensory science, and human nutrition) have taken advantage of the unique interdisciplinary program to enhance their educational experience.

Many undergraduate students use the Food Science degree to complete pre-professional requirements for veterinary, medical, pharmacy and dental schools while also preparing for challenging careers in the food industries. Students in this major must have skills and interests in the basic sciences of math (calculus); chemistry (inorganic, organic, and biochemistry); physics; biology, microbiology, plus aspects of food chemistry, processing, safety, nutrition, quality, and regulatory issues. Graduate students within the program win competitive scholarships as well as national and international competitions in the Food Science field. Over the past five years, Food Science students as a whole have won three national awards in their field per year. In addition, graduate students make an average of 18 presentations a year at national meetings on research they have done with their professors, win competitive internships, and obtain good jobs at nationally recognized companies. Companies that interview Food Science students have told the program's faculty that the KSU Food Science graduate degrees are well-respected throughout the United States.

The United States department of Agriculture has documented shortages of four year college graduates in the food and agricultural sciences. More specifically there are projected shortages in research and development, food quality assurance, sales representatives and production managers. These are exactly the types of careers the Food Science degree prepares students to assume. Additionally, Food Science students are well positioned for careers in the emerging bio-security and food defense industries. Students in this major have 100% placement and often receive signing bonuses. In over 30 years of the program's existence, there have seldom been enough bachelor's degree graduates to meet job demand. The majority of the M.S. students go directly into the work force rather than into a Ph.D. program due to enticing salaries and a growing need for Food Science professionals with advanced degrees. The Ph.D. graduates are generally hired into the private work force rather than academia. Companies regularly send representatives to Kansas State University to recruit students for internships, which can often lead to job offers. Companies also regularly call and ask if we have students who are near graduation who would be willing to interview at their company.

Food Science developed one of the first bachelor's degree completion programs for distance students and currently provides 21 distance education courses. For on-campus student enrollment alone, KSU Food Science enrollment ranks in the top five nationally and when combined with the off-campus DCE students, KSU is in the top three nationally. Food Science faculty have been very involved with a summer research program designed to recruit more minority students, and the faculty and students have been active in undergraduate research and the Honors program. Currently, the impact of faculty in the Food Science Graduate Program extends beyond campus to the distance education community composed of working professionals in the food industry. Many industry professionals would be unable to obtain a M.S. degree in Food Science while working full time if not for the distance M.S. degree program, the only one of its kind in the world. Food Science also hosts extension and outreach programs. On a daily basis, faculty answer the questions of county extension agents and entrepreneurs. The program boasts a Rapid Response Center, which

quickly addresses any questions posed by consumers as well as the Value-Added Program, which facilitates the start-up of Kansas food production companies.

Summarized Assessment of Student Learning – B.S., M.S., and Ph.D.

Food Science and Industry – B.S. Degree Program

Student Learning Outcomes Assessed:

- 1) The ability to apply critical thinking skills especially in the context of distinguishing fact; 2) The application of scientific principles to food science; 3) The ability to demonstrate effective oral and written communication skills in an individual, group or team environment. Selected exam questions, written assignments, and oral presentations were selected from several classes as well as survey responses from required exit interviews of all graduating seniors to assess learning progress.

Results:

SLO 1: In 2006, one area that showed a significant need for improvement was applied critical thinking skills in FDSCI 690, Principles of HACCP. This concern was noted by the instructors and as a result, 2007 scores significantly improved with 81% of the students answering correctly the critical thinking questions in FDSCI 690 compared to only 58% from the previous year.

SLO 2: In 2007, 73% of students answered scientific principle exam questions correctly in FDSCI 302 and 95.6% answered those same types of questions correctly in FDSCI 690.

SLO 3: In 2007, students scored over 82% when evaluated on their oral communication skills and over 97% when evaluated on their written communication skills. Both skills were evaluated through the use of a rubric. Though the assignment scores by faculty are high in this category, the self-reported scores by seniors on the exit survey are the lowest (but still very good scores) of the three SLOs, with an average score of 1.6 and 2.1 in oral and written communication skills, respectively.

Actions/Revisions:

With data existing only from 2006 and 2007, few changes have been implemented as a baseline is still being established. Data from 2008 data will give a better analysis of progress over 3 years. The program will consider incorporating more courses into their assessment and increase the number of SLOs evaluated. They also will consider what improvements can be made within existing courses and will follow current procedures used for course and curriculum revisions if significant course changes are warranted.

Food Science—Doctoral and Masters Degree Programs

Student Learning Outcomes:

- 1) Students will demonstrate an advanced knowledge and understanding in an area of emphasis offered by the Food Science Graduate Program; 2) Students will collect, analyze, and interpret data as it relates to the scholarship of the students' areas of emphasis; 3) Students will demonstrate competency in scholarly writing and oral communication by writing a M.S. thesis, M.S. report, or a Ph.D. dissertation and presenting it to a committee of professors in their field or, if in a non-thesis option M.S. track, by presenting an original scientific seminar.

Results:

- The average GPA of graduate students (both M.S. and Ph.D.) in Food Science graduate courses during the past two academic years has been 3.83, which is much higher than the 3.0 required by the program.
- Food Science graduate students' progress in collecting, analyzing, and interpreting data is, when documented, excellent.
- Students are required to submit a semester report detailing their research progress on their final seminar, report, thesis, or dissertation. Of the reports that were submitted from Fall 2006-Spring 2008, students reported satisfactory progress on their research projects, which has been verified by their advisors.
- All students who complete their final examination and defend their seminar, report, thesis, or dissertation are scored by their Supervisory Committee on seven different criteria. Students from Fall 2006 to Spring 2008 have scored an average of five out of seven possible points or higher on each criterion.

Actions/Revisions:

Due to the relative newness of the program and of the assessment data, the program has identified the need to implement a system to receive a higher response rate from students and major professors on the semester reports.