

Curriculum Review

Food Science

In the US, Food Science programs traditionally have small undergraduate programs. Our undergraduate program has increased in the past 10 years from 36 to 100. This type of increase has also been observed nationally and is likely due to an increase in interest of food production and a decrease in the economy which attracts students to the excellent salaries and placement potential of food science jobs. Our current enrollment of 100 is similar to the national average of 96. Larger undergraduate programs exist in more traditional agricultural states such as California, Kansas State and Wisconsin. Our current undergraduate body is >50% out of state students.

Undergraduate students looking at UMass Food Science should be attracted by:

- Departmental ranking in the top 3 of all University Departments in the Student Satisfaction Survey for 8 years in a row
- One year retention of 83%
- Above average four year time to degree rate (25-100%)
- Above average cohort of female and ALANA students
- Excellence in advising and career preparation
- Small Food Science classroom size
- High number of faculty recognitions and awards

Part One. Analysis of Current Curriculum

Coherence and accessibility of essential curricular feature: The undergraduate degree in food science and technology requires knowledge of the fundamental sciences and all disciplines of Food Science (food chemistry, food microbiology, food processing, sensory evaluation, engineering and health and wellness) and the interconnections between each. Students must demonstrate the ability and skill to: define, analyze and solve in a practical way evolving problems related to food production; apply chemistry, engineering, nutrition and microbiology knowledge to produce a safe and wholesome food supply; communicate effectively both orally and in writing. To obtain these goals students must take fundamental courses in math, chemistry, physics and biology within the first 2-2.5 years. In general, first semester organic chemistry is the major hurdle for students getting into upper level courses as this is a prerequisite for several upper level classes. Students that do not graduate within 4 years usually are transfer students who are behind on their core science requirements or students that struggle with organic chemistry.

We have developed example curriculum that outline sequence of courses necessary to graduate. Our core courses are only taught once per year so faculty advising is critical in keeping students on track. Food Science faculty is very dedicated to advising and helping student graduate on time. Advising has been very effective in keeping students on track. In cases where required classes are full we always expand the classes to accommodate all students. In cases where students cannot take a required class due to conflicts, we do everything in our power to find substitute classes.

Clarity of communication: Food Science Faculty do an excellent job in helping our students prepare for future careers. For example we have professional development activities including resume preparation, interview training and information session on how to find jobs in FS 190I, 265 and 391C. We also have Alumni who work in industry come to campus to talk to students about career expectations. Students in FS 190I, 266 and 563 go on numerous food processing plant tours to directly observe industry operations and engage with food science professionals. Finally, 3-5 food companies come directly to the Department to conduct internship and full time job interviews. These companies have partnered with the faculty to provide input to the students after the interview process.

Effective use of faculty time: Being a small Department, none of our core requirements (freshman to senior) have more than 35 undergrads in a class. We have a large number of required lab courses (7) so they receive are large amount of hands on training. All of these labs are taught by faculty and supported by TAs. This hand on training is cumulated by our Integrative Experience Course (FS 563) which integrates all of the student's previous labs into a product development ice cream preparation exercise that is overseen by several faculty and industry representatives from Maple Valley Ice Cream.

Part Two. Goals for Student Learning and the Student Experience

The Department is continuously modifying our curriculum to improve the student experience. For example, with the increasing concern for food safety by the consumer, public health community and the food industry, we decided to increase student exposure to additional Food Microbiology. This involved the modification of an existing course, FS 466, The Hygienic Handling of Food, into a course that provides students with fundamental microbiology knowledge and skills with emphasis on how microbiology impacts foods.

In the area of Health and Wellness, we have had several new and revised courses. Dr. Xiao has revised FS 101, Food and Health to focus on how food and food components play a role in nutrition and disease. Dr. Park developed a new course several years ago on nutrition and functional foods entitled Biology of Food in Human Health, FS 270. This course not only covers more advanced issues of nutrition than FS 101 but also how relates how the food industry can develop healthier foods.

To get our first year students more exposure to Food Science, we added an additional food processing class, Introduction for the Future Food Scientist (FS 190I). This class covers the origins of food and how they are processed. Due to the increasing complexity of food ingredients such as flavors, preservatives, colorants, we also added a second food chemistry class (FS 542).

One of the main job markets for our students is in the area of product development. Several commodity organizations and our professional society, the Institute of Food Technologists, have product development competitions. These competitions are nationally prestigious and also prepare the students for the job market. We are currently developing a 1 credit product development course that will be taught each semester that would be required for all students interested in participating in the national product development competitions. This course would teach the fundamentals of product development, marketing and food regulations such as labeling and would help to student prepare for the competition. An additional advantage of this course is that it would increase student contact with faculty.

We would also develop a similar 1 credit undergraduate research methods course that will be taught each semester for students that participate in undergraduate research projects. This course would cover topics such as literature searches, understanding scientific papers, scientific writing and experimental design. Students in this course would then be encouraged to enter undergraduate research competitions. This course should help increase the productivity of undergraduate research, increase student accessibility to faculty and improve our national research stature.

Studying abroad in Food Science can be difficult due to the very specific course requirements, very different curriculum structure at international universities compared to the U.S. and of course language barriers. To overcome these hurdles we have begun working with 3 European Universities, the University of Hohenheim in Germany, the University of Reading in the U.K and the Universitat Politècnica de València in Spain. These programs were chosen due to the Food Science or related course offerings and their diversity of courses taught in English.

Part Three. Curricular Revision Action Plan

As mentioned above we are developing additional courses in product development and research methods to better prepare student for the career paths. Due to current retirements and loss of faculty to other Universities, our faculty numbers are currently down 29%. Two searches have been approved and hopefully if the additional two are approved as well we will be able to continue to provide our students with one of the best Food Science educations in the world.