

# **Learning Outcomes**

## **Food Science & Technology**

### **Oregon State University**

The Department's Learning Outcomes are integrated with its Mission and Long-range Goals:

#### **Mission Statement**

The mission of the Department of Food Science & Technology at Oregon State University is to serve food technologists, food processors and the citizens of Oregon, the region, nation and the world through research, education, and outreach activities. To achieve this mission, the Department will:

- Provide education and training in food chemistry, food safety, food processing, food packaging, sensory evaluation, flavor chemistry, enology, and fermentation science;
- Integrate fundamental and applied research across dairy, seafood, wine, beer, fruit, and vegetable categories to provide value-added solutions to current and future problems encountered by Oregon's food and beverage processing industry;
- Be responsive in providing outreach activities that convey integrated knowledge of food science and technology to food professionals, the public, and food manufacturers for the long-term sustainability of Oregon's food processing industry
- Provide service to the profession and society by interpreting science-based knowledge to assist policymakers and regulators in formulating informed policies, regulations, and decisions. Faculty will provide leadership and support for professional organizations and related activities that advance food science.

The Department will develop flexibility with goals and programs to most effectively accomplish this mission, and be responsive as agricultural production, food processing needs, regulatory, and consumer issues change.

#### **Department Long-range Goals**

1. Provide students an undergraduate and graduate education with comprehensive knowledge in food science and food technology that will allow them to be successful in their chosen careers.
2. Conduct basic and applied research that provides fundamental knowledge about food systems, and addresses the needs of the food technology profession and our industry stakeholders.
3. Provide applied extension outreach that serves the needs of Oregon's food processors and enables them to respond to consumer needs and concerns.
4. Emphasize economically and environmentally sustainable food processing through efficient utilization of ingredients, by-products, and processing water as the result of research and education.

## **Expected Student Learning Outcomes**

A key measure of success of any academic program is the quality of the graduates it produces. We seek continual improvement in the means by which we educate our students, toward the end of providing the strongest possible foundation for their professional success. The end result of our efforts is that *our graduates will be competitive for industry and public sector employment and admission to advanced degree programs*. To realize this overarching outcome, we have designed our undergraduate program to achieve specific learning outcomes in core professional knowledge, option specialization, integration, and success skill modalities:

### **Core Professional Knowledge & Skills**

#### **Food Chemistry and Analysis**

Graduates will understand the fundamental chemical properties and reactions of foods. They will be familiar with the major chemical reactions that limit shelf life, and will be able to apply their knowledge and laboratory skills to measure, control and modify the chemical and physical properties of food. They will understand the relationship of chemical markers and key chemical compounds that relate flavor and color attributes to thermal processing, oxidative changes, and product quality.

Graduates will sufficiently understand the principles behind analytical techniques associated with food to be able to select the appropriate analytical technique when presented with a practical problem. Our students will have proficiency with a variety of classical and instrumental analytical techniques.

#### **Food Safety and Microbiology**

Graduates will have the laboratory skills and knowledge to identify the important microorganisms in foods, and the conditions under which they grow. They will be familiar with methods, including sanitation procedures, to control spoilage and maintain the safety of foods.

#### **Food Engineering, Processing, and Packaging**

Graduates will understand the source and variability of raw food materials and their impact on food processing operations. Our students will understand the concepts of material and energy balances in food processing systems, unit operations in food processing, the physics of fluid flow, and mechanisms of heat transfer. Graduates will be knowledgeable of traditional and new types of packaging materials, closures, and delivery systems.

#### **Sensory Evaluation**

Graduates will understand objective and descriptive sensory evaluation methods and how to apply them. They will also understand human sensory systems, and the inherent variability in human perception and judgment. Graduates will be cognizant of how these skills are used to design, collect, and analyze experimental data to compare competitive products, to interpret consumer-directed feedback, to guide product development, to assure quality, and to track food appearance, flavor and textural changes over shelf life.

### **Option Specialization**

Graduates in the Food Science option will have particular strengths in their understanding of dairy and fruit and vegetable processing, and be able to apply the principles of Hazard Analysis of Critical Control

Points (HACCP) to ensure safe processing of these and other foods. They also will have gained advanced specialized knowledge in their choice of two of the three following areas: Functional Foods, Food Toxicology, or Food Biotechnology.

Graduates in the Fermentation Science option will be able to make wine or beer that is free of defects and meets generally recognized levels of quality. They will be able to troubleshoot and solve technical problems in fermented beverage manufacturing, whether they are chemical, microbiological, or physical in origin.

## **Integration**

Graduates will be able to integrate chemical, biochemical, microbiological, engineering and sensory analysis principles to develop foods that are safe, nutritious, and flavorful.

Graduates will have the necessary mathematical, computer, statistical, and critical thinking skills to design experiments, collect and interpret data, and predict the impact of raw material and processing changes on food safety and quality.

Graduates will have sufficient understanding of packaging materials and products such that they can select appropriate packaging systems to meet a range of requirements such as quality preservation, convenience, solid waste minimization, and consumer marketing needs.

Our students will be knowledgeable of the federal regulations governing the manufacture and sale of food products.

Our students will be familiar with current issues in food science.

## **Success Skills**

Graduates will be able to write technical reports and make formal and informal presentations, communicating scientific knowledge to both a technical and non-technical audience.

Graduates will understand the expectation of professionalism in the food science community, including the need for: 1) integrity, 2) the ability to work productively in diverse situations – particularly to collaborate with individuals with diverse skills, backgrounds and cultural norms, 3) the willingness and ability to provide both leadership and support, as appropriate for a given project, and 4) recognition that a network of professional associates is essential for individual and organizational success.

Our graduates will have developed time management skills such that they can fulfill multiple tasks and meet deadlines.

Our graduates will be life-long learners.

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