Framingham State University

Program Assessment Plan for BS in Food Science (2021-2026)

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Department Chair:	Catherine Dignam
Date Created/Updated:	10/21/2014 Revised: May 18th 2021 Revised: Aug 30th 2021

1) PROGRAM MISSION STATEMENT

The mission of Food Science program is to develop undergraduate students into responsible food scientists, who understand the food industry from a global perspective and are able to address safety, ethical and technical issues using critical thinking and teamwork. The program incorporates the sub-disciplines of food chemistry, food analysis, food processing, and engineering and food safety, and microbiology. The program is unique in that it is cost-effective and provides students with a blend of immersive research experiences and real-world industry experience through required internships. Graduates of our program are well prepared to enter either professional employment in any food or food-relevant industry or graduate studies.

2) PROGRAM LEARNING OBJECTIVES

The student should be able to:

1) Design appropriate analytical approach to solve a practical problem
2) Explain the chemistry underlying the properties and reactions in various foods
3) Discuss the role and significance of adaptation and environmental factors (i.e. water activity, pH, temperature) on growth responses and inactivation of microorganisms in various environments
4) Design a food safety plan for the manufacture of a specific food
5) Formulate mass and energy balances for a given food
6) Design processing methods that make safe, high-quality foods
7) Evaluate ethical situations that students encounter in real world

3) LEARNING OPPORTUNITIES Share with Students and Advisors

Food Science																
Program Learning Objectives		BIOL 130	FDSC 151/161	CHEM 107	CHEM 108	PHYS 211	PHYS 212	CHEM 207	CHEM 208	CHEM 301	CHEM 303	BIOL 307	FDSC 351	FDSC 408	FDSC 413	FDSC 405
Content Knowledge																
PLO1	Design analytical approach to solve a practical problem	N/A	I	I	R	N/A	N/A	R	R	R	N/A	N/A	R/E	N/A	N/A	R/E
PLO2	Explain chemistry underlying the properties of foods	N/A	I	I	I	N/A	N/A	R	R	R	N/A	N/A	N/A	E	N/A	N/A
PLO3	Discuss the role of environment on microbial growth	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	N/A	N/A	E	N/A
PLO4	Design a food safety plan	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	N/A	N/A	E	N/A
PLO5	Formulate mass and energy balances	N/A	I	I	I	R	R	N/A	N/A	N/A	N/A	N/A	E	N/A	N/A	N/A
PLO6	Design processing methods that make safe, high quality foods	N/A	I	N/A	N/A	R	R	N/A	N/A	N/A	R	R	E	N/A	N/A	N/A
PLO7	Evaluate ethical situations encountered in real-life	N/A	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R/E	R/E	R/E

I: Introductory, R: Reinforce, E: Emphasize

BIOL 130: Principles of Biology, FDSC 151: Principles of Food Science, FDSC 161: Introduction to Food Science and Technology, CHEM 107: Principles of Chemistry, CHEM 108: Principles of Chemistry and Quantitative Analysis, PHYS 211: Principles of Physics I, PHYS 212: Principles of Physics II, CHEM 207: Organic Chemistry I, CHEM 208: Organic Chemistry II, CHEM 301: Biochemistry, CHEM 303: Physical Chemistry I, BIOL 307: Microbiology, FDSC 351: Food Engineering and Processing **(Fall of odd years)**, FDSC 408: Food Chemistry **(Spring of even years)**, FDSC 413: Food Safety and Microbiology **(Fall of even years)**, FDSC 405: Food Analysis **(Spring of odd years)**

4) ASSESSMENT METHODS AND TIMELINE

Indicate when and how program learning objectives will be assessed. Refer to the curriculum map to draft a student learning outcomes assessment timeline. It is recommended that you outline a 5-year plan for assessment in which you will assess all of your PLOs.

Academic Years	Outcome(s)	Course(s)	Assessment Evidence (direct/indirect)	Assessment Method	Responsibility
WHEN	WHICH outcome(s) will you examine in each period (Use number)?	WHERE will you look for evidence of student learning (i.e., list course(s) that will generate evidence for each objective.	WHAT student work or other evidence will you examine in order to assess each objective?	HOW will you look at the evidence; what means will you use to analyze the evidence collected for each objective	WHO will oversee collecting, analyzing, reporting, results? List names or titles.
Year 1 2021-2022	PLO1 (Collect only from Seniors)	FDSC 351	Food processing problem	Students are given with an activity problem set requiring to solve a food processing problem using analytical tools. Their responses are assessed utilizing a rubric.	Department Comm
	PLO2 (Collect)	FDSC 408	Reflection Questions	Students are presented with a food industry case-study, requiring them to diagnose a challenge with a product and to suggest an appropriate ingredient addition or replacement utilizing the knowledge of underlying properties of food components. Student responses are assessed using a rubric.	Department Committee
	PLO5 (Collect)	FDSC 351	Product Development project	Students are provided with a prompt to design a specific type of food product with limited ingredients – requiring them to formulate the recipe and compute nutritional values. Students present their products in final report and presentation, which are assessed using a rubric	Department Committee
	PLO6 (Collect)	FDSC 351	Product Development project	Students are provided with a prompt to design a specific type of food product with limited ingredients – requiring them to create a process flow chart and conditions for the product. In addition, students will determine processing conditions to create quality and safe product. Students present their products in final report and presentation, which are assessed using a rubric	Department Committee
	PLO7 (Collect only from Seniors)	FDSC 408	Reflection Question	Students are presented with an ethics-based, discipline related scenario in which they must choose between two or more difficult alternatives. Students write a reflection response presenting the case of their choice of the most ethical decision. Rubric and Assessment committee review.	Department Committee
Year 2 2022-2023	PLO1 (Collect only from Seniors)	FDSC 405	Capstone Project with paper and presentation	Students are presented with an analytical task to be solved. The design the appropriate approach. Rubric and Assessment committee review	Department Committee
	PLO3 (Collect)	FDSC 413	Assay Questions (Exam or Assignment)	Students are presented with questions that directly assess knowledge relevant to this PLO. Correct answer and rubric.	Department Committee
	PLO4 (Collect)	FDSC 413		Students are asked to evaluate an existing food safety plan that has failed	Department

			Capstone Project with paper and presentation	and design the appropriate corrective actions. Rubric and Assessment committee review.	Committee
	PLO7 (Collect only from Seniors)	FDSC 405/FDSC 413	Assay Question / Survey	Students are presented with an ethics-based, discipline related scenario in which they must choose between two or more difficult alternatives. Students write an essay response presenting the case of their choice of the most ethical decision. Rubric and Assessment committee review.	Department Committee
Year 3 2023-2024	PLO1 (Collect only from Seniors)	FDSC 351	Food processing problem	Students are given with an activity problem set requiring to solve a food processing problem using analytical tools. Their responses are assessed utilizing a rubric.	
	PLO2 (Collect)	FDSC 408	Reflection Questions	Students are presented with a food industry case-study, requiring them to diagnose a challenge with a product and to suggest an appropriate ingredient addition or replacement utilizing the knowledge of underlying properties of food components. Student responses are assessed using a rubric.	Department Committee
	PLO5 (Collect)	FDSC 351	Product Development project	Students are provided with a prompt to design a specific type of food product with limited ingredients – requiring them to formulate the recipe and compute nutritional values. Students present their products in final report and presentation, which are assessed using a rubric	Department Committee
	PLO6 (Collect)	FDSC 351	Product Development project	Students are provided with a prompt to design a specific type of food product with limited ingredients – requiring them to create a process flow chart and conditions for the product. In addition, students will determine processing conditions to create quality and safe product. Students present their products in final report and presentation, which are assessed using a rubric	Department Committee
	PLO7 (Collect only from Seniors)	FDSC 408	Assay Question / Survey	Students are presented with an ethics-based, discipline related scenario in which they must choose between two or more difficult alternatives. Students write an essay response presenting the case of their choice of the most ethical decision. Rubric and Assessment committee review.	Department Committee
Year 4 2024-2025	PLO1 (Collect)	FDSC 405	Capstone Project with paper and presentation	Students are presented with an analytical task to be solved. The design their the appropriate approach. Rubric and Assessment committee review	Department Committee
	PLO3 (Collect)	FDSC 413	Assay Questions (Exam or Assignment)	Students are presented with questions that directly assess knowledge relevant to this PLO. Correct answer and rubric.	Department Committee
	PLO4 (Collect)	FDSC 413	Capstone Project with paper and presentation	Students are asked to evaluate an existing food safety plan that has failed and design the appropriate corrective actions. Rubric and Assessment committee review.	Department Committee
	PLO7 (Collect only from Seniors)	FDSC 405/FDSC 413	Assay Question / Survey	Students are presented with an ethics-based, discipline related scenario in which they must choose between two or more difficult alternatives. Students write an essay response presenting the case of their choice of the most ethical decision. Rubric and Assessment committee review.	Department Committee
	PLO1 (Assess)	FDSC 405 (from previous years)			Department Committee
	PLO2 (Assess)	FDSC 408 (from previous			Department Committee

Year 5 2025-2026		years)			
	PLO3 (Assess)	FDSC 413 (from previous years)			Department Committee
	PLO4 (Assess)	FDSC 413 (from previous years)			Department Committee
	PLO5 (Assess)	FDSC 351 (from previous years)			Department Committee
	PLO6 (Assess)	FDSC 351 (from previous years)			Department Committee
	PLO7 (Assess)	FDSC 405/FDSC 413/FDSC 408/ FDSC 351 (from previous years)			

Program Size and Sampling Technique

a. State the number of students in the program or the number who graduate each year. **4 graduates/year**

b. Describe the sampling technique to be used. **Samples will be collected for all food science majors each academic year and evaluated in aggregate as indicated in the assessment timeline. Please note that these courses are taught every other year so collection will occur on a two year cycle.**

5) PLAN FOR ANALYZING RESULTS

- List who is responsible for distributing results and who will receive results? **The results will be shared with all full-time tenured/tenure track faculty and will be stored in the department chair's office. Emmanouil Apostolidis & Vinay Mannam will be responsible for data collection and analysis.**

- State how and at which forums discussion of results will take place. **Discussion of results will take place during the department's annual retreat.**

6) DISTRIBUTION. The program will distribute or publish these items in the following ways:

ITEM	***Distribution Method***					
	FSU Catalog (provide section title)	**Website** (provide URL)	**Annual Reports**	**Brochures**	**Course Syllabi**	**Other** (please describe, e.g. department meeting, advising session)
Program Mission	X	X (http://www.framingham.edu/chemistry/index.html)	X			Department meetings and annual retreat
Program Learning Objectives		X (http://www.framingham.edu/chemistry/index.html)	X			Department meetings and annual retreat
Learning Opportunities (Curriculum Map)		X (http://www.framingham.edu/chemistry/index.html)	X			Department meetings and annual retreat
Assessment Plan		X (http://www.framingham.edu/chemistry/index.html)	X			Department meetings and annual retreat

[1] If you have questions or need assistance, please contact Dr. Mark Nicholas, Director of Assessment at mnicholas1@framingham.edu or 508-626-4670

[2]Accredited programs can provide supplemental documents that indicate the answers to these questions as long as specific page references are provided in each cell of the tables in this form. When the answers are not accessible in that way, please cut and paste into your assessment plan.