**MFSQ Graduate Program Assessment for
NDFS Department 2022**

The Master of Food Safety and Quality is a professional degree designed to provide students with in-depth training in food safety assurance and quality control. The program trains students in the use of management systems that address food safety and quality through the analysis and control of biological, chemical, and physical hazards from raw material production through procurement and handling, manufacturing, distribution, and consumption of the finished food product. The degree is primarily intended for individuals who wish to advance their careers as supervisors, managers, and inspectors in food safety and quality-related positions in the food industry.

In 2019, the MFSQ degree was moved to an entirely online format, opening the program to students across the nation. A survey was conducted in Dec. 2020 to better understand the needs, motivation, and demographics of current MFSQ students:
- They are employed full time in a food-related field (100%)
- They entered the MFSQ program because of the scheduling flexibility it afforded (100%)
- They desire to increase potential for advancement in their current place of employment (80%) or to enhance future employment opportunities (80%)

Additionally, many MFSQ students do not have prior food science coursework, but come from related fields such as Public Health or Environmental Health.

**ENROLLMENT SUMMARY**

Previous metrics used to evaluate MFSQ program performance (full-time vs part-time enrollment, time to graduate, job placement after graduation) are inconsistent with the aforementioned factors and do not provide meaningful assessment of program quality, so are not reported here.

| Academic Year | 2021-22 | 2020-21 | 2019-20 | 2018-19 |
|---|---|---|---|---|
| New Enrollments | 5 | 4 | 4 | 1 |
| Students Graduating | 4 | 1 | 1 | 0 |

**PROGRAM EVALUATIONS**

*Learning Outcomes – NDFS 617X Series*
1. Students will demonstrate mastery of content included in industry-driven or regulatory-required training programs.

This outcome is assessed by reviewing exam scores. Mastery is demonstrated by passing a challenge exam on a specified training topic at 85% or higher. Challenge exams are given as part of the NDFS 617X series, which covers the following industry and regulatory trainings: Food

Quality Management Systems; Current Good Manufacturing Practices; Hazard Analysis and Critical Control Points; Preventive Controls for Human Food; Produce Safety; and, Acidified Foods. Students are required to complete a minimum of two trainings from this series. For most of these topics, the training must be taken from an accredited or certified trainer outside of the course. Training certificates (which indicate attendance but not learning or understanding) must be provided as part of fulfilling NDFS 617X course requirements.

| Course | Description of Assessment | Outcomes for AY 2021-22 | Outcomes for AY 2020-21 |
|---|---|---|---|
| **NDFS 6170, Food Quality Management Systems** | A challenge exam on topics covered in a training course related to food safety/quality management schemes. Students must complete a training related to industry best practices or third-party auditing (such as Safe Quality Foods). | Enrollment: 2 Passing (<85%): 2 Passing Rate: 100% | Enrollment: 1 Passing (<85%): 1 Passing Rate: 100% |
| **NDFS 6171, Current Good Manufacturing Practices (cGMPs)** | A challenge exam on cGMPs, as defined by the Food and Drug Administration. The training for this topic is embedded into the course. | Enrollment: 2 Passing (>85%): 2 Passing Rate: 100% | Enrollment: 4 Passing (>85%): 4 Passing Rate: 100% |
| **NDFS 6172, Hazard Analysis and Critical Control Points (HACCP)** | A challenge exam on HACCP systems. Students must complete a formal HACCP training course. HACCP training is required for certain manufacturers subject to FDA and USDA regulations. | Enrollment: 3 Passing (>85%): 3 Passing Rate: 100% | Enrollment: 4 Passing (>85%): 4 Passing Rate: 100% |
| **NDFS 6173, Preventive Controls for Human Food (PCHF)** | A challenge exam on the Preventive Controls for Human Food Rule (21CFR §117). Students must complete an FDA-recognized PCHF training course. PCHF training is required by the FDA for certain management positions. | Enrollment: 4 Passing (>85%): 4 Passing Rate: 100% | Enrollment: 4 Passing (>85%): 4 Passing Rate:100% |
| **NDFS 6174, Produce Safety (PS)** | A challenge exam on the Produce Safety Rule (21CFR §112). Students must complete an FDA-recognized | Enrollment: 0 Passing (>85%): 0 Passing Rate: n/a | Enrollment: 2 Passing (>85%): 2 Passing Rate: 100% |

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| | PS training course. PS training is required by the FDA for certain on-farm management positions. | | |
| **NDFS 6175, Acidified Foods (AF)** | A challenge exam on FDA Standards for Acidified Foods (21CFR §114). Students must complete an FDA-recognized AF training course. AF training is required by the FDA for manufacturers of acidified foods. | Enrollment: 2<br>Passing (>85%): 2<br>Passing Rate: 100% | Enrollment: 1<br>Passing (>85%): 1<br>Passing Rate: 100% |
| **TOTALS** | | **Enrollment: 10<br>Passing: 10<br>Passing Rate: 100%** | **Enrollment: 16<br>Passing: 16<br>Passing Rate: 100%** |

*Learning Outcomes – NDFS 6960, Capstone*
1. Students will evaluate a specific issue or problem related to food safety and/or quality and develop a solution or systematic approach to address the problem.

This outcome will be assessed through completion of the requirements for the MFSQ Capstone course. Students are required, in coordination with a faculty advisor, to:
1. Identify an issue or problem related to food safety and/or quality (this may be a project or issue related to their current employment)
2. Complete a formal written capstone report
3. Give a presentation on their project to MFSQ students and NDFS faculty

Final grades are assigned by the faculty advisor. Successful completion of the capstone is considered receipt of a passing grade (B or better, not including "Incomplete" credits changed to a passing grade at a later date). All students are required to complete a capstone project prior to graduation, but often register for capstone credit over multiple semesters.

| | Spring 2022 | Fall 2021 | Spring 2021 | Fall 2020 |
|---|---|---|---|---|
| **NDFS 6960, MFSQ Capstone** | Enrollment: 3<br>Completed: 3<br>Percent: 100% | Enrollment: 1<br>Completed: 0<br>Percent: 0% | Enrollment: 2<br>Completed: 2<br>Percent: 100% | Enrollment: 1<br>Completed: 0<br>Percent: 0% |

*Learning Outcomes – NDFS 6510, Food Laws & Regulations*

Core MFSQ courses (NDFS 6150, Food Sanitation; NDFS 6160, Food Toxicology; NDFS 6510, Food Laws & Regulations; NDFS 6610 Food Microbiology) will be evaluated on a rolling basis beginning in 2022.  For NDFS 6510, Food Laws, and NDFS 6610, Food Microbiology, this will be in conjunction with the evaluation of the corresponding undergraduate courses as part of the USU Food Science BS program evaluation.  NDFS 6510, Food Laws, was evaluated in Fall 2021 based on three Learning Outcomes:

1. Recall government regulatory frameworks required for the manufacture and sale of food products.
2. Describe the processes involved in formulating food policy.
3. Locate sources of food laws and regulations.

Information on how each of the LOs was assessed, and the outcome of the assessment, is presented in the following table.

| Learning Objective 1 | *Recall government regulatory frameworks required for the manufacture and sale of food products* |
|---|---|
| **_Exactly two different_ Learning Assessment Techniques (LATs) used to assess above LO** | *LAT 1.* Homework analysis and writing answers to questions.<br><br>*LAT 2.* Objective test items. |
| **Description of how each of the two LATs was implemented with students to assess LO** | *LAT 1.* Analysis of *Federal Register* document series and synthesis writing of presented homework questions. Homework assignment to ten (10) students requiring in-depth reading of *Federal Register* documentation. Homework Module 1E presents the assigned *Federal Register* documentation and essay-style questions requiring written answers about reading content.<br><br>*LAT 2:* Objective test items. Administered in mid-term examination questions to ten (10) students. Questions were administered to test student recall and understanding of the laws and regulations framework. |
| **Description of the tool(s) used for LAT analysis** | *LAT 1.* Homework analysis and writing answers to questions. Forty-five (45) total points. Each homework question has an assigned point value. Students receive the following guidance: *This assignment will be read, graded, and commented upon by the instructor on the bases of (a) depth, clarity, and logic of information presented, and (b) spelling, punctuation, and grammar of the written presentation.*<br><br>*LAT 2.* Objective test items. Each mid-term examination question has a two (2)-point value. |
| **Key Findings for each of the two LATs** | *LAT 1.* 8/10 (80%) students scored 45 points.  1/10 student scored 42 points. 1/10 student scored 34 points.<br><br>*LAT 2.*  Q3 analysis. 9/10 (90%) students scored 2 points. 1/10 student scored 1 point.<br><br>Q11 analysis. 10/10 (100% students scored 2 points. |

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| | Q14 analysis. 8/10 (80%) students scored 2 points. 2/10 students scored 0. |
| | Q30 analysis. 8/10 (80%) students scored 2 points. 2/10 students scored 0. |
| | Q43 analysis. 10/10 (100%) students scored 2 points. |
| | Q45 analysis. 9/10 (90%) scored 2 points. 1/10 scored 0. |
| | Q46 analysis. 10/10 (100%) students scored 2 points. |
| | Q48 analysis. 7/10 (70%) students scored 2 points. 3/10 students scored 0. |
| | Q52 analysis. 10/10 (100%) students scored 2 points. |
| **Interpretation of key findings in connection to student learning** | *LAT 1.* 9/10 students scored in the "A" range indicating that LO1 was successful by having students analyze and write critical short-essay answers. |
| | *LAT 2.* The overall score of ten (10) students answering the mid-term examination objective nine (9) questions related to LO1 was 163/180 points (91%). |
| **Description of anticipated actions for improvement of teaching and learning based on key findings** | The two forms of having students read, analyze, and answer homework and mid-term examination questions met LO1 as a high number of students successfully recalled and presented written materials about food regulatory documents and frameworks. |

| Learning Objective 2 | *Describe the processes involved in formulating food policy* |
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| **_Exactly two different_ Learning Assessment Techniques (LATs) used to assess above LO** | *LAT 1.* Homework analysis and writing answers to questions; Open-ended essay. |
| | *LAT 2.* Open-ended essay. |
| **Description of how each of the two LATs was implemented with students to assess LO** | *LAT 1:* (Homework analysis and writing answers to questions; Open-ended essay) Homework Module 3E Questions 1-3 (link) is a homework assignment to group of ten (10) students that requires the reading of a D.C. Circuit federal court legal opinion *Pearson v. Shalala* and, in an open-essay format, answering questions about the legal opinion. This exercises exposes the students to legal reasoning by a federal court of a federal law and/or regulation. |
| | *LAT 2.* (Open-ended essay). Homework assignment requiring in-depth reading of *Federal Register* documentation. Homework Module 3E Question 4 (link) presents the assigned *Federal Register* documentation and essay-style questions requiring written answers about the method by which a *Federal Register* publication requests input ("comments") by the public. This presents to students the methodology by which input can help form an eventual *Final Rule* and subsequent publication in the *CFR*. |

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| **Description of the tool(s) used for LAT analysis** | *LAT 1.* (Homework analysis and writing questions; Open-ended essay) Question 1-3 of Module 3E each has a value of 3 points. Questions 1-3 have a total value of nine (9) points. Students receive the following guidance in answering the three (3) questions: *This assignment will be read, graded, and commented upon by the instructor on the bases of (a) depth, clarity, and logic of information presented, and (b) spelling, punctuation, and grammar of the written presentation.* |
| | *LAT 2.* (Open-ended essay) Question 4 of Module 3E has eight (8) parts, each worth three (3) points. This Question 4 has a total value of 24 points. *This assignment will be read, graded, and commented upon by the instructor on the bases of (a) depth, clarity, and logic of information presented, and (b) spelling, punctuation, and grammar of the written presentation.* |
| **Key Findings for each of the two LATs** | *LAT 1.* 9/10 students scored nine (9) points. 1/10 student scored 8 points resulting from one missing element of Question 2 (worth one point). Group/class average scored 98.9%. |
| | *LAT 2.* 8/10 students scored 24 points. |
| | 1/10 student scored 21 points resulting from insufficient justification for position taken in Part 4E. |
| | 1/10 student scored 18 points resultin from insufficient justification for position taken in Part 4G and Part 4H. |
| | Group/class average scored 96.3%. |
| **Interpretation of key findings in connection to student learning** | *LAT 1.* 9/10 students scored in the "A" range and one student scored in "B" range indicating that LO2 was successful by having students analyze and write critical short-essay answers. |
| | *LAT 2.* The overall score of ten (10) students answering the eight (8) questions related to LO2 was 231/240 points (96.3%) indicating a successful reading, analyzing, and writing open-ended essays in such manner to be acceptable comments to the *Federal Register*. |
| **Description of anticipated actions for improvement of teaching and learning based on key findings** | The two (2) forms of having students read and analyze judicial opinions and *Federal Register* documentation, and answer related homework questions meet LO2 as a high number of students successfully presented open-ended essays about legal reasoning of food laws/regulations and sufficiently robust answers to questions (as "comments") posed in the *Federal Register*. |

| **Learning Objective 3** | *Locate sources of food laws and regulations* |
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| ***Exactly two different*** **Learning Assessment Techniques (LATs) used to assess above LO** | *LAT 1.* Objective test items. |
| | *LAT 2.* Homework analysis and writing answers to questions. |

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| **Description of how each of the two LATs was implemented with students to assess LO** | *LAT 1.* (Objective test items). Administered in mid-term examination questions to group of ten (10) students. Appendix 2. IFT 3. LAT 1. SAMPLE MID-TERM EXAMINATION EXERCISE 1. (link) presents questions that test students of their locating source of, interpreting same, and answering specific questions about a Final Rule in the *Federal Register.* |
| | *LAT 2:* (Homework analysis and writing answers to questions). Homework Module 2E (link) is a homework assignment to group of ten (10) students that requires the location of a specific CFR source information followed by analyses of two (2) sample **Nutrition Facts** boxes and calculating the missing values using the CFR source information. Question also requires the students provide a "Regulatory Reason" for respective answers. |
| **Description of the tool(s) used for LAT analysis** | *LAT 1.* (Objective test items). Each of the nine (9) questions of Exercise 1 has a point value of one (1) point. Exercise 1 has a total point value of nine (9) points. |
| | *LAT 2.* (Homework analysis and writing answers to questions). The homework assignment has a total value of 12 points as indicated in Homework Module 2E (link). |
| **Key Findings for each of the two LATs** | *LAT 1.* (Objective test items). *9*/10 students scored 9 points. 1/10 student scored 8 points. Class average 98.9%. |
| | *LAT 2.* (Homework analysis and writing answers to questions). |
| | Students scoring 12/12 points – 7 |
| | Students scoring 11/12 points – 1 |
| | Students scoring 10/12 points -1 |
| | Students scoring 9/12 points – |
| | Class average 95.0% |
| **Interpretation of key findings in connection to student learning** | *LAT 1.* 9/10 students scored in the "A" range indicating that LO3 was successful by having students locate source of, interpreting same, and answering questions about a Final Rule in the *Federal Register*. |
| | *LAT 2.* The overall score of ten (10) students answering the homework questions related to LO3 was 114/120 points (95%). This indicates that the LO3 and USU IDEA Student Learning Outcome were successfully met. |
| **Description of anticipated actions for improvement of teaching and learning based on key findings** | The two (2) forms of having students read, analyze, and answer mid-term examination and homework questions met LO3 as a high number of students successfully searched for, found, interpreted, and answered questions about food regulatory documents and frameworks. |

**Assessment plan**

Learning objectives for MFSQ core courses will be conducted based on the following schedule:

| Course | Year |
|---|---|
| NDFS 6510, Food Laws & Regulations | Fall 2021 |
| NDFS 6160, Food Toxicology | Fall 2022 |
| NDFS 6610, Food Microbiology | Spring 2023 |
| NDFS 6150, Food Sanitation | Spring 2024 |
| NDFS 617X series | Annually |
| NDFS 6960, Capstone | Annually |

Work will continue to develop meaningful program evaluation metrics and learning outcomes for NDFS 6150, Food Sanitation, and NDFS 6160, Food Toxicology. To further focus and refine appropriate outcomes for the MFSQ program, input will be obtained by some combination the following methods, as appropriate:

1. Conducting focus groups with current students to determine what knowledge and skills they *consider* to be important for their future careers.
2. Conducting surveys of alumni to determine what knowledge and skills they *found* to be important in their post-degree careers.
3. Conducting surveys of food industry employers in Utah to determine what knowledge and skills they would *expect* an employee with a graduate education to possess.