

## Course Number and Title: FSY 120 Technology of Food Processing

**Campus Location:**

Georgetown

**Effective Date:**

2021-52

**Prerequisite:**

SSC 100 or concurrent

**Co-Requisites:**

None

**Course Credits and Hours:**

3.00 credits

2.00 lecture hours/week

2.00 lab hours/week

**Course Description:**

This course introduces the principles of food processing and food preservation methods to produce a safe wholesome food product for consumers. Laboratory techniques in dehydration, canning, freezing, fermentation of foods and beverages, food additives, packaging of food products, and sensory evaluation are emphasized.

**Required Text(s):**

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

**Additional Materials:**

None

**Schedule Type:**

Classroom Course

**Disclaimer:**

None

**Core Course Performance Objectives (CCPOs):**

1. Discuss the importance of food processing, and explain why food is processed. (CCC 1, 2, 3, 5; PGC 1, 2, 3, 4)
2. Explain why food preservation methods are effective in keeping food safe for later consumption. (CCC 1, 2, ; PGC 1, 5, 6)
3. Describe the basic units of operations in food processing. (CCC 1, 2, 5; PGC 2, 4, 5)
4. Use thermal processing as a heat preservation method. (CCC 2, 3, 4, 5, 6; PGC 1, 4, 5, 6)
5. Explain cold storage preservation and freezing methods. (CCC 1, 2, 5, 6; PGC 1, 2, 3, 4, 5)
6. Apply food dehydration methods to various food products. (CCC 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5)
7. Use fermentation methods for processing food and beverages. (CCC 2, 3, 4, 5, 6; PGC 1, 5, 6)
8. Use chemical food additives for thermal and non-thermal food processing. (CCC 2, 3, 4, 5, 6; PGC 1, 3, 5)
9. Explain the use of various packaging materials used to protect food. (CCC 2, 3, 5, 6; PGC 1, 2, 5, 6, 7)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

### Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Discuss the importance of food processing, and explain why food is processed.
  1. Discuss reasons why food is processed.
  2. Describe United States Department of Agriculture (USDA) and Food and Drug Administration (FDA) regulations in food processing.
  3. List the six basic principles of food processing.
  4. Describe the quality factors of food products.
  5. Discuss the chemistry of food.
  6. Create a sensory evaluation analysis data set.
  7. Evaluate quality defects, and calculate defective samples.
2. Explain why food preservation methods are effective in keeping food safe for later consumption.
  1. Explain food preservation.
  2. List food preservation techniques, and provide examples of preserved foods.
  3. Identify thermal and non-thermal preservation methods.
3. Describe the basic units of operation in food processing.
  1. Discuss the importance of basic unit operations.
  2. Describe material handling methods.
  3. Provide examples of separation methods.
  4. Describe methods of cleaning food.
  5. Describe homogenization, mixing, and transfer methods.
4. Use thermal processing as a heat preservation method.
  1. Discuss the principles of thermal processing, sterilization, blanching, and pasteurization.
  2. Identify heat resistant microorganisms.
  3. Define high-temperature/short-time (HTST) and ultra-high temperature (UHT) processing.
  4. Define *decimal reduction time* (D value), *12D concept*, and *thermal death time* (TDT).
  5. Discuss heat transfer, and explain the difference among conduction, convection, and radiant energy methods.
  6. Discuss time and temperature heat combinations.
  7. Prepare food products using pressure and water bath canning techniques.
  8. Identify potential problems that may occur during canning.
5. Explain cold storage preservation and freezing methods.
  1. Discuss the history of cold storage preservation.
  2. Describe cooling, refrigeration, and freezing methods.
  3. Describe how cold storage affects the quality of food.
  4. Identify various methods of freezing.
6. Apply food dehydration methods to various food products.
  1. Identify the purpose of food dehydration.
  2. Describe how drying affects the quality of food.
  3. List the common drying methods used in the food industry.
  4. Identify chemical changes that occur during drying.
  5. Discuss factors that affect drying.
  6. Operate a food dehydrator.
7. Use fermentation method for processing food and beverages.
  1. Describe the history of fermentation.
  2. Identify foods produced by fermentation.
  3. List the chemical reaction of fermentation.
  4. Explain how food spoilage occurs and produces alcohol.
  5. List three methods to control fermentation to inhibit the process.
  6. Produce small batches of fermented food products and beverages using fermentation techniques.
8. Use chemical food additives for thermal and non-thermal food processing.
  1. Explain how food additives are monitored and controlled.
  2. Define *additive*, and identify which additives require certification and which are exempt.
  3. Define *generally recognized as safe* (GRAS) substances, and explain their use as ingredients.
  4. Discuss the use of fat replacers/reducers, and describe how they affect the quality of food.
  5. Produce a food product using non-thermal processing techniques.
9. Explain the use of various packaging materials used to protect food products.
  1. Identify types of food packaging.
  2. Describe the uses of four basic packaging materials
  3. List the features and requirements of the packaging materials.
  4. Design or create a package for a food product.
  5. Explain ingredient interactions with various types of packaging.
  6. Examine packaging methods of foods.

**Evaluation Criteria/Policies:**

The grade will be determined using the Delaware Tech grading system:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
0	-	69	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

**Final Course Grade:**

Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
Summative: Exams (6) (equally weighted)	70%
Summative: Lab activity/reports, SOP, Product Development (equally weighted)	20%
Formative: Study/Review Questions/Field Trips (equally weighted)	10%
TOTAL	100%

**Core Curriculum Competencies (CCCs are the competencies every graduate will develop):**

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

**Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):**

1. Apply knowledge of the theories and principles of biology, chemistry and food microbiology.
2. Analyze food samples by common and quantitative and qualitative techniques.
3. Identify emerging technologies and ingredient innovations that have the potential to transform product and process development.
4. Analyze market trends associated with the development of foods to maintain and improve health.
5. Apply knowledge of food processing to improve the quality, efficiency, and sustainability of processing and packaging efforts.
6. Apply knowledge of best practices, risk analysis, traceability, and analytical tools in the areas of microbial and chemical food safety and defense.
7. Apply knowledge of public policy, food laws, and regulations that have national and international implications for the food industry, research, and consumer food safety.

**Disabilities Support Statement:**

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.