# Food Science Course No. 19254 Credit: 1.0

|  |  |  |  |
| --- | --- | --- | --- |
| **Student name:** |  | **Graduation Date:** |  |

Pathways and CIP Codes:Food Products and Processing Systems (01.0401); Restaurant and Event Management (12.0504); Biomedical (14.0501)

Course Description: **Technical Level:** A comprehensive, technical level course designed to provide students with the basic skills and knowledge that enhance scientific principles and how those principles can be applied to improve the health of individuals and families. Instruction is given concerning the physical, microbiological, and chemical principles that affect the food we eat. Suggested prerequisite: Chemistry.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Understand (or apply) basic concepts of nutrition and food science principles.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Define the term food science and describe the main goal of food scientists. |  |
| 1.2 | Discuss the interrelationship of food science and nutrition to promote wellness and disease prevention. |  |
| 1.3 | Define the term sensory evaluation and the qualities that make the sensory characteristics of food. |  |
| 1.4 | Describe the characteristics of sensory tasting and the impact on people’s food preferences. |  |

## Benchmark 2: Demonstrate the use of science and technology in food product testing and development.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Use leadership and teamwork skills in collaborating with others to accomplish lab goals and objectives. |  |
| 2.2 | Identify scientific equipment and the proper methods for use. |  |
| 2.3 | Maintain test kitchen/ laboratory and related equipment and supplies. |  |
| 2.4 | Implement safety procedures when conducting experiments. |  |
| 2.5 | Apply scientific principles when conducting research and/or sensory evaluations of food products. |  |
| 2.6 | Use the metric system of measurement. |  |
| 2.7 | Conduct testing of food products, utilizing available technology. |  |
| 2.8 | Analyze data in statistical analysis when making development decisions. |  |
| 2.9 | Write reports using scientific terminology. |  |

## Benchmark 3: Apply risk management procedures to food safety, food testing, and sanitation.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Use Occupational Safety and Health Administration's (OSHA) Right to Know Law and Safety Data Sheets (SDS) and explain their requirements in handling hazardous materials. |  |
| 3.2 | Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes (the flow of food) to minimize the risks of food borne illness. |  |
| 3.3 | Demonstrate practices and procedures that assure personal and workplace health and hygiene (e.g. sanitary food-handling practices, cleaning and sanitizing materials). |  |
| 3.4 | Identify properties of microorganisms that cause food spoilage and contribute to food-borne illness. e.g. time, temperature, date markings, cross contamination, etc.). |  |
| 3.5 | Explain the difference between food intoxication and food infection. |  |

## Benchmark 4: Understand principles of food biology and microbiology.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Explain the food dehydration process and how it relates to food preparation. |  |
| 4.2 | Discuss the food canning process. |  |
| 4.3 | Discuss freeze-drying and/or air-drying processes. |  |
| 4.4 | Discuss the food irradiation process. |  |

## Benchmark 5: Understand and apply principles of food chemistry.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Explain the properties of elements, compounds, and mixtures in foods and food products. |  |
| 5.2 | Observe and explain why specific chemical reactions occur and the chemical and physical changes in food. |  |
| 5.3 | Investigate the processes of heat and temperature including: molecular motion & temperature, heat transfer, latent heat in phase changes, and temperature on rates of reaction. |  |
| 5.4 | Investigate the role of acids and bases in foods and food products (e.g. Why baking soda is used with an acid in baked goods). |  |
| 5.5 | Explain the coagulation and coalescence processes associated with milk protein and cheese. |  |
| 5.6 | Discuss the functions of enzymes in food. |  |
| 5.7 | Analyze the functions of molds and fermentation in food products. |  |
| 5.8 | Analyze leavening agents and baked goods. |  |
| 5.9 | Explain the impact of molecular structure of simple and complex carbohydrates on digestion, nutrition, and food preparation procedures. |  |
| 5.10 | Relate the composition of lipids and proteins to their functions in foods and their impact on food preparation and nutrition. |  |
| 5.11 | Compare the heat of fusion and the heat of vaporization. |  |
| 5.12 | Explain the functions of water in food preparation. |  |
| 5.13 | Explain the three parts of an emulsion and their relationship to each other. |  |
| 5.14 | Demonstrate various food emulsions and tell the types of each emulsion. |  |
| 5.15 | Discuss fermentation and food including reasons why. |  |
| 5.16 | Identify bacteria used to ferment food (e.g. Lactic acid to create sauerkraut, process of making vinegar, fresh-pack vs brine pickling). |  |
| 5.17 | List the four major leavening agents. |  |
| 5.18 | Identify the types of doughs and batters used in making quick breads. |  |
| 5.19 | Demonstrate how air and steam act as leavening agents. |  |
| 5.20 | Analyze the purposes of the ingredients used in making yeast breads. |  |

## Benchmark 6: Analyze career paths within food science and food technology.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | Explain the roles and functions of individuals engaged in food science and food technology. |  |
| 6.2 | Analyze opportunities for employment and entrepreneurial endeavors. |  |
| 6.3 | Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition. |  |
| 6.4 | Review and enhance an electronic career portfolio to document knowledge, skills and experiences, and individual plan of study. |  |

|  |
| --- |
| \*SDS previously known as MSDS |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

(785) 296-4908

[pathwayshelpdesk@ksde.org](mailto:pathwayshelpdesk@ksde.org)



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

[https://www.ksde.org](https://www.ksde.org/)

The Kansas State Department of Education does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities and provides equal access to any group officially affiliated with the Boy Scouts of America and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: KSDE General Counsel, Office of General Counsel, KSDE, Landon State Office Building, 900 S.W. Jackson, Suite 102, Topeka, KS 66612, (785) 296-3201.