

Course Rationale:

To improve the health and quality of life of Missouri citizens, performance competencies for the Food Science course taught in Family and Consumer Sciences Education programs enable students to:

- construct meaning related to the biochemistry of foods and nutrition;
- solve problems related to foods and nutrition through the application of scientific principles; and,
- assess the impact of food safety and sanitation on the health and well-being of individuals and families.

Directions:

Evaluate the student by checking the appropriate number or letter to indicate the degree of competency. The rating for each task should reflect **employability readiness** rather than the grades given in class.

Rating Scale:

- 3 Mastered** – can work independently with no supervision
2 Requires Supervision – can perform job completely with limited supervision
1 Not Mastered – requires instruction and close supervision
N No Exposure – no experience or knowledge in this area

3	2	1	N	A. Orientation to Food Science	Notes:
				1. Compare and contrast food science to foodservice management	
				2. Utilize basic principles of measurement in scientific experimentation (e.g., metrics, formulas, and equations)	
				3. Demonstrate use, care, and safety of scientific lab equipment	
				4. Explain the steps in the scientific method	
				5. Write accurate and complete reports of science experiments	
				6. Identify the public and private organizations that influence food service, dietetics and nutrition industries	
				7. Identify career paths related to food science, dietetics and nutrition	
				Other:	

3	2	1	N	B. Sensory Evaluation of Food	Notes:
				1. Identify qualities that make up the sensory characteristics of food	
				2. Describe characteristics of sensory evaluation using appropriate terms	
				3. Determine characteristics that affect food preferences	
				Other:	

3	2	1	N	C. Food Safety and Sanitation	Notes:
				1. Compare the positive and negative effects of yeast, molds, bacteria and enzymes in foods	
				2. Identify principles of HACCP (assess hazards, identify critical control points, set up control procedures, monitor critical control points, take corrective actions, develop a record keeping system, verify that the system is working)	

				3. Describe the types of microorganisms that cause foodborne illness (e.g., bacteria, viruses, parasites, yeast, molds)	
				4. Explain the relationship between microorganisms and foodborne illness	
				5. Describe the basic environmental conditions that encourage the growth of microorganisms (e.g., time, temperature, moisture, oxygen)	
				6. Identify the three major types of hazards that cause foodborne illness (biological, chemical and physical)	
				7. Describe symptoms and causative agents of major foodborne illnesses (e.g., salmonellosis, botulism, hepatitis A)	
				8. Discuss how contamination and cross-contamination of foods can occur	
				9. Identify methods and procedures for controlling foodborne illness	
				10. Demonstrate personal hygiene/health practices essential for food safety and sanitation	
				11. Name typical products, tools and methods for effective cleaning and sanitizing	
				12. Identify location of and information on MSDS (Material Safety Data Sheets)	
				Other:	

3	2	1	N	D. Science Foundations	Notes:
				1. Demonstrate the effects of acids and bases in food metabolism, preparation, processing and preservation	
				2. Describe the classes of matter, including pure substances and mixtures	
				3. Identify the elements found in biochemical systems (food) and their atomic symbols	
				4. Explain the properties and principles of matter and energy (e.g., bonding, parts of the atom)	
				5. Identify components of a chemical equation	
				6. Differentiate between chemical reactions and physical changes in food	
				7. Demonstrate the relationship between energy, physical changes, and chemical reactions	
				8. Discuss the relationship between molecular motion and temperature	
				9. Explain how heat is transferred	
				10. Interrelate the effects of temperature, latent heat and phase changes	
				Other:	

3	2	1	N	E. Biochemistry of Foods and the Major Nutrient Groups (Carbohydrates, Proteins, Lipids, Vitamins, Minerals and Water)	
				1. Describe terms related to the major nutrients and nutrient groups	
				2. Describe the functions of the major nutrients and nutrient groups	
				3. Explain the functions of the major nutrients and nutrient groups in foods and food systems	

				4. Explain the process of sugar hydrolysis	
				5. Identify the product resulting from the hydrolysis of sucrose and lactose	
				6. Compare the structures of amylose and amylopectin and their effect on cooking properties	
				7. Discuss gelatinization, paste, retrogradation and syneresis as they relate to starch cookery	
				8. Explain what occurs during denaturization	
				9. Describe the chemical structure of protein	
				10. Compare the properties of saturated and unsaturated fatty acids	
				11. Identify foods that contain saturated and unsaturated fats (triglycerides)	
				12. Explain the differences between the types of fats and cholesterol	
				13. List the ways lipid oxidation can be controlled in food	
				14. Explain the role of water in the formation of solutions, colloidal dispersions and emulsions	
				15. Compare and contrast bound and free water in foods	
				16. Compare and contrast water soluble and fat soluble vitamins	
				17. Distinguish between major and trace minerals	
				18. Identify some interrelationships among nutrients (e.g., vitamin D and calcium)	
				19. Discuss the effect of food processing on vitamin and mineral levels in food	
				20. Relate metabolism to the factors that affect it	
				Other:	

3	2	1	N	F. Chemistry of Food Formulations and Reactions	Notes:
				1. Explain the relationships between enzymes, coenzymes and substrates	
				2. Identify factors that affect enzymatic activity	
				3. Distinguish the function of enzymatic reactions in food spoilage and food preparation	
				4. Identify the solvents and solutes in solutions	
				5. Analyze the effect of concentration on physical properties of a solution	
				6. Identify the properties of colloidal dispersions	
				7. Explain the relationship of an emulsion's parts	
				8. Explain the functions and properties of leavening agents	
				9. Identify the classes of food additives	
				10. Discuss the role of governmental regulations regarding food additives	

				11. Explain the use of additives in food	
				12. Discuss the risks and benefits of using additives in food	
				Other:	

3	2	1	N	G. Food Manufacturing Processes (Fermentation, Canning, Freezing, Dehydration and Irradiation)	Notes:
				1. Define terms related to food manufacturing processes	
				2. Identify commonly processed foods	
				3. Compare and contrast food manufacturing processes	
				4. Identify equipment used in food manufacturing processes	
				Other:	