Discipline: Agriculture	Sub-discipline: Food Safety
General Course Title: **Introduction to Food Microbiology**	Min. Units: **2 Semester**
	Proposed Suffix:

Course Description: An introduction to the principles of food microbiology and food safety. Students will investigate the beneficial and harmful effects of microorganisms on food. They will survey the types of microbes found in various types of food, as well as methods for their detection. Students will evaluate methods of microbial control. They will describe mechanisms of disease of important food microorganisms, as well as sources of food contamination. Students will also examine food safety programs, their implementation and effectiveness. Field trips may be required.

Required Prerequisites or Co-Requisites[1]

Advisories/Recommended Preparation[2]

Course Objectives: *At the conclusion of this course, the student should be able to:*

1. review the different categories and properties of microbes.
2. distinguish between controlled (fermentation) and uncontrolled (spoilage) biochemical processes of microorganisms.
3. assess the factors that affect microbial growth.
4. examine the prevalence of microorganisms in different types of foods.
5. compare and contrast mechanisms for measuring microbial growth in foods.
6. evaluate methods for controlling microbial growth in foods.
7. analyze mechanisms, and symptoms, of food borne intoxication and food borne infection.
8. evaluate protective measures and programs designed to improve food safety.

Course Content:

1. Types and properties of microbes
    a. Bacteria
    b. Fungi
    c. Viruses
    d. Protozoans
    e. Helminths
    f. Prions
    g. Viroids
2. Metabolic properties of microbes
    a. Fermentation

[1] Prerequisite or co-requisite course need to be validated at the CCC level in accordance with Title 5 regulations; co-requisites for CCCs are the linked courses that must be taken at the same time as the primary or target course.

[2] Advisories or recommended preparation will not require validation but are recommendations to be considered by the student prior to enrolling.

b. Spoilage
c. Contamination without perceptible change

3. Factors that influence microbial growth
    a. Intrinsic parameters
        1) Moisture content
        2) Acidity – alkalinity (pH)
        3) Oxidation – reduction potential
        4) Nutrient content
        5) Antimicrobial constituents
        6) Biological structures
    b. Extrinsic parameters
        1) Storage temperature
        2) Relative humidity
        3) Presence and concentration of gases in the environment
        4) Presence and activity of other microorganisms
4. Microbial activity in food and beverage production
    a. Dairy products
    b. Pickled products
    c. Fermented meat products
    d. Bread
    e. Alcoholic fermentation
    f. Contribution of molds to food quality
5. Overview of intrinsic microorganisms in foods
    a. Fresh meats and poultry
    b. Processed meats and seafood
    c. Vegetable and fruit products
    d. Other foods
6. Measuring microbial presence or activity in foods
    a. Culture and sampling methods
    b. Biochemical identification
    c. Molecular identification
    d. Serological identification
    e. Quantitative assays
    f. Bioassays

7. Controlling microbial growth in foods
    a. Preservation methods
        1) Heat
        2) Cold storage
        3) Drying
        4) pH change
        5) Preservatives
        6) Modified atmospheres
        7) Irradiation
    b. Microbial control in water supply, food preparation areas, and other practices
8. Food transmitted pathogens
    a. Bacterial
        1) Salmonella
        2) *E. coli* O157H7
        3) Listeria
        4) "Emerging" and other bacterial pathogens
    b. Viruses
    c. Protzoans
    d. Helminths
    e. Other
9. Control of food safety
    a. Indicator organisms
    b. Systems for assessing food safety
        1) HACCP
        2) FSO
    c. Other criteria

Textbook similar to:
Jay, J. M., Loessner, M., and Golden, D.A. Modern Food Microbiology (7th edition). Boston: Springer, 2006.

Methods of Evaluation: Lecture Comprehensive Quizzes and Exams Written Critical Thinking Scenarios Problem Analysis and Solution Research Papers	Methods of Evaluation:
Typical Textbooks, "Modern Food Biology" by Jay, James M and Loessner, 7ed,	

CSU GE Area	
Statewide Articulation: TBD	
FDRG Lead Signature: Neil Ledford, Hartnell College	Date:
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