AG. 540 AGRICULTURAL BIOTECHNOLOGY

COURSE DESCRIPTION: A course designed to incorporate basic elements of science with a variety of technology applications that are used to modify living organisms. Areas of emphasis include basic science laboratory procedures, implementation of the scientific method of discovery, plant science, animal science, environmental science and food science.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Introduction To Biotechnology	470
Genetics and Genetic Engineering	940
Impacts of Biotechnology	705
Biotechnology in Plant Science	705
Biotechnology in Animal Science	705
Microbial Biotechnology in Agriculture	705
TOTAL MINUTES	4,230

A. Introduction To Biotechnology

1. Define biotechnology
2. Match biotechnology historical events with their proper time periods
3. Arrange the steps of the scientific method of discovery in their proper order
4. Identify the steps to be included in a laboratory report
5. Write a laboratory report
6. List laboratory safety rules

B. Genetics and Genetic Engineering

1. Match genetic terms with correct definitions
2. Match basic cell structures with correct descriptions
3. Distinguish between the kinds of cell reproduction
4. Explain the role of DNA in living organisms
5. Identify the steps of the genetic engineering process
6. Describe procedures for gene transfer
7. Explain the process of suing DNA by gel electrophoresis
8. Extract DNA from cells
9. Transform bacterial cells

C. Impacts of Biotechnology

1. List benefits and concerns for biotechnology
2. Identify environmental impacts of biotechnology
3. Name regulatory agencies and laws affecting biotechnology
4. Identify ethical issues impacting biotechnology
5. Defend a position on the ethics of biotechnology

D. Biotechnology in Plant Science

1. Define plant science terms
2. Distinguish between traditional plant breeding and genetic engineering of plants
3. Explain the processes of micropropagation and tissue culture
4. Describe agricultural applications for plant culture
5. Construct a still air chamber from a box
6. Build a light stand for plant culture
7. Demonstrate propagation of dry bean shoot tips Demonstrate tissue culture of a cauliflower

E. Biotechnology in Animal Science

1. Define animal science terms
2. Describe ways that biotechnology might be used in animal science
3. Distinguish between traditional animal breeding and genetic engineering of animals
4. Identify ways that biotechnology may be used to make changes in animals and animal products
5. Define terms relating to immunology
6. List methods of stimulating an immune response
7. Distinguish between types of immunity
8. Describe and list uses for monoclonal antibodies
9. Write opinion statements about concerns in animal biotechnology

F. Microbial Biotechnology in Agriculture

1. Define microbial biotechnology
2. Identify the types of microorganisms used in biotechnology
3. List uses of the fermentation process
4. Describe the components of a fermentation system
5. Distinguish between types of fermentation systems
6. List the sequence of events that occur in a fermentation process
7. Identify some products of fermentation
8. Describe how microbial biotechnology can benefit agricultural production
9. List some benefits of microbial biotechnology to the food processing industry
10. List same benefits of microbial biotechnology to the environment

11. Identify food products produced through fermentation
12. Explain the role of microorganisms in biodegradation
13. Demonstrate bacterial nitrogen fixation with inoculated clover seeds