



AGRICULTURAL BIOTECHNOLOGY

AI SYLLABUS

Agricultural Biotechnology

Course Description:

In this course, students will delve into the scientific principles and techniques of agricultural biotechnology, including genetic engineering and gene editing. They will learn how these techniques are used to improve crop yield, quality, and resistance to pests and disease, and how they can be applied to sustainable agriculture practices. Additionally, students will explore the ethical and social implications of biotech research and development, including the regulation of biotechnology, international policies, and public perception. They will also examine the impacts of agricultural biotechnology on society, including economic and environmental impacts, and how it can contribute to food security.

Throughout the course, students will develop critical thinking and problem-solving skills as they engage with case studies, current research, and real-world applications of agricultural biotechnology. They will also have the opportunity to apply their knowledge through hands-on activities and class discussions.

By the end of the course, students will have gained a comprehensive understanding of agricultural biotechnology, its applications, and its impact on society, preparing them to make informed decisions about biotech research and development in the agricultural industry.

Course Goals:

- To understand the scientific principles of genetic engineering and gene editing
- To gain knowledge of the applications of biotechnology in agriculture
- To analyze the regulatory and ethical issues surrounding biotech research and development
- To develop critical thinking and problem-solving skills in the context of agricultural biotechnology

Course Outline:

Week 1: Introduction to Agricultural Biotechnology

1. Overview of the course and its objectives

2. Historical perspectives on agricultural biotechnology
3. Ethical considerations of biotech research and development

Week 2: Genetic Engineering

1. Introduction to genetic engineering
2. Techniques for gene transfer
3. Applications of genetic engineering in agriculture

Week 3: Gene Editing

1. Introduction to gene editing
2. CRISPR/Cas9 technology and its applications
3. Regulatory issues related to gene editing

Week 4: Crop Improvement

1. Overview of crop improvement techniques
2. Biotechnology and crop improvement
3. Social and ethical implications of crop improvement

Week 5: Biotech Regulations

1. Introduction to biotech regulations
2. International regulations on biotech research and development
3. Ethical considerations in biotech regulations

Week 6: Social and Ethical Implications

1. Societal impacts of agricultural biotechnology
2. Ethical considerations in biotech research and development
3. Public perception of biotech research and development

Week 7: Biotechnology in Practice

1. Industry guest speaker: biotech company case study
2. Biotech research at universities and government labs
3. Careers in biotechnology and agricultural science
4. Wrap-up and course evaluation

Course Assignments:

Midterm exam (25%)

Research paper on a selected topic in agricultural biotechnology (35%)

Class participation and attendance (20%)

Final exam (20%)

Required Readings:

1. ["Tomorrow's Table: Organic Farming, Genetics, and the Future of Food" by Pamela C. Ronald and Raoul W. Adamchak](#)
2. ["Genetic Engineering of Plants: Agricultural Research Opportunities and Policy Concerns" by National Academy of Sciences](#)
3. ["The GMO Deception: What You Need to Know about the Food, Corporations, and Government Agencies Putting Our Families and Our Environment at Risk" by Sheldon Krimsky](#)
4. ["Biotechnology and the Integrity of Life: Taking Public Fears Seriously" by Michael Hauskeller and Nigel M. de S. Cameron](#)
5. ["Plant Biotechnology: The Genetic Manipulation of Plants" by Adrian Slater, Nigel W. Scott, and Mark R. Fowler](#)

Classroom Policies:

- Attendance and participation are expected in every class.
- Late homework assignments will not be accepted without prior approval from the instructor. If you have an emergency or an unexpected situation that prevents you from completing an assignment on time, please contact the instructor as soon as possible.
- Academic dishonesty, including plagiarism and cheating, will not be tolerated and will result in a failing grade for the course. It is the responsibility of each student to ensure that their work is original and properly cited.
- Students are expected to treat each other and the instructor with respect and professionalism. Inappropriate behavior, including harassment and discrimination, will not be tolerated and may result in disciplinary action.

Course Resources:

Online resources on genetic engineering and gene editing

Journal articles on biotech regulations and crop improvement

TED Talks on the ethical and social implications of biotech research and development

Industry reports on the biotech industry and agricultural technology trends