BIOSAFETY AND ETHICS OF BIOTECHNOLOGY (ABS-832) **Credit Hrs 3(3-0)**

Educational Objectives:

1. Biotechnology and allied fields like Molecular Biology, Biochemistry and Microbiology will be promising research-oriented and fast-growing interdisciplinary fields. These subjects find application in every sphere of life and have tremendous career opportunities available presently and in future. In such demand-oriented fields, lot of research works at molecular level changes, like gene-transfer, stem-cell research, chemicals application, microbial involvement in environmental up gradation including organic shift is being aimed at fertilizers, raw materials and ultimately in human beings–food-related issues. Under these circumstances due to growing concerns arising from Genetically-Modified Organisms throughout the world the UNIDO/WHO/ FAO/UNEP has built up an informal working group on Bioethics and Biosafety. The course is designed to develop the students' knowledge in aspects of Bioethics and Biosafety. An overview of biotechnology and societal needs will be addressed. An understanding of Intellectual Property Rights, Patents and trade secrets will be introduced. The implications of IPR on the commercialisation of biotechnology products and Bioethics, Biosafety concepts and issues related to biosafety assessment of food safety will be also addressed.

2. **Course Outcomes:**

   a. Responsibility and accountability is the central core learning outcome of this course.
   b. The hazards of plagiarism and benefits of originality shall be highlighted for students.
   c. The ethical use of animals in research and to report data in an ethical manner is the focus of learning outcomes.

3. **Course Contents:**

   a. Principles of Biosafety

b. procedures and good laboratory practices (GLPs)
c. Biotechnology: benefits and concerns/risks
d. Standard operating procedures for research involving microbes and recombinant DNA
e. Designing of containment facilities: laboratories
f. Biosafety cabinets
g. Greenhouses
h. Ethical theories
i. Ethical principles
j. Ethical issues surrounding GMOs and recombinant DNA research
k. national policies for biotechnology products and research
l. Principles of Risk assessment and management
m. Biosafety procedures: Assigning of Biosafety levels
n. The concept of Biosecurity
o. International conventions and treaties of relevance to Biosafety
p. National guidelines for research with GMOs and microbes
q. Bioethics and social issues: Theories of bioethics
r. challenges facing modern biotechnology research and application
s. Management of intellectual property: patenting
t. copyrights and trademarks
u. intellectual property rights as applied to biotechnology
v. intellectual Property key policy issues in the research setting
w. Protection of traditional knowledge for biotechnology innovation
x. national and international and legal and regulatory framework for Intellectual property and relevance to biotechnology
y. Challenges of Biotechnology policy development and implementation
z. Features of the Uganda biotechnology and Biosafety policy and its linkage to other national and global policies

Recommended Books:

1. **Bioethics and Biosafety** by M. K. Sateesh.

2. **Bioethics and Biosafety in Biotechnology** by V. Sree Krishna.
3. **Toward a More Natural Science: Biology and Human Affairs** byKass, Leon.
4. **Cutting-Edge Bioethics** by Kilner, John. Eerdmans.
5. **Biological Safety: Principles And Practices** (Biological Safety: Principles & Practices) by Diane O., Diane O., Ph.D. Fleming and Ph.D. Fleming.
6. **Biotechnology, Biosafety, and Biodiversity: Scientific and Ethical Issues for Sustainable Development** by SivramiahShantharam, Jane F. Montgomery and Satellite Symposium on Biotechnology and Biodiversity.