Course Title: BIO SAFETY STANDARDS AND ETHICS	**Course Code:** BT232AT
Total Contact Hours: 45L	**Credits:** 03
SEE Marks: 100	**CIE Marks:** 100
Semester: III/IV	**Academic Year:** 2023-24
Lesson Plan Author: Dr. Trilokchandran B / Dr. G Vijaya Kumar	**Date:** 11/12/2023

Hour	Unit	Main Topics	Course Outcomes (CO)
1	Unit-1 Biohazards, Bio safety levels and cabinets	Introduction to Bio Safety	1
2		Introduction to Biohazards,	1
3		Biological Safety levels,	1
4		Bio safety Cabinets,	1
5		Study of various types of Bio safety cabinets	1
6		Various parameters for design of Biosafety cabinets (Materials used for fabrication	1
7		Various parameters for design of Biosafety cabinets (Materials used for fabrication	1
8		Various parameters for design of Biosafety cabinets (Materials used for fabrication	1
9		Various parameters for design of Biosafety cabinets (Materials used for fabrication	1
10	Unit-2 Biosafety Guidelines:	Biosafety guidelines of Government of India,	1
11		GMOs & LMOs,	2
12		Roles of Institutional Biosafety Committee, RCGM (Review committee o Genetic manipulation),	2
13		Roles of Institutional Biosafety Committee, GEAC (Genetic Engg Approval Committee) for GMO.	2
14		Applications in food and agriculture.	2
15		Overview of National Regulations and relevant International Agreements	2
16		Overview of National Regulations and relevant International Agreements	2
17		Cartagena Protocol	2
18		Conclusion of the chapter	2
19	Unit-3 Food safety standards: Food Hygiene	**Food safety standards:** FSSAI (Food Safety and Standards Authority of India), Functions, License, types of FSSAI Licences and compliance rules.	3
20		FSSAI (Food Safety and Standards Authority of India), Functions, License, types of FSSAI Licences and compliance rules	3
21		FSSAI (Food Safety and Standards Authority of India), Functions, License, types of FSSAI Licences and compliance rules	3
22		**Food Hygiene:** General principles of food microbiology and overview of food borne pathogens,	3
23		**Food Hygiene:** sources of microorganisms in the food chain (raw materials,	3

		water, air, equipment, etc.)	
24		Quality of foods, Microbial food spoilage and Foodborne diseases,	**3**
25		Quality of foods, Overview of beneficial microorganisms and their role in food processing and human nutrition,)	**3**
26		Food Analysis and Testing, General principles of food safety management systems,	**3**
27		Food Analysis and Testing, General principles of food safety management systems, Hazard Analysis Critical Control Point (HACCP	**3**
28		Hazard Analysis Critical Control Point (HACCP)	**3**
29		Conclusion of the chapter	**3**
30	**Unit-4 Food Preservations, processing, and packaging**	Food Preservations, processing, and packaging introduction	**4**
31		Food Processing Operations, Principles,	**4**
32		Good Manufacturing Practices HACCP, Good production,	**4**
33		and processing practices (GMP, GAP, GHP, GLP, BAP, etc)	**4**
34		Overview of food preservation methods and their underlying principles	**4**
35		novel and emerging, methods/principles	**4**
36		Overview of food packaging methods and principles	**4**
37		novel packaging materials	**4**
39	**Unit 5 Food safety and Ethics**	Food Hazards, Food Additives,	**4**
40		Food Allergens Drugs, Hormones, and Antibiotics in Animals.	**4**
41		History of Food Safety, The Role of Food Preservation in Food Safety.	**4**
42		Ethics: Clinical ethics, Health Policy,	**4**
43		Research ethics, ethics on Animals.	**4**
44		Biosafety and Bioethics	**4**
45		Biosafety and Bioethics	**4**

RUBRIC FOR THE CONTINUOUS INTERNAL EVALUATION (THEORY)		
#	**COMPONENTS**	**MARKS**
1.	**QUIZZES:** Quizzes will be conducted in online/offline mode. TWO QUIZZES will be conducted & Each Quiz will be evaluated for 10 Marks. **THE SUM OF TWO QUIZZES WILL BE THE FINAL QUIZ MARKS.**	**20**
2.	**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). TWO tests will be conducted. Each test will be evaluated for 50 Marks, adding upto 100 Marks. **FINAL TEST MARKS WILL BE REDUCED TO 40 MARKS.**	**40**
3.	**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning (10), Program specific requirements (10), Video based seminar/presentation/demonstration (20**) Phase 2 will be done in the exhibition mode (Demo/Prototype/any outcome). ADDING UPTO 40 MARKS**.	**40**
	MAXIMUM MARKS FOR THE CIE THEORY	**100**

RUBRIC FOR SEMESTER END EXAMINATION (THEORY)		
Q. NO.	**CONTENTS**	**MARKS**
	PART A	
1	Objective type questions covering entire syllabus	20
	PART B (Maximum of ***TWO*** Sub-divisions only)	
2	Unit 1 : (Compulsory)	16
3 & 4	Unit 2 : Question 3 or 4	16
5 & 6	Unit 3 : Question 5 or 6	16
7 & 8	Unit 4 : Question 7 or 8	16
9 & 10	Unit 5: Question 9 or 10	16
	TOTAL	**100**

REFERENCE BOOKS:

1. Deepa Goel, Shomini Parashar IPR, Biosafety and Bioethics 1st Edition, 2013, ISBN: 978-8131774700.
2. Cynthia A Roberts, The Food Safety, Oryx Press, first edition, 2001, ISBN: 1–57356–305–6.
3. Hal King, Food Safety Management Systems, Springer Cham, 2020, ISBN: 978-3-030-44734-2.
4. Alastair V. Campbell , Bioethics: The Basics, Routledge; 2nd edition, 2017, ISBN: 978-0415790314.

COURSE OUTCOMES:

Expected Course Outcomes: After going through this course the student will be able to	
CO1:	Have a comprehensive knowledge of Biohazards and bio safety levels
CO2:	Understand the biosafety guidelines and their importance to the society
CO3:	Acquire knowledge with respect to the Food standards, Hygiene, food processing and packing
CO4:	Appreciate the food safety, Ethics, biosafety and bio ethics

Faculty In-charge **Head of the Department**

Date: **Date:**