Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-4

Subject: Food quality safety and regulation- BETFT14304

Type of course: Professional Core

Prerequisite: Basic knowledge of good agricultural practices (GAP), good manufacturing practices (GMP), and good hygiene practices (GHP). Proper facility design, sanitation, pest control, waste management, water quality, and personnel hygiene are essential components.

Rationale: Food quality safety and regulation lie in protecting consumer health and ensuring that food products are safe, nutritious, and of consistent quality. With increasing globalization and complexity of the food supply chain, there is a greater risk of contamination, adulteration, and misuse of additives. Regulations help establish scientific standards, inspection systems, and enforcement mechanisms to prevent foodborne illnesses and fraud.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

Legends: *CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*

Course Content:

Unit No.	Course content	Hours	% Weightage
1	**Introduction to Food Quality and Safety:** Concept and scope of food quality and food safety, Importance of food safety in public health and trade, Types of food hazards – biological, chemical, and physical, Sources and prevention of food contamination, Quality attributes of food: sensory, nutritional, microbiological, and functional aspects.	14	20
2	**Food Standards and National Food Regulations:** National and international quality standards (ISO 9001, ISO 22000, ISO 14001, ISO 17025), Food Safety Management Systems (FSMS), Overview of Indian food laws and regulatory agencies, Food Safety and Standards Act (FSSA), 2006 and Food Safety and Standards Authority of India (FSSAI), Legal Metrology Act and Packaging & Labelling Regulations.	15	30
3	**International Food Regulations and Trade:** Codex Alimentarius Commission: objectives and structure, WTO Agreements – SPS (Sanitary and Phytosanitary Measures) and TBT (Technical Barriers to Trade), Global Food Safety Initiative (GFSI), International certifications: BRC, SQF, IFS, GlobalG.A.P., Role of FAO, WHO, and ISO in global food safety.	15	20
4	**Food Testing, Risk Assessment and Food Safety Management:** Sampling techniques and statistical quality control, Food analysis methods: physical, chemical, microbiological, and sensory evaluation, Rapid detection methods for pathogens and adulterants, Concept of risk analysis: risk assessment, risk management, and risk communication, Foodborne diseases and outbreak investigation, Crisis management in the food industry, Role of predictive microbiology and data analytics in risk prevention.	16	30

Continuous Assessment:

Sr. No.	Active Learn	Marks
1	**Presentation:** Students prepare a short presentation on types of food hazards with real-life examples and submit on GMIU Web portal.	**10**
2	**Simulation exercise:** Students develop a risk assessment matrix for a food processing line and submit it through the GMIU Web Portal.	**10**
3	**Case study analysis:** Students prepare a HACCP flowchart for a selected food product and submit to the GMIU Web Portal.	**10**
Total		**30**

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	30%	10%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from the above table.

List of Practical

Sr. No.	Title	Hours
1.	Sensory evaluation (assess colour, aroma, texture, taste, and overall acceptability) of a food product.	2
2.	Determination of free fatty acids from food sample.	2
3.	Estimation of reducing sugars in food sample by DNS method.	2
4.	Adulteration tests for starch, detergent, urea, water Addition in milk.	4
5.	Thin layer chromatography for food colour/dye analysis in food sample.	2
7.	Estimate microbial load of a food sample using serial dilutions and pour/ spread plates.	4
8.	Detection of coliforms by presumptive (Most Probable Number) from food sample.	4
9.	Determination of alcohol content in fermented beverage.	4
10.	Estimation of Vitamin C (Ascorbic Acid) from food sample by DCPIP titration.	2
11.	Determination of salt (NaCl) content by Mohr's titration from food sample.	2
12.	Determination of specific gravity of milk.	2
	Total	**30**

Course Outcome:

After learning the course, the students should be able to:	
CO1	Understand the basics of food quality and safety, types of food hazards, sources of contamination, and key quality attributes of food.
CO2	Gain knowledge of national and international food quality standards, food safety management systems, Indian food laws and regulatory agencies, and key regulations related to packaging and labelling.
CO3	Understand international food regulations, global trade agreements, major food safety initiatives, international certification systems, and the roles of global organizations in ensuring food safety.

CO4	Application of food testing methods, risk assessment principles, and safety management practices for detecting hazards, preventing foodborne diseases, and managing crises in the food industry.

Instructional Method:

The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by blackboard, may also use any of the tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
From the content, 10% of topics are suggested for flipped mode instruction.
Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.
The internal evaluation will be done based on the Active Learning Assignment.

Reference Books:

[1] Ananthanarayan, L., & Deepika, B. (2018). *Basic Food Microbiology.* McGraw Hill Education, India.

[2] Food Safety and Standards Authority of India (FSSAI). (2011). *Manual of Methods of Analysis of Foods.*

[3] Food and Agriculture Organization (FAO) & World Health Organization (WHO). *Codex Alimentarius: Food Hygiene Basic Texts.* FAO/WHO Joint Publications.

[4] Wallace, C. A., & Williams, T. (2015). *Food Safety for the 21st Century: Managing HACCP and Food Safety throughout the Global Supply Chain.* Wiley-Blackwell.

[5] Subbulakshmi, G., & Udipi, S. A. (2001). *Food Processing and Preservation.*