



Gyanmanjari
Innovative University

Course Syllabus

Gyanmanjari Institute of Technology
Semester-5

Subject: Food Waste Management-BETFT15316

Type of course: Professional Elective

Prerequisite: Basic knowledge of biology, microbiology, food technology, environmental science, and chemistry.

Rationale: The Food Waste Management course for B Tech Food Technology students explores strategies, biotechnological processes, and sustainable practices to handle food waste generated from production, processing, and consumption. It equips students with skills to minimize waste, recover value through recycling and valorization, and develop eco-friendly technologies to reduce environmental impact. The course fosters innovation in converting food waste into resources like bio energy, animal feed, and bioactive compounds.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
3	0	0	3	60	30	10	00	50	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	Hrs.	% Weightage
1	Food Waste Generation and Characterization Sources and types of food waste (household, industrial, agricultural); Composition analysis (moisture, organics, nutrients); Global and Indian statistics on food waste; Environmental impacts (GHG emissions, landfill issues); Quantification methods and audits.	10	20%



2	Prevention and Reduction Strategies Prevention hierarchies (avoidance, redistribution, reuse); Food recovery programs (donation, upcycling); Supply chain optimization; Consumer education and policy interventions (e.g., India's FSSAI guidelines); Smart technologies for waste tracking.	12	25%
3	Biotechnological Valorization Processes Anaerobic digestion for biogas; Composting and vermi-composting; Fermentation for bio ethanol, organic acids, and enzymes; Insect farming (black soldier fly); Extraction of bioactive compounds and nutraceuticals from waste.	13	30%
4	Advanced Technologies and Sustainability Pyrolysis and hydrothermal processing; Waste-to-energy plants; Circular economy models for food waste; Economic analysis (LCA, cost-benefit); Regulations and case studies (Indian and global examples).	10	25%

Continuous Assessment:

Sr. No.	Active Learn	Marks
1.	Presentation: Discuss food waste valorization techniques; submit on GMIU portal.	10
2.	Awareness Campaign: Poster/video on food waste reduction; submit on GMIU portal.	10
3.	Essay Writing: Write ~900 words on food waste impacts or biotech solutions; submit on GMIU portal.	10
4.	Field Survey: Visit food processing unit/market, report waste management; submit on GMIU portal.	10
5.	Patent Analysis: Recent patents on food waste tech; submit on GMIU portal.	10
Total		50

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.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Understand food waste generation, characteristics, and environmental implications.
CO2	Analyze prevention strategies and recovery methods for sustainable management.
CO3	Apply biotechnological processes for food waste valorization and resource recovery.
CO4	Remember advanced technologies, policies, and circular economy practices for food waste solutions.

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] Waste Management for the Food Industries by Ioannis S. Arvanitoyannis
- [2] Sustainable Technologies for Food Waste Management by Ranjna Sirohi, Ayon Tarafdar et al.
- [3] Handbook of Waste Management and Co-product Recovery in Food Processing edited by Keith W. Waldron
- [4] Routledge Handbook of Food Waste by Christian Reynolds, Tammara Soma et al.
- [5] Food Waste Valorisation by Ming Hung Wong et al.

