Course Title: Food Industrial Waste Management
Course Code: FT-609
Department: Food Science and Technology

School of Food and Agricultural Sciences (SFAS) Vision

SFAS endeavors to be a premier center of excellence, offering innovative, high-quality education and professional programs aimed at achieving academic and research excellence, enriching the lives of individuals and making a difference in the world of academia and industry, and to develop a society of professionals, who can contribute towards the betterment of their respective communities.

SFAS Mission

SFAS provides an intellectually rich, collaborative, research-focused and dedicated learning environment for students, faculty, and staff, while serving the community at various levels. SFAS at UMT has been established with the aim to integrate recent advances in food sciences/technology and agricultural innovations.

Program Objectives

Students graduating with MS Food Science and Technology Shall be able to:

1. Explain the basic principles of food sciences, and its multidisciplinary scope.
2. Explain the physical, chemical and biological properties of food and their effects on food safety, and sensory and nutritional quality.
3. Apply analytical techniques to characterize composition, and to identify physical, chemical and biological changes in foods.
4. Explain the effects of food processing, engineering, preservation, packaging, and storage on food safety and quality.
5. Identify the importance of food laws and regulations in ensuring safety and quality of the processed/manufactured foods.
6. Conduct applied research and use statistical tools in experimental design and data analysis.
7. Apply acquired knowledge to real world situations in food systems, components, production, and process.
8. Apply critical thinking to professional problems.
9. Communicate effectively in both oral and written forms.
10. Develop organizational, teamwork, and leadership skills.
11. Demonstrate professional skills and thoughts of ethical, social integrity, and respect for diversity.
12. Demonstrate preparedness for continued reflective practice, and lifelong learning relevant to careers in food sciences.

PhD Food Technology program has the following main objectives;

1. To produce original scientific contribution in the domain of Food Science and Technology
2. To demonstrate effective and ethical learning through thesis defense and manuscript preparation in the scientific journals of food science and allied fields
3. To enhance critical thinking related to various food components as well as food systems through experiments and innovation
4. To develop skills for effective communication of discipline-specific information in various seminars, symposiums and conferences

Course Objectives

At the completion of the course, a student will be able to:

- Impart the comprehensive knowledge regarding various **types of waste** generated from food processing industries and their **effective treatment and disposal management**
- Compare the functional properties of different type of food industrial wastes for selection of suitable treatment/management approaches
- Apply this information in the professional practice by **developing strategies** for effective food **waste management**

Learning Objectives

Sr#	Course Learning Objectives	Link with Program Learning Objectives
1.	To understand the main concept and theoretical approaches differentiating between food loss, food waste and industrial food waste, the national and global situations related to hunger, food loss and food wastage and the importance of designing food waste management model for achieving a more sustainable food system	To enhance the knowledge and critical thinking about the worldwide scenario of food loss and food waste
2.	To understand the main concepts about the need and establishment of EMS/ISO 14000, the basic steps to model the EMS, the requirements for characterizing the environmental effects of EMS	Explain the main concept and need for the establishment of EMS/ISO 14000
3.	To understand the concept, need, importance and objectives of food waste valorization	Learn about the need and importance of food waste valorization in food waste management
4.	To understand the compositional properties of waste generated during packaging of different food products at domestic and industrial level	Learn about the strategies to manage the food waste at domestic and industrial scale
5.	Learn about the emerging methods for the conversion of waste into useful products	Analyze the principles and practices involves in the conversion of food waste into useful by products

Learning Outcomes

1. Demonstrate the knowledge and skills about legislation to bear the responsibility for preventive solutions in food waste management
2. Explain and apply the advanced technical knowledge of waste management in food industry
3. Compare the functional properties of different type of food industrial wastes for selection of suitable treatment/management approaches

Teaching Methodology Interactive

Classes:

1. *Use media to increase student engagement and improve learning outcomes.*
2. *Try adding metaphors to help students remember details.*
3. *Give students a real-world context with extra projects to reinforce skills.*
4. *Provide practical practice within your lessons. Making it relatable will do wonders.*

Case based teaching:

Class Participation

Positive, healthy and constructive class participation will be monitored for each class. Particular emphasis will be given to participation during the presentation sessions. The manner in which the question is asked or answered will also be noted.

Word of advice

Assignments/ projects are very demanding and time consuming. Since you might be exposed to the real corporate environment, the ensuing reality checks could be demoralizing and frustrating. So you must learn to handle the intra group conflicts and any clash of interests. Unless you start working on the assignments/ projects right away from the very first day you are likely to miss the dead lines.

Participant Responsibilities:

Student should be responsible enough to practice whatever they have learnt during class sessions. They should also implement it to other subjects as well. They are expected to come prepared in the class.

Class activities:

Presentations

After careful analysis, resource person will constitute the groups to achieve balanced heterogeneity among groups, for group assignments/projects and will have the final decision in this regard. Every member of the group is expected to be able to handle all aspects of the assignments. Groups are not allowed to choose presenters for various parts of the presentations; instead resource person will nominate them. Individuals will be judged for their understanding of the topic through question handling. Q/A section of the presentations will way heavily for grading of assignments/ projects.

Team Discussions:

During class, each student will work in a team on discussion questions. Teams will be assigned questions, allowed ten minutes for Internet research, and permitted five minutes to present their results. Points are earned by active participation with your team.

STUDENTS ARE REQUIRED TO READ AND UNDERSTAND ALL ITEMS OUTLINED IN THE PARTICIPANT HANDBOOK

Class Policy:

Be on Time

You need to be at class at the assigned time. After 10 minutes past the assigned time, you will be marked absent.

Mobile Policy

TURN OFF YOUR MOBILE PHONE! It is unprofessional to be texting or otherwise.

Email Policy

READ YOUR EMAILS! You are responsible if you miss a deadline because you did not read your email. Participants should regularly check their university emails accounts regularly and respond accordingly.

Class Attendance Policy

A minimum of 80% attendance is required for a participant to be eligible to sit in the final examination. Being sick and going to weddings are absences and will not be counted as present. You have the opportunity to use 6 absences out of 30 classes. Participants with less than 80% of attendance in a course will be given grade 'F' (Fail) and will not be allowed to take end term exams. International students who will be leaving for visa during semester should not use any days off except for visa trip. Otherwise they could reach short attendance.

Withdraw Policy

Students may withdraw from a course till the end of the 12th week of the semester. Consequently, grade W will be awarded to the student which shall have no impact on the calculation of the GPA of the student. A Student withdrawing after the 12th week shall be automatically awarded "F" grade which shall count in the GPA.

Moodle

UMT –LMS (Moodle) is an Open Source Course Management System (CMS), also known as a learning Management System (LMS). Participants should regularly visit the course website on MOODLE Course Management system, and fully benefit from its capabilities. If you are facing any problem using moodle, visit http://oit.umt.edu.pk/moodle. For further query send your queries to moodle@umt.edu.pk

Harassment Policy

Sexual or any other harassment is prohibited and is constituted as punishable offence. Sexual or any other harassment of any participant will not be tolerated. All actions categorized as sexual or any other harassment when done physically or verbally would also be considered as sexual harassment when done using electronic media such as computers, mobiles, internet, emails etc.

Use of Unfair Means/Honesty Policy

Any participant found using unfair means or assisting another participant during a class test/quiz, assignments or examination would be liable to disciplinary action.

Plagiarism Policy

All students are required to attach a "Turn tin" report on every assignment, big or small. Any student who attempts to bypass "Turn tin" will receive "F" grade which will count towards the CGPA. The participants submit the plagiarism report to the resource person with every assignment, report, project, thesis etc. If student attempts to cheat "Turn tin", he/she will receive a second "F" that will count towards the CGPA. There are special rules on plagiarism for final reports etc. all outlined in your handbook.

Communication of Results

The results of quizzes, midterms and assignments are communicated to the participants during the semester and answer books are returned to them. It is the responsibility of the course instructor to keep the participants informed about his/her progress during the semester. The course instructor will inform a participant at least one week before the final examination related to his or her performance in the course.

Course Outline

Course code: FT-609 **Course title:** Food Industrial Waste Management

Program	MS Food Technology/PhD Food Technology
Credit Hours	3 (3-0)
Duration	16 weeks
Prerequisites (If any)	Nill
Resource Person Name and Email	Dr. Momna Rubab momna.rubab@umt.edu.pk
Counseling Timing (Room#)	6:30 pm to 8:45 pm STD 503
Contact no.	
Web Links:- (Face book, Linked In, Google Groups, Other platforms)	

Chairman/Director Programme

Signature……
Date……..

Dean's signature……
Date……

Grade Evaluation Criteria

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

Marks Evaluation	Marks in percentage
Quizzes:	**10%**
Mid Term Exam:	**20%**
Assignment/Project/Case study:	**10%**
Class participation:	**5%**
Presentation:	**15%**
End Term Exam:	**40%**
Total:	**100%**

Recommended Textbooks:

1. Arvanitoyannis, I, S. 2008. Waste Management for the Food Industries. Elsevier, Academic Press, UK.
2. Narvanen, E., Mesiranta, N., Mattila, M., Heikkinen, A. 2020. Food Waste Management: Solving the Wicked Problem. Switzerland. https://doi.org/10.1007/978-3-030-20561-4.
3. Riley, G. L. 2016. Food Waste: Practice, Management and Challenges. Nova Publishers, New York, USA.

Course: Food Industrial Waste Management **Course code:** FT-609/FT-719

No	Topics to be covered in the course	Learning Objective of this topic	Expected Outcomes from Students	Teaching Method	Assessment Criteria	Deadlines and Homework
1	Introduction, course overview Food waste and food loss: overview, global and national scenario	To understand the main concept and theoretical approaches differentiating between food loss, food waste and industrial food waste, the national and global situations related to hunger, food loss and food wastage and the importance of designing food waste management model for achieving a more sustainable food system	Explore the key aspects of food loss and food waste globally	Lecture, discussion	Class Participation	Within a Week
2	Food waste management landscape Application of environmental management system to food industries: potential and representative	Explain the concept and importance of environmental management system, the present situation of environment management system Implementation and Identify different types of wastewater generated from various food industries	To understand the importance of food waste management in the food industry from environmental perspective	Lecture, discussion	Class participation	Within a Week
3	ISO 14000, 14001, 14010 and 14040 Environmental legislation related to food industries	To understand the main concepts about the need and establishment of EMS/ISO 14000, the basic steps to model the EMS, the requirements for characterizing the environmental effects of EMS	Explore the introduction, history, benefits of compliance, implementation steps and application of ISO14001 to the food industry	Lecture Discussion	Class participation	Within a Week

4	Need for valorizing the food waste Food waste management/treatment strategies	To understand the concept, need, importance and objectives of food waste valorization Compare the functional properties of different type of food industrial wastes for selection of suitable treatment/management approaches	Discuss the strategies for food waste valorization/treatment Explain and apply the advanced technical knowledge of waste management in food industry	Lecture Discussion	Class participation	Within a Week
5	Fruit/ fruit juice waste management Vegetable waste management	To understand the compositional properties of waste generated during processing of different fruits and vegetables	Describe the strategies for fruits and vegetable waste treatment and utilization	Lecture, Discussion	Class participation and assignment	Within a Week
6	Oil waste management Cereal waste management	To understand the compositional properties of waste generated during processing of oil and different cereals	Describe the strategies for oil and cereal waste treatment and utilization	Lecture, Discussion	Class participation	Within a Week
7	Baking industrial waste management Meat waste management	To understand the compositional properties of waste generated during processing of different meats and in baking industry	Describe the strategies for meat and baking waste treatment and utilization	Lecture, Discussion	Class participation and quiz	Within a Week
8	**Mid Term**					Within a Week
9	Fish industrial waste management Dairy waste management	To understand the compositional properties of waste generated during processing of fish (and fish products) milk (and milk products)	Describe the strategies for fish and dairy waste treatment and utilization	Lecture Discussion	Class participation	Within a Week
10	Dairy waste management Wine waste management	To understand the compositional properties of waste generated during processing of milk and milk products and in wine industry	Describe the strategies for dairy and wine waste treatment and utilization	Lecture, Discussion	Class participation	Within a Week
11	Waste management of food packaging industries Household waste management	To understand the compositional properties of waste generated during packaging of different food products at domestic and industrial level	Describe the strategies for domestic and industrial waste treatment and utilization	Lecture Discussion	Class participation and Quiz	Within a Week
12	City region food systems and food management Food management in	To understand the challenges in food waste management at regional level	Describe the strategies to manage the waste at regional level	Lecture, Discussion	Class participation	Within a Week

13	Sustainable business models to fight food wastes Food waste conversion to biofuel	Learn the most advance strategies to manage the food waste	Describing the strategies to manage the waste in eco-friendly way	Lecture, Discussion	Class participation	Within a Week
14	Food waste conversion to bioplastics Emerging opportunities in food waste valorization	Learn about the emerging methods for the conversion of waste into useful products	Understanding the significance of emerging methods for the management of food waste into useful by-products	Lecture Discussion	Class participation quiz	Within a Week
15	Emerging opportunities in food waste valorization	Learn about the emerging methods for the conversion of waste into useful products	Understanding the significance of emerging methods for the management of food waste into useful by-products	Lecture, Discussion	Class participation	Within a Week
16	**Final exam**	**-**	**-**	On campus examination	Paper and Viva	Within a Week