Course Title: Food Additives
Course Code: FT-504
Resource Person: Rizwan-ur-Rehman
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 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 Learning Objectives (PLO's)

Students graduating with BS Food Science and Technology shall be able to:

1. *To develop a comprehensive understanding of various food production and processing issues faced by the food industry*
2. *To provide a comprehensive know how about the recent tools that are developed internationally to tackle the food processing issues*
3. *To train on various analytical instruments and equipments that are relevant to new product development*
4. *To develop research and analytical skills for effective evaluation of quality issues in various food industries*
5. *To develop effective scientific writing and publications skills for effective dissemination of research outputs.*

Course Objectives (CLO's)

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

1. *Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.*
2. *Comprehend the interaction between nutrients and food additives, safety concerns and their metabolism*
3. *Comprehend the quantitative and qualitative tools used to detect the food additives and their bioavailability.*
4. *Develop the skill of publication writing understand different solution preparation.*

Learning Objectives

Sr#	Course Learning Objectives	Link with Program Learning Objectives
1.	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives	Develop a comprehensive understanding of various food production and processing issues faced by the food industry
2.	Comprehend the interaction between nutrients and food additives, safety concerns and their metabolism	Develop a comprehensive understanding of various food production and processing issues faced by the food industry
3.	Comprehend the quantitative and qualitative tools used to detect the food additives and their bioavailability.	Provide a comprehensive know how about the recent tools that are developed internationally to tackle the food processing issues.
4.	Develop the skill of publication writing understand different solution preparation	Develop effective scientific writing and publications skills for effective dissemination of research outputs.

Course Learning Outcomes

After successful completion of the course work, students will have the skills to:

1. *Improve the understanding of role of food additives and their regulatory status in food processing.*
2. *Identify how food additives interact with food ingredients to improve the quality attributes.*
3. *Identify how food additives are metabolized and what is their impact on human health.*
4. *Identify different unit operations involved in raw sugar making.*
5. *Improves the understanding for the application and safe use of food additives.*
6. *Improves the understanding of consumer attitude and hypersensitivity towards food additives..*
7. *Improves the learning of different types of food additives being used in food manufacturing*

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 participants during the presentation sessions. How the question is asked or answered will also be noted. Your behavior, as business executives in the class will contribute to the class participation marks.

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 intragroup 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 deadlines.

Participant Responsibilities:

Students should be responsible enough to practice whatever they have learned 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.

Class 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.

Applied Projects:
This is a practical-based course. Regular attendance is the best predictor of success. Students will perform different practices with detailed instructions, teacher demonstrations, and video tutorials.

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 phone 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 email 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 a grade 'F' (Fail) and will not be allowed to take end-term exams. International students who will be leaving for visas during semester should not use any days off except for visa trips. 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 an "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 offense. 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 in" report on every assignment, big or small. Any student who attempts to bypass "Turn tin" will receive an "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 a 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-504 **Course title**: Food Additives

Program	MS Food Technology
Credit Hours	3(2-1)
Duration	16 Weeks
Prerequisites (If any)	
Resource Person Name and Email	Rizwan-ur-Rehman rizwan.rehman@umt.edu.pk
Counseling Timing & Room #	3 hours per week (STD 502)
Contact no.	-
Web Links	-

Director Program 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**
Class Presentation	10%
Quizzes	5%
Assignments	10%
Class Project	10%
Lab	20%
Mid-Term	15%
Final exam	30%
Total	**100%**

Recommended Text Books:

1. Saltmarsh, M., Saltmarsh, M. and Barlow, S. 2013. Essential guide to food additives. Royal Society of Chemistry, USA.
2. Msagati, T.A.M. 2012. The chemistry of food additives and preservatives. John Wiley & Sons, USA.
3. Smith, J. and Hong-Shum, L. 2011. Food additives data book. John Wiley & Sons, USA.
4. Smith, J. and Hong-Shum, L. 2011. Food additives data book. 2nd. Wiley-Blackwell, John Wiley & Sons Ltd, Chichester, West Sussex, UK.
5. Butt, M.S., Anjum, F.M. and Asghar, A. 2010. Food additives: a comprehensive treatise. University of Agriculture Press, Faisalabad-Pakistan.
6. Chaudhary, M. M. and Riaz, M. N. 2019. Hand book of Halal Food Production. CRC Press, Boca Raton, Florida, USA.

Course: Food Additives **Course code: FT 504**

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	Food additives: Purpose of application in food	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.	Improve the understanding of role of food additives and their regulatory status in food processing.	Lecture slides Short assignment	Class Participation	Within a Week
2	Regulatory status, generally recognized as safe (GRAS)	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.	Improve the understanding of role of food additives and their regulatory status in food processing.	Lecture Class discussion	Class participation	Within a Week
3	Mode of action of Additives	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.	Identify how food additives interact with food ingredients to improve the quality attributes.	Lecture Class discussion	Class participation Discussion	Within a Week
4	Stability & interaction with food components	Comprehend the interaction between nutrients and food additives, safety concerns and their metabolism.	Identify how food additives interact with food ingredients to improve the quality attributes.	Lecture Literature review	Quiz Class participation	Within a Week

5	Metabolism & carcinogenic effects of food additives	Comprehend the interaction between nutrients and food additives, safety concerns and their metabolism.	Identify how food additives are metabolized and what is their impact on human health	Lecture Literature review Video tutorial	Quiz Case study	Within a Week
6	Recommended doses in food industry	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.	Improve the understanding for the application and safe use of food additives.	Lecture Practical	Lab performance Class participation	Within a Week
7	Application techniques used in food industry	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.	Improves the understanding for the application and safe use of food additives	Lecture Literature review	Class participation	Within a Week
8	**Revision & Mid Exams**					
9	Precautionary instructions for safe use of food additives in food	Comprehend the interaction between nutrients and food additives, safety concerns and their metabolism	Improves the understanding for the application and safe use of food additives	Lecture Class discussions Video tutorial	Quiz Lab Performance	Within a Week
10	Hypersensitivity of food additives	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.	Improves the understanding of consumer attitude and hypersensitivity towards food additives.	Lecture Class discussions Video tutorial	Case Study Lab Performance	Within a Week
11	Consumers attitude towards food additives	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives.	Improves the understanding of consumer attitude and hypersensitivity towards food additives.	Lecture Class discussions Video tutorial	Quiz Lab Performance	Within a Week

12	Types of food additives: antimicrobial agents, antibiotics, colors, sugar and fat substitutes	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives	Improves the learning of different types of food additives being used in food manufacturing	Lecture Class discussions Video tutorial	Quiz Lab Performance	Within a Week
13	Types of food additives: sweeteners, acids, humectants, thickening agents, stabilizers	Get knowledge about the classification, legislation and regulatory authorities, consumer hypersensitivity and mode of action of food additives	Improve the learning of different types of food additives being used in food manufacturing	Lecture Class discussions Video tutorial Practical	Quiz Lab Performance	Within a Week
14	Types of Food Additives: Anticaking agents, emulsifiers, bleaching, glazing agents, sequestrant.	Have a better understanding of various byproducts that can be manufactured along with sugar production.	Improve the understanding regarding the production of alcohol and other valuable organic compounds produced from molasses	Lecture Lab practical Video tutorial Practical	Whiteboard test Quiz Lab performance	Within a Week
15	Class presentations and project assessment	To estimate student learning and progress in beverage technology	To develop communication skills and effective communication on industrial floors	Class participation Class projects Q/A session	Class presentation Viva	Within a Week
16	Final Examination	Application of all the concepts learned in Food Additives		On campus examination	Paper	Within a Week
	Result Display					

Lab Component

During the course students will be able to perform the following Food Additives related practical in the laboratory:

1. *Food additives and classes of preservatives.*
2. *Ferric chloride and modified Mohler's Test for qualitative determination of preservative*
3. *Quantitative analysis of preservatives using titrimetric method*
4. *Estimation of benzoic acid using UV-VIS spectrophotometer*
5. *Demonstration of HPLC and determination of Benzoic acid through HPLC*
6. *Estimation of saccharine through calorimetric method*


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