

KU4VACCHE101: FOOD ADDITIVES, CONTAMINATION AND SAFETY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	VAC	100	KU4VACCHE101	3	45

Learning Approach (Hours/ Week)		Marks Distribution			Duration of ESE (Hours)
Lecture/ Tutorial	Practical/ Internship	CE	ESE	Total	
3	0	25	50	75	1.5

Course Description: This VAC course is designed to enrich the students with deep understanding about the chemistry of food additives, their applications and to learn methods for detecting and controlling contamination in food production and distribution.

Course Prerequisite: **NIL**

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand and describe applications of various food additives in food processing and preservation.	U
2	To identify and prevent potential sources of food contamination	An
3	To know the Safe and scientific measures of food additives	U
4	Interpret and adhere to regulatory requirements and international standards for food safety for a healthy society	E
5	Utilize laboratory techniques for detecting and analysing contamination in food samples	C

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3	2	3	2	1	3	2
CO 2	3	2	3	2	2	3	2
CO 3	3	1	3	2	1	3	2
CO 4	3	2	3	2	2	3	2
CO 5	3	2	3	1	2	3	2

COURSE CONTENTS

Contents for Classroom Transaction:

M O D U L E	U N I T	DESCRIPTION		HOURS
1	FOOD ADDITIVES			12
	1	Introduction - Need of food additives in food processing and preservation. Characteristics and classification of food additives.		
	2	Antimicrobial agents. -Nitrites, sulphides, sulphur dioxide, sodium chloride, hydrogen peroxide Antioxidants - Introduction, mechanism of action, natural and synthetic antioxidants, technological aspect of antioxidants.		
	3	Sweeteners- Introduction, importance, classification- natural and artificial, chemistry, technology and toxicology, consideration for choosing sweetening agents.		
	4	Colours- Introduction, importance, classification- natural, artificial, and natural identical, FD&C Dyes and Lakes. polymeric colours.		

2	FOOD CONTAMINATION & ADULTERANTS			12
		Contamination in Food: Physical, chemical contaminants- heavy metals, pesticide residues, agrochemicals, Antibiotics and Veterinary Drug residues, environmental pollutants, radionuclides, solvent residues, NOTS (Naturally Occurring Toxic Substances).		

		Contaminants formed during processing & packaging – nitrosamines, acrylamide, alloys, benzene, dioxins, furans, persistent organic pollutants, polymers, PAH (Polycyclic Aromatic Hydrocarbons) in smoked foods, food. fumigants, autoxidation products.	
		Food adulteration - Common adulterants in foods and tests to detect common adulterants.	

		FOOD SAFETY, RISKS AND HAZARDS	6
3	1	Food safety – Introduction to food safety. food-borne illness and contaminants –Consumer concerns and issues - Food safety standards and regulations	
	2	Food risks and hazards - Food related hazards (Chemical, Biological, Physical) - interaction of additives with food ingredients and their toxicological aspects.	
		ADULTRATION OF COMMON FOODS AND METHODS OF DETECTION	6
4	1	Adulteration methods of detection adulterants in the following foods- Milk, Oil, Grain, Sugar, Spices and Condiments, Processed food, Fruits and Vegetables.	

		TEACHER SPECIFIC MODULE -LABORATORY DEMONSTRATIONS	9
5	1	Laboratory demonstrations on the methods of detection of adulterants in the following foods- Milk, Oil, Grain, Sugar, Spices and Condiments, Processed food, Fruits and Vegetables.	

Essential Readings:

1. Principles of Food Chemistry. DeMan, Springer, 3rd edition
2. Food Colours, Emerton, V, Blackwell Publishing.
3. Sweeteners, Wilson, R., Blackwell Publishing.
4. Food Chemistry, Fennema OR., Marcel Dekker.
5. Food Quality Management Technological and Managerial principles and practices, Pieter A., Luning. & Willem, J. Marcelis., Wageningen
6. Handbook of analysis and quality control for fruit and vegetable products, Ranganna, S., & Ranganna, S., New Delhi: Tata McGraw-Hill
7. Food analysis, Nielsen, S. S.
8. Vogel's textbook of quantitative chemical analysis, Vogel, Arthur I. Harlow, Essex, England, New York: Longman Scientific & Technical; Wiley

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation (ESE)		50
Continuous Evaluation (CCA)		25
Theory (CCA)		25
a)	Test Paper*	10
b)	Assignment	5
c)	Seminar, Viva-Voce	10
Total		75