

KU2DSCFTY104- FOOD PROCESSING AND PRESERVATION

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
II	DSC A2	100-199	KU2DSCFTY104	3+1	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	0	25L+10P	50L+15P	100	2

COURSE DESCRIPTION:

The Food Preservation course focuses on the principles, techniques, and importance of preserving food to ensure its safety, quality, and shelf-life extension. Students will explore various preservation methods including thermal processing (such as canning and pasteurization), chilling and freezing, drying, fermentation, irradiation, and the use of chemical preservatives. Emphasis is placed on understanding the factors influencing microbial growth and spoilage in food, as well as the mechanisms by which preservation methods inhibit microbial activity and enzymatic degradation.

Course Prerequisite: Basic Knowledge in Science

COURSE OUTCOMES:

CO No.	Expected Outcome	Learning Domains
1	Understanding of thermal processes, their industrial, and ability to apply this knowledge in various contexts.	U
2	Apply knowledge and skills related to preserving products at low temperature. Practical skills in implementing and optimizing low temperature preservation methods, along with an awareness of safety measures and quality control.	Ap
3	Apply knowledge of the biological processes and chemical methods of preservation.	Ap
4	Demonstrate knowledge of innovative preservation methods and also gain insights into sustainable practices, quality control and regulatory considerations with in the dynamic field of food science.	Ap

5	Create basic knowledge on recent trends in food preservation.	C
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**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	PSO8
CO 1	✓			✓				
CO 2					✓			✓
CO 3								✓
CO 4					✓			
CO 5						✓		

COURSE CONTENTS

Contents for Classroom Transaction:

Module	Description	Teaching Hours
PRESERVATION BY ALTERING TEMPERATURE		
1	<p>Introduction to food preservation</p> <ul style="list-style-type: none"> a) Importance of food preservation b) Aims, principles and methods of food preservation. <p>Preservation by High Temperature</p> <ul style="list-style-type: none"> a) Principles and application b) Pasteurization c) Blanching d) Sterilization e) UHT f) Asceptic preservation g) Microwave assisted thermal sterilisation <p>Preservation by Low Temperature</p> <ul style="list-style-type: none"> a) Refrigeration b) Chilling injury <p>Freezing</p> <ul style="list-style-type: none"> a) Principle b) Freezing rate, Quick freezing, Slow freezing, IQF 	15

	<p>c) Types of freezers- Air blast, Contact, Immersion, Fluidized bed and Cryogenic freezers.</p> <p>Quality of frozen foods</p> <p>a) Retrogradation</p> <p>b) Protein denaturation</p> <p>c) Freezer burn</p>	
PRESERVATIVES AND FERMENTATION		
2	<ol style="list-style-type: none"> 1. Natural preservatives – Class I preservatives 2. Chemical Preservatives - Sulphur dioxide, Benzoic acid, Sorbic acid, Propionic acid, Acetic acid. 3. Canning: principle, steps involved in canning, types of containers used, heat penetration into containers, pH classification of foods, corrosion of cans. 4. Fermentation <ol style="list-style-type: none"> a) Principles, Significance b) Types of fermentation- Acetic, Lactic and Alcoholic 5. Preservation by controlling water activity: High sugar products, IMF, curing and effect of salt of food preservation. 6. Dehydration <ol style="list-style-type: none"> a) Principles, Types of drying methods b) Natural drying c) Driers in food industry: drum, spray, fluidized bed, air drier, vacuum drier, tunnel drier. Dehydrofreezing, freeze drying. <p>Drying pre-treatments – blanching & sulphuring</p> 7. Smoking <p>Principle, Advantages and disadvantages</p> 	10
NOVEL AND NON-THERMAL PRESERVATION		
3	<ol style="list-style-type: none"> 1. Irradiation <p>Principles (mode of action) – Application of irradiation</p> <p>Specific types of radiation treatment.</p> <p>Measurement & Uses of irradiation.</p> <p>Novel preservation techniques</p> <ol style="list-style-type: none"> 2. Hurdle technology: Principles applications and advantages. 3. Hydrostatic Pressure Processing: Principles applications and advantages. 4. Pulsed Electric Field: Principles applications and advantages. 5. Ultrasonication: Principles applications and advantages. 6. Novel Thermal Technologies 7. Ohmic Heating: Principles applications and advantages. 8. Infrared Heating: Principles applications and advantages. 9. Induction Heating: Principles applications and advantages. 10. Bacteriocins: Principles applications and advantages. 11. Microfiltration: Principles applications and advantages. 	15

	12. Bactofugation: Principles applications and advantages. 13. Dielectric Heating: Principles applications and advantages. 14. Nanotechnology: Principle, application and advantages	
PRACTICAL IN FOOD PRESERVATION		
4	a) Blanching of Vegetables. b) Dehydration of Vegetables using Cabinet drier c) Determination of Moisture using a) Hot air oven b) Distillation method Infrared method d) Dehydration of fruits in sugar syrup e) Qualitative Determination of Benzoic acid and SO ₂ f) Determination of Acidity & Ph g) Determination of TSS	30
5	Teacher Specific Module	5
	<i>Directions: 15 Days internship</i>	

Essential Readings

1. Fennema Owen R. Principles of food Science. Marcel Dekkar, Inc
2. Murano, Peter S. Understanding Food Science and Technology Thomson
3. Khader, Vijaya Textbook on Food Storage and Preservation Kalyani Publishers
4. Pruthi JS Quick Freezing Preservation of Foods Allied publishers Limited
5. Potter N N.& Hotchkiss 1997 Food Science CBS Publishers
6. Desrosier NW James N, 1977 Technology of Food Preservation CBS Publishers
7. Arti Sanhla Food Preservation. Principles and practices
8. Manay, N.S, Shadaksharaswamy, M., Foods: New Age international (P) publishers, New Delhi 2004 S
9. Hafiur Rahman M., 1999, Hand book of food preservation. Marcel Dekker, Inc, New York.
10. Subbulakshmi G and Udippi S.A Food Processing and Preservation Foods: New Age international (P) publishers, New Delhi 2001

Assessment Rubrics:**Theory**

Evaluation Type		Marks
End Semester Evaluation L		50
Continuous Evaluation L		25
a)	Test Paper- 1	5
b)	Test Paper-2	5
c)	Assignment	5
d)	Seminar	10
e)	Book/ Article Review	-
f)	Viva-Voce	5
g)	Field Report	-
Total L		75

Any components from the above table can be taken for CE not exceeding 15 Marks.
Teacher specific module is evaluated for 10 marks.

Practical's

Evaluation Type		Marks
End Semester Evaluation P		15
Continuous Evaluation P		10
a)	Practical Test - 1	5
b)	Practical Test -2	5
c)	Record	5
d)	Lab skill	10
e)	Regularity	5
f)	Viva-Voce	5
g)	Report writing	5
Total		25

Any components from the above table can be taken for CE not exceeding 10 Marks