

(Abstract)

Scheme (All Semester) and first & second Semester Syllabi of B.Sc. Food Technology Programme (FYUGP) in Affiliated Colleges under the University - with effect from 2024 Admission- Approved- Orders issued

FYUGP Spl.cell

FYUGPSC/FYSC-III/9089/2024

Dated: 21.11.2024

- Read:-1. U O No. FYUGPSC/FYSC-I/5074/2024 dated: 18/04/2024 and 06.08.2024
2. E mail dated 20.07.2024 from the Head, Dept. of Food Technology, WMO IG Arts & Science College, Koolivayal,Wayanad
 3. E-mail dated 23.07.2024 from the Dean, Faculty of Science
 4. E mail dated 28.07.2024 from the Head, Dept. of Food Technology, WMO IG Arts & Science College, Koolivayal,Wayanad
 5. E mail dated 24.08.2024 from the Dean, Faculty of Science
 6. The Orders of Vice Chancellor dated 05.10.2024
 7. Minutes of the meeting of the Standing Committee of the Academic Council held on 07/10/2024.
 8. The Orders of Vice Chancellor dated 19.10.2024
 9. E Mail dated 07.11.2024 from the Head, Dept. of Food Technology, W M O Imam Gazzali Arts & Science College,Koolivayal,Wayanad
 10. Minutes of the meeting of the Standing Committee of the academic council held on 13.11.2024
 11. The Orders of the Vice Chancellor dated 20.11.2024

ORDER

- 1.The Regulations of Kannur University Four Year Under Graduate Programmes (KU-FYUGP Regulations 2024) for Affiliated Colleges were implemented w.e.f. 2024 admission and certain modifications are effected thereafter vide papers read (1) above.
2. In the absence of Board of Studies for Food Technology, the Head, Dept. of Food Technology, W M O Imam Gazzali Arts & Science College,Wayanad who was entrusted to prepare the Syllabus, submitted the Draft Scheme (all Semesters) and Syllabus (I st and II nd Semester) of the B.Sc. Food Technology programme, to be implemented in affiliated colleges under Kannur University w e f 2024 admission, in tune with KUFYUGP Regulations 2024.
- 3.Subsequently, the syllabus of the B.Sc.Food Technology programme was forwarded to the Dean, Faculty of Science for verification and the Dean pointed out certain defects in the Syllabus, vide the paper read (3) above.
4. Following this, the Head, Dept of Food Technology submitted the defect-rectified syllabus of the B.Sc.Food Technology programme (vide paper read 4) and the Dean, Faculty of Science recommended to approve the same vide paper read (5).
5. Considering the matter, the Vice Chancellor ordered to place the Syllabus of the B.Sc. Food Technology Programme, before the consideration of the Standing Committee of the Academic Council.
6. The Meeting of the Standing Committee of the Academic Council, vide paper read 7 above, considered the matter and recommended to approve the Scheme and Syllabus of the B.Sc. Food Technology Programme.

7. Considering the recommendation of the Standing Committee, Vice Chancellor, in exercise of the powers of the Academic Council conferred as per the KU Act, approved the Scheme, First and Second Semester Syllabus of the B.Sc.Food Technology Programme.
8. However, on verification of the Syllabi with approved Regulation, some errors were noticed in the Mark distribution pattern and the same has been rectified.
- 9 Considering the matter, the Vice Chancellor has ordered to place the modified Scheme and I & II semester Syllabus of the B.Sc. Food Technology programme, again before the consideration of Standing Committee of the Academic Council.
10. The Standing committee of the Academic Council vide paper read 10, recommended to approve the modified Scheme and I & II Semester Syllabus of the B.Sc. Food Technology Programme.
11. The Vice Chancellor, after considering the recommendation of the Standing Committee of the Academic council, and in exercise of the powers of the Academic Council, conferred under Section 11(1) Chapter III of Kannur University Act, 1996 and all other enabling provisions read together with, **approved the Scheme (all Semesters) and the First and Second semester Syllabus of the B.Sc.Food Technology programme (FYUGP) in Affiliated colleges under Kannur University and accorded sanction to implement the same w.e.f. the 2024 admission, subject to reporting to the Academic Council.**
- 12.The Scheme & First and Second semester syllabus of the B.Sc. Food Technology programme (FYUGP) in affiliated Colleges under Kannur University, applicable w.e.f. 2024 admission are appended with this U.O. & uploaded in the University website.

Orders are issued accordingly.

Sd/-

ANIL CHANDRAN R
DEPUTY REGISTRAR (ACADEMIC)
For REGISTRAR

To: The Principals of affiliated colleges under Kannur University offering the B.Sc. Food Technology programme

- Copy To: 1. The Examination Branch (through PA to CE)
2. The Head, Dept. of Food Science, WMO Imam Gazzali Arts & Science College, Koolivayal, Wayanad
3. PS to VC/ PA to R
4. DR/AR (Academic)
5. JR (Exam)
4. The IT Cell (For uploading in the website)
5. SF/DF/FC



Forwarded / By Order


SECTION OFFICER



KANNUR UNIVERSITY



FYUGP FOOD TECHNOLOGY SYLLABUS (w.e.f. 2024 Admission)

KANNUR UNIVERSITY

VISION AND MISSION

Vision

To establish a teaching, residential and affiliating University and to provide equitable and just access to quality higher education involving the generation, dissemination and a critical application of knowledge with special focus on the development of higher education in Kasargod and Kannur Revenue Districts and the Manandavady Taluk of Wayanad Revenue District.

Mission

- To produce and disseminate new knowledge and to find novel avenues for application of such knowledge.
- To adopt critical pedagogic practices which uphold scientific temper, the uncompromised spirit of enquiry and the right to dissent.
- To uphold democratic, multicultural, secular, environmental and gender sensitive values as the foundational principles of higher education and to cater to the modern notions of equity, social justice and merit in all educational endeavours.
- To affiliate colleges and other institutions of higher learning and to monitor academic, ethical, administrative and infrastructural standards in such institutions.
- To build stronger community networks based on the values and principles of higher education and to ensure the region's intellectual integration with national vision and international standards.
- To associate with the local self-governing bodies and other statutory as well as non- governmental organizations for continuing education and also for building public awareness on important social, cultural and other policy issues.

About the program

A four-year degree in Food Technology offers students a comprehensive understanding of the scientific principles and technological innovations crucial to the food industry. This program integrates disciplines such as food science, microbiology, chemistry, engineering, and nutrition to equip students with the skills necessary for the processing, preservation,

and distribution of food products. Throughout the curriculum, students delve into topics like food chemistry, food microbiology, food engineering, and food safety regulations. Practical training in laboratories and industry settings enhances their ability to apply theoretical knowledge to real-world challenges. Graduates of a four-year Food Technology degree are prepared for careers as food technologists, quality assurance managers, research scientists, and product developers in various sectors of the food industry, contributing to the advancement of food safety, quality, and innovation globally.

Graduates of Food Technology can pursue various career paths in the food industry, including roles such as food technologist, quality assurance manager, product development scientist, food safety specialist, research associate, and regulatory affairs officer. They may work in food manufacturing companies, research institutions, government agencies, or food consulting firms.

A four-year Bachelor of Science (Honors) in Food Technology program is designed to provide students with an in-depth understanding of the scientific principles, technological advancements, and regulatory frameworks crucial to the food industry. This specialized degree integrates disciplines such as food science, microbiology, chemistry, engineering, and nutrition, equipping students with comprehensive knowledge and practical skills needed for various roles within the field.

Graduate Attributes

Kannur University is fundamentally dedicated to nurturing well-rounded individuals with a comprehensive set of graduate attributes. Graduates from Kannur University emerge equipped with a multidisciplinary approach, allowing them to integrate knowledge across various domains for a holistic understanding of complex issues. With a strong emphasis on critical thinking and effective problem-solving skills, Kannur University's graduates demonstrate intellectual curiosity and the ability to tackle challenges creatively. Proficient in communication and social interaction, they engage adeptly in diverse settings, fostering Kannur University FYUGP – Regulations and Curriculum Framework - 2024 collaboration and effective interpersonal connections. Moreover, the graduates embody effective citizenship and leadership, showcasing a sense of responsibility, community engagement, and leadership qualities. With a global perspective, ethical grounding, and a commitment to environmental sustainability, our students are well-prepared for active participation in an

interconnected world. Embracing self-directed and lifelong learning, they continually adapt to evolving challenges, embodying the university's commitment to producing resilient, knowledgeable, and socially responsible individuals.

Program Outcomes (POs):

Program Outcomes (POs) serve as a foundational framework defining the skills, knowledge, and attributes that students at Kannur University are expected to acquire upon completion of a specific academic program. Tailored to the unique goals of each program, POs articulate the overarching learning objectives that guide curriculum design and assessment. These outcomes encompass a diverse range of competencies, including critical thinking, problem-solving, effective communication, and discipline-specific expertise. POs play a crucial role in shaping educational experiences, ensuring alignment with academic standards and industry expectations. By articulating clear and measurable expectations, POs contribute to the continuous improvement of academic programs and provide a roadmap for students to develop into well-rounded, competent professionals within their chosen fields.

PO1: Critical Thinking and Problem-Solving-Apply critical thinking skills to analyse information and develop effective problem-solving strategies for tackling complex challenges.

PO2: Effective Communication and Social Interaction-Proficiently express ideas and engage in collaborative practices, fostering effective interpersonal connections.

PO3: Holistic Understanding-Demonstrate a multidisciplinary approach by integrating knowledge across various domains for a comprehensive understanding of complex issues.

PO4: Citizenship and Leadership-Exhibit a sense of responsibility, actively contribute to the community, and showcase leadership qualities to shape a just and inclusive society.

PO5: Global Perspective-Develop a broad awareness of global issues and an understanding of diverse perspectives, preparing for active participation in a globalized world.

PO6: Ethics, Integrity and Environmental Sustainability-Uphold high ethical standards in academic and professional endeavours', demonstrating integrity and ethical decision- making. Also acquire an understanding of environmental issues and sustainable practices, promoting responsibility towards ecological well-being.

PO7: Lifelong Learning and Adaptability-Cultivate a commitment to continuous self-directed learning, adapting to evolving challenges, and acquiring knowledge throughout life.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1. To provide adequate knowledge and skills necessary for all levels of positions in the various sectors of the food industry across the world

PSO2. To provide required operational and managerial skills in Food Production, Distribution and Marketing.

PSO3. To develop the required skills in Accounts, Management, Entrepreneurship, Research Methodology

PSO4. The ability to apply and evaluate standard practices, Laws and regulation in food production

PSO5. To enhance the communication skills for a better career in the Food Industry.

PSO6. Develop the experimental and analytical skills in BSc Food Technology that can be of useful applications in allied areas of knowledge.

PSO7. To provide the basic knowledge in food safety, food science and nutrition

PSO8. Develop understanding of the fundamental concepts of BSc Food Technology needed for a deeper study of related fields of knowledge viz. Food Chemistry, Food Microbiology and Food Engineering etc

PSO9. Develop the skills to analyse preservation, processing, packaging and storage of foods

List of Courses (Category-wise)
Discipline Specific Core (DSC) courses (Major):

Sl. No	Semester	Course Code	Course Title	Credit				Hours/week				Marks		
				L*	T*	P*	Total	L	T	P	Total	CE	ESE	Total
1	I	KU1DSCFTY101	FUNDAMENTALS OF FOOD TECHNOLOGY	3	0	1	4	3	0	2	5	35	65	100
2	II	KU2DSCFTY104	FOOD PROCESSING AND PRESERVATION	3	0	1	4	3	0	2	5	35	65	100
3	III	KU3DSCFTY201	FOOD MICROBIOLOGY I	3	0	1	4	3	0	2	5	35	65	100
4		KU3DSCFTY202	FOOD CHEMISTRY	3	0	1	4	3	0	2	5	35	65	100
5	IV	KU4DSCFTY205	FOOD ANALYSIS I	3	0	1	4	3	0	2	5	35	65	100
6		KU4DSCFTY206	NUTRITION SCIENCE	4	0	0	4	4	0	0	4	30	70	100
7.		KU4DSCFTY207	TECHNOLOGY OF CEREALS, PULSES AND OILSEED	3	0	1	4	3	0	2	5	35	65	100
8	V	KU5DSCFTY301	TECHNOLOGY OF SPICES AND PLANTATION CROPS	3	0	1	4	3	0	2	5	35	65	100
9		KU5DSCFTY302	TECHNOLOGY OF FRUITS AND VEGETABLES	3	0	1	4	3	0	2	5	35	65	100
10		KU5DSCFTY303	ENTERPRENEURSHIP DEVELOPMENT	4	0	0	4	4	0	0	4	30	70	100
11	VI	KU6DSCFTY304	DAIRY TECHNOLOGY	3	0	1	4	3	0	2	5	35	65	100
12		KU6DSCFTY305	TECHNOLOGY OF ANIMAL FOOD	3	0	1	4	3	0	2	5	35	65	100
13		KU6DSCFTY306	BASICS OF FOOD ENGINEERING	4	0	0	4	4	0	0	4	30	70	100
14	VII	KU7DSCFTY401	FOOD MICROBIOLOGY II	3	0	1	4	3	0	2	5	35	65	100
15		KU7DSCFTY402	FOOD SAFETY AND FOOD LAWS	4	0	0	4	4	0	0	4	30	70	100
16		KU7DSCFTY403	FOOD PACKAGING TECHNOLOGY	3	0	1	4	3	0	2	5	35	65	100
17		KU7DSCFTY404	FOOD BIOCHEMISTRY	3	0	1	4	3	0	2	5	35	65	100
18		KU7DSCFTY405	FOOD INDUSTRY MANAGEMENT	4	0	0	4	4	0	0	4	30	70	100

19	VIII	KU8DSCFTY406	FOOD ANALYSIS II	3	0	1	4	3	0	2	5	35	65	100
20		KU8DSCFTY407	FOOD STORAGE AND INFESTATION CONTROL	4	0	0	4	4	0	0	4	30	70	100
21		KU8DSCFTY408	FOOD PROCESS ENGINEERING	3	0	1	4	3	0	2	5	35	65	100

Disciple Specific Core (DSC) courses (Minor):

Sl. No	Semester	Course Code	Course Title	Credit				Hours/week				Marks		
				L*	T*	P*	Total	L	T	P	Total	CE	ESE	Total
1	I	KU1DSCFTY102	PERSPECTIVES OF FOOD SCIENCE AND TECHNOLOGY	3	0	1	4	3	0	2	5	35	65	100
2		KU1DSCFTY103	FOOD MICROBIOLOGY	3	0	1	4	3	0	2	5	35	65	100
3	II	KU2DSCFTY105	FOOD SCIENCE AND NUTRITION	4	0	0	4	4	0	0	4	30	70	100
4		KU2DSCFTY106	FOOD PRESERVATION	3	0	1	4	3	0	2	5	35	65	100
5	III	KU3DSCFTY203	FOOD SAFETY AND HYGIENE	4	0	0	4	4	0	0	4	30	70	100
6		KU3DSCFTY204	CHEMISTRY OF FOODS	3	0	1	4	3	0	2	5	35	65	100

Disciple Specific Elective (DSE) courses:

Sl. No	Semester	Course Code	Course Title	Credit				Hours/week				Marks		
				L*	T*	P*	Total	L	T	P	Total	CE	ESE	Total
1	V	KU5DSEFTY301	FOOD SAMPLING AND INSPECTION	4	0	0	4	4	0	0	4	30	70	100
2		KU5DSEFTY302	FOOD PLANT OPERATIONS	4	0	0	4	4	0	0	4	30	70	100
3		KU5DSEFTY303	FOOD SAFETY SATANDARDS AND CERTIFICATION	4	0	0	4	4	0	0	4	30	70	100
ANY TWO ELECTIVES SHOULD BE STUDIED IN V SEM														
5	VI	KU6DSEFTY304	FOOD COST ACCOUNTING	4	0	0	4	4	0	0	4	30	70	100
6		KU6DSEFTY305	SENSORY EVALUATION	3	0	1	4	3	0	2	5	35	65	100
7		KU6DSEFTY306	FOOD PRODUCT DEVELOPMENT	3	0	1	4	3	0	2	5	35	65	100

8		KU6DSEFTY307	NUTRACEUTICALS, FOOD ALLERGIES, INTOLERANCES AND CONSUMER SCIENCE	4	0	0	4	4	0	0	4	30	70	100
ANY TWO ELECTIVES SHOULD BE STUDIED IN VI SEM														
9	VIII	KU8DSEFTY401	TECHNOLOGY OF BAKERY AND CONFECTIONARY	3	0	1	4	3	0	2	5	35	65	100
10		KU8DSEFTY402	DIETITICS AND HEALTH	4	0	0	4	4	0	0	4	30	70	100
11		KU8DSEFTY403	TECHNOLOGY OF BEVERAGES	3	0	1	4	3	0	2	5	35	65	100
12		KU8DSEFTY404	FOOD MARKETING	4	0	0	4	4	0	0	4	30	70	100
13		KU8DSEFTY405	FOOD INDUSTRIAL WASTE MANAGEMENT	4	0	0	4	4	0	0	4	30	70	100
ANY THREE ELECTIVES CAN BE STUDIED IN VIII SEM OR ANY THREE MOOC COURSES														

GENERAL FOUNDATION COURSES (MDC, VAC, SEC)

Multi-Disciplinary Courses (MDC):

Sl. No	Semester	Course Code	Course Title	Credit				Hours/week				Marks		
				L*	T*	P*	Total	L	T	P	Total	CE	ESE	Total
1	I	KU1MDCFTY101	FOOD PROCESSING TECHNOLOGY	2	0	1	3	2	0	2	4	25	50	75
2	II	KU2MDCFTY102	FOOD CONSERVATION	2	0	1	3	2	0	2	4	25	50	75
3	III	KU3MDCFTY103	DAIRY SCIENCE	2	0	1	3	2	0	2	4	25	50	75

Value Added Courses (VAC):

Sl. No	Semester	Course Code	Course Title	Credit				Hours/week				Marks		
				L*	T*	P*	Total	L	T	P	Total	CE	ESE	Total
1	III	KU3VACFTY100	FOOD MARKETING	3	0	0	3	3	0	0	3	25	50	75
2	IV	KU4VACFTY101	MANAGEMENT CONCEPT AND PRINCIPLES	3	0	0	3	3	0	0	3	25	50	75
3		KU4VACFTY102	FOOD TOURISM	3	0	0	3	3	0	0	3	25	50	75

Skill Enhancement Courses (SEC):

Sl. No	Semester	Course Code	Course Title	Credit				Hours/week				Marks		
				L*	T*	P*	Total	L	T	P	Total	CE	ESE	Total
1	IV	KU4SECFTY100	NEW PRODUCT DEVELOPMENT	2	0	1	3	2	0	2	4	25	50	75
2	V	KU5SECFTY101	BAKERY AND CONFECTIONARY TECHNOLOGY	2	0	1	3	2	0	2	4	25	50	75
3	VI	KU6SECFTY102	FOOD INFORMATICS	2	0	1	3	3	0	0	3	25	50	75

Internship & Dissertation:

Sl. No	Semester	Course Code	Course Title	Credit				Hours/week				Marks		
				L*	T*	P*	Total	L	T	P	Total	CE	ESE	Total
1.	IV/ V	KU4INTFTY201	INTERNSHIP	0	0	2	2	0	0	4	4	15	35	50
2.	VIII	KU8RPHFTY301	RESEARCH PROJECT	0	0	12	12	0	0	24	24	30	70	100

*L-Lecture, T-Tutorial, P-Practical

EVALUATION SCHEME

1. The evaluation scheme for each course contains two parts: internal evaluation (about 30%) and external evaluation (about 70%). Each of the Major and Minor courses is of 4-credits. It is evaluated for 100 marks, out of which 30 marks is from internal evaluation and 70 marks, from external evaluation, but DSC course with practical is evaluated for 100 marks, out of which 35 marks is from internal evaluation and 65 marks, from external evaluation Each of the General Foundation course is of 3-credits. It is evaluated for 75 marks, out of which 25 marks is from internal evaluation and 50 marks, from external evaluation.
2. The 4-credit Discipline Specific Courses are of two types: (i) courses with only theory and (ii) courses with 3-credit theory and 1-credit practical.
 - a. In 4-credit courses with only theory component, out of the total 5 modules of the syllabus, one open-ended module with 20% content is designed by the faculty member teaching that course, and it is internally evaluated for 10 marks. The internal evaluation of the remaining 4 theory modules is for 20 marks.
 - b. In 4-credit courses with 3-credit theory and 1-credit practical components, out of the total 5 modules of the syllabus, 3 modules are for theory and the fourth module is for practical and, one open-ended module with 20% content, is designed by the faculty member teaching that course. The theory component is evaluated for 50 marks externally and 15 marks internally and the teacher specific module is evaluated for 10 marks internally. The practical component is evaluated for 15 marks externally and 10 marks internally.
3. All the 3-credit courses (General Foundational Courses) are of two types: (i) courses with only theory and (ii) courses with 2-credit theory and 1-credit practical.
 - a. In 3-credit courses with only theory component, out of the total 5 modules of the syllabus, one open-ended module with 20% content is designed by the faculty member teaching that course, and it is internally evaluated for 10 marks. The evaluation of the remaining 4 theory modules is for 50 marks externally and 15 marks internally.
 - b. In 3-credit courses with 2-credit theory and 1-credit practical components, out of the total 5 modules of the syllabus, 3 modules are for theory and the fourth module is for practical. The theory component is evaluated for 35 marks externally and 7 marks internally and the teacher specific module is evaluated for 8 marks internally. The practical (fourth module) is evaluated in 15 marks externally and 10 marks internally.

Sl. No	Nature of the Course		Internal Evaluation in Marks (about 30% of the total)		External Exam			Total Marks
			Open-ended module	On the other 4 modules	4 modules	3 modules + 1 practical		
						Theory	Practical	
1	4-credit course	only theory (5 modules)	10	20	70	-	-	100
2		Theory (4 modules + 1 Practical)	10	15T + 10P	-	50	15	100
3	3-credit course	only theory (5 modules)	10	15	50	-	-	75
4		Theory (4 modules) + Practical	8	7T+ 10P	-	35	15	75

EXTERNAL EVALUATION OF THEORY COMPONENT

External evaluation carries 70% marks. Examinations will be conducted at the end of each semester. Individual questions are evaluated in marks and the total marks are converted into grades by the University based on 10-point grading system.

PATTERN OF QUESTION PAPER FOR DISCIPLINE SPECIFIC COURSES (ONLY THEORY)

Duration	Type	Total No. of Questions	No. of Questions to be Answered	Marks for Each Question	Ceiling of Marks
2 Hours	Short Answer	8	6	3	18
	Paragraph/ Problem	6	4	6	24
	Essay	3	2	14	28
Total Marks					70

QUESTION PATTERN OF PRACTICAL EXAM FOR DISCIPLINE SPECIFIC COURSES

RECORD	PROCEDURE	WORK DONE	VIVA	Total
2	2	8	3	15

PATTERN OF QUESTION PAPER FOR DISCIPLINE SPECIFIC COURSES (THEORY & PRACTICAL)

Duration	Type	Total No. of Questions	No. of Questions to be Answered	Marks for Each Question	Ceiling of Marks
1.5 Hours	Short Answer	8	6	2	12
	Paragraph/ Problem	6	4	6	24
	Essay	2	1	14	14
Total Marks					50

PATTERN OF QUESTION PAPER FOR FOUNDATION COURSES (MDC, VAC & SEC) (ONLY THEORY)

Duration	Type	Total No. of Questions	No. of Questions to be Answered	Marks for Each Question	Ceiling of Marks
2 Hours	Short Answer	8	6	2	12
	Paragraph/ Problem	6	4	6	24
	Essay	2	1	14	14
Total Marks					50

PATTERN OF QUESTION PAPER FOR FOUNDATION COURSES (MDC, VAC & SEC) (THEORY & PRACTICAL)

Duration	Type	Total No. of Questions	No. of Questions to be Answered	Marks for Each Question	Ceiling of Marks
2 Hours	Short Answer	4	3	3	9
	Paragraph/ Problem	3	2	6	12
	Essay	2	1	14	14
Total Marks					35

QUESTION PATTERN OF PRACTICAL EXAM FOR FOUNDATION COURSES (MDC, VAC & SEC)

RECORD	PROCEDURE	WORK DONE	VIVA	Total
2	2	8	3	15

Semester I

KU1DSCFTY101: FUNDAMENTALS OF FOOD TECHNOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	DSC A1	100-199	KU1DSCFTY101	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:

Food technology encompass fundamental concepts essential for understanding the production, processing, and preservation of food. It includes knowledge of food chemistry, which explores the composition and reactions of food components like proteins, carbohydrates, lipids, vitamins, and minerals. It aims to foster a comprehensive understanding of food, nutrition, composition of different food, food and future, research institutions and journals.

Course Prerequisite: Basic knowledge in nutrients gained during a +2 level.

COURSE OUTCOMES:

	Expected Outcome	Learning Domains
CO1	Know the relationship between food, nutrition and functional foods.	U
CO2	To Remember the basic Food groups like cereals, pulses, oilseeds, fruits vegetables, spices, meat, fish, poultry, sea food, milk and dairy products.	R
CO3	Apply the scientific method of enquiry as it relates to the measurement of sensory, chemical and physical properties of foods	Ap
CO4	To develop an insight among the students about the existing modern techniques and their applications in food processing preservation.	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	PSO 8
CO 1				✓	✓			✓
CO 2							✓	✓
CO 3				✓				
CO 4							✓	

COURSE CONTENTS

Contents for Classroom Transaction:

Module	Description	Teaching Hours
INTRODUCTION TO FOOD NUTRITION		
1	<p>FOOD SCIENCE AND FSSAI</p> <p>a) Definition and Possibility of Food science and technology, Functions of food, Food Groups.</p> <p>b) FSSAI</p> <p>FOOD AND NUTRITION</p> <p>a) Food as a source of nutrition</p> <p>NUTRIENTS</p> <p>a) Water, Carbohydrates, Proteins, Lipids,</p> <p>b) Vitamins and minerals</p> <p>c) Food is more than nutrients</p> <p>FOOD PRESERVATION</p> <p>1. a) Principles</p>	15
COMPOSITION AND NUTRITIVE VALUE		
2	<ol style="list-style-type: none"> 1. Wheat and Rice – Structure 2. Pulses and legumes 3. Nuts and Oilseeds 4. Milk 5. Egg – Structure 6. Flesh foods (Meat, Poultry and Fish) 7. Fruits and Vegetables – Classification 8. Spices and Plantation products – Classification 9. Phytonutrients 	15
FOOD AND THE FUTURE		

3	<ol style="list-style-type: none"> 1. GM foods, Organic Food 2. Functional food – Nutraceuticals, Probiotics and Prebiotics 3. NPD (New Product Development) 4. Major Sectors of Food Processing Industry, National and International Research Institutes – CFTRI, DFRL, NIFTEM, CIFT, NDRI 	10
PRACTICAL IN FOOD TECHNOLOGY		
4	<ol style="list-style-type: none"> 1. Standardisation of NaOH 2. Standardisation of HCl 3. Qualitative test for carbohydrates – Molisch’s test, Benedict’s test, Iodine test, Anthrone test, Selivanoff’s test. 4. Specific reactions of reducing sugars. Benedict’s test, Fehling’s test, picric acid test, ferricyanide test. Seliwanoff’s test and osazone reaction of sugars. 5. Qualitative Test of Proteins (Biuret test, Lowry’s test, xanthoproteic test, Millon’s test) 6. Sensory evaluation 7. Industrial visit 	30
5	Teacher Specific Module	5
	<i>Directions: Sensory evaluation of food</i>	

Essential Readings

1. Potter N, Hotchkiss JH. Food Science. CBS publishers and distributors
2. S. Manany, N S. Swamy Food Facts and Principles. New Age International Publishers
3. Murano, Peter S. Understanding Food Science and Technology. Thomson
4. Sumati R Mudambi, Rajagopal M V. Fundamentals of Food and Nutrition. New Age International Publishers
5. Shubhangini A Joshi. Nutrition and Dietetics. Tata McGraw Hill Education Private Limited
6. Vijaya Khader. Text Book of Food Science and Technology. ICAR

Suggested Readings:

1. Food Science by N Potter
2. Food Science by b. Srilakshmi

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)	Viva-Voce	5
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

KU1DSCFTY102: PERSPECTIVES OF FOOD SCIENCE AND TECHNOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	DSC B1	100-199	KU1DSCFTY102	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:

This course aims to introduce students to the interdisciplinary field that combines elements of food science, technology, nutrition, and research. Its goal is to develop a thorough understanding of food and nutrition, including the composition of various food types, emerging trends in food technology, and the role of research institutions and journals in advancing the field. This course seeks to provide a foundational knowledge base that integrates scientific principles with practical applications in the food industry.

Course Prerequisite: Basic knowledge in Food and Nutrients gained during a +2 level.

COURSE OUTCOMES:

	Expected Outcome	Learning Domains
CO1	Know the relationship between food, nutrition and functional foods.	U
CO2	To Remember the basic Food groups like cereals, pulses, oilseeds, fruits vegetables, spices, meat, fish, poultry, sea food, milk and dairy products.	R
CO3	Apply the scientific method of enquiry as it relates to the measurement of sensory, chemical and physical properties of foods	Ap
CO4	To develop an insight among the students about the existing modern techniques and their applications in food processing preservation.	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	PSO8

CO 1				✓	✓			✓
CO 2							✓	✓
CO 3				✓				
CO 4							✓	

COURSE CONTENTS

Contents for Classroom Transaction:

Module	Description	Teaching Hours
FOOD NUTRIENTS		
1	FOOD AND NUTRITION a) Food as a source of nutrition NUTRIENTS a) Water, Carbohydrates, Proteins, Lipids, b) Vitamins and minerals c) Food is more than nutrients	10
FOOD GROUPS		
2	1. Cereals - Structure, composition and nutritive value of wheat and rice, rice and wheat products 2. Pulses and legumes - Composition and nutritive value, Toxic constituents present in pulses 3. Nuts and oilseeds - composition and nutritive value, Toxins, Role of nuts and oilseeds-in cookery 4. Fruits and vegetables - Classification, Composition and nutritive value 5. Spices and Plantation products - Classification, Composition and nutritive value 6. Milk - Composition and nutritive value, Role of milk and milk products in cookery, Milk substitutes 7. Eggs - Structure, Composition and nutritive value, Quality of egg, role of egg in cookery 8. Flesh Foods (meat, poultry, fish)- Composition and	20

	nutritive value, Classification	
FOOD AND FUTURE		
3	1. GM foods, 2. Organic Food 3. Functional food – Nutraceuticals, Probiotics and Prebiotics 4. NPD (New Product Development)	10
Practical in Food science		
4	1. Qualitative test for carbohydrates – Molisch ‘s test, Benedict ‘s test, Iodine test, Anthrone test, Selivanoff ‘s test. 2. Qualitative Test of Proteins (Biuret test, Lowry’s test, xanthoproteic test, Millon’s test) 3. Specific reactions of reducing sugars. Benedict’s test, Fehling’s test, picric acid test, ferricyanide test. Seliwanoff’s test and osazone reaction of sugars.	30
5	Teacher Specific Module	5
	<i>Directions: Sensory evaluation of food</i>	

Essential Readings

1. Potter N, Hotchkiss JH. Food Science. CBS publishers and distributors
2. S. Manany, N S. Swamy Food Facts and Principles. New Age International Publishers
3. Murano, Peter S. Understanding Food Science and Technology. Thomson
4. Sumati R Mudambi, Rajagopal M V. Fundamentals of Food and Nutrition. New Age International Publishers
5. Shubhangini A Joshi. Nutrition and Dietetics. Tata McGraw Hill Education Private Limited
6. Vijaya Khader. Text Book of Food Science and Technology. ICAR

Suggested Readings:

1. Potter N, Hotchkiss JH. Food Science. CBS publishers and distributors
2. B Srilakshmi Food Science New Age International Publishers

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

KU1DSCFTY103: FOOD MICROBIOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	DSC C1	100-199	KU1DSCFTY103	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 Microbiology course provides an in-depth exploration of microorganisms relevant to food safety, quality, and preservation. Students will study the characteristics, growth, and behaviour of bacteria, yeasts, molds, and viruses in food systems. Emphasis is placed on understanding their roles in food spoilage, foodborne illnesses, and methods for microbial control. The course covers principles of food preservation techniques such as heating, cooling, fermentation, and chemical preservation. Additionally, students will learn about microbial risk assessment, food safety regulations, and emerging trends in food microbiology research. Practical aspects include laboratory sessions to cultivate skills in microbial identification, testing, and quality assurance in food production. This course equips students with essential knowledge and skills to ensure the safety and quality of food products in the food industry.

Course Prerequisite: Basic knowledge in Biology gained during a +2 level

COURSE OUTCOMES

	Expected Outcome	Learning Domains
CO1	Understand about microorganisms associated with food	U
CO2	Understand Fermentation and fermented food products	U
CO3	Understand control of microorganisms by using various methods	Ap
CO4	Understand spoilage of different foods by microorganisms	U

**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	PSO 8
CO 1				✓	✓			
CO 2							✓	
CO 3						✓		
CO 4	✓							

COURSE CONTENTS

Contents for Classroom Transaction:

Module	Description	Teaching Hours
INTRODUCTION TO FOOD MICROBIOLOGY		
1	<ol style="list-style-type: none"> 1. Introduction to food microbiology <ol style="list-style-type: none"> a) Definition b) Scope of food microbiology 2. History of Microbiology <ol style="list-style-type: none"> a) Biogenesis versus abiogenesis 3. Antonie van Leeuwenhoek 4. Louis Pasteur <ol style="list-style-type: none"> a) Contributions of Louis Pasteur b) Swan neck experiment 5. Robert Koch <ol style="list-style-type: none"> a) Contributions of Robert Koch b) Koch's Postulates 6. Sources of contamination of food- animals, plants, soil, air, sewage, contamination during handling and processing. 7. Perishable, semi perishable and non- perishable foods 8. Factors influencing microbial growth – Extrinsic and Intrinsic factors 	10
MICROSCOPY, STAINING & CULTURE TECHNIQUES		
2	<ol style="list-style-type: none"> 1. MICROSCOPY – Bright field, Dark field, Phase contrast, Fluorescent, Scanning and Transmission electron microscopy (principle, methodology, specimen preparation and Use) and atomic force microscopy. 2. STAINING - types of stains used for bacteria with examples <ol style="list-style-type: none"> a) Staining techniques - Simple, Negative b) Differential Staining (Gram & Ziehl Nielsen), c) Special Staining (Capsule, flagella & endospore) d) Fungal staining 3. CULTURE TECHNIQUES <ol style="list-style-type: none"> a) Bacteriological Media – classification- solid, liquid, semi-solid 	10

	Media b) Selective, Differential, Enrichment Media c) Methods of isolating pure culture: Serial dilution, Pour plate, streak plate, stroke Culture.	
FOOD BORNE DISEASES		
3	Food Borne Diseases: Definition, Classification (Food borne intoxications, Food borne infections & Toxi - infection), 1. Staphylococcal intoxication, 2. Botulism, 3. Neurolathyrism, 4. Aflatoxins, 5. Egotism, 6. Epidemic dropsy, 7. Typhoid fever, 8. Salmonellosis, 9. Bacillus cereus food poisoning, 10. E. coli diarrhea, 11. Cholera, 12. Shigellosis, 13. Brucellosis.	20
PRACTICAL FOR FOOD MICROBIOLOGY		
4	1. Staining techniques – simple staining, gram staining 2. Isolation of pure culture: Pour plate, Streak plate 3. Microbial analysis of Milk- MBRT	30
5	Teacher Specific Module <i>Directions: Sources of contamination in food</i>	5

Essential Readings:

1. Banwart GJ ,1989. Basic Food Microbiology. AVI publishers
2. JayJM, Loessner MJ & Golden D A 2005. Modern Food Microbiology. Springer Verlag
3. Anantha Narayanan R Jayaram Panikkar CK 2009 Text book of microbiology. University Press VT Ltd, Hyderabad
4. Prescott, L.M, Harley, J.P and Klein, D.A Microbiology. McGraw Hill New York
5. Frazier J& Westhoff DC. 1988. Food Microbiology. McGraw Hill, New York.
6. Pelczar JM & Reid RD. Microbiology. Tata McGraw Hill
7. Black, JG. Microbiology. Principles and Explorations John Will

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)	Viva-Voce	5
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

KU1MDCFTY101: FOOD PROCESSING TECHNOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	MDC	100	KU1MDCFTY101	2+1	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical	Tutorial	CE	ESE	Total	
2	2	0	15L+10P	35L+15P	75	1.5

COURSE DESCRIPTION

The Food Processing Technology course delves into the principles, methods, and applications of transforming raw ingredients into safe, nutritious, and marketable food products. It covers various processing techniques such as thermal processing (including pasteurization and sterilization), chilling, freezing, drying, and fermentation. Students will learn about the importance of food processing in enhancing shelf life, improving safety, and maintaining nutritional quality. The course also addresses the role of food additives, packaging, and preservation methods in food processing.

Course Prerequisite: Basic knowledge in science gained during a +2 level.

COURSE OUTCOMES:

	Expected Outcome	Learning Domains
CO1	Learn about food processing	U
CO2	Commercial methods of food processing	A
CO3	An idea about sensory attributes in food	U
CO4	Practical knowledge in sensory evaluation of food	An

**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	PSO 8
CO 1				✓				
CO 2			✓					

CO 3						✓		
CO 4		✓						

COURSE CONTENTS

Contents for Classroom Transaction:

Module	Description	Teaching Hours
INTRODUCTION TO FOOD PROCESSING		
1	<ol style="list-style-type: none"> 1. Definition and history of food processing. 2. Importance, advantages of Food processing and nutritional losses in food processing. 3. Primary processing, secondary processing and tertiary processing, 4. Advantages and disadvantages. 5. Objectives and method of conventional cooking methods. 	10
COMMERCIAL METHODS OF PROCESSING		
2	<ol style="list-style-type: none"> 1. High temperature method- Blanching, pasteurisation and sterilisation. 2. Low temperature method- freezing 3. Drying, 4. Canning, 5. Fermentation, 6. Irradiation. 	10
SUBJECTIVE ANALYSIS		
3	<ol style="list-style-type: none"> 1. Sensory attributes, 2. Sensory evaluation and types, 3. Factors influencing and application of sensory evaluation. 4. Sensory panel, recruitment and selection criteria. 	5
PRACTICAL FOR FOOD PROCESSING		
4	<ol style="list-style-type: none"> 1. Difference test, 2. paired comparison test, 3. duo trio test, triangle test 4. Rating test, 5. Ranking test 6. Numerical scoring test, 7. Composite scoring test. 	30

5	Teacher Specific Module	5
	<i>Directions: Noval Methods in food processing</i>	

Essential Readings

- 1 Food Science, Norman N Potter and Joseph H Hotchkiss, (1986),4th edition, CBS publishers
2. Food Processing technology, P, J Fellows (2009) 3rd edition Wood head publishers.
3. Khetarpaul, N. (2005). Food processing and preservation. Daya Books
- 4.Srilakshmi, B, food science, new age International (P) limited, New Delhi,2005
- 5 Manay, S, Sadaksharaswamy.M, Food facts and principles, new age international (P) Limited, New Delhi, 2008

Assessment Rubrics:

Theory

Evaluation Type		Marks
End Semester Evaluation L		35
Continuous Evaluation L		15
a)	Test Paper- 1	5
b)	Test Paper-2	5
c)	Assignment	2
d)	Seminar	5
e)	Viva-Voce	2
Total L		50

Any components from the above table can be taken for CE not exceeding 7 Marks.
Teacher specific module is evaluated for 8 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

Semester II

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	PSO 8
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> <p>a) Importance of food preservation</p> <p>b) Aims, principles and methods of food preservation.</p> <p>Preservation by High Temperature</p> <p>a) Principles and application</p> <p>b) Pasteurization</p> <p>c) Blanching</p> <p>d) Sterilization</p> <p>e) UHT</p> <p>f) Aseptic preservation</p> <p>g) Microwave assisted thermal sterilisation</p> <p>Preservation by Low Temperature</p> <p>a) Refrigeration</p> <p>b) Chilling injury</p> <p>Freezing</p> <p>a) Principle</p> <p>b) Freezing rate, Quick freezing, Slow freezing, IQF</p>	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

KU2DSCFTY105: FOOD SCIENCE AND NUTRITION

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
II	DSC B2	100-199	KU2DSCFTY105	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	30	70	100	2

COURSE DESCRIPTION:

A course in Food Science and Nutrition delves into the intricate relationship between food, health, and science. Students explore the fundamental components of food—carbohydrates, proteins, lipids, vitamins, and minerals—learning how these nutrients contribute to human nutrition and well-being. Through the lens of food chemistry, they study the chemical reactions that occur during food processing and cooking, as well as the role of additives in food preservation and enhancement.

Course Prerequisite: Basic knowledge in science gained during a +2 level

COURSE OUTCOMES:

	Expected Outcome	Learning Domains
CO1	Understand basic concepts of food nutrition	U
CO2	Explore the energy metabolism in food	An
CO3	Understand the concept of macronutrients in food	U
CO4	Understand the concept of micronutrients in food.	An

**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	✓							

COURSE CONTENTS

Contents for Classroom Transaction:

Module	Description	Teaching Hours
BASIC CONCEPTS OF NUTRITION		
1	Nutrition and Health a) Inter Relationship between Nutrition and Health b) Physical, Mental, Social and Mental Health c) Balanced diet, BMI, Food guide, Pyramid and RDA d) Malnourishment- definition, types etiological factors and remedial measures. e) Menu Planning, Significance of Menu Planning, Menu planning for family. Factors influencing meal planning. f) Nutrigenetics and Genomics g) HFSS foods h) DASH diet	10
ENERGY AND DISORDERS		
2	1. Energy value of foods, Calorie, Joule 2. Measurement of Calorific values of Food 3. Determination of Basal Metabolic Rate (BMR), 4. Respiratory Quotient (RQ), 5. Specific Dynamic Action (SDA) of foods, 6. Disorders- Kwashiorkor, Marasmus, Xerophthalmia, Beriberi, Pernicious anaemia, Scurvy, Rickets, Osteomalacia,	10
CARBOHYDRATES, PROTEINS AND LIPIDS		
3	a) Definition, Classification and properties b) Sources, daily requirements, functions. c) Digestion, absorption and transportation d) Physiological disruptions	10
VITAMINS AND MINERALS		
4	a) Characteristics b) Sources c) Physiological and biochemical functions d) Daily requirement e) Digestion, absorption and transportation Dietary Fibre Classification, sources, composition, properties & nutritional significance WATER Water and Its Use in the Body- Distribution, Requirements, Sources	25

5	Teacher Specific Module	5
	<i>Directions: Balanced diet formulation</i>	

Essential Readings

1. Nutrition Science, B. Sri Lakshmi, New age international publishers
2. Dietetics, B. Sri Lakshmi, New age international publishers
3. Food Facts & Principles by Shakunthala manay & Shadakhswamy.
4. Food Science by Srilakshmi, second edition,2002.
5. Food science, Chemistry and Experimental foods by M. Swaminathan.
6. Food Science by Norman.N. Potter.

Assessment Rubrics:

Theory

Evaluation Type		Marks
End Semester Evaluation		70
Continuous Evaluation		30
a)	Test Paper- 1	5
b)	Test Paper-2	5
c)	Assignment	5
d)	Seminar	10
e)	Viva-Voce	5
Total L		100

Any components from the above table can be taken for CE not exceeding 30 Marks

KU2DSCFTY106- FOOD PRESERVATION

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
II	DSC C2	100-199	KU2DSCFTY106	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	PSO 8
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	Introduction to food preservation a) Importance of food preservation b) Aims, principles and methods of food preservation. Preservation by High Temperature h) Principles and application i) Pasteurization j) Blanching k) Sterilization Preservation by Low Temperature a) Refrigeration b) Chilling injury Freezing a) Principle b) Freezing rate, Quick freezing, Slow freezing, IQF Quality of frozen foods Retrogradation	15

	Protein denaturation Freezer burn	
PRESERVATIVES AND FERMENTATION		
2	8. Natural preservatives – Class I preservatives 9. Chemical Preservatives - Sulphur dioxide, Benzoic acid, Sorbic acid, Propionic acid, Acetic acid. 10. Canning: principle, steps involved in canning, heat penetration into containers, pH classification of foods, corrosion of cans. 11. Fermentation Principles, Significance Types of fermentation- Acetic, Lactic and Alcoholic 12. Preservation by controlling water activity: High sugar products, IMF, curing and effect of salt of food preservation. 13. Dehydration a) Principles, Types of drying methods b) Natural drying c) Driers in food industry: drum, spray, fluidized bed, air drier, vacuum drier, tunnel drier. d) Freeze drying. Drying pre-treatments – blanching & sulphuring 14. Smoking Principle, Advantages and disadvantages	10
NOVEL AND NON-THERMAL PRESERVATION		
3	Novel preservation techniques <ul style="list-style-type: none"> • Hurdle technology: Principles applications and advantages. • Hydrostatic Pressure Processing: Principles applications and advantages. • Pulsed Electric Field: Principles applications and advantages. Novel Thermal Technologies <ul style="list-style-type: none"> • Ohmic Heating: Principles applications and advantages. • Infrared Heating: Principles applications and advantages. • Induction Heating: Principles applications and advantages. • Bacteriocins: Principles applications and advantages. • Microfiltration: Principles applications and advantages. • Bactofugation: Principles applications and advantages. 	15
PRACTICAL IN FOOD PRESERVATION		

4	a. Blanching of Vegetables. b. Determination of Moisture using a) Hot air oven b) Distillation method Infrared method c. Preparation of Jam d. Preparation of Jelly e. Preparation of preserve f. Determination of TSS g. Determination of Acidity & Ph h. Determination of Acidity & pH i. Determination of TSS	30
5	Teacher Specific Module	5
	<i>Direction:</i> Irradiation <ul style="list-style-type: none"> • Principles (mode of action) – Application of irradiation • Specific types of radiation treatment. • Measurement & Uses of irradiation. 	

Essential Readings

1. Subalakshmi, G and Udipi, S.A. Food processing and preservation; New Age International Publishers, New Delhi, 2001.
2. Srilakshmi, B. Food Science. New Age International Publishers, New Delhi, 2003.
3. Potter, N.N. and Hotchkiss J. H. Food Science.CBS publishers and distributors. 1996.
4. Srivastava, R.PO and Kumar, S. Fruit and vegetable preservation, International Book distribution Company, Lucknow, 1994.
5. MC.Williams, M and Paine, H. Modern Food preservation. Surjeet Publications, Delhi, 1984.
6. Cruess, W.V. Commercial Fruits and Vegetable Products, Anees Offset press, New Delhi, 1997
7. Fellows, P.J. (2009). *Food Processing Technology: Principles and Practice* (3rd Ed.). Woodhead Publishing.
8. Rahman, M.S. (2007). *Handbook of Food Preservation* (2nd Ed.). CRC Press

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)	Viva-Voce	5
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

KU2MDCFTY102- FOOD CONSERVATION

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
II	MDC 2	100-199	KU2MDCFTY102	3	45

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical	Tutorial	CE	ESE	Total	
2	2	0	15L+10P	35L+15P	75	1.5

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	PSO 8
CO 1	✓			✓				
CO 2					✓			✓
CO 3								✓
CO 4					✓			
CO 5						✓		

COURSE CONTENTS

Contents for Classroom Transaction:

Module	Description	Teaching Hours
INTRODUCTION		
1	<ol style="list-style-type: none"> 1. Introduction, Importance, Principle, and Types of Food Preservation 2. Moisture Removal Preservation Techniques <ul style="list-style-type: none"> ○ Concentration ○ Drying ○ Dehydration ○ Freeze Drying ○ Dehydro Freezing 	10
Temperature-Based Preservation Techniques		
2	<ol style="list-style-type: none"> 1. High and Low Temperature Preservation <ul style="list-style-type: none"> ○ Pasteurization ○ Sterilization ○ Canning ○ Freezing ○ Refrigeration 	10

PRESERVATIVES, AND FERMENTATION		
3	1. Preservatives <ul style="list-style-type: none"> ○ Class I and Class II ○ Its Role ○ Permitted Preservatives and Levels 2. Combination Techniques <ul style="list-style-type: none"> • Types of Fermentation • Fermented Foods • Properties of Irradiation • Microwave Heating 	10
Preservatives, and Advanced Techniques		
4	1.Preparation of: <ul style="list-style-type: none"> • Jam • Jelly • Preserves • Glazed Crystallized Fruit • Sauces • Pickles 2) Determination of Acidity & pH 3) Determination of TSS	10
5	Teacher Specific Module	5
	<i>Directions; Novel technologies in food preservation</i>	

Essential Reading

1. Subalakshmi, G and Udipi, S.A. Food processing and preservation; New Age International Publishers, New Delhi, 2001.
2. Srilakshmi, B. Food Science. New Age International Publishers, New Delhi, 2003.
3. Potter, N.N. and Hotchkiss J. H. Food Science. CBS publishers and distributors. 1996.
4. Srivastava, R.PO and Kumar, S. Fruit and vegetable preservation, International Book distribution Company, Lucknow, 1994.
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6. Cruess, W.V. Commercial Fruits and Vegetable Products, Anees Offset press, New Delhi, 1997
7. Fellows, P.J. (2009). *Food Processing Technology: Principles and Practice* (3rd Ed.). Woodhead Publishing.
8. Rahman, M.S. (2007). *Handbook of Food Preservation* (2nd Ed.). CRC Press

Assessment Rubrics:

Theory

Evaluation Type		Marks
End Semester Evaluation L		35
Continuous Evaluation L		15
a)	Test Paper- 1	5
b)	Test Paper-2	5
c)	Assignment	2
d)	Seminar	5
e)	Viva-Voce	2
Total L		50

Any components from the above table can be taken for CE not exceeding 7 Marks.
Teacher specific module is evaluated for 8 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

