



B. Sc. Food Science and Technology Multidisciplinary Minor to be offered

Course code	Course name	Total credits
U25MM011	Fundamentals of Food Technology	2
U25MM021	Fruit and Vegetable Technology	3
U25MM022	Fruit and Vegetable Technology Lab	1
U25MM031	Milk and Milk Products	3
U25MM032	Milk and Milk Products Lab	1
U25MM041	Bakery Science	3
U25MM042	Bakery Science Lab	1
U25MM051	Food Quality Evaluation	3
U25MM052	Food Quality Evaluation Lab	1
	Total	18



Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25MM011	Fundamental of Food Technology	02	-	-	02	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
		T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
U25M M011	Fundamental of Food Technology	10	--	5	15	40%	35	40%	50

Course Description: This course will focus on and explore the ideas from viewpoint of knowing and understanding the basics of food science, imparting knowledge about the fundamentals of food science, sources and basic components of food classification and their uses. It will also focus on learning the about the basic concepts of various unit operations that take place in a food industry.

Course Objectives:

1. To understand the basic principles of food.
2. To study the different constituents of food.
3. To application various units operations in food industry..

Course Outcomes: after the end of this course students will able to

CO1 Estimate² The scope and historic background of food science.

CO2 Identify² Various source of nutrients of food.



CO3 Describe³ Types of food products and their composition

CO4 Analyze² Basic concepts of unit operations.

Course Contents

Module	Unit	Description	Hours
1.0		Introduction	
1	1.1	Food Technology: Introduction and Scope of food technology, Food production and consumption patterns.	6
	1.2	Food pyramid. Major food industries and their products in India, Role of food processing in Indian economy.	
2.0		Sources and Basic constituents of food	
2	2.1	Carbohydrates – Sources, requirement, classification of carbohydrates, dietary fibers and their role in foods. Protein – Requirement and sources of proteins, deficiency diseases,	6
	2.2	amino acids, essential amino acids. Fats – Sources, saturated and unsaturated fats, good and bad fat, Omega fatty acids.	
3.0		Vitamins	
3	3.1	simple, compound and derived lipids. Vitamins – Role of vitamins in human health,	6
	3.2	Fat and water soluble vitamins, their sources and deficiency diseases.	
4.0		Fruits and Vegetable	
4	4.1	Fruits and vegetables – Different fruits and vegetables and their composition. Use of fruits and vegetables in human food. Cereals, pulses and oil seeds	6



	4.2	Composition of wheat, rice, oat, barley, corn, soy bean, mustard, sunflower, cotton seed and their use. Animal foods – Meat and meat animals, Composition of meat and egg. Benefits of meat consumption. Milk – Fluid milk, composition of milk, tones and double toned milk.	
5.0 Unit Operation an quality control			
5	5.1	Basic concepts of common unit operations in food industry – Material handling, cleaning, separating, pumping, mixing, heat exchanging, evaporation, drying, freezing, freeze drying, packaging.	6
	5.2	Thermal processing, D, Z, F and F ₀ value, quality control, introduction to HACCP and ISO 9000, Implementation of ISO	

Text Books

- 1 B.Srilakshmi.,(2018) Food Science,K,R, New age international Pvt.Ltd 7th Edition
- 2 B.Poornima.,(2012)Fundamental of Food Sciences Technology,Processing and Preservation Centrum Press.

References

- 1 Potter.,(2007) Food Science CBS Publishers & Distributors,5th Edition.
- 2 Sukumar De (194) Outlines of Dairy Technology Oxford University Press 2nd Edition.
- 3 L. H. Meyer., (2006). Food Chemistry. CBS Publishers and Distributors, New Edition.
- 4 Triveni P., (2010). Food Preservation. Aadi Publications. 1st Edition.
- 5 Dr. Mamata Arora., (2020). Practical Manual of Food Processing. Nirali Prakashan.
- 6 Shalini Sehgal., (2020). A laboratory manual of food analysis. Wiley, Dreamtech Press.



U25MM021 Fruit and Vegetable Technology

Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25MM021	Fruit and Vegetable Technology	03	-	-	03	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
		T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
U25M021	Fruit and Vegetable Technology	10	10	5	25	40%	50	40%	75

Course Description: This course will focus on and explore the ideas from viewpoint of knowing and understanding the basics of fruit and vegetable, imparting knowledge about the classification and basic components, processing of fruit and vegetable.

Course Objectives:

1. To understand the basic classification of fruits and vegetables.
2. To study the different constituents of fruits and vegetables.
3. To application of fruits and vegetables in processed foods.

Course Outcomes: after the end of this course students will able to

- CO1 Explain²Importance of fruit and vegetable.
- CO2 Apply³Different method for processing of fruit product.
- CO3 Apply³Different method for processing of vegetable product.
- CO4 Evaluate⁴Different preservation technique of fruit and vegetable.



Course Contents

Module	Unit	Description	Hours
1.0		Introduction to fruits and vegetables	
1	1.1	Scope and Importance of fruits and vegetable.	9
	1.2	, Classification and composition of fruits and vegetables.	
2.0		Post-harvest handling of fruits and vegetables	
2	2.1	Post-harvest handling, canning and bottling of fruits and vegetables	9
	2.2	Spoilage in canned foods ,Processing of fruit juices.	
3.0		Processing of fruits	
3	3.1	Processing of squashes, cordials, nectar.	9
	3.2	Processing of concentrates and powder, Jam, Jelly, Marmalade, fruit leather.	
4.0		Processing of vegetables	
4	4.1	Pickles, chutneys and sauces Processing Causes of spoilage in pickling	9
	4.2	Tomato products -Processing of tomato juice, tomato puree, paste, ketchup, sauce and soup	
5.0		Drying of fruits and vegetables	
5	5.1	Dehydration of fruits and vegetables Sun drying & mechanical dehydration	9
	5.2	Process variation for fruits and vegetables, packing and storage. Storage of Fruits and Vegetables.	

Text Books

- 1 B.Srilakshmi.,(2018) Food Science,K,R, New age internationalPvt.Ltd 7th Edition



- 2 Woodroof, Jasper, ed. Commercial fruit processing.

References

- 1 Thompson, Anthony Keith. Fruit and vegetables: harvesting, handling and storage. John Wiley & Sons, 2008.
- 2 Barta, Jozsef, M. Pilar Cano, Todd W. Gusek, Jiwan S. Sidhu, and Nirmal K. Sinha. Handbook of fruits and fruit processing. Wiley-Blackwell, 2006.

- Internal Assessment (T1, T2 and FET):

- T1 should be based on first two modules and T2 should be based on next two modules, for 10 marks each.
- Fifth module will be assessed for 5 marks separately.

- End Semester Examination:

- Question paper will comprise of 5 questions, each carrying 10 marks.
- The duration of end semester examination shall be 2 hours.
- The students need to solve all 5 questions.
- Question No.1 will be compulsory and based on entire syllabus.
- Remaining question (Q.2 to Q.5) will be selected from all the modules.



U25MM022Fruit and Vegetable Technology

Lab without POE

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25MM022	Fruit and Vegetable Technology Lab	-	02	-	-	01	-

Evaluation Scheme

Course Code	Course Name	In Semester Evaluation		End Semester Exam (OE/POE)		
U25MM022	Fruit and Vegetable Technology Lab	Term Work	Min pass %	Marks	Min pass %	Total (Marks)
		--	--	25	40	25

Course Outcomes: after the end of this course students will able to

- CO1** Explain²Importance of fruit and vegetable.
- CO2** Apply³Different method for processing of fruit product.
- CO3** Apply³Different method for processing of vegetable product.

List of Experiments

1. Preparation of squash.
2. Preparations of RTS
3. Preparation of nectar
4. Preparation of Jam
5. Preparation of Marmalade
6. Preparations of Jellies
7. Preparation of Tomato Ketchup



8. Preparations of Preserve and Candied Fruit
9. Preparation of Pickle
10. Preparation of food product by drying.

Text Books

- B.Srilakshmi.,(2018) Food Science,K,R, New age international Pvt.Ltd 7th Edition

References

- Thompson, Anthony Keith. Fruit and vegetables: harvesting, handling and storage. John Wiley & Sons, 2008.
- Barta, Jozsef, M. Pilar Cano, Todd W. Gusek, Jiwan S. Sidhu, and Nirmal K. Sinha. Handbook of fruits and fruit processing. Wiley-Blackwell, 2006.
- Evaluation Scheme
 - Term work assessment shall be based on the overall performance of the student with every assignment graded from time to time.
 - The grades will be converted to marks as per 'credit and grading system' manual and should be added and averaged.
 - Based on above scheme grading and Term work assessment should be done.OE/POE shall be based on all Term work and work carried.



U25MM031 Milk and Milk Product Technology

Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25MM031	Milk and Milk Product Technology						
		03	-	-	03	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
		T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
U25M M031	Milk and Milk Product Technology								
		10	10	5	25	40%	50	40%	75

Course Description:

This course will focus on and explore the ideas from viewpoint of knowing and understanding the basics of milk and milk product, imparting knowledge about the processing of milk, basic components of milk and milk product, spoilage, packaging of milk and milk product

Course Objectives:

1. To understand the basic of milk and milk product.
2. To study the different constituents of milk and milk product
3. To application of milk in processed foods.

Course Outcomes: after the end of this course students will able to

CO1 Explain²Scope and status of dairy industry.



- CO2** Identify² Different component of milk.
- CO3** Application³ of different methods for processing of milk.
- CO4** Evaluate² Different sanitization process.

Course Contents

Module	Unit	Description	Hours
1.0		Introduction of dairy	
1	1.1	Introduction of dairy industry in India. Scope of dairy industry and present status.	9
	1.2	Dairy layout for small scale industry and Equipments in the dairy industry.	
2.0		Dairy plant sanitization	
2	2.1	Dairy plant sanitization: Basic principles, cleaning in place, types and design of CIP System, agents and methods: bottle and can washing.	9
	2.2	Rotary type and straight through type, cleaning of tankers and silos, Energy use in Dairy plant - sources and cost of energy, control of energy losses and Energy conservation	
3.0		Composition of milk	
3	3.1	Composition of milk, Physicochemical properties of milk, Factors affecting Composition of milk.	9
	3.2	Buying, receiving, collection, Transportation of milk, storage and distribution of milk, processing of milk, filtration, clarification, cream separation and heat treatment of milk.	
4.0		Milk processing I	
4	4.1	Types of milk products. Milk product Processing: Cream, Butter, Khoa, Paneer, Ice-cream	9
	4.2	Condensed milk and Evaporated milk. Judging and grading of milk and its products	



5.0		Milk processing II	
5	5.1	Processing of Fermented products: Yoghurt, Curd, acidophilus milk, buttermilk, and Cheddar cheese, Introduction, Manufacturing process, packaging, storage	9
	5.2	Defects and their prevention Processing of cheese: Introduction, Types, processing, packaging, storage, defects and their prevention WMP and SMP.	

Text Books

- 1 De Sukumar - Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.
- 2 Robinson R. K. - Modern Dairy Technology. Elsevier Applied Science UK

References

- 1 Warner J. M. - Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.
 - 2 Yarpar W. J. and Hall C. W. - Dairy Technology and Engineering. AVI Westport.
 - 3 Rosenmal I. - Milk and Milk Products. VCH. New York
- Internal Assessment (T1, T2 and FET):
 - T1 should be based on first two modules and T2 should be based on next two modules, for 10 marks each.
 - Fifth module will be assessed for 5 marks separately.
 - End Semester Examination:
 - Question paper will comprise of 5 questions, each carrying 10 marks.
 - The duration of end semester examination shall be 2 hours.
 - The students need to solve all 5 questions.
 - Question No.1 will be compulsory and based on entire syllabus.
 - Remaining question (Q.2 to Q.5) will be selected from all the modules.

U25MM032 Milk and Milk Products



Lab without POE

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25MM032	Milk and Milk Products Lab	-	02	-	-	01	-

Evaluation Scheme

Course Code	Course Name	In Semester Evaluation		End Semester Exam (OE/POE)		
U25MM032	Milk and Milk Products Lab	Term Work	Min pass %	Marks	Min pass %	Total (Marks)
		--	--	25	40	25

Course Outcomes: after the end of this course students will able to

- CO1** Explain² Scope and status of dairy industry.
- CO2** Identify² Different component of milk.
- CO3** Application³ of different methods for processing of milk.

List of Experiments

1. Platform tests for milk. (Acidity, COB, specific gravity, SNF, Organoleptic test).
2. Estimation of milk fat.
3. Adulteration tests for different foods: Milk and milk products.
4. Preparation of Flavored milk.
5. Preparation of Curd.
6. Preparation of Shrikhand.
7. Preparation of Khoa.
8. Preparation of Paneer.
9. Preparation of whey based beverages.



Text Books

1. De Sukumar - Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.
2. Robinson R. K. - Modern Dairy Technology. Elsevier Applied Science UK

References

1. Warner J. M. - Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.
2. Yarpar W. J. and Hall C. W. - Dairy Technology and Engineering. AVI Westport.

● Evaluation Scheme

- Term work assessment shall be based on the overall performance of the student with every assignment graded from time to time.
- The grades will be converted to marks as per 'credit and grading system' manual and should be added and averaged.
- Based on above scheme grading and Term work assessment should be done. OE/POE shall be based on all Term work and work carried.