

Choice Based Credit System Syllabus
(2019 pattern)

Mapping of Program Outcomes with Course Outcomes

Class: T. Y. B. Voc.(SEM – V)

Subject: Dairy Technology

Course: Quality assurance and waste management (Th)

Course Code: BDT- 501

Objectives-

- To understand the importance of quality in food production
- To learn various methods of analysis of dairy and food products
- To learn the importance of waste management.

Unit 1- Quality: Definition and Importance, Quality control management system, Good manufacturing practices, good hygienic practice and HACCP **12 Periods**

Unit 2- Chemical and Microbiological analysis of Dairy products: Rule and regulations governing dairy industry, sampling of milk and milk products, chemical analysis of milk and milk products, microbiological analysis of milk and milk products

12 Periods

Unit 3- Sensory Evaluation: Definition, Application of sensory, Quality Parameter and sensory lab requirements, Selection and training of sensory panelists and method of sensory evaluation, judging of milk and milk products **12 Periods**

Unit 4- Packaging Materials and Other Food Ingredients-Definition, types of packaging material, Properties and basic requirement, General packaging materials – Paper, Glass, Plastic, Metal, Foil. MAP, CAP, Packaging materials and specifications, testing of packaging materials, Standards for food ingredients. **12 Periods**

Unit 5- Waste Management: Properties and requirements of processing water, water hardness, other impurities, chlorination, Properties of waste water Physical, Chemical, Biological nature of impurities, BOD, Water waste treatments, Primary and Secondary treatments.

12 Periods

References-

1. Quality Control for Food and Agriculture Products
2. Food safety and standards act- 2006 Ministry of food processing industries.
3. Sensory Evaluation Practices- Stone H, and Sidel J. (1993)
4. Modern Food packaging (1998)- Indian institute of packaging

Weightage: 1=weakorlowrelation,2=moderateorpartialrelation,3=strongordirectrelation

Course Outcomes	Programme Outcomes(POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3								
CO2	3	3							
CO3						3			
CO4	3	3		1			3		3
CO5		3	2		3				
CO6		3			2			3	
CO7						2	3		

Justification for the mapping

PO1: Disciplinary Knowledge:

CO1: Gain exposure to the quality parameters of milk and milk products.

CO2: Differentiate between quality assurance and quality control in the dairy industry.

CO4: Acquire in-depth knowledge of waste management in dairy industries.

PO2: Critical Thinking and Problem Solving:

CO2: Differentiate between quality assurance and quality control in the dairy industry.

CO4: Acquire in-depth knowledge of waste management in dairy industries.

CO5: Develop the ability to create Standard Operating Procedures (SOP) for specific dairy operations.

CO6: Recognize and understand the importance of quality in food production.

PO3: Social Competence Exhibit thoughts and ideas effectively in writing and orally:

CO5: Develop the ability to create Standard Operating Procedures (SOP) for specific dairy operations.

PO4: Research-Related Skills:

CO4: Acquire in-depth knowledge of waste management in dairy industries.

PO5: Personal and Professional Competence:

CO5: Develop the ability to create Standard Operating Procedures (SOP) for specific dairy operations.

CO6: Recognize and understand the importance of quality in food production.

PO6: Effective Citizenship and Ethics:

CO3: Familiarize with various government rules and regulations related to dairy products.

CO7: Learn about waste management practices in the food and dairy industry.

PO7: Environment and Sustainability:

CO4: Acquire in-depth knowledge of waste management in dairy industries.

CO7: Learn about waste management practices in the food and dairy industry.

PO8: Self-directed and Life-long Learning:

CO6: Recognize and understand the importance of quality in food production.

PO9: Trans-disciplinary Research Competence:

CO4: Acquire in-depth knowledge of waste management in dairy industries.

Choice Based Credit System Syllabus
(2019 pattern)

Mapping of Program Outcomes with Course Outcomes

Class: T. Y. B. Voc.(SEM – V)

Subject: Dairy Technology

Course: Fat Rich milk product (Th)

Course Code: BDT- 502

Objectives-

- To understand the range of products made from milk fat
- To learn the making procedure and principle.

Unit-1 Cream: Definition, Composition, Standards and Processing of Cream, Preparation of Different Types of Cream, Packaging, Storage and Common Defects in Cream

12 Periods

Unit-2 Butter: Definition, Standards and Principles of Butter Making, Methods of Manufacture of Butter, Packaging, Storage and Common Defects in Butter

12 Periods

Unit-3 Ghee, Butter-oil and Fat-rich Products: Definition, Composition and Standards of Ghee and Butter Oil, Principles and Methods of Manufacture of Ghee and Butter Oil

12 Periods

Unit-4 Packaging, Storage, Keeping Quality Extension and Adulteration of Ghee

12 Periods

Unit-5 Fat-rich Products in Dairy and Food Industries

12 Periods

References-

- Dairy Plant Engineering and Management (1990) Tufail Ahmad
- Outlines of Dairy Technology, (1980) Sukumar De
- Milk Products of India – ICAR Anantkrishanan C.P. and Srinivasan M.R.
- Technology of Indian Milk Products- Aneja R.P., Mathur B.N.
- Indian Dairy Products (1974) Rangappa K.S., Acharya K.T.

Weightage: 1=weakorlowrelation,2=moderateorpartialrelation,3=strongordirectrelation

Course Outcomes	Programme Outcomes(POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3		2					3	
CO2	3		3					3	
CO3		2						3	
CO4		3		3		3			

CO5	3			3				3	3
CO6	3				3			3	3
CO7	3		2		3	3	3	3	3

Justification for the mapping

PO1: Disciplinary Knowledge:

CO1. Gain comprehensive knowledge of various fat-rich products derived from milk.

CO2. Develop analytical skills by exploring the manufacturing processes of cream, butter, butter oil, ghee, etc.

CO5. Recognize the diverse range of products made from milk fat, enhancing personal and professional competence.

CO6. Gain awareness of ethical considerations in the production of fat-rich milk products and their impact on effective citizenship.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO2: Critical Thinking and Problem Solving:

CO3. Communicate effectively about the significance of fat-rich milk products in the dairy business.

CO4. Acquire research skills to understand and implement preventive measures against the rancidity of milk products.

PO3: Social Competence (Exhibit thoughts and ideas effectively in writing and orally):

CO1. Gain comprehensive knowledge of various fat-rich products derived from milk.

CO2. Develop analytical skills by exploring the manufacturing processes of cream, butter, butter oil, ghee, etc.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO4: Research-Related Skills:

CO4. Acquire research skills to understand and implement preventive measures against the rancidity of milk products.

CO5. Recognize the diverse range of products made from milk fat, enhancing personal and professional competence.

PO5: Personal and Professional Competence:

CO6. Gain awareness of ethical considerations in the production of fat-rich milk products and their impact on effective citizenship.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO6: Effective Citizenship and Ethics:

CO4. Acquire research skills to understand and implement preventive measures against the rancidity of milk products.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO7: Environment and Sustainability:

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO8: Self-directed and Life-long Learning:

CO1. Gain comprehensive knowledge of various fat-rich products derived from milk.

CO2. Develop analytical skills by exploring the manufacturing processes of cream, butter, butter oil, ghee, etc.

CO3. Communicate effectively about the significance of fat-rich milk products in the dairy business.

CO5: They will understand the range of products made from milk fat.

CO6: They will learn the making process and principle of fat-rich milk products.

CO7: They will study about packaging, storage, and keeping quality of different fat-rich milk products.

PO9: Trans-disciplinary Research Competence:

CO5. Recognize the diverse range of products made from milk fat, enhancing personal and professional competence.

CO6: They will learn the making process and principle of fat-rich milk products.

CO7: They will study about packaging, storage, and keeping quality of different fat-rich milk products.

Choice Based Credit System Syllabus
(2019 pattern)

Mapping of Program Outcomes with Course Outcomes

Class: T. Y. B. Voc.(SEM – V)

Subject: Dairy Technology

Course: dairy plant management (Th)

Course Code: BDT- 503

Objectives-

- To learn basics of management
- To learn key skills in managing the efficiency and man power of the dairy plant.

Unit 1- Production management: Introduction, definition, Function and structure of production management, Production planning and control **12 Periods**

Unit 2- Efficiency of Plant Operation: Introduction, definition, Product accounting, Setting up norms for operational and processing losses for quantity of fat and SNF, Monitoring efficiency **12 Periods**

Unit 3- Plant Operations: Energy conservation and auditing, Product and process control, Control charts, Process Sigma, Efficiency factors losses, financial and managerial efficiency, Provision for industrial legislation in India particularly in dairy industry. **12 Periods**

Unit 4- Human Resource Management: Personnel management, Manpower Planning, Recruitment, training, transfer, promotion policies, job specifications, job evaluation, Job enhancement, Job enrichment, MBO, working conditions **12 Periods**

Unit 5- Dairy Plant Design and Layout: Introduction, Types of dairies, Location of the plant, selection of site, Hygiene design considerations, Space requirement, Single and multilevel design, layout of process section, foundations, walls, windows and doors. **12 Periods**

References-

- Dairy Plant Management- D.B. Puranik
- Management of dairy plants- Martin Mortensen (2012)
- In milk plant layout FAO- H.S. Hall, B. Helge (1963)
- Competitive global management Principles and Strategies , Abbas F, Alkhafaji (1995)

Weightage: 1=weakorlowrelation,2=moderateorpartialrelation,3=strongordirectrelation

Course Outcomes	Programme Outcomes(POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1		3		3				3	
CO2	3		2		3				3
CO3	3				3				3
CO4			3	2	3			3	
CO5	3						3		

CO6	3				3	2		3	
CO7									

Justification for the mapping

PO1: Disciplinary Knowledge:

CO2: Acquire proficiency in the principles of dairy plant management.

CO3: Acquire detailed knowledge of plant operation, dairy plant design, and layout for continuous self-directed learning.

CO5: Develop knowledge and skills related to energy conservation, contributing to sustainability in dairy plant operations.

CO6: Learn about financial and managerial efficiency provisions within the framework of industrial legislation in India.

PO2: Critical Thinking and Problem Solving:

CO1: Develop key skills in efficiently managing manpower and resources in a dairy plant. CO4: They will learn about human resource management.

PO3: Social Competence (Exhibit thoughts and ideas effectively in writing and orally):

CO2: Acquire proficiency in the principles of dairy plant management.

CO4: Gain understanding of human resource management in the context of dairy plant operations.

PO4: Research-Related Skills:

CO1: Develop key skills in efficiently managing manpower and resources in a dairy plant.

CO4: They will learn about human resource management.

CO2: Acquire proficiency in the principles of dairy plant management.

PO5: Personal and Professional Competence:

CO2: Acquire proficiency in the principles of dairy plant management.

CO3: Acquire detailed knowledge of plant operation, dairy plant design, and layout for continuous self-directed learning.

CO4: Gain understanding of human resource management in the context of dairy plant operations.

CO6: Learn about financial and managerial efficiency provisions within the framework of industrial legislation in India.

PO6: Effective Citizenship and Ethics:

CO6: Learn about financial and managerial efficiency provisions within the framework of industrial legislation in India.

PO7: Environment and Sustainability:

CO5: Develop knowledge and skills related to energy conservation, contributing to sustainability in dairy plant operations.

PO8: Self-directed and Life-long Learning:

CO1: Develop key skills in efficiently managing manpower and resources in a dairy plant.

CO4: They will learn about human resource management.

CO6: Learn about financial and managerial efficiency provisions within the framework of industrial legislation in India.

PO9: Trans-disciplinary Research Competence:

CO2: Acquire proficiency in the principles of dairy plant management.

CO3: Acquire detailed knowledge of plant operation, dairy plant design, and layout for continuous self-directed learning.

(2019 pattern)

Mapping of Program Outcomes with Course Outcomes

Class: T. Y. B. Voc.(SEM – V)

Subject: Dairy Technology

Course: Quality assurance and waste management (Pr)

Course Code: BDT- 5.1

Weightage: 1=weakorlowrelation,2=moderateorpartialrelation,3=strongordirectrelation

Objectives-

- To learn different analysis methods used for analyse of different quality parameters of food
1. Determination of acid value in Ghee
 2. Determination of Titrable acidity and pH of milk and milk products
 3. Determination of COD
 4. Determination of BOD
 5. Microbiological Analysis of air and water
 6. Test for sanitization of dairy equipment (Swab method)

Course Outcomes	Programme Outcomes(POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3								
CO2	3	3							
CO3						3			
CO4	3	3		1			3		3
CO5		3	2		3				
CO6		3			2			3	
CO7						2	3		

Justification for the mapping

PO1: Disciplinary Knowledge:

CO1: Gain exposure to the quality parameters of milk and milk products.

CO2: Differentiate between quality assurance and quality control in the dairy industry.

CO4: Acquire in-depth knowledge of waste management in dairy industries.

PO2: Critical Thinking and Problem Solving:

CO2: Differentiate between quality assurance and quality control in the dairy industry.

CO4: Acquire in-depth knowledge of waste management in dairy industries.

CO5: Develop the ability to create Standard Operating Procedures (SOP) for specific dairy operations.

CO6: Recognize and understand the importance of quality in food production.

PO3: Social Competence Exhibit thoughts and ideas effectively in writing and orally:

CO5: Develop the ability to create Standard Operating Procedures (SOP) for specific dairy operations.

PO4: Research-Related Skills:

CO4: Acquire in-depth knowledge of waste management in dairy industries.

PO5: Personal and Professional Competence:

CO5: Develop the ability to create Standard Operating Procedures (SOP) for specific dairy operations.

CO6: Recognize and understand the importance of quality in food production.

PO6: Effective Citizenship and Ethics:

CO3: Familiarize with various government rules and regulations related to dairy products.

CO7: Learn about waste management practices in the food and dairy industry.

PO7: Environment and Sustainability:

CO4: Acquire in-depth knowledge of waste management in dairy industries.

CO7: Learn about waste management practices in the food and dairy industry.

PO8: Self-directed and Life-long Learning:

CO6: Recognize and understand the importance of quality in food production.

PO9: Trans-disciplinary Research Competence:

CO4: Acquire in-depth knowledge of waste management in dairy industries.

Mapping of Program Outcomes with Course Outcomes

Class: T. Y. B. Voc.(SEM – V)

Subject: Dairy Technology

Course: Fat Rich milk product (Pr)

Course Code: BDT- 5.2

OBJECTIVES-

- To learn the making procedure and principle.
1. Preparation and Standardization of Cream
 2. Preparation of Sterilized Cream
 3. Preparation of Butter Starter
 4. Preparation of Cream for Butter Making
 5. Preparation of Desi Butter (Makkhan), Table Butter and Cooking Butter
 6. Cooking Butter by Hand Operated Churn.
 7. Study of Manufacture of Table Butter by Power Churn.
 8. Preparation of Ghee

Weightage: 1=weakorlowrelation,2=moderateorpartialrelation,3=strongordirectrelation

Course Outcomes	Programme Outcomes(POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3		2					3	
CO2	3		3					3	
CO3		2						3	
CO4		3		3		3			
CO5	3			3				3	3
CO6	3				3			3	3
CO7	3		2		3	3	3	3	3

Justification for the mapping

PO1: Disciplinary Knowledge:

CO1. Gain comprehensive knowledge of various fat-rich products derived from milk.

CO2. Develop analytical skills by exploring the manufacturing processes of cream, butter, butter oil, ghee, etc.

CO5. Recognize the diverse range of products made from milk fat, enhancing personal and professional competence.

CO6. Gain awareness of ethical considerations in the production of fat-rich milk products and their impact on effective citizenship.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO2: Critical Thinking and Problem Solving:

CO3. Communicate effectively about the significance of fat-rich milk products in the dairy business.

CO4. Acquire research skills to understand and implement preventive measures against the rancidity of milk products.

PO3: Social Competence (Exhibit thoughts and ideas effectively in writing and orally):

CO1. Gain comprehensive knowledge of various fat-rich products derived from milk.

CO2. Develop analytical skills by exploring the manufacturing processes of cream, butter, butter oil, ghee, etc.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO4: Research-Related Skills:

CO4. Acquire research skills to understand and implement preventive measures against the rancidity of milk products.

CO5. Recognize the diverse range of products made from milk fat, enhancing personal and professional competence.

PO5: Personal and Professional Competence:

CO6. Gain awareness of ethical considerations in the production of fat-rich milk products and their impact on effective citizenship.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO6: Effective Citizenship and Ethics:

CO4. Acquire research skills to understand and implement preventive measures against the rancidity of milk products.

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO7: Environment and Sustainability:

CO7. Explore the environmental implications of packaging, storage, and maintaining the quality of different fat-rich milk products.

PO8: Self-directed and Life-long Learning:

CO1. Gain comprehensive knowledge of various fat-rich products derived from milk.

CO2. Develop analytical skills by exploring the manufacturing processes of cream, butter, butter oil, ghee, etc.

CO3. Communicate effectively about the significance of fat-rich milk products in the dairy business.

CO5: They will understand the range of products made from milk fat.

CO6: They will learn the making process and principle of fat-rich milk products.

CO7: They will study about packaging, storage, and keeping quality of different fat-rich milk products.

PO9: Trans-disciplinary Research Competence:

CO5. Recognize the diverse range of products made from milk fat, enhancing personal and professional competence.

CO6: They will learn the making process and principle of fat-rich milk products.

CO7: They will study about packaging, storage, and keeping quality of different fat-rich milk products.

Mapping of Program Outcomes with Course Outcomes

Class: T. Y. B. Voc.(SEM – V)

Subject: Dairy Technology

Course: Project (Pr)

Course Code: BDT- 5.3

Group of four students shall undertake project work related to design and development of innovative food product, its quality evaluation, packaging, labeling and shelf life testing under the supervision of a faculty member. In principle, the research /design work has to be carried out by the student himself taking advice from his supervisor when problem arises. The work will be allotted at the beginning of the fifth semester specifying the different aspects to be carried out by the student. At the end of the semester the student will submit an interim report on his/her work in typed form. Evaluation shall include oral presentation.

Weightage: 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

Course Outcomes	Programme Outcomes(POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3								
CO2		3							
CO3	2								
CO4			2	3	3	2		3	3
CO5	3	3			2		3	3	
CO6	3				3				
CO7	3						3		

Justification for the mapping

PO1: Disciplinary Knowledge:

CO1: Attain proficiency in understanding the entire process of product development.

CO3: Develop familiarity with diverse methods for assessing sensory attributes specifically related to dairy products.

CO5: Demonstrate the application of critical thinking in the design and development of innovative food products.

CO6: Acquire skills in effectively evaluating and communicating the quality, packaging, and labeling of food products.

CO7: Develop the ability to articulate and present findings related to shelf life testing of various products.

PO2: Critical Thinking and Problem Solving:

CO2: Acquire comprehensive knowledge of conducting shelf life analysis for various products.

CO5: Demonstrate the application of critical thinking in the design and development of innovative food products.

PO3: Social Competence - Exhibit thoughts and ideas effectively in writing and orally:

CO4: Gain proficiency in composing detailed project reports, demonstrating analytical and problem-solving abilities.

PO4: Research-Related Skills:

CO4: Gain proficiency in composing detailed project reports, demonstrating analytical and problem-solving abilities.

PO5: Personal and Professional Competence:

CO4: Gain proficiency in composing detailed project reports, demonstrating analytical and problem-solving abilities.

CO5: Demonstrate the application of critical thinking in the design and development of innovative food products.

CO6: Acquire skills in effectively evaluating and communicating the quality, packaging, and labeling of food products.

PO6: Effective Citizenship and Ethics:

CO4: Gain proficiency in composing detailed project reports, demonstrating analytical and problem-solving abilities.

PO7: Environment and Sustainability:

CO5: Demonstrate the application of critical thinking in the design and development of innovative food products.

CO7: Develop the ability to articulate and present findings related to shelf life testing of various products.

PO8: Self-directed and Life-long Learning:

CO4: Gain proficiency in composing detailed project reports, demonstrating analytical and problem-solving abilities.

CO5: Demonstrate the application of critical thinking in the design and development of innovative food products.

PO9: Trans-disciplinary Research Competence:

CO4: Gain proficiency in composing detailed project reports, demonstrating analytical and problem-solving abilities.