

Choice Based Credit System Syllabus  
(2022 Pattern)

**Mapping of Program Outcomes with Course Outcomes**

**Class:** F. Y. B. Voc.(Sem – II)

**Subject:** Dairy Technology

**Course:** Food Technology (Th)

**Course Code:** UBDT-121

**Objectives:**

- To study methods of preservation of foods
- To study the natural and chemical preservatives i.e. Class I and Class II Preservatives

**Unit-1: Introduction to preservation:** Definition, Introduction to preservation, History of preservation, general principles of food preservation, Need & benefits of industrial food preservation **12 Periods**

**Unit-2: Food Preservation by drying:** Types of drying, changes during drying, effect of drying on food, advantaged and disadvantages of drying **12 Periods**

**Unit-3: Food preservation by High & Low temperature:** Preservation by high temperature: Blanching, pasteurization & Canning, Effect of heat on food and micro-organisms Preservation by low temperature: Chilling, Refrigeration & freezing Effect of low temperature on food & microorganisms **12 Periods**

**Unit-4: Food preservation by irradiation:** Introduction & units of irradiation, mechanism of action of radiation, radiation process, effect of radiation on food, effect of radiation on micro-organisms **12 Periods**

**Unit-5: Food preservation by other methods:** Definition of preservative, Types of preservatives - Class I & Class II, Carbonation, Antibiotics, Fermentation & Filtration **12 Periods**

**References:**

- Handbook of Food preservation (1999) M. Shafiur Rahman CRC Press
- Food Preservation techniques (2003) Peter Zeuthen
- The Technology of food preservation 4<sup>th</sup> Edition (2006) Norman W. Desroier

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

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

CO3			2						
CO4		2							3
CO5					3				
CO6				3				3	
CO7						2			

### **Justification for the mapping**

#### **PO1: Disciplinary Knowledge:**

CO1: Students will acquire knowledge on the science and principles of food preservation.

CO2: They will comprehend various methods and processes employed in food preservation.

#### **PO2: Critical Thinking and Problem Solving:**

CO4: Students will analyze and choose the most suitable preservation technique based on critical evaluation.

#### **PO3: Social Competence:**

CO3: They will be able to demonstrate pre-preparation actions, considering social and cultural contexts.

#### **PO4: Research-Related Skills:**

CO6: Students will research and learn about different types of preservatives.

#### **PO5: Personal and Professional Competence:**

CO5: They will enhance the shelf life of food, showcasing personal and professional competence.

#### **PO6: Effective Citizenship and Ethics:**

CO7: They will understand and adhere to ethical considerations in different methods of food preservation.

#### **PO7: Environment and Sustainability:**

CO2: They will comprehend the environmental impact of different food preservation processes.

#### **PO8: Self-directed and Life-long Learning:**

CO1: Students will independently gather information on the preservation of food.

CO6: They will continue to learn and adapt to new types of preservatives throughout their professional life.

#### **PO9: Trans-disciplinary Research Competence:**

CO4: Students will explore trans-disciplinary aspects related to food preservation techniques

Choice Based Credit System Syllabus  
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**Mapping of Program Outcomes with Course Outcomes**

**Class:** F. Y. B. Voc.(Sem – II)

**Subject:** Dairy Technology

**Course:** Market Milk (Th)

**Course Code:** UBDT-122

**Objectives-**

- To study the methods of the collection and transportation of milk.
- To study hygiene and sanitation in dairy industry.
- To know the processing and packaging materials and machineries for milk and milk products.

**Unit-1: Milk Reception:** Milk Collection and Transportation, Milk Reception at the Dairy Dock, Milk Chilling and Storage **12 Periods**

**Unit-2: Processing of milk:** Collection, Storage, Filtration/ Clarification, Pasteurization, Separation, Standardization, Bactofugation, Sterilization **12 Periods**

**Unit-3: Sterilization and Ultra-High-Temperature Processing**

Definition, Theoretical basis types of sterilization plants, Description of the canning process, Quality of sterilized milk **12 Periods**

**Unit-4: UHT**

Ultra-High temperature processing definition, Theoretical basis for UHT processing, Types of UHT sterilization plants, Changes in milk during processing, Aseptic packaging, types of sterilizing medium, Types of packaging materials, Description of aseptic packaging systems **12 Periods**

**Unit-5: Special Milks:** Sterilized milk, Homogenized milk, Flavored milk, Toned milk, Double toned milk, Standardized milk, rehydrated milk, recombinant milk, UHT milk. **12 Periods**

**References:**

- Outlines of Dairy Technology, (1980) Sukumar De
- The technology of milk processing, (1991) Khan A.Q
- Manual for milk plant operations, (1957) Washington
- Food engineering and Dairy technology (1981) Kessler H.G.

**Weightage:** 1=weakerlowrelation,2=moderateorpartialrelation,3=strongordirectrelation

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

### Justification for the mapping

#### PO1: Disciplinary Knowledge:

CO1: Students will gain comprehensive knowledge about different milk processes, establishing a strong foundation in milk processing disciplines.

#### PO2: Critical Thinking and Problem Solving:

CO5: Students will develop critical thinking skills to identify and resolve errors in milk processing, demonstrating problem-solving abilities.

#### PO3: Social Competence:

CO7: Students will explore the social aspects of milk collection and transportation, understanding the importance of effective communication and cooperation in the dairy industry.

#### PO4: Research-Related Skills:

CO4: Students will acquire research-related skills by gaining in-depth knowledge of the fundamentals of milk processing.

#### PO5: Personal and Professional Competence:

CO3: Students will enhance personal and professional competence by learning about the reception and storage of milk, ensuring quality control in the dairy industry.

#### PO6: Effective Citizenship and Ethics:

CO2: Students will explore different types of milk while considering ethical considerations, promoting effective citizenship in the dairy sector.

#### PO7: Environment and Sustainability:

CO6: Students will learn about different methods of pasteurizing milk with a focus on environmental sustainability and resource efficiency.

#### PO8: Self-directed and Life-long Learning:

CO1: Students will gain comprehensive knowledge about different milk processes, establishing a strong foundation in milk processing disciplines.

#### PO9: Trans-disciplinary Research Competence:

CO2: Students will develop trans-disciplinary research competence through their exploration of the diverse types of milk and their processing methods

Choice Based Credit System Syllabus  
(2022 Pattern)

**Mapping of Program Outcomes with Course Outcomes**

**Class:** F. Y. B. Voc. (Sem – II)

**Subject:** Dairy Technology

**Course:** Microbiology of milk and milk product (Th)

**Course Code:** UBDT-123

**Objectives-**

- To Know the important genera of microorganisms associated with dairy and their characteristics
- To study the role of microbes in fermentation, spoilage and food borne diseases.

**Unit 1:History & scope of Microbiology:** Introduction to microbiology, Historical Contribution of various scientists, scope of microbiology in food, Types of cell – Prokaryotic & Eukaryotic cell, Introduction to various types of micro-organisms, Structure of bacteria

**12 Periods**

**Unit 2:Microbial growth in food:** Factors affecting growth of micro-organisms, Growth curve, Sources of contamination, causes of spoilage, Food in relation to disease- food borne poisoning, infections and intoxications

**12 Periods**

**Unit-3:Culture media and Pure culture Techniques:** Culture Media & its Composition, Types of culture media Methods for isolation of pure culture- Streak plate, Pour plate and Spread plate

**12 Periods**

**Unit 4:Microscopy and Staining Procedures:** Introduction & types of microscope, Definition of dye & stains, classification of stains- Acidic, Basic and Neutral, principles, procedure, mechanism & applications of staining procedures: simple staining, negative staining, differential staining- gram staining & acid fast staining

**12 Periods**

**Unit-5:Beneficial microorganisms and Microbial spoilage:** Beneficial microorganisms and Microbial spoilage of meat, poultry fish; fruits & vegetables; cereal & cereal products and milk & milk products.

**12 Periods**

**References:**

- Food Microbiology (2013) William C Frazier
- Dairy Microbiology (2005) Richard K. Robinsons
- Dairy Microbiology : A Practical approach Photis Papademas (2014)

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

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

### **Justification for the mapping**

#### **PO1: Disciplinary Knowledge:**

CO1: Students will acquire knowledge about the microbial composition of milk.

CO2: They will demonstrate an understanding of microorganisms with commercial importance.

CO3: They will gain familiarity with various methods employed for microbial analysis.

CO4: They will comprehend the overall impact of microbial activity on milk.

CO5: They will distinguish between beneficial and harmful microorganisms in milk.

CO6: They will learn and apply different staining methods used in microbiology.

CO7: They will proficiently execute techniques for the isolation of pure cultures.

#### **PO2: Critical Thinking and Problem Solving:**

CO5: They will distinguish between beneficial and harmful microorganisms in milk.

CO7: They will proficiently execute techniques for the isolation of pure cultures.

#### **PO4: Research-Related Skills:**

CO3: They will develop skills in utilizing various methods for microbial analysis.

#### **PO5: Personal and Professional Competence:**

CO6: They will demonstrate proficiency in different staining methods used in microbiology.

CO7: They will showcase competence in executing techniques for the isolation of pure cultures.

#### **PO7: Environment and Sustainability:**

CO4: They will understand the environmental implications of microbial activity on milk.

#### **PO8: Self-directed and Life-long Learning:**

CO1: Students will acquire knowledge about the microbial composition of milk.

CO2: They will demonstrate an understanding of microorganisms with commercial importance.

CO5: They will distinguish between beneficial and harmful microorganisms in milk.

CO6: They will learn and apply different staining methods used in microbiology.

#### **PO9: Trans-disciplinary Research Competence:**

CO1: Students will gain knowledge about the microbial composition of milk with potential trans-disciplinary applications.

CO2: They will recognize the trans-disciplinary relevance of microorganisms with commercial importance.

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**Mapping of Program Outcomes with Course Outcomes**

**Class:** F. Y. B. Voc.(Sem – II)

**Subject:** Dairy Technology

**Course:** Food Technology (Pr)

**Course Code:** UBDT-121-1

**Objectives-**

- To study methods of preservation of foods
  - To study the natural and chemical preservatives i. e. class I and class II preservatives
1. Study of class I and class II preservatives **2P**
  2. Preservation of vegetables by Salt (Pickle) **2P**
  3. Preservation of Guava by Sugar (Jam) **2P**
  4. Preservation of Vegetables by Oil (Pickle) **2P**
  5. Preservation of fruits by Chemical preservative (Squash) **3P**
  6. Preservation of Fruits and Vegetables by Low temperature (Refrigeration, Freezing) **3P**
  7. Preservation of Fruits and Vegetables by High temperature (Blanching, Pasteurization) Vegetables, Fruits, Milk **2P**
  8. Preservation of Fruits and vegetables by Drying (Sun and mechanical) **2P**
  9. Preservation of Tomatoes by use of acidulants (Ketchup) **2P**
  10. Preservation of Indian gooseberry by Osmotic dehydration **4P**
  11. Activity – Which are preservatives used in food and prepare the list and write the uses

**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							3	
CO2	3						3		
CO3			2						
CO4		2							3
CO5					3				
CO6				3				3	
CO7						2			

**Justification for the mapping**

**PO1: Disciplinary Knowledge:**

CO1: Students will acquire knowledge on the science and principles of food preservation.

CO2: They will comprehend various methods and processes employed in food preservation.

**PO2: Critical Thinking and Problem Solving:**

CO4: Students will analyze and choose the most suitable preservation technique based on critical evaluation.

**PO3: Social Competence:**

CO3: They will be able to demonstrate pre-preparation actions, considering social and cultural contexts.

**PO4: Research-Related Skills:**

CO6: Students will research and learn about different types of preservatives.

**PO5: Personal and Professional Competence:**

CO5: They will enhance the shelf life of food, showcasing personal and professional competence.

**PO6: Effective Citizenship and Ethics:**

CO7: They will understand and adhere to ethical considerations in different methods of food preservation.

**PO7: Environment and Sustainability:**

CO2: They will comprehend the environmental impact of different food preservation processes.

**PO8: Self-directed and Life-long Learning:**

CO1: Students will independently gather information on the preservation of food.

CO6: They will continue to learn and adapt to new types of preservatives throughout their professional life.

**PO9: Trans-disciplinary Research Competence:**

CO4: Students will explore trans-disciplinary aspects related to food preservation techniques



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**Mapping of Program Outcomes with Course Outcomes**

**Class:** F. Y. B. Voc.(Sem – II)

**Subject:** Dairy Technology

**Course:** Microbiology of milk and milk product (Pr)

**Course Code:** UBDT-121-2

**Objectives-**

- To know basic microbiology laboratory practices and equipment
- To study the preparation of media, culture, identify micro organisms

- |   |           |
|---|-----------|
| 1. Introduction to basic microbiology laboratory practices                                | <b>2P</b> |
| 2. Study of compound microscope   | <b>2P</b> |
| 3. Study of instruments used in microbiology lab  | <b>2P</b> |
| 4. Cleaning and methods of sterilization  | <b>2P</b> |
| 5. Microbiological media preparations (Sabourds, Mac-Conkeys, Nutrient, Blood, Chocolate) | <b>3P</b> |
| 6. Gram staining  | <b>1P</b> |
| 7. Monochrome staining  | <b>1P</b> |
| 8. Cultivation and subculturing of microbes   | <b>2P</b> |
| 9. Microbial sampling   | <b>1P</b> |
| 10. Standard Plate Count method   | <b>2P</b> |
| 11. Isolation of E. coli from food sample   | <b>2P</b> |
| 12. Colony characterization   | <b>2P</b> |
| 13. Industrial quality control lab visit  | <b>2P</b> |
| 14. Activities – Study of swab test   |           |
| Study the difference between fresh and spoiled food                                       |           |

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

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

**Justification for the mapping**

**PO1: Disciplinary Knowledge:**

All of the course outcomes (COs) contribute to the development of students' disciplinary knowledge in Dairy Technology. For example, CO1, and CO2 require students to get knowledge about Dairy Microbiology. CO3 require students to apply suitable techniques for analysis of milk.

**PO2: Critical Thinking and Problem solving**

All of the COs also contributes to the development of students' critical thinking and problem-solving skills. For example, CO3, and CO4 require students to think critically about different techniques for microbial analysis, overall effect of microbial action on milk. CO5 require students to use their knowledge and think critically on types of organisms, beneficial and harmful microorganisms in Milk.

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

CO3 and CO4 contribute to the development of students' research-related skills and scientific temper towards microbial analysis and overall effect of microbial action on milk. For example, CO3 requires students to learn different methods of microbial analysis. CO4 require students to develop their ability to think critically about effect of microorganisms on milk.

**PO4: Research-RelatedSkills:**

CO2, CO3, CO4, and CO5 contribute to the development of students' research related skills. For example, CO5 requires students to learn how to perform different methods of microbial analysis. CO7 requires student to learn to demonstrate different isolation of pure culture techniques.

**PO5: Personal and professional competence**

CO2, CO3, CO4, CO5, CO6 and CO7 all contribute to the development of students' professional competence. For example, all of the COs require students to develop their ability to work independently and as part of a team.

**PO6: Effective Citizenship and Ethics:**

CO2, CO3, CO5 contribute towards the development of ethics in Microbiology of milk and milk products.

**PO8: Self – directed and lifelong learning:**

All of the course outcomes (COs) contribute to the development of students' life long learning in Dairy Technology. For example, CO1, CO2, CO3, CO4 and CO5 require students to get lifelong knowledge about microbiology of milk and milk products. CO6 and CO7 require students to get knowledge about methods of staining and methods of isolation of pure starter culture.

**PO9: Trans – disciplinary research competence:**

CO2, CO3, CO4, and CO5 all contribute to the development of students' ability to engage in self-directed and life-long learning. For example, all of the COs require students to develop their ability to learn new concepts and apply them to new problems. They also require students to develop their ability to think critically about their own learning and to identify areas where they need to improve.

Choice Based Credit System Syllabus  
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**Mapping of Program Outcomes with Course Outcomes**

**Class:** F. Y. B. Voc.(Sem – II)

**Subject:** Dairy Technology

**Course:** Computer Application (Pr)

**Course Code:** UBDT-121-3

**Objectives-**

- To study the computer machine and operating system
- To study the different programmes for development of websites and designing of packaging labels.

- |   |           |
|---|-----------|
| <b>1. Introducing Computer and Operating system</b>     | <b>1P</b> |
| <b>2. MS-WORD</b>                                       | <b>2P</b> |
| <b>3. MS-EXCEL</b>                                      | <b>2P</b> |
| <b>4. MS-POWERPOINT</b>                                 | <b>2P</b> |
| <b>5. Introduction to the internet, search engine</b>   | <b>2P</b> |
| <b>6. E-Mails, Google Docs and Forms</b>                | <b>3P</b> |
| <b>7. Introduction to PageMaker</b>                     | <b>3P</b> |
| <b>8. Introduction to Corel Draw</b>                    | <b>3P</b> |
| <b>9. Introduction to Photoshop</b>                     | <b>2P</b> |
| <b>10. Web development: HTML and Scripting language</b> | <b>2P</b> |
| <b>11. How to search research papers</b>                | <b>1P</b> |
| <b>12. How to convert word to PDF and vice-versa</b>    | <b>1P</b> |
| <b>13. Activity – Report preparation</b>                |           |

**References:**

- 1) Microsoft Office 2000 by Vipra Computers, Vipraprinterspvt. Ltd.
- 2) Advanced Maicrosoft Office 2000 by MeredithaFlynin, Nita Rukosky, BPB pub.
- 3) Teach yourself Windows
- 4) Fundaments of Computers - V. Rajaraman
- 5) Computer Fundamentals by P. K. Sinha &Priti Sinha, 4th edition, BPB, publication.

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

	<b>Programme Outcomes(POs)</b>								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
<b>Course Outcomes</b>									
CO1	2		3	1	3	3			
CO2	2	2	3	2	3				

CO3	2	3	3	3	3			2	
CO4	2		3	3	3				
CO5	2	2	3	3	3			2	3
CO6	3				3				
CO7				3			2		3

### **Justification for the mapping**

#### **PO1: Disciplinary Knowledge:**

All of the course outcomes (Cos) contribute to the development of student's disciplinary knowledge in Dairy Technology. For example, CO1, CO2, and CO3 require students to master in advances of Information technology, Data storing and computing techniques, and use of different applications. CO4 and CO5 require students to apply these concepts to complex problems in data entry, computing and storage. CO6 Provide a deep understanding of computer machines and operating systems, contributing to personal and professional competence.

#### **PO2: Critical Thinking and Problem solving**

Some of the outcomes contribute to the development of student's critical thinking and problem-solving skills. For example, CO2 and CO3 require students to think critically about how to apply different data processing applications and correlate their functions to the types of data. CO5 require students to use their knowledge of classifying data on the basis of it's nature, whether its quantitative or qualitative.

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

All of the course outcomes (COs) contribute to the development of student's Social Competence to exhibit thoughts and ideas effectively in writing and orally. For example, CO1 requires students to learn how to use information technology to perform complex computations. CO3 requires students to develop their ability to think critically about computational data and run different programmes.

#### **PO4: Research-Related Skills:**

All of the course outcomes (COs) contribute to the development of student's research – related skills. For example, CO1 requires students to learn importance and application of information technology in research work, for data collection, references and also for publication of research project. CO2 requires students to develop an understanding of the connections between the collected data and its processing through different applications, such as coding of data in MS Excel. CO3 and CO4 require students to apply their knowledge of different computer applications and use of electronic communication for collection of data. CO5 requires students to acquire with hands on training in operations of MS Excel. CO7: study different programmes for website developments and packaging label design, emphasizing ethical consideration in technological applications.

#### **PO5: Personal and professional competence**

All of the course outcomes (COs) contribute to the development of student's personal and professional competence. For example, all of the Cos require students to develop their ability to

work independently and as part of a team. They also require students to develop their communication skills and their ability to apply their knowledge to solve real-world problems. CO6 Provide a deep understanding of computer machines and operating systems, contributing to personal and professional competence.

**PO6: Effective Citizenship and Ethics:**

CO3 contributes to the development of student's Effective Citizenship and Ethics. For example, use of information technology in research work requires student to consider the prevention of plagiarism while collecting the data.

**PO7: Environment and sustainability:**

CO7: study different programmes for website developments and packaging label design, emphasizing ethical consideration in technological applications.

**PO8:Self – directed and lifelong learning:**

CO3 and CO5 contribute to the development of student's self – directed and lifelong learning. For example, CO3 and CO5 require students to explore different shortcuts and functions of the various computer applications.

**PO9: Trans – disciplinary research competence:**

CO2, CO3, CO4, CO5, contribute to the development of students' ability to engage in Trans – disciplinary research competence. For example, all of the mentioned COs require students to develop their ability to learn new concepts and apply them to new problems. They also require students to develop their ability to think critically about their own learning and to identify areas where they need to improve. CO7 study different programmes for website developments and packaging label design, emphasizing ethical consideration in technological applications.