

# GUJARAT TECHNOLOGICAL UNIVERSITY

**Branch Name: Food Processing & Technology (14)**  
**Subject Name: Milk and Milk Products Technology**  
**Subject Code: 2171403**  
**BE Semester: 07**

1) **Type of Course:** Food Processing Technology

2) **Prerequisite:** Nil

3) **Rational**

This course includes the study of milk from farm gate all the way through the distribution, storage, manufacturing and applications of dairy products. Practices that affect milk quality and the technology of milk processing and dairy products manufacture are the main emphasis of this course.

4) **Teaching Scheme & Examination Scheme**

Subject Code	Subject Name	Teaching Scheme(Hours)				Credits	Theory Marks					Tutorial Work/Practical Marks					Total
		Theory	Tutorial	Practical	ESE (E)		PA (M)			Viva (V)		PA(I)					
							Passing Criteria	Other PA	ALA	Passing Criteria	Viva	OEP	Passing Criteria	Other PA	CS	Passing Criteria	
2171403	Milk and Milk Products Technology	4	0	2	6	70	23/70	20	10	12/30	20	10	15/30	20	0	10/20	150

**ESE = End Semester Examination**

**PA = Progressive Assessment**

**ALA = Active Learning Assignments'**

**OEP = Open Ended Problems**

**CS = Case Studies**

5) **Learning Objectives**

- a. To have the information about dairy development in India.
- b. To impart knowledge in understanding the physico-chemical aspects of milk with its composition.
- c. To make aware about the unit operations involved in the processing of milk and its products
- d. To acquaint with techniques and technologies of testing and processing of milk into various products and by products

6) **Open Ended Problems**

The topics taught in this subject would be useful to develop insight and application based knowledge among students. Students would be able to:

- a. Conduct platform tests for checking the suitability of milk for processing
- b. Analyze major constituents of milk
- c. Make different milk & milk products with quality assurance
- d. Judge and grade the quality of milk products

7) **Content**

TOPIC	SUB TOPIC	LECTURES	Module Weightage (%)
<b>Market Milk</b>	Review of Dairy Development in India, National Dairy Development Board and Operation Flood, Market Milk Industry in India and Abroad; Milk Composition; Factors Affecting composition of milk; Physio-chemical Properties of Milk;	<b>10</b>	<b>17</b>

	Judging & Grading of Milk; Flavour Defects in Milk; their Causes and Prevention, Platform test.		
<b>Special Milks</b>	Sterilized Milk; Homogenized Milk; Flavoured Milks; Standardized Milk; Reconstituted/Re-hydrated Milk; Recombined Milk; Toned Milk.	<b>06</b>	<b>10</b>
<b>Butter</b>	Yield of cream; Composition; Flow Diagram of Production, Overrun; Yield; Fat Losses in Butter Making; Continuous Butter Making; Judging and Grading of table Butter; Defects in Butter, their Causes and Prevention.	<b>07</b>	<b>12</b>
<b>Ice Cream</b>	Composition; Flow Diagram of Production; Defects in Ice Cream, their Causes and Prevention; Quality Control.	<b>05</b>	<b>10</b>
<b>Cheese</b>	Composition; Types of cheese, Flow Diagram Cheddar Cheese, Mozzarella cheese and processed cheese manufacturing; Curing and Storage of cheddar cheese; Defects, their Causes and Prevention; Quality Control.	<b>07</b>	<b>15</b>
<b>Condensed and Dried Milks</b>	Composition; Types of condensed milk; Flow diagram of condensed milk production; Types of Dried Milk; Flow Diagram of Dried Milk Production; Malted milk food, Yield; Defects, their Causes and Prevention; Quality Control.	<b>07</b>	<b>15</b>
<b>Traditional Indian Milk Products</b>	Various types of Khoa and Khoa based sweets (Peda, Burfi and Kalakand) Chhana and Chhana based sweets (Rasogolla), Paneer; fermented products: shrikhand.	<b>06</b>	<b>13</b>
<b>Quality Control in Milk Processing</b>	Tests for evaluation of quality of milk.	<b>04</b>	<b>8</b>

**Suggested Specification table with Marks (Theory):**

<b>Distribution of Theory Marks</b>				
<b>Remembrance</b>	<b>Understanding</b>	<b>Application</b>	<b>Analyze</b>	<b>Evaluate</b>
<b>R</b>	<b>U</b>	<b>A</b>	<b>N</b>	<b>E</b>
<b>Level</b>	<b>Level</b>	<b>Level</b>	<b>Level</b>	<b>Level</b>
<b>20</b>	<b>20</b>	<b>18</b>	<b>20</b>	<b>22</b>

**8) Reference Books**

1. Outlines of Dairy Technology by Sukumar De. Oxford University Press
2. Indian Dairy Products by Rangappa KS. Asia Publishing House
3. Engineering for Dairy and Food Products by Farrall AW. John Wiley and Sons
4. Cheese and Butter. V. Cheke & A. Sheepr. Agrobios (India)
5. Technology of Indian Milk Products by R P Aneja, B N Mathur, A Dairy India Publication, Delhi, India
6. Dairy Plant Engineering and Management By Tufail Ahmed, Kitab Mahal.

**9) Course Outcome**

At the end of this module, following capabilities will be develop in the students:

- a. A broad and coherent body of knowledge of basic physico-chemical and compositional aspects of milk
- b. Develop proficiency and hands-on skills in manufacturing selected dairy products in a pilot plant setting
- c. An appreciation of the safety and quality factors that determine the acceptability of the dairy products by consumers

## 10) List of Practicals

- a. To conduct platform test for checking suitability milk for processing
- b. To estimate the solid non fat content in the given sample of milk
- c. To Standardization milk from cow and buffalo using two axis equation
- d. To prepare khoa or mava from the given sample of milk
- e. To estimate acidity of given milk sample
- f. Judging and grading of quality of butter
- g. Judging and grading of quality of cheese
- h. Judging and grading of quality of paneer
- i. Preparation of paneer
- j. Determination of fat content by Gerbers' method

## 11) Major Equipments

Centrifugal cream separator  
Milko-tester  
Centrifuge  
Steam jacketed kettle  
Lactometer  
Butyrometer

## 12) List of Open Source Software/learning website

- a. <http://www.nddb.org>
- b. <http://www.amul.com/>
- c. <http://www.dairyfoods.com/>
- d. <http://www.fao.org/agriculture/dairy-gateway/milk-production/en/>