- Luthans Fred (2004) Organisational Behaviour 10th Edition McGraw Hill International.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi.

DISCIPLINE SPECIFIC ELECTIVE COURSE – DSE-13 –FT: DAIRY TECHNOLOGY

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Dairy Technology	4	3	1	0	Class XII	Nil

LEARNING OBJECTIVES:

The learning objectives of this course are

- To understand the importance of dairy industry and processing of milk.
- To gain knowledge of compositional and technological aspects of milk and milk products.

LEARNING OUTCOMES:

After completing the course, students will be able to:

- Describe the physico-chemical properties of milk.
- Develop understanding about composition of milk.
- Gain knowledge of milk processing techniques and various types of market milk.
- Develop an understanding of the processing of milk and milk products.

SYLLABUS OF DSE:13-FT

THEORY
(Credits: 3; Hours: 45)

Unit I: Introduction and Physical Properties of Milk (7 Hours)

Unit Description: This unit covers the historical development of the dairy industry in India and the production and utilization of milk. It also explores the key physical properties of milk that are essential for understanding milk quality and behavior.

Subtopics:

- Historical development of dairy industry in India
- Production and utilization of milk
- Properties of milk (Color, Taste, pH, Refractive index, Viscosity, Surface tension,
- Freezing & boiling point, specific heat and electrical conductivity

Unit II: Composition and Spoilage of Milk **(15 Hours)**

Unit Description: This unit covers the composition of milk. It also discusses the factors responsible for milk spoilage, focusing on microbial, enzymatic, and environmental influences on milk quality.

Subtopics:

- Milk carbohydrates
- Milk proteins and enzymes
- Milk fat
- Micronutrients present in milk
- Milk spoilage and factors responsible for spoilage

Unit III: Milk Processing **(8 Hours)**

Unit Description: This unit covers the techniques and technologies involved in liquid milk collection and processing. It also explores different types of milk available in the market.

Subtopics:

- Liquid milk collection
- Platform testing
- Various stages of processing; Filtration, Clarification Homogenization, Pasteurization, Packaging
- Types of market milk- toned, full cream, skim, homogenized, standardized, sterilized, recombined, reconstituted/ rehydrated and flavoured milk.

Unit IV: Milk Products **(15 Hours)**

Unit Description: This unit focuses on the processing and storage of fermented milk and other milk products. It covers the definition, manufacturing process of milk cream, paneer, and cheese, including the classification and production methods for various types of cheese and cream.

Subtopics:

- Processing and storage of fermented milk and fermented milk products.
- Milk Cream: definition and manufacturing
- Paneer: definition and manufacturing
- Cheese: definition, classification and manufacture of different types of cheese

Tutorial
Credit: 1; Hours: 30

1. Formula and calculation for: Saponification value, Iodine value, RM value, Polenske value, peroxide value, Pearson square, casein protein
2. Schematic diagram of pasteurization of milk in dairy industry.
3. Study critical control points in milk processing.
4. Study and prepare schematic diagram of CIP in dairy industry
5. Make an effective layout for the dairy plant or dairy plant visit with the report.

ESSENTIAL/ RECOMMENDED READINGS:

- De, Sukumar. (2007). Outlines of dairy technology. Oxford University Press.
- Webb, B. H., Johnson, A. H., & Alford, J. A. (2005). Fundamentals of Dairy Chemistry. CBS Publisher.
- A. Kanekanian. 2014. Milk and Dairy Products as Functional Foods. John Wiley & Sons, Ltd., UK.
- Singh, S (2014). Dairy Technology: Milk and Milk Processing. New India Publishing Agency.
- https://fssai.gov.in/upload/uploadfiles/files/2_%20Chapter%202_1%20(Dairy%20products%20and%20analogues).pdf

SUGGESTED READINGS

- P.F. Fox, T. Uniacke-Lowe and J.A.O' Mahony (2005). Dairy Science and Technology. Taylor & Francis.
- P. Walstra, Jan T.M. Wouters and Tom J. Geurts (2015). Dairy Chemistry and Biochemistry. Springer.
- Y.H. Hui. 1993. Dairy Science and Technology Handbook, Vol. I, II and III. Wiley-VCH, USA.
- Deeth, H. & Kelly, P. (2020). Processing and Technology of Dairy Products. MDPI.
- https://fssai.gov.in/upload/uploadfiles/files/Gazette_Notification_Milk_Products_24_10_2017.pdf

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