Course Syllabus
Gyanmanjari Science College
Semester- 3(M.Sc.)

Subject: Technology for Milk and Milk Products -MSCFT13514

Type of course: Major

Prerequisite: Student must have comprehensive understanding of Food Processing and Preservation Technology

Rationale: This course empowers students with essential knowledge and practical skills for effective processing and preservation of fruits and vegetables, addressing industry needs and emerging technologies.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
4	0	0	4	60	30	10	00	50	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Unit No	Course content	Hrs	% Weightage
1	**Introduction to Milk and Dairy Industry in India:** Overview of milk and milk products in India, Importance of milk processing plants, Problems of milk supply in India, Scope and functioning of milk supply schemes, National and international organizations in dairy sector (e.g., NDDB, AMUL, FAO), Specifications and standards in the milk processing industry	10	15%

2	Dairy Plant Operations and Equipment: Handling and maintenance of dairy plant equipment. Dairy plant operations: Receiving, Separation, Clarification, Pasteurization, Standardization, Homogenization, Sterilization, Storage, Transport and distribution of milk. Ultra-High Temperature (UHT), toned, humanized, fortified, reconstituted, and flavored milks.	20	35%
3	Fermented Milk and Milk Product Technologies: Technology of fermented milks: Starter culture, Dahi, Yoghurt, Shrikhand. Processing of milk products: Cream, Butter, Ghee, Cheese, Condensed milk, Evaporated milk, Whole and skimmed milk powders, Ice cream, Butter oil, Khoa, Channa, Paneer, Similar traditional products.	20	35%
4	Advanced Dairy Processing and Plant Hygiene: Cheese spreads: Spray and roller drying techniques, Enzyme Modified Cheese (EMC), Enzymes in dairy processing, Judging and grading of milk and milk products. Dairy plant sanitation: Selection and use of cleaners and sanitizers, In-plant cleaning systems (CIP systems), Waste disposal and environmental management in dairy plants	10	15%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Milk Adulteration Awareness Campaign (Virtual):** Design an awareness campaign (digital poster, video, or brochure) on common milk adulterants and how consumers can detect them at home and submit it on GMIU web Portal.	10
2	**Mini Documentary- Local Dairy Practices**: student will record a short documentary-style video on local dairy farming or small-scale milk processing units, highlighting traditional techniques and challenges and submit video on GMIU web portal.	10
3	**Field Visit:** Student will visit a dairy unit (at village level) and cooperative society. Submit a comparative report covering operations, hygiene practices, and product lines on GMIU web portal.	10
4	**Poster: Types of Fermented Milk Products in India:** Student will design and submit a creative poster highlighting traditional Indian fermented milk products, their preparation methods, and cultural relevance on GMIU web portal.	10
5	**Dairy Product Shelf-life Chart**: Student will create and submit a visual shelf-life chart of common dairy products under various storage conditions (ambient, chilled, frozen) on GMIU web portal.	10
	Total	**50**

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks **(Revised Bloom's Taxonomy)**						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	30%	30%	10%	-	10%

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Understand the structure and importance of the dairy industry and related organizations.
CO2	Explain dairy plant operations and milk processing techniques.
CO3	Analyze fermentation processes and their application in dairy product development.
CO4	Apply advanced processing methods and ensure plant hygiene and waste management.

Instructional Method: The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1]. Outline of Dairy Technology Sukumar De Oxford University Press, 2008.

[2]. Technology of Milk Processing Khan QA and Padmanabhan, ICAR, New Delhi.
[3]. Principles of Dairy Processing J.N.Warner, Wiley Eastern Ltd, New Delhi.
[4]. Judging of Dairy Products J.A.Nelson and Trout The Olsen publishing Co. Milwankee, Wisconsin, USA.
[5]. Dairy Technology: Principles of milk properties and processes Walstra P. CRC Press, 1999
[6]. Technology of Dairy Products Early R. Springer, 1998.