Department of Food Sciences

University of the Punjab, Lahore

Course Outline

Program	B.Sc. (Hons.) Food Science & Technology	Course Code	FST-307	Credit Hours	3(2-1)
Course Title	**DAIRY TECHNOLOGY**				

Course Introduction

The course is about the technology of milk and milk products. It will provide basic knowledge of milk production, biochemistry and its product. Students would be able to learn about processing of milk and various milk products and their technological aspects. It will deliver the learning of milk preservation techniques of milk like homogenization, pasteurization, UHT and drying. Production technology of different milk products like yoghurt, cheese, butter and ice-creams along with brief introduction of our traditional dairy products will teach. The concepts of milk and milk product processing machinery will give to the students. Moreover, laboratory skills for sensorial and adulteration tests as well as physiochemical and microbiological analysis of milk and milk products will also demonstrate to the students.

Learning Outcomes

After completing this course students should be able to:

1. Find the composition, processing and analysis of milk and milk products.
2. Demonstrate industrial production of milk and milk products.
3. Apply principles and techniques for the preservation of milk and milk products.

THEORY

	Course Content	Assignments/Readings
Week 1	**Unit-I** 1.1 Milk: production , statistics 1.2 Importance	Gosta B., 2008 Chapter 1
	1.3 standards 1.4 major constituents	Gosta B., 2008 Chapter 2
Week 2	**Unit-II** 2.1 Factors influencing raw milk quality 2.2 Milk handling: manual and machine milking	Gosta B., 2008 Chapter 1

	2.3 farm cooling, collection, reception 2.4 analyses at different levels transportation	Gosta B., 2008, Chapter 5
Week 3	**Unit-III** 3.1 Unit operations in milk processing: cream separation 3.2 Bactofugation, filtration, thermalization, standardization	Gosta B., 2008, Chapter 8
	3.3 homogenization 3.4 pasteurization	Gosta B., 2008, Chapter 8
Week 4	**Unit-IV** 4.1 Sterilization 4.2 UHT	Gosta B., 2008, Chapter 9
	4.3 Aseptic packaging and storage 4.4 distribution effect on milk constituents	Student assignments
Week 5	**Unit-V** 5.1 Technology and chemistry of evaporated milk	Gosta B., 2008, Chapter 17
	5.2 Microbiology and shelf life of evaporated milk	Gosta B., 2008, Chapter 17
Week 6	**Unit-VI** 6.1 Technology and Production of Condensed milk 6.2 Sweetened condensed milk	Gosta B., 2008, Chapter 16
	6.3 Powder milk 6.4 Characteristics of powder milk	Class quiz
Week 7	**Unit-VII** 7.1 Technology and chemistry of yoghurt: flow line 7.2 Microbiology	Gosta B., 2008, Chapter 11
	7.3 Starter cultures and fermentation 7.4 Metabolites produced in yogurt	Gosta B., 2008, Chapter 11
Week 8	**Unit-VIII** 8.1 Technology and Production of butter: types 8.2 Flow line	Gosta B., 2008, Chapter 12
	8.3 Microbiology 8.4 Starter cultures	Gosta B., 2008, Chapter 12
Week 9	**Unit-IX**	Gosta B., 2008, Chapter 14

	9.1 Technology and Production of Cheese: types and flow line	
	9.2 Microbiology and starter culture	Gosta B., 2008, Chapter 14
Week 10	**Unit-X** 10.1 Production of cheddar cheese	Gosta B., 2008, Chapter 14
	10.3 Production of mozzarella cheese and paneer	Gosta B., 2008, Chapter 14
Week 11	**Unit-XI** 11.1 Ingredients and their role 11.2 Technology of Ice cream production: Flow line and storage	Gosta B., 2008, Chapter 19
	11.3 Defects and characteristics of ice cream 11.4 Other frozen deserts	Students assignments
Week 12	**Unit-XII** 12.1 Technology and processing of cream	Gosta B., 2008, Chapter 8
	12.2 Traditional dairy products: Khoa and gulabjamun Production	Students Quiz
Week 13	**Unit-XIII** 13.1 Production technology of burfi and rabri	
	13.2 Dahi, lassi, kheer and desi ghee production	
Week 14	**Unit-XIV** 14.1 Milk by products: Production and utilization of whey	Gosta B.,(2008) Chapter 15
	14.2 Technology of Casein production	GostaB.,(2008) Chapter 20
Week 15	**Unit-XV** 15.1 Packaging and storage of different dairy products	Class Presentations
	15.2 Dairy plant design and Automation in dairy production.	
Week 16	**Unit-XVI** 16.1 Cleaning of dairy equipment: Aspects of cleaning, Cleaning objectives	Gosta B,(2008) Chapter 21

	16.2 Cleaning-in-place systems	Gosta B., 2008, Chapter 21

PRACTICAL		
Course Content		**Assignments/Readings**
Week 1	Milk sampling methods	
Week 2	Reception tests: Sensory test	
Week 3	Determine the sedimentation in the milk,	
Week 4	Measurement of pH of milk sample	
Week 5	Determination of acidity milk and milk products	
Week 6	Estimation of Lactometer reading	
Week 7	Clot on boiling and alcohol precipitation test	
Week 8	Microbiological analysis of milk: Measuring of total plate count (TPC) in milk sample	
Week 9	Measuring of total coliform count (TCC) in milk sample	
Week 10	Reductase test of milk sample	
Week 11	Physico-chemical and microbiolgical analysis: Measurement of fat in milk sample	
Week 12	Determination of total soluble solids of milk (TSS)	
Week 13	Tests for adulterants of milk: Detection of starch in milk	
Week 14	Detection of alkali treatment to milk	
Week 15	Detection of SMP to constitute the milk	
Week 16	Visit to commercial dairy farms and milk processing plants.	

Textbooks and Reading Material

Books Recommended

1. Gosta Bylund (2008). Dairy Processing Handbook. Alfa Laval/Tetra Pak Processing System, Lund, Sweden.
2. Chandan, R.C., Kilara, A. & Shah, N. (2015). Dairy Processing and Quality Assurance, John Wiley & Sons Inc., New York, USA.
3. Walstra, P., Wouters J.T.M. & Guerts T.J. (2006). Dairy Science & Technology. CRC Press Taylor & Francis Group, Boca Raton, Florida, USA.
4. Winton, A.L. & Winton K.B. (2006). Milk and Milk Products. Agrobios, Agro House, New Delhi, India.

5. Smith, G. (2000). Dairy Processing: Improving Quality. CRC Press Taylor & Francis Group, Boca Raton, Florida, USA.

Teaching Learning Strategies

1. Lectures
2. Class discussions
3. Quizzes
4. Assignments
5. Practical performance
6. Presentations

Assignments: Types and Number with Calendar

1. Milk and milk products processing plant design and flow sheet diagrams
2. Traditional dairy products development
3. Market study of new dairy products availability and opportunities
4. Latest dairy products equipment and their working processing technology
5. Dairy laboratory apparatus and its role in milk products control

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.