

SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY
NANDED

SYLLABUS

Of

B.Sc. Third Year

DAIRY SCIENCE

Annual Pattern (Revised)

Effective from June 2010

S.R.T.M.U. Nanded
Dairy Science
B.Sc. Third Year
(General outline of the course)
-: SCHEME :-

Sr. No.	Paper No.	Title of Paper	No. of Periods / Week / Paper	Marks
1	VIII	Market Milk Industry	3	100
2	IX	Dairy Technology	3	100
3	X	Practical Paper Based on Theory VIII Paper	One Practical of 3 periods/week	100
4	XI	Practical Paper Based on Theory IX Paper	One Practical of 3 periods/ week	100

DAIRY SCIENCE

B.Sc. Third Year

SYLLABUS

Theory Paper – VIII, IX & Pra. Paper- X & XI

Objectives : -

To impart the knowledge regarding :

- Present Status & Scope of dairy Industry in India.
- Significance of Milk & Milk products in human nutrition.
- Technologies used in indigenous milk products.
- Technologies used for western dairy products.
- Marketing of milk & milk products.
- Quality parameters for milk & milk products.
- Dairy Plants

S.R.T.M.U. Nanded
B.Sc. Third Year
Theory Paper No. VIII
Market milk Industry

Marks 100

3 Periods Per week

Unit I	No. of Periods	25
<ul style="list-style-type: none"> • Introduction to Market Milk Industry in India • History of development of Indian dairy industry with reference to NDDDB, OF and Dairy Co-operatives. • Production and Utilization patterns of Milk in India • Study of Udder : A) Morphology and Anatomy B) Physiology and Endocrinology C) Theories of Milk Secretion • Milk : Definition, Composition and Study of Milk Constituents • Physico-Chemical Properties of Milk • Nutritive Value of Milk • Factors affecting quality and quantity of Milk • Economics of Milk production. 		
Unit II	No. of Periods	25
<ul style="list-style-type: none"> • Collection, Transportation, Receiving, Grading, Weighing and cooling of Milk • Milk processing : Straining, Filtration, Clarification, Pasteurization, Homogenization • Standardization of Milk, Legal standards • Milk packaging : Pouch, Tetra packs, Glass bottles • Storage and distribution of Milk (Milk Marketing) 		

Unit III	No. of Periods	15
<ul style="list-style-type: none"> • Study of Bacteria, Classification, Properties, Reproduction and Growth • Sources of Microorganisms in Milk and their prevention • Steps in clean milk production • Milk Fermentation, Microbial toxins 		

Unit IV	No. of Periods	15
<ul style="list-style-type: none"> • Lay-out of Milk processing plant, Hygienic Requirements of plant, Process equipments and Personels, Plant and Machinery, Storage tanks, Ventilation, Drainage systems, Floorings, Doors And windows, Rodent control beat stations, Hand washing Stations • Metals used in Dairy Industry and their effect on quality of Milk • Steam generation and refrigeration • Dairy waste disposal 		

Theory Paper IX

Dairy Technology

Marks 100

3 Periods Per week

UNIT I	No. of Periods 15
<ul style="list-style-type: none">• Introduction to milk products technology• Dairy products and Entrepreneurial opportunities• Classification of Milk Products• Study of Starter cultures• Marketing of milk products : Scope and Limitations.	
UNIT II	No. of Periods 25
<ul style="list-style-type: none">• Study of fermented milk products : Curd, Yoghurt, Chakka, Shrikhand, Kefir, Kumiss• Cream : Methods of Separation, types of cream, defects and efficiency of cream separator.• Butter : Definition and composition of desibutter and Creamery butter, History, Manufacturing, Packaging, Storage and defects in butter.• Ghee : History, Definition and composition, methods of preparation Grading, Packaging storage and Defects in Ghee.	
UNIT III	No. of Periods 25
<ul style="list-style-type: none">• Khoa: Definition, Composition, types, manufacturing, Packaging and Khoa based sweet meets• Channa: Definition, Composition, Manufacturing and Channa based sweet meets i.e. Rosogolla, Sandesh, Kalakand etc.• Panir : Manufacturing, Packaging and Storage.• Ice-Cream: History, Definition, Composition, Manufacturing, Storage and defects, Kulfi• Study of Indigenous Milk products : Basundi, Rabri etc.• Milk by products: Casein, Lactose, Whey, Ghee residue.	

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- Cheese : History, Definition, Composition, Classification, Manufacturing Storage and Defects
 - Condensed Milk : History, Definition, Composition, Manufacturing and Defects.
 - Milk Powder: Definition, Composition, types, Methods of Manufacture, packaging, Storage and defects.
 - Study of special Milks : Toned and double toned milk, Fortified milk, Synthetic milk, Recombined and Reconstituted milk.

Practical Paper - X

Mark – 100	One Practical of 3 periods / Week
1. Study of Udder Structure	01
2. Study of	
a. Preparation of Animals for Milking	01
b. Equipments/Utensils used for milking	01
3. Milking Methods-Hand Milking	
- Machine milking-components and working	02
4. Physico-chemical evaluation of Milk	
a. Sampling-	01
b. Organoleptic/ Platform tests	01
c. Specific gravity	01
d. Viscosity	01
e. pH and acidity	01
f. Electrical conductivity and Refractive Index	02
g. Freezing point	01
h. Fat, SNF and TS	02
5. Adulteration and its detection from milk (2/3).	01
6. Detection of preservatives (2/3).	01
7. Identification of bacteria in milk sample.	02
8. Methods of counting bacteria by SPC/ MBRT/ RRT	03
9. Preparation of standardized milk.	01
10. Study of detergents.	01
11. Cleaning and sterilization of milk utensils.	01
12. Milk packaging materials.	01
13. Study of milk records.	01
14. Visits: Milk collection centre, co-op, dairy society, Milk processing plant.	02

Practical Paper – XI

Mark – 100	One Practical of 3 periods / Week
1. Preparation of curd, Lassi and acidophilus milk	02
2. Preparation of Chakka and Shrikhand	02
3. Preparation of Ice-Cream and Kulfi	02
4. Cream separation	01
5. Preparation of Butter	01
6. Preparation of Ghee	01
7. Preparation of Khoa	01
8. Preparation of Khoa based sweets like Pedha, Burfi and Gulab Jamun	04
9. Preparation of Channa and Channa based sweets like Kalakand, Rosgolla and Sandesh	04
10. Preparation of Basundi, Rabri and Kheer	03
11. Preparation of Chocolate milk, Milk Shakes and Reconstituted milk	04
12. Adulteration in milk products and their detection	02
13. Visits to Butter, Ice-cream, milk powder and Cheese Making units of the processing plant	02

List of Equipment, Glassware's

1. Model of udder, charts, figures showing Internal and External structure. Milking pail, weighing buckets, milking machine.
2. Platform test equipments, strainers, filters, clarifiers .
3. Centrifugal fat testing Machine, Milk-o-tester, Majoneer **flasks**
4. pH Meter, pH papers
5. Oven, Incubator, Muffle furnace, Autoclave
6. Weighing scales, balances
7. Microscope, Colony counter, Inoculation chamber
8. Viscometers, Hortvet cryoscope
9. Centrifugal cream separator, Hand operated, Power driven
10. Butter churner and accessories, Ghee vat
11. Ice-Cream freezer and accessories, Mixer, grinder
12. Heating units, heat exchangers
13. Electrical conductivity meter
14. Stainless steel and iron pans, Laddle, spoons, scrapers
15. Paneer pot and paneer press
16. Cheese making equipments
17. Milk packaging materials, capping unit (hand operated)
18. Laboratory glasswares and required chemicals
19. Richmond scales for T.S.
20. Refractometer

Reference Books:

1. Out lines of Dairy Technology - S.K. De
2. Milk & Milk Products - Eckless, Combs & Macay
3. Modern Dairy Products - Lampert
4. Dairy Chemistry - M.M. Rai.
5. Principles of Dairy Chemistry - Jeneess & Patton
6. A Text book of Dairy Chemistry - N.C. Ganguly
7. Fundamentals of Dairy Chemistry - Web & Jonson
8. Dairy Chemistry - Fox
9. Dairy Processing - James Warner
10. Indigenous milk products - ICAR pub.
11. Hand book of Dairy Science - K.C. Mahanta
12. Dictionary of Dairying - Davis & Leonard Hill
13. Engineering for Food & Dairy Processing - E.M. Farrel
14. Dairy Plant-Management & Engineering - Tufail Ahemad
15. Text book of Practical Dairy Chemistry - N.K. Roy & D.C. Sen
16. Milk Testing - J.G. Davis
17. Dairy Microbiology - K.C. Mahanta
18. Dairy Bacteriology - Hammer
19. Fundamentals of Dairy Microbiology - J.B. Prajapati
20. Standard Methods for Examination of Dairy Products - Gary H. Richerdson
21. Market Milk Industry - C.L. Rhodhouse & J.L. Henderson
22. Comprehensive Dairy Microbiology - Yadav, Batish and Grover
23. A Text Book of Animal Husbandry - J.C. Banerjee
24. The Fluid Milk Industry - Handerson
25. ISI Specifications - BIS Publication

Practical Question Paper proforma
B.Sc. Third Year, Dairy Science
Paper-X

		Mark – 100
1.	Spotting – Lab. Equipments (10 Spots)	10
2.	Udder on Model / Specimen / Milking Utensils/ Milking Machine	10
3.	Milk Analysis (any One)	20
	a) Fat / TS	
	b) % Titrable acidity / pH	
	c) Specific gravity / SNF	
	d) Viscosity / Electrical Conductivity / Freezing point/ Refractive Index	
4.	Detection of Milk adulterants / Preservatives	15
5.	Sensory evaluation of milk / preparation of standardized milk	15
6.	Identification of Bacteria / MBRT/ SPC/ RRT	10
7.	a) Record book	20
	b) Excursion Report & Viva - Voce	

Practical Question Paper proforma

B.Sc. Third Year, Dairy Science

Paper-XI

		Mark – 100
1.	Spotting – Appliances, Milk Products (10 Spots)	20
2.	Preparation of Dairy Product (any one) Basundi/ Rabri/ Khoa/ Chocolate Milk/ Milkshake	15
3.	Preparation of Dairy Products (any one) Channa/ Kalakand / Paneer / Rasogolla	15
4.	Preparation of Dairy Product (any one) Khoa/ Padha/ Barfi/ Gulabjam	15
5.	Preparation of Dairy Product (any one) Curd / Chakka/ Shrikhand / Butter/ Ghee/Ice-cream	15
6.	a) Record book	20
	b) Excursion Report & Viva - voce	

S.R.T.M.U.
QUESTION PAPER PATTERN (THEORY)
B.Sc. Third year
Dairy Science
Theory Paper VII & IX

Time 3 Hrs	Marks 100	
Q. 1	A) Select appropriate Answer	10 Marks
	B) Short Notes (Any Two.)	10 Marks
	a)	
	b)	
	c)	
	d)	
Q. 2	(From Any Unit)	
	Long answer type	20 Marks
	OR	
	Long answer type	
Q. 3	(From Any Unit)	
	Long answer type	20 Marks
	OR	
	A)	10 Marks
	B)	10 Marks
Q. 4	(From Any Unit)	
	A)	10 Marks
	B)	10 Marks
	OR	
	A)	10 Marks
	B)	10 Marks
Q. 5	(From Any Unit)	
	Write Answers of the Following (Any Two)	20 Marks
	a)	
	b)	
	c)	
	d)	