

SWAMI RAMANAND TEERTH MARATHAWADA UNIVERSITY, NANDED

SYLLABUS

OF

B.Sc. Third Year

DAIRY SCIENCE

(Semester Pattern)

Effective from June 2013

S.R.T.M.U. Nanded
Dairy Science
B.Sc. Third Year (Semester Pattern)
(General Outline of the Course)
SEM - V and VI

-: SCHEME :-

Semester V

Sr.No	Paper No.	Title of Paper	No. of Period / Week/ Paper	Marks
1	XII Theory	Market Milk Industry	03	40+10=50
2	XIII Theory	Dairy Technology I	03	40+10=50

Semester VI

Sr.No	Paper No.	Title of Paper	No. of Period / Week/ Paper	Marks
3	XIV Theory	Market Milk Processing	03	40+10=50
4	XV Theory	Dairy Technology II	03	40+10=50
Annual Practical Examination at the End of the Academic Year				
5	Pra. Paper XVI	Practical Paper based on Theory Paper XII, XIV	One Practical of 3 periods /Week	50
6	Pra. Paper XVII	Practical Paper based on Theory Paper XIII, XV	One Practical of 3 periods /Week	50

DAIRY SCIENCE
B.Sc. Third Year
SEM - V and VI Theory and Practical

SYLLABUS

Theory Paper - XII, XIII, XIV, XV & Pra. Paper - XVI & XVII

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.
- ❖ Quality Standards for milk & milk products.
- ❖ Dairy Plant operations.
- ❖ Marketing of Milk & Milk products.
- ❖ Recent trends in Dairy Technology.

DAIRY SCIENCE
B.Sc. Third Year Semester -V
Theory Paper No. XII
Market Milk Industry

Marks 100	3 Periods Per Week
UNIT I	No of Periods 08
<ul style="list-style-type: none">❖ Introduction to Market Milk Industry in India.❖ History of development of Indian dairy industry with reference to NDDB, OF and Dairy Co-operatives.❖ Production and utilization patterns of Milk in India.❖ Economic of Milk production.	
UNIT II	No. of Periods 10
<ul style="list-style-type: none">❖ Study of Udder : A] Morphology and Anatomy B] Physiology and Endocrinology C] Theories of Milk Secretion	
UNIT III	No. of Periods 15
<ul style="list-style-type: none">❖ Milk : Definition, Composition and Study of Milk Constituents❖ Physico-Chemical Properties of Milk❖ Nutritive Value of Milk❖ Factors affecting quality and quantity of Mil.	
UNIT IV	No. of Periods 12
<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 Fermentations, Products of Microbial growths.	

Semester V
Theory Paper XIII
Dairy Technology - I

Marks 100	3 periods per week
Unit I	No. of periods 06
<ul style="list-style-type: none">❖ Introduction to milk products technology❖ Dairy products and entrepreneurial opportunities❖ Classification of milk products❖ Marketing of milk products: scope and limitations.	
Unit II	No. of Periods 12
<ul style="list-style-type: none">❖ Study of starter cultures❖ Study of fermented milk products: curd, yoghurt, chakka, Shrikhand, kefir, kumiss❖ Khoa : definition, composition, types, manufacturing, packaging and khoa based sweet meats	
Unit III	No. of Periods 12
<p>Study of indigenous milk products: basundi, rabri etc.</p> <ul style="list-style-type: none">❖ Channa: definition, composition, manufacturing and channa based sweet meats i.e. Rosogolla, Sandesh, Kalakand etc.❖ Panir: manufacturing, packaging and storage.	
Unit IV	No. of Periods 15
<ul style="list-style-type: none">❖ 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.	

Semester VI
Theory Paper XIV
Market Milk Processing

Marks 100	3 Periods per Week
Unit I	No. of Periods 15
<ul style="list-style-type: none">❖ Collection, Transportation, receiving, Grading, Weighing and cooling of Milk.❖ Milk processing : Straining, Filtration, Clarification, Homogenization.❖ Pasteurization - LTLT, HTST, Vaction, UHT, Uprization, Stassanization, Sterilization.	
Unit II	No. of Periods 10
<ul style="list-style-type: none">❖ Standardization of Milk, Legal standards, pricing policy of Milk❖ Milk packaging : Pouch, Tetra packs, Glass bottles❖ Storage and distribution of Milk (Milk Marketing)	
Unit III	No. of Periods 12
<ul style="list-style-type: none">❖ Lay-out of Milk processing plant, Hygienic Requirements of plant, Process equipments and Personnel, Plant and Machinery, Storage tanks, Ventilation, Drainage systems, Floorings, Doors and Windows, Rodent control beat stations, Hand washing Stations.	
Unit IV	No. of Periods 08
<ul style="list-style-type: none">❖ Metals used in Dairy Industry and their effect on quality of Milk Steam generation and refrigeration❖ Dairy waste disposal.	

Semester VI
Theory paper XV
Dairy Technology II

Marks 100

3 Periods per Week

Unit I

No. of Periods 08

- ❖ Recent Trends in Dairy Technology : Membrane technology, Food preservation , Water activity, Hurdle technology, Enzyme Encapsulation

Unit II

No. of Periods 10

- ❖ Ice-cream: history, definition, composition, manufacturing, storage and defects, kulfi.
- ❖ Milk byproducts: casein, lactose, whey, ghee residue.

Unit III

No. of Periods 12

- ❖ Cheese: history, definition, composition, classification, manufacturing. Defects in manufacturing and storage.
- ❖ Condensed milk: history, definition, composition, manufacturing and defects.
- ❖ Evaporated Milk : Definition, Composition, manufacturing and defects.

Unit IV

No. of Periods 15

- ❖ 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 - XVI

Marks - 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. Detection of Phosphatase enzyme	01
8. Identification of bacteria in milk sample.	02
9. Methods of counting bacteria by SPC / MBRT /RRT.	03
10. Preparation of standardized milk.	01
11. Study of detergents.	01
12. Cleaning and sterilization of milk utensils.	01
13. Milk packaging materials.	01
14. Study of milk records.	01
15. Visits : Milk collection centre, co-op, dairy society, Milk processing plant.	02

Practical Paper - XVII

Marks - 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, Rosogolla 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, Aautoclave
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, 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 & Macacy
3. Modern Dairy Products - Lampert
4. Dairy Chemistry - M.M. Rai.
5. Principals 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. Farrell
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. Richardson
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 - Henderson
25. ISI Specifications - BIS Publication
26. Technology of Dairy plant operations - K. P. S. Sangwan.
27. technology of milk processing - C.P. Anantkrishnan, A. khan and P.N. Padmanabhan
28. Milk and It's properties - S.M. Srivastava
29. Chemical & Microbiological Analysis of milk & milk projects. - Ramakant Sharma.

Dr. S. A. Kulkarni
Chairman
(Adhoc Board in Dairy Science)

Practical Question Paper Proforma
B.Sc. Third Year, Dairy Science
Paper - XVI

		Marks - 100
1.	Spotting - Lab. Equipments (10 Spots)	10
2.	Udder on Model / Specimen / Milking Utensils/ Milking Machine	15
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/ Phosphatase enzyme.	15
5.	Sensory evaluation of milk / preparation of standardized milk	10
6.	Identification of Bacteria / MBRT /SPC / RRT	10
7.	a) Record book	20
	b) Excursion Report & Viva - Voice	

Practical Question Paper Proforma
B.Sc. Third Year, Dairy Science
Paper - XVII

		Marks - 100
1.	Spotting - Appliances, Milk Products (08 Spots)	16
2.	Preparation of Dairy Product (any one) Basundi / Rabri / Khoa / Chocolate Milk / Milkshake	16
3.	Preparation of Dairy Products (any one) Channa / Kalakand / Paneer / Rasogolla	16
4.	Preparation of Dairy Product (any one) Khoa / Pedha / Barfi / Gulabjam	16
5.	Preparation of Dairy Product (any one) Curd / Chakka / Shrikhand / Butter / Ghee / Ice-cream	16
6.	a) Record book	20
	b) Excursion Report & Viva – voice	

