

**D.R. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.**



Revised Syllabus of
B.Sc. [Dairy Science & Technology]
Semester –V & VI

(*Effective from 2011-12 & onwards*)

B.Sc. Third Year
(Dairy Science & Technology)
Semester V & VI

Objectives

The course is planned to acquaint the students with:

- i) Animal reproduction practices in dairy farm.
- ii) Breeding practices in dairy farm
- iii) Manufacturing technology of Ice-cream and frozen desserts
- iv) Fat rich dairy products and their manufacture at industrial level
- v) Production of condensed and dried milks
- vi) Food safety and quality assurance

**B.Sc. III Year (Semester – V)
Dairy Science & Technology
Paper-XVII**

Title: Animal Reproduction & Artificial Insemination

Max Marks: 50

Sr. No.	Topics	No. of Periods
1.	Anatomy of reproductive system in cattle/Buffalo.	06
2.	Growth, Puberty Gametogenesis, - Growth- Defination, Factors affecting growth. Puberty- Defination, factors affecting puberty. Gametogenesis- Defination, types.	04
3.	Study Of oestrus cycle- Defination, Harmones in reproduction & Stages of Oestrus cycle.	04
4.	Ovulation , Fertilization & Implantation.	04
5.	Gestation- Types of Placenta, Functions of Placenta, Length of gestation in Farm animals, Factors affecting Gestaion.	02
6.	Pregnancy Diagnosis	03
7.	Parturition- Defination ,stages of parturition, evolution of Uterus.	03
8.	Artificial Insemination – a) Defination, advantages & Disadvantages b) Evolution of Semen c) Collection of Semen d Dilution of semen e) Preservation of semen f) Handling & storing of semen	14

9	Bio-techniques in Animal Reproduction a) A.I. –Time, technique b) Super Ovulation c) Oestrus Synchronization d) ETT e) Cloning.	12
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Sr.No.	Topics	No. of Periods
II	Fat rich dairy products	
	A) Cream i) Methods of cream separation ii) Types of cream iii) Factors affecting efficiency of cream iv) Defects of cream	08
	B) Butter: i) History ii) Definition, composition & types of butter iii) Butter churn iv) Method of manufacturing v) Factors affecting fat losses in butter milk vi) Theories of churning vii) Defects, their causes & prevention viii) Continuous butter making machine{ CBMM) ix) Comparison of desi and table butter	08
C) Butter oil i) Composition ii) Method of manufacturing iii) Distribution & uses	07	

**B.Sc. III Year (Semester – V)
Dairy Science & Technology**

Practical paper-XIX

Animal reproduction & artificial insemination

Max Marks: 50

Sr.No.	Topics
1.	Study of reproductive organs of cattle, buffaloes, sheep, goat on chart/model/specimen
2.	Study of section slides of spermatogenesis, oogenesis, maturation of sperm & ova
3	Assembling and preparation of A.V., collection of semen by A.V.
4	Study of A.I. equipments & insemination of cow
5	Examination of semen
6.	Preparation of semen extender/dilutor
7.	Pregnancy diagnosis in cow
8.	Detection of heat in farm animals
9.	Project work
10.	Visit to slaughter house & A.I center

B.Sc. III Year (Semester – V)

Dairy Science & Technology

Practical paper-XX

Ice-cream & fat rich dairy products

Max Marks: 50

Sr. No.	Topics
1.	Study of ice-cream freezer
2.	Calculation & standard of ice-cream mix
3.	Manufacturing of soft serve plain & fruit flavored ice-cream
4.	Preparation of kulfi
5.	Preparation of milk shake
6.	Study of cream separator
7.	Separation of cream
8.	Study of butter churn & butter making equipment
9.	Manufacturing of table butter & white butter
10.	Manufacturing of butter oil
11.	Project work
12.	Visit to ice-cream plant

B.Sc. III Year (Semester – VI)

Dairy Science & Technology

Paper-XXII

Title- Condensed, dried milk and by-products

Max Marks: 50

Sr.No.	Topics	No. of periods
1.	Condensed and evaporated milk. a) History, status and scope. b) Physico-chemical changes taking place during manufacturing of condensed milk c) Heat stability of milk & condensed milk d) Condensed milk, sweetened condensed milk & evaporated milk e) Seeding crystallization & stability of evaporated milk f) Defects in condensed milk, their causes & prevention	14
2.	Dried milk a) history & status in India b) Types, composition, PFA/BIS and international standards c) Manufacturing of skim milk powder (SMP), whole milk powder (WMP) and heat classified powder d) Physical properties of dried milk e) Defects during manufacturing & storage, their causes and prevention f) Study of infant milk food, malted milk food and dairy whitener	14
3	By- products a) Status, scope and utilization of dairy by- products in India b) Physico chemical characteristic of whey, butter milk c) Whey processing, beverages of whey and dried milk d) Butter milk processing, condensed butter milk & dried butter milk e) Casein, industrial and food grade	15

	Lactose	
4	Introduction to food safety, quality assurance: a) international organization for standards (ISO) b) total quality management (TQM) c) hazard analysis critical control point (HACCP)	06

B.Sc. III Year (Semester – VI)

Dairy Science & Technology

Practical Paper-XXIII

Genetics and animal breeding

Max Marks: 50

Sr. No.	Topics
1.	Judging of dairy cattle
2.	Estimation of gene frequency
3.	Estimation of genotype frequency
4.	Estimation of most probable producing ability in cow
5.	Estimation of breeding efficiency of cow
6.	Project work
7.	Visit to cattle breeding farm

B.Sc. III Year (Semester – VI)

Dairy Science & Technology

Practical Paper-XXIV

Condensed, dried milks and by-products

Max Marks: 50

Sr. No.	Topics
1.	Study of vacuum pan
2.	Determination of heat stability of milk
3.	.manufacturing of condensed & evaporated milk
4.	Study of drum dryer
5.	Study of spray drying plant
6.	Manufacturing of skim milk & whole milk powder
7.	Determination of partial & bulk density of dried milks
8.	Preparation of whey beverages
9.	Preparation of casein
10.	Preparation of lactose
11.	Project work

Reference Books

- 1] A Text book of Animal Husbandry by - G.C. Banarjee
- 2] Milk and milk products-----Eckles, Comb and Mary
- 3] Milk and milk products ----Harbonsing and Moore
- 4] Modern Dairy Products-----by Lampert
- 5] Dairy India Year Book – 2007 by - P.R. Gupta
- 6] Dairy Plant Engineering and Management by Tufail Ahmed.
- 7] Handbook of Dairy science----by K. C. Mahanta
- 8] Outlines of Dairy Technology by Sukumar De.
- 9] Milk products in India-----M.R. Shrinivasan & C.P.Anantkrishnan.
- 10] Dairy Technology and Engineering by H.G. Kessler
- 11] Ice-Cream-----by W. S. Arbuckle
- 12] Dairy Processing by Earl.
- 13] Technology of Indian milk products—by R.P.Aneja, B.N.Mathur, R.C. Chandan & A.K. Banerjee.
- 14] Introduction to food safety-----IGNOU, New Delhi.
- 15] Food Safety & Quality Assurance—IGNOU, New Delhi.
- 16] Hazards to food Safety-----IGNOU, New Delhi.
- 17] Reproduction in farm animals----C. N. Sane & others.
- 18] Hand Book of Indian Dairy Farmers---Patrick John.
- 19] A Textbook of Genetics-----Dalela R. C. & S. R. Verma.
- 20] Genetics and Breeding in farm animals---Banerjee & Mukharjee.
- 21] Reproduction in farm animals-----Hafeez.
- 22] Hand book & Physiology of farm animals----R. D. Frandson.
- 23] Anatomy & Physiology of farm animals---R. D. Frandson.
- 24] Principles of Dairy Science----G. H.Schmidt, L. D. Vivek & N. N. Pathak.
- 25] Genes and Evolution-----JHA
- 26] Cattle embryo transfer procedure-----Curtis.
- 27] Genetics of Live stock improvement-----John F. Lesley
- 28] An Introduction to Genetics-----B. K. Jain.
- 29] Population Genetics in animal breeding----Franz pitcher.

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