Syllabus of

B.Sc. Second Year

Subject: Animal Husbandry and Dairy Science

W.E.F. 2009-2010

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Animal Nutrition

Paper V

Sr. No.	Topics	No. of periods
1	Introduction to the subject	1
2	a) Anatomy of digestive system in ruminants (Cattle/Buffalo) b) Study of rumen microbiology	5
3	**Study of nutrients and their nutritional importance:** a) Water: sources, requirements in animal body, water loss & functions of water in animal body b) Carbohydrates: Definition, classification, importance, digestion and metabolism in ruminants c) Proteins: Definition, classification, importance, digestion in ruminants d) Lipids: Definition, classification, importance, digestion in ruminants e) Minerals: Definition, types, and importance in animal nutrition f) Vitamins: Definition, classification, and importance in animal nutrition. g) By pass protein, probiotics, antibiotics, hormones, and other growth stimulating substances	**23**
4	Classification of feeds and fodder	3
5	Agronomical practices for fodder production	2
6	**Cultivation of important fodder crops:** a) Legumes: Lucerne, Berseem, and Cowpea, Subabul b) Non legumes: Jawar, Maize, Oat c) Grasses: hybrid Napier, Para grass, Rhodes, Stylo, Guinea Grass d) Intensive/ relay fodder cropping programme	12
7	Conservation of green fodders as Silage and Hay	5
8	**Study of roughages:** a) Nutritional characteristics of roughages b) Processing of inferior quality roughages	5

Sr. No.	Topics	No. of periods
9	Nutritional characteristics of concentrates	2
10	Study of agro-Industrial by-products and unconventional feeds: sugar industry by products, mango seed kernel groundnut husk, neem cake, babool and babool pods, tamarind seeds, urea molasses and feeding UMMB	6
11	Feeding livestock during scarcity	1
12	Measures of energy value and protein value of feeding stuff – GE, 04 DE, ME, NE, SE, DCP, TDN, Biological value, PER (Protein Efficiency Ratio), Protein replacement value, EAA (Essential Amino Acid)	4
13	Feeding standards for farm animals.	2
14	Study if compounded feeds, concentrate mixtures, calf starters, and milk replacer and mineral mixtures	5
15	Study of ration: Definition, types, characteristics of balanced ration	8
16	Factors affecting digestion of feed and digestibility coefficient	3
17	Natural grass land, pasture improvement & management	4

PRACTICAL

Animal Nutrition

Paper VII

Max. Marks - 100

1	Collection and identification of feeds / fodder
2	Proximate analysis of important feeds and fodders a) Preparation of sample of feeds/fodder for chemical analysis and storage. b) Detection of moisture / Dry matter content in feed c) Determination of crude fiber d) Determination of crude protein e) Determination of enter extract f) Determination of ash
3	Study of digestive system of ruminants on model
4	Preparation of feeds and fodder, Chaffing, Cooking, Grinding, Soaking, Pelleting and Enriching
5	Processing of inferior quality roughages
6	Computation of ration for different categories of farm animals
7	Preparation of concentrate mixtures
8	Study of Calf starter, milk replacer and Mineral mixtures
9	Silage and Hay making types of silos relay/intensive
10	Preparation of cropping scheme of fodder crops
11	Preparation of calendar to supply fodder round the year
12	Visit to feed factory
13	Visit to Animal farms of Agricultural College, Veterinary College, and established dairy farm.

Reference Books

1	Animal Nutrition & Feeding practices in India	-S.K.Ranjhan
2	Hand Book of Indian Dairy Farmers	-Patrick John
3	A Text book of Animal Husbandry (8th Edn)	-G.C. Banerjee
4	Feeds and feeding	-G.B.Morrison
5	Live stock production and management	-NSR Sastri & Thomas
6	A Textbook of Animal Nutrition	-G.C.Banerjee
7	Animal Nutrition	-Maynard & Loosli
8	Principles & Practices of Dairy Farm Management	-Jagdish Prasad
9	Modern Dairy Cattle Management	-Davis
10	A Textbook of animal Husbandry & Dairy Science	-Jagdish Prasad
11	Dairy cattle feeding & management	- Wiltam N.Etgas
12	Live-stock feeding & management	- Sing & Moor
13	Hand book of animal Husbandry Science	- Amlendy Chakrabarti
14	Laboratory Manual for Nutrition Research	-S.K.Ranjan & Gopal K
15	The Science of Animal Husbandry 5th (Edn.)	- Baikely & Bade
16	Principles of Dairy Science	- G.H.Schmidt, L.D.Vivek
17	Dairy Cattle: Principles, Practices, Problems & Profits (2nd Edn) .	- Donald L. Bata. Frank
18	Milk production in the Tropics	-A. Chemberlin
19	Analytical techniques in animal nutrition research	-N.N. Pathak D.N.Kansra, R.C. Jakhmola
20	Analytical Techniques in Animal Nutrition	- P.C.Gupta V.K.Sharma -A.B. Maudar
21	Animal Nutrition	-Crampton and Harris
22	The feeding of farm animals in India	-P.E.Lander
23	Applied Nutrition	- D.V. Reddy
23	Nutritional microbiology of farm animals	-D.N. Karma, N.N.Pathak
24	Energy in Biological systems	- Smiths

Dairy Technology- I

Paper No. VI

Max Marks – 100

Sr. No.	Topics	No. of periods
1	**Introduction:** a) Indigenous dairy products b) Western dairy products	2
2	**Concentrated and Condensed Dairy Products:** a) Khoa :- Definition, composition, types, methods of manufacture, factors affecting yield, physico-chemical changes during manufacture and storage of Khoa, over run, defects. b) Khoa based sweets :- Peda, Burfi, Gulab Jamun, Milk Cake, Kalakand,Rabri, Basundi, Kheer, Khurchan	14
	Condensed and Evaporated milks: History, status scope in India and abroad, definition composition, method of manufacturing, lactose crystallization, browning, heat stability, gelation, salt balance, and defects.	10
4	**Fat rich dairy products**. a) Cream: - Definition, Composition, Methods of cream separation, Types of cream, Factors affecting cream in skimming efficiency, Defects. b) Butter: - Definition, Composition, Classification, Method of manufacturing Desi butter, Table butter and White butter. Fat c) losses in butter milk, Theories of churning, over run, defects.	16

	d) Study of buttermilk. e) Butter oil: - Definition, Composition, Methods of manufacturing, Uses. f) Ghee: - Definition, Composition, Methods of manufacturing, g) Physico-chemical changes during manufacturing, Ghee quality parameters, Grading, Renovation, Defects in Ghee. Ghee residues h) and its utilization.	

5	**Microbiology of starter culture:** Definition, types, classification of lactic starter culture, propagation, single and mixed starter culture, factors affecting propagation, properties of good starter culture, defects in starter culture and their control. Role of starter culture in preparation of various milk products.	12
6	**Fermented milk products:** a) Definition, Classification b) Dahi/Curd, Chakka, Shrikhand c) Yogurt d) Kefir e) Kumis f) Lebanon g) Yacult h) Bulgarian milk i) Acidophilus milk j) Cultured butter milk k) Lassi	18
7	Study of microbial toxins	3
8	**Packaging of dairy products:** Definition, objectives, principle and role of packaging, packaging materials, package forms, legal requirements of packaging materials and products information. Aseptic packaging, new packaging materials like biodeg radable films.	8
9	Role of daiying as an entrepreneurship for development of small-scale industry	4

PRACTICAL

Dairy Technology - I

Paper No. VIIi

Sr. No.	Topics
1	Preparation of khoa and detection of adulteration in khoa
2	Preparation of burfi and peda
3	Preparation of kalakand
4	Preparation of gulabjamun
5	Preparation of basundi
6	Preparation of rabri
7	Preparation of kheer
8	Study of cream separator
9	Separation of cream
10	Study of butter churn
11	Preparation of butter
12	Preparation of ghee
13	Detection of adulteration in ghee
14	Preparation of dahi
15	Preparation of chakka and shrikhand
16	Preparation of lassi
17	Identification of packaging materials
18	Visit to dairy products processing plant

Reference Books

1) Outlines of Dairy Technology, by Sukumar De; Oxford University Press publication

2) Milk and Dairy Product Technology by Edgar Spreer; Marcel Dekker publication

3) Dairy Technology: Principles of Milk properties & processes by P. Walstra, T.J. Geurts, A. Noomen, A. Jellema and M.A.J.S. van Boekel; Marcel Dekker publication

4) Technology of Indian Milk Products by R.P. Aneja, B.N. Mathur, Chandan R.C. and A.K. Banargee; A Dairy India Publication

5) Dairy processing: Improving quality, edited by Gerrit Smit; Woodhead publishing Limited

6) Fundamentals of Dairy Chjemistry by Webb Johnson and Alford, 2nd Ed.; CBS publishers & Distributors

7) Grading dairy produce by G. Sutherland Thomson; Medi World Press

8) Dairy India Yearbook - 2007 by. P.R. Gupta

9) Dairy Technology and Engineering by H.G. Kessler

10) Dairy plant Engineering and Management by Tufail Ahmed, Kitab Mahal

11) Textbook of Dairy Plant Layout & Design by Lalat Chander , I.C.A.R. publication

12) Principles of Dairy Chemistry by Jenners and Pattorn

13) Dairy Chemistry by M.M. Rai

14) Dairy Microbiology by K.C. Mahanta

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B.Sc. Second Year

Subject : Animal Husbandry & Dairy Science

Objectives:

The course is planned to acquaint the students with:

1) Study of nutrients and their nutritional importance in livestock
2) Study of various feeds and fodders used in animal feeding
3) Method manufacturing of concentrated and Condensed Dairy Products
4) Fat rich dairy products
5) Microbiology of starter culture
6) Fermented milk products
7) Packaging of dairy products