SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY

NANDED

SYLLABUS

Of

B.Sc. Second Year

DAIRY SCIENCE

Semester Pattern

Effective from June 2010

S.R.T.M.U. NANDED

B.Sc. Dairy Science

Second year

(Semester Pattern)

(Semester III, IV)

Objectives :

- The course is framed for getting the students acquainted with the breeding and nutritional aspects of important livestock.
- The anatomy and physiology of digestive system
- Role of various nutrients in animal nutrition.
- The nature and quality of ration/diet required to the livestock for maintaining different body systems along-with requirement of ration for production.
- The knowledge of reproduction and different breeding systems along-with application of bio-techniques.
- The recent advances in animal nutrition and animal breeding.
- The basic genetic principles applied in breeding of animals to increase their productivity.

S.R.T.M.U. NANDED

Sub - Dairy Science

General Outline of the course of B.Sc. second year

(Semester Pattern)

Sr. No.	Class	Paper No.	Title of the paper	Maximum Marks
Semester III (No. of periods 3 /week/paper)				
01	B.Sc. S.Y.	VI Theory	Animal Nutrition	50
	B.Sc. S.Y.	VI Theory	Animal Genitics and reproduction.	50
Semester IV (No. of periods 3 /week / paper)				
02	B.Sc. S.Y.	VIII Theory	Forage production feeds and feeding	50
		IX Theory	Animal Breeding	50
(One practical of periods 3 / week /paper) Annual Examination at the end of academic year				
03	B.Sc. S.Y.	X Practical	Practical based on Paper No. VI & VIII	100
		XI Practical	Practical based on paper VII & IX	100

Semester – III

Theory Paper No. VI

Animal Nutrition

Marks – 50 3 Periods per week

UNIT – I **No. of periods 08**

- Introduction to Animal Nutrition
- Anatomy of Ruminant's digestive system
- Rumen ecosystem
- Rumen manipulation

UNIT – II **12**

- Definition, classification, importance of nutrients in Animal nutrition - water, carbohydrates, proteins, Lipids, Minerals, Vitamins.

UNIT – III **13**

- Digestion, absorption, metabolism of carbohydrates, proteins, lipids
- Digestibility – Digestibility of nutrients, Digestion trials, factors affecting digestibility.

UNIT – IV **12**

- **Evaluation of energy value of feed –**
    - GE, DE, ME, NE, SE, TDN, HI, NR
- **Estimation of energy Value of feeds by -**
    - C N Balance technique
    - Bomb Calorimeter
    - Calculation of TDN by digestion trials
    - Chemical composition
- **Estimation of Protein value of feeds by –**
    - PER, B.V., Net protein utilization
    - DCP estimation by digestion trials
    - Nitrogen Balance experiments
    - NPN substances as a source of proteins

Semester – III

Theory Paper No. VII

Animal Genetics and Reproduction

Max. Marks 50 3 periods per week

UNIT – I	No. of periods 07
• Introduction to Animal Genetics • Animal genetic resources, conservation and approach related to regional aspects. • Gene, its function • Mendel's laws of inheritance	
UNIT – II	**10**
• Qualitative and quantitative traits • Variation and causes of variation • Sex linked inheritance • Sex influenced inheritance and sex limited inheritance • Random mating, Hardy Weinberg equilibrium	
UNIT – III	**14**
• Anatomy of Reproductive system of cattle • Study of Gametogenesis, Maturation of Sperm and Ovum • Study of Puberty, oestrus cycle	
UNIT – IV	**14**
• Fertilization, pregnancy, parturition in cow and buffalo. • Semen collection, evaluation, freezing, handling and transport • AI - Time and Technique, Advantages and disadvantages	

Semester – IV

Theory Paper No. VIII

Forge production, Feeds and Feeding

Max. Marks 50 3 periods per week

UNIT – I **No. of periods 15**

- Cultivation of green forages, their nutritional characteristics and importance in animal Nutrition
- Cultivation of Legumes-Lucerne, Berseem, Cowpea, subabhul
- Cultivation of Non Legumes-Jawar, Maize, Oat, Bajra
- Cultivation of Grasses-Napier, Paragrass, Gajraj, Stylo, Yeshwant, Jaywant.

UNIT – II **12**

- Classification of feeds
- Importance of concentrates and roughages
- Ration – types, principles of rationing
- Feeding practices for different categories of animals - Dry, Pregnant, Lactating cow and buffalo, working bullocks.

UNIT-III **10**

- Processing of feeds and fodders – Physical, Chemical, Microbiological treatment
- Agro-industrial by products and their role in animal nutrition
- Significance of fodder preservation

- Silage making
  - ◆ Principles and steps is silage making.
  - ◆Ensiling, Bio-chemical changes during ensiling
  - ◆ Quality and characteristics of silage
- Hay Making
  - ◆ Principles, types, curing of hay, quality, characteristics of hay.

UNIT – IV **08**

- Probiotics in Animal Nutrition
- Hormones and Harmonal preparations
- Antibiotics and Growth Promoters
- Feed additives, feed supplements, deleterious substances in feeds
- Pasture management and grazing systems.

Semester – IV

Theory Paper No. IX

Animal Breeding

Max. Marks 50 3 periods per week

UNIT – I **No. of periods 15**

- Principles of animal breeding
- Fertility, breeding efficiency, factors affecting breeding efficiency
- Sterility, causes of sterility

UNIT – II **10**

- Biotechniques is animal reproduction
  - ♦ Oestrus synchronization
  - ♦ E.T.T., cloning
  - ♦ Super ovulation, super foetation
  - ♦ Formation of breeding plans on the basis of genotypic and phenotypic parameters.
  - ♦ Factors to be considered while preparing Breeding plans.

UNIT-III **12**

- Systems of animal breeding
- Inbreeding – Methods, effects on growth, production.
- Out breeding – Methods, effects on growth, production.
- Buffalo breeding in India
- Review of cattle crossbreeding policy in India

UNIT – IV **08**

- Selection
- Choosing traits for selection
- Heritability
- Selection methods
  - ◆ performance method
  - ◆ Pedigree selection
  - ◆Progeny testing
  - ◆ Tandam method
- Effects of selection.

Semester – IV

Practical Paper No. X

Practicals based on Theory paper VI & VIII

Max. Marks 100 One practical of 3 periods per week

01. General precautions in Nutrition laboratory.
02. Collection of fodder samples and preparation of samples for chemical analysis.
03. Proximate principles of feeds.
04. Determination of DM and Moisture content in feeds.
05. Determination of ether extract.
06. Determination of crude fibre.
07. Determination of Nitrogen and crude Protein.
08. Determination of Ash.
09. Silage Making.
10. Hay Making.
11. Feed preparations processing and automization in animal feeding.
12. Feeding standards and nutrient requirement to different categories of livestock, feed formulations
13. Computation of ration for different categories of animals.
14. Preparation of UMMB, UROMOL.
15. Preparation of calf starter, milk replacer and mineral mixture.
16. Preparation of cropping scheme of fodder crops.
17. Feeds and fodder collection.
18. Visit to feed factory.
19. Visits to – animal farms of Agriculture college, veterinary colleges.
    Agro Industries.
    BAIF Urulikanchan etc.

Semester – IV

Practical Paper No. XI

Practicals based on Theory paper VII & IX

Max. Marks 100 One practical of 3 periods per week

1. Study of reproductive organs of cattle on Charts / Models / Specimens.
2. Estimation of gene frequency.
3. Estimation of genotype frequency.
4. Estimation of most probable producting ability in cow.
5. Estimation of breeding efficiency of the cow.
6. Study of section slides – spermatogenesis, oogenesis, maturation of sperm, ovum.
7. Judging of dairy cattle.
8. Preparation of heat expectancy chart.
9. Estimation of sire index.
10. Assembling and preparation of artificial vagina, collection of Semen by AV method.
11. Macroscopic examination of semen.
12. Microscopic Examination of normal spermatozoa in cattle and buffalo.
13. Bacteriological examination of semen.
14. Estimation of pH of semen.
15. Enumeration of the total sperms per unit volume of semen.
16. Preparation of semen extenders.
17. Determination of mobility of spermatozoa.
18. Study of AI equipments and insemination of cow in oestrus.
19. Pregnancy diagnosis in cow and buffalo.
20. Visit to – Cattle and Buffalo breeding farms.
    Slaughterhouse
    AI Center
    Semen collection center.

REFERENCE BOOKS.

1.	Reproduction in farm animals	- C.N. Sane & Others
2.	Animal nutrition & feeding practices in India.	- S.K. Ranjhan
3.	Hand book of Indian dairy farmers	- Patrick John.
4.	A Textbook of genetics	- Dalela R.C. & S.R. Verma
5.	A textbook of animal husbandry	- G.E. Banergee
6.	Feeds and Feeding	- G.B. Morrison
7.	Live stock production and management.	- NSR Sastri & Thomas
8.	A textbook of animal nutrition	- G.C. Banergee
9.	Genetics and Breeding in farm animals	- Banergee & Mukhargee
10.	Reproduction in farm animals	- Hafeez
11.	Animal Nutrition	- Maynord & Loosli
12.	Handbook & physiology of farm animals	- R.D. Frandson
13.	Anatomy & Physiology of farm animals	- R.D. Frandson
14.	Principles and practices of dairy farm management	- Jagdish Prasad
15.	Modern dairy cattle management	- Wiltam N. Etgas
16.	A textbook of animal Husbandry & Dairy Science	- Jagdish Prasad
17.	Dairy Cattle feeding & Management	- Wiltam N. Etgas
18.	Handbook of animal husbandry sciences	- Amlendy Chakrabarti
19.	Live stock feeding & management	- Sing & Moor
20.	Laboratory manual for nutrition research	- S.K. Rajan & Gopal Krishna
21.	The science of animal Husbandry	- Balkely & Bade
22.	Principles of Dairy Science	- G.H. Schmidt, L.D. Vleck

23.	Dairy Cattle : Principles, practices, Problems & profits.	- Donald L Bata, Frank
24.	Milk Production in Tropics	- A. Chemberlin
25.	Analytical Techniques in animal nutrition research	- N. N. Pathak, D.N. Kansra, R. C. Jakhmola
26.	Analytical Techniques in animal nutrition	- P.C. Gupta, V.A. Sharma, A.B. Maudar.
27.	Animal Nutrition	- Cramptom and Harris
28.	Applied Nutrition	- D.V. Reddy
29.	Nutritional microbiology of farm animals	- D.N. Karma, N.N. Pathak
30.	Genes and Evolution	- JHA
31.	Cattle Embrayo Transfer Procedure	- Curtis
32.	Genetics of Livestock improvement	- John F. Lasley
33.	An introduction to Genetics	- B.K. Jain
34.	A Test book of Animal Nutrition	- D.N. Verma

PRACTICAL QUESTION PAPER PROFORMA

B.Sc. Second year, Dairy Science

PAPER X

Time : 3 Hrs. Marks : 100

Q. 1	computation of ration / Cropping Scheme	20
Q. 2.	Spotting – Laboratory equipments, Glasswares used in analysis, Digestive system (Any FIVE)	10
Q.3.	Spotting – Feeds and Fodders (TEN SPOTS)	20
Q.4.	Proximate analysis DM/EE/CF/CP/NFE/Ash OR Silage making / Hay making	20
Q. 5	Feed processing / Preparation of calf starter / Milk replacer UMMB/UROMOL/Mineral mixture/ Concentrate Mixture.	10
Q.6	Record book and submission of collection of Feeds and fodders	10
Q.7	Viva – voce and excursion report.	10

PRACTICAL QUESTION PAPER PROFORMA

B.Sc. Second year, Dairy Science

PAPER XI

Time : 3 Hrs. Marks : 100

Q. 1	Spotting – Reproductive organs, Equipments of AI and AV Section Slides (ANY TEN SPOTS.)	20
Q. 2	Estimation of gene frequency / Genotype frequency / sire index/ Pregnancy Diagnosis.	10
Q. 3	Estimation of Breeding Efficiency of the cow/ preparation of Heat expectancy chart / Estimation of Most Probable Producing Ability in the cow.	15
Q. 4	Estimation of pH of a semen / Bacteriological Examination of semen	10
Q. 5	Preparation of semen extender / assembling and preparation of AV	10
Q. 6	Macroscopic examination of semen / Enumeration of the total sperm/sperm count per unit volume of semen / determination of mobility of Spermatozoa	15
Q. 7	A) Record Book	10
	B) Excursion Report and Viva-Voce.	10