

**SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY**

NANDED

SYLLABUS

Of

B.sc Second Year

DAIRY SCIENCE

Effective from June 2009

S.R.T.M.U. NANDED

B.sc Dairy science

Second year

Objectives:

- The course is framed for getting the students acquainted with
 - The breeding and nutritional aspects of important livestock.
 - The anatomy of digestive systems and role of various nutrients in animal nutrition.
 - The nature and quality of ration/diet required by 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.
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Theory Paper IV

ANIMAL NUTRITION

3 Periods per week

Marks 100

UNIT I	NO. OF PERIODS 15
FUNDAMENTALS OF ANIMAL NUTRITION	

- Introduction to animal nutrition.
 - Definition, classification and importance of nutrients in animal nutrition – water, carbohydrates, proteins, lipids, minerals and vitamins.
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UNIT II	25
DIGESTION AND METABOLISM OF NUTRIENTS	

- Digestive System of ruminants and poultry.
- Digestion, absorption and metabolism of carbohydrates, proteins and lipids.
- Digestibility: Digestibility of nutrients, digestion trials, digestion coefficient, NR, factors affecting digestibility.
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- Evaluation of energy value of feed: GE, DE, ME, NE, SE, TDN and HI.
- Estimation of energy content in feeds.
 - C N balance technique.
 - Bomb calorimeter.
 - Calculation of TDN by digestion trial
 - From Chemical composition.
- Estimation of protein value of feed:
 - PER, BV, Net protein utilization
 - DCP Estimation by digestion trial.
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- Nitrogen balance Experiment
 - NPN Substances as a source of proteins.
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UNIT III 25
FEEDS AND FEEDING

- Classification of feeds.
 - Importance of concentrates and roughages.
 - Cultivation of green forages and their nutritional characteristics.
 - Legumes: Lucerne, Berseem, cow pea, Dashrath, shevari, subabul.
 - Non Legumes: Jawar, Maize, Oat, Bajra.
 - Grasses : Napier ,paragrass, gajraj, guinea grass, stylo.
 - Ration: Types and principles of rationing.
 - Feeding Standards
 - Feeding practices for different categories of animals
 - Dry, Pregnant, Lactating cow and buffalo, working bullocks, sheep and goat.
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UNIT IV 15
FEED PROCESSING AND BIO TECHNIQUES

- Preparation and processing of feed.
 - Agro industrial by-products and their role in animal nutrition.
 - Bio-Techniques:
 - Probiotics in animal nutrition
 - Rumen eco-system and manipulation, bypass proteins, bypass fats
 - Hormones and hormonal preparations
 - Antibiotics and growth promoters.
 - Pasture management and grazing systems.
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Theory Paper V

GENETICS AND ANIMAL BREEDING

3 Periods per week

Marks 100

UNIT I ANIMAL GENETICS

NO. OF PERIODS 20

- Introduction to animal genetics.
 - Animal genetic resources – conservation and approach related to regional aspects.
 - Gene, their function.
 - Mendel's laws of inheritance.
 - Qualitative and Quantitative traits.
 - Cytological and molecular basis of heredity.
 - Mutation.
 - Variation.
 - Sex linked inheritance, Sex Influenced inheritance and Sex limited inheritance.
 - Random mating, Hardy Weinberg equilibrium.
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UNIT II 20 ANATOMY AND PHYSIOLOGY OF REPRODUCTIVE SYSTEM

- Study of anatomy of reproductive system in cattle.
 - Study of gametogenesis, maturation of sperm and ovum.
 - Study of puberty, oestrus cycle, fertilization, pregnancy and parturition in cattle.
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UNIT III 20 ANIMAL BREEDING

- Principles of animal breeding.
- Fertility, Breeding efficiency, factors affecting breeding efficiency.
- Sterility, causes of sterility.
- Selection:
 - Choosing traits for selection
 - Heritability
 - Selection Methods.
 - Effects of selection.
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- Systems of animal breeding:
 - Inbreeding – Methods, consequences of homozygosity.
 - Out breeding – Methods, effects on growth and production.
 - Adaptability of crossbreds in tropics.
 - Buffalo breeding in India.
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UNIT IV

20

BIOTECHNIQUES IN ANIMAL REPRODUCTION

- Semen - collection, evaluation, freezing, handling and transport.
 - AI – Time, technique, advantages and disadvantages.
 - Super-ovulation.
 - Superfoetation.
 - Oestrus Synchronization.
 - ETT
 - Cloning.
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S.R.T.M.U

PRACTICAL Paper VI

ANIMAL NUTRITION

One Practical Per Week

Marks 100

- 01 General precautions in Nutrition laboratory.
 - 02 Collection of fodder samples and preparation of samples for Chemical analysis and storage.
 - 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 automation in animal feeding.
 - 12 Computation of ration for different categories of animals.
 - 13 Preparation of conc. Mixtures, UMMB, UROMOL.
 - 14 Preparation of calf starter, milk replacer and mineral mixture.
 - 15 Preparation of cropping scheme of fodder crops.
 - 16 Feed and fodder collection.
 - 17 Visit to feed factory.
 - 18 Visits to- Animal farms of Agriculture College, Veterinary College.
Agro Industries.
BAIF Urulikanchan.
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S.R.T.M.U

PRACTICAL Paper VII

GENETICS AND ANIMAL BREEDING

One Practical Per Week

Marks 100

- 01 Study of reproductive organs of cattle on charts/models/specimens.
- 02 Estimation of gene frequency.
- 03 Estimation of genotype frequency.
- 04 Estimation of most probable producing ability in cow.
- 05 Estimation of breeding efficiency of the cow.
- 06 Study of section slides-spermatogenesis, oogenesis, maturation of sperm, ovum.
- 07 Judging of dairy cattle.
- 08 Preparation of heat expectancy chart.
- 09 Estimation of sire index.
- 10 Assembling and preparation of artificial vagina, collection of Semen by AV method.
- 11 Study of AI equipments and insemination of cow in oestrus.
- 12 Estimation of pH semen.
- 13 Bacteriological examination of semen.
- 14 To examine normal spermatozoa in cattle and buffalo.
- 15 Preparation of semen extenders.
- 16 Enumeration of the total sperms per unit volume of semen.
- 17 Macroscopic examination of semen.
- 18 Determination of mobility of spermatozoa.
- 19 Pregnancy diagnosis in cow and buffalo.
- 20 Visits to – Cattle and Buffalo breeding farms.
Slaughterhouse.
AI center
Semen collection Center.

S.R.T.M.U. REFERANCE BOOKS

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|---|---|
| 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 8th edition | -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 | -Davis. |
| 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 5 th edition | -Balkely & Bade |
| 22.Principles of DairyScience | -G.H.Schmidt.L.D.Vleck |
| 23.Dairy Cattle: Principles ,practices,
Problems & profits 2 nd edition | -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 Embryo Transfer procedure | - Curits |
| 32 Genetics of Livestock improvement | - John F. Lasley |
| 33 An introduction to Genetics | - B. K. Jain |
| 34 A Text book of Animal Nutrition | - D.N.Verma |

S.R.T.M.U.
PRACTICAL QUESTION PAPER PROFORMA

PAPER VI

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

S.R.T.M.U.
PRACTICAL QUESTION PAPER PROFORMA
PAPER VII

Time 3 Hrs.	Marks100
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

S.R.T.M.U.
QUESTION PAPER PATTERN (THEORY)
B.sc Second Year
Dairy Science
Theory Paper IV & V

Time 3Hrs

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) 20 Marks
Long answer type
- OR
- Long answer type
- Q.3 (From Any Unit) 20 Marks
Long answer type
- OR
- A) 10 Marks
B) 10 Marks
- Q.4 (From Any Unit)
- A) 10Marks
 - B) 10 Marks
- OR
- A) 10Marks
 - B) 10 Marks
- Q.5 (From Any Unit) 20 Marks
Write Answers of the Following (ANY TWO)
- a)
 - b)
 - c)
 - d)