

B. Sc. (Hons) Agriculture

Animal Husbandry and Dairy Science

- **Syllabus**
- **Teaching Schedule**
- **Suggested Readings**

Animal Husbandry and Dairy science

Sr. No.	Semester	Course No.	Credits	Course Title
1	I	AHDS-111	1+1=2	Livestock Production and Management
2	IV	AHDS-242	1+1=2	Livestock Breeding and Nutrition
3	V	AHDS-353	1+1=2	Technology of Milk and Milk Products
4	VI	AHDS-364	1+1=2	Sheep, Goat and Poultry Production
5	VIII	ELM AHDS 485	10(0+10)	Poultry Production
6	VIII	ELM AHDS 486	10(0+10)	Processing of Milk and Milk Products

Course :	AHDS 111		Credit:	2(1+1)	Semester-I
Course title:	Livestock Production & Management				

Syllabus

Theory

Importance of livestock in the national economy. Livestock development programmes of Govt. of India. Terminology used in livestock management. Important exotic and Indian breeds of cattle and buffalo. Male and female reproductive system of cattle. Measures and factors affecting fertility in livestock, Reproductive behaviour – oestrus and parturition. Mammary gland and milk secretion. Feeding and management of calves, heifers, dry, pregnant, milch animals and breeding bull. Disease – causes, symptoms, preventive and control measures. Feeding and production records. Organic livestock production- definition, importance, principles, standards, certifications, SWOT analysis. Concept of A 1 and A 2 milk. Effect of climate change on livestock production. Integrated livestock farming. Cost of milk production, economical unit of cattle and buffalo.

Practical

External body parts of cattle and buffalo. Routine management practices followed on livestock farm. Methods of handling and restraining of animal. Methods of identification marks and dehorning of animal. Recording of pulse rate, respiration rate and body temperature of animal. Preparation of feeding schedule and feeding different categories of cattle and buffalo. Estimation of age and body weight of animal. Clean and hygienic milk production and milking methods. Judging of animal for dairy and draft purpose. Study of computerized database on dairy farm. Vaccination and control of ecto and endo parasites in cattle and buffalo. Study of various dairy structures. Collection of semen and artificial insemination in farm animal. Pregnancy diagnosis in farm animal. Utilization of dairy farm wastes i. e. dung, urine, etc. Preparation of viable bank proposal for cattle and buffalo.

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	Importance of Livestock in the national economy and different livestock development programme	10
2	Livestock census and trends of livestock production	5
3	Terminology used in livestock management	5
4 & 5	Important Indian and exotic breeds of cattle and buffalo	7
6	Principles of maximization of livestock production	6
7	Feeding and management of calf, heifer and milking animal	5
8	Feeding and management of dry, pregnant, draft animals and breeding bull	10
9	Diseases and it's preventive, curative measures in cattle and buffalo	6
10	Bovine male and female reproductive system	7

Lecture	Topic	Weightage (%)
11	Fertility, sterility and reproductive behaviour viz. oestrus and parturition	7
12	Mammary gland and milk secretion	7
13	Organic livestock production- definition, importance, principles, standards, certifications, SWOT analysis, A 1 and A 2 milk	8
14	Effect of climate change on livestock production	5
15	Integrated livestock farming	7
16	Cost of milk production, economical unit of cattle and buffalo	5
	Total	100

b) Practical

Experiment	Topic
1	External body parts of cattle and buffalo
2	Routine management practices followed on livestock farm
3	Methods of handling and restraining of animal
4	Methods of identification marks and dehorning of animal
5	Recording of pulse rate, respiration rate and body temperature of animal
6	Preparation of feeding schedule and feeding different categories of cattle and buffalo
7	Estimation of age and body weight of animal
8	Clean and hygienic milk production and milking methods
9	Judging of animal for dairy and draft purpose
10	Study of computerized database on dairy farm
11	Vaccination and control of ecto and endo parasites in cattle and buffalo
12	Study of various dairy structures
13	Collection of semen and artificial insemination and pregnancy diagnosis in farm animal
14	Utilization of dairy farm wastes i. e. dung, urine, etc.
15	Preparation of viable bank proposal for cattle and buffalo
16	Visit to dairy farms

Suggested Readings

- 1) Livestock and poultry Production – Harban Singh and Moore, E. N. (1968)
- 2) Goat, Sheep and Pig Production and Management – Jagdish Prasad, (1996), Kalyani Publishers 1/1, Rajinder Nagar, Ludhiana
- 3) Text Book of Animal Husbandry – G. C. Banerjee (1999), 9th ed Oxford and IBH Publishers, New Delhi.
- 4) Dairy Bovine Production – Thomas, C. K. and Sastri, N. S. R., Kalyani Publishers, 1/1, Rajinder Nagar, Ludhiana.
- 5) Text-Book of Buffalo Production – Ranjhan, S. K. and Pathak, N. N. (1979) Vikas, Publishing House Pvt. Ltd. 576, Masjid Road, Jangpura, New Delhi.

Course :	AHDS 242		Credit:	2(1+1)	Semester-IV
Course title:	Livestock breeding and Nutrition.				

Syllabus

Theory

History and concept of animal breeding. Cell and cell division, spermatogenesis and oogenesis. Gene: Functions and role in animal genetics, gene actions, gene and genotypic frequencies, gene expression and mutation. Mendelian principles and Hardy Weinberg law. Chromosomes and its abnormalities. Laws of probabilities and animal breeding. Variations in economic traits of farm animals. Systems of breeding. Methods of selection and basis for selection. Quantitative and qualitative traits. Composition of plant and animal body. Classification of feeds and fodders. Important food ingredients and their functions in animal body. Digestive system, digestion and absorption of different nutrients in ruminants. Feed supplements and feed additives. Methods of measuring food values. Feeding standard & their principles. Concept in feed processing eg. Complete feed block, enrichment of low quality roughages and use of unconventional feed stuff. Recent trends in animal feed technology.

Practical

Study of animal cell structure. Estimation of gene and genotypic frequency. Estimation of heritability and repeatability. Estimation of genetic and phenotypic correlation by analysis of variance, co- variance. Estimation of most probable producing ability and breeding value of cow. Study of sire index. Estimation of regression coefficient. Estimation of genetic gain. Estimation of heterosis. Identification of feeds and fodders. Study of desirable characteristics of ration. Evaluation of nutritive value of various feeds and fodders. Study of nutritive values DCP, TDN, NR, SE and GE. Nutrient requirement of different classes of animals. Principles of thumb rule. Computation of ration for different classes of livestock. Conservation of fodder viz. Silage making, Hay making, Chaffing of fodders. Studies on processing of low quality roughages. Study of azolla and hydroponics fodder production.

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	History and concept of animal breeding	5
2	Cell and cell division, spermatogenesis and oogenesis	5
3	Gene: Functions and role in animal genetics gene actions, gene and genotypic frequencies	6
4	Gene expression and mutation and laws of probabilities	6
5	Mendelian principles and Hardy Weinberg law	8
6	Chromosomes and its abnormalities	8

Lecture	Topic	Weightage (%)
7	Variations in quantitative and qualitative traits of farm animals	5
8	Systems of breeding	6
9	Methods of selection and basis for selection	6
10	Composition of plant and animal body	6
11	Classification of feeds and fodders	6
12	Important nutrients and their functions in animals body	6
13	Digestive system and digestion of different nutrients in ruminants	6
14	Feed supplements and feed additives, method of measuring food values	7
15	Feeding standards and bypass nutrient technology	8
16	Concept in feed processing eg. Complete feed block, enrichment of low quality roughages and use of unconventional feed stuff	6
	Total	100

b) Practical

Experiment	Topic
1	A) Study of animal cell structure B) Estimation of gene and genotypic frequency
2	A) Estimation of heritability and repeatability B) Estimation of genetic and phenotypic correlation by analysis of variance, co- variance
3	Estimation of most probable producing ability and breeding value of cow
4	Study of sire index
5	Estimation of regression coefficient
6	A) Estimation of genetic gain B) Estimation of heterosis
7	Identification of feeds and fodders
8	Study of desirable characteristics of ration
9	Evaluation of nutritive value of various feeds and fodders
10	Study of nutritive values DCP,TDN,NR,SE and GE
11	Principles of thumb rule and nutrient requirement of different classes of animals
12	Computation of ration for different classes of livestock
13	Conservation of fodder A) Silage making, B) Hay making, C) Chaffing of fodders
14	Studies on processing of low quality roughages
15	Study of azolla and hydroponics fodder production
16	Visit to forage farms/ laboratory/veterinary dispensary

Suggested Readings

- 1) Lasley, J. S. (1978) Genetics of livestock improvement, New Delhi, Prentice House of India
- 2) Kanakraj, P (2001) A text book of Animal Genetics I, International Book Distributing Co. Lucknow, India
- 3) Jagdish Prasad (1996) Animal Genetics and Breeding practices, International Book Distribution Co. Lucknow, India
- 4) Rice, V. A. & Andrews F. N. (1964) Breeding and Improvement of Farm Animals 6thed Banerjee, G. C.(1998)
- 5) Feeds & Principles of Animal Nutrition Oxford and IBH Publ. New Delhi.
- 6) Ranjan, S. K. (1983) Animal Nutrition and Feeding Practices, Kalyani Publ. Ludhiana, New Delhi
- 7) Maynard L. A. Loosli J. K., Hintz H. F. and Warner R. C. (1979) Animal Nutrition 7th ed. Tata Mc Grow – Hill publishing Co. New Delhi
- 8) Reddy, B. V. (2001) Principles of Animal Nutrition and Feed technology oxford and IBH Publ. New Delhi
- 9) Mukherje, D. P. and Banerjee G. C. Genetics and breeding of farm animals. Oxford IBH Publ. Co. Colkota

Course :	AHDS 353		Credit:	2(1+1)	Semester-VI
Course title:	Technology of milk and milk products.				

Syllabus

Theory

Present status of dairy industry in India. Definition and composition of milk. Physico-chemical properties of milk. Microbial quality of raw milk and standards for different market milk. Factors affecting yield and composition of milk. Physico-chemical and microbial standards for different types of milk. Nutritional importance of milk and its constituents. Reception and processing (Platform test, Chilling, Standardization, Homogenization, Pasteurization, Storage, Marketing) of milk. Classification and composition of milk products (Heat coagulated, Heat and acid coagulated, Evaporated, Fermented Frozen and Fat riched products). Quality management standard and system (BIS/ISI standards, PFA rules, AGMARK, HACCP, FSSAI). International requirement for export of milk and milk products. Preservation of milk and milk products by physical, chemical, biological and herbal preservatives. Utilization of dairy by-product: whey and high acid milk. Packaging of milk and milk products with modern techniques.

Practical

Sampling of milk and milk products. Study of platform tests. Determination of fat by Gerber's method. Determination SNF, TS and specific gravity of milk. Determination of acidity of milk. Determination of adulteration in milk and milk products. Standardization of milk by Pearson's method. Study of cream separator and separation of cream. Preparation of flavoured and chocolate milk. Preparation of *Khoa*, *Basundi* and *Rabri*. Preparation of *Paneer*, *Channa* and *Rassogolla*. Preparation of *Dahi*, *Chakka* and *Shrikhand*. Preparation of Butter. Preparation of *Ghee*. Preparation of Ice-cream and *Kulfi*. Preparation of *Pedha* and *Gulabjamun*. Study of cleaning and sanitization of dairy equipments.

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	Present status of dairy industry in India	6
2	Definition of milk, composition of milk of different livestock species	7
3	Physico-chemical properties of milk	6
4	Factors affecting yield and composition of milk	7
5	Microbial quality of raw milk and standards for different market milk	9
6	Nutritional importance of milk and its constituents	4
7	Reception , standardization and homogenization of milk	4
8	Pasteurization of milk and its methods	6
9	Chilling, storage and marketing of milk	5
10&11	Classification and composition of Indigenous milk products	10
12	Quality management standard and system (BIS/ISI standards, PFA rules, AGMARK, HACCP, FSSAI)	7
13	International requirements for export of milk and milk products	6
14	Preservation of milk and milk products by physical, chemical, biological and herbal preservatives	7
15	Utilization of dairy by-products like whey and high acid milk	8
16	Packaging of milk and milk products with modern techniques	8
	Total	100

b) Practical

Experiment	Topic
1	Study of platform tests and sampling of milk and milk products
2	Determination of fat by Gerber's method
3	Determination SNF, TS, specific gravity and acidity of milk
4	Determination of adulteration in milk and milk products
5	Standardization of milk by Pearson's method
6	Study of cream separator and separation of cream
7	Preparation of flavoured and chocolate milk
8	Preparation of <i>Khoa, Basundi and Rabri</i>
9	Preparation of <i>Paneer, Channa and Rassogolla</i>
10	Preparation of <i>Dahi, Chakka and Shrikhand</i>

Experiment	Topic
11	Preparation of Butter
12	Preparation of <i>Ghee</i>
13	Preparation of Ice-cream and <i>Kulfi</i>
14	Preparation of <i>Pedha</i> and <i>Gulabjamun</i>
15	Study of cleaning and sanitization of dairy equipments
16	Visit to milk processing plant.

Suggested Reading:

- 1) Milk and Milk Products – Winton and Winton (1993), Agrobios (India), Agro. House, Behind Nasrani Cinema, Chopsani Road, Jodhapur
- 2) Milk Testing – Davis J. G. Agrobios (India), Agro. House, Behind Nasrani Cinema, Chopsani Road, Jodhapur.
- 3) Chemistry of Milk and Milk Products – Singh V. B. (1965), Asian Publishers, New mandi, Muzaffarnagar.
- 4) Dairying in India – Gupta, H. A. (1997) Kalyani Publisher, 1/1 Rajinder Nagar, Ludhiana.
- 5) Outlines of Dairy Technology – Sukumar De (2000) Oxford University Press, New Delhi

Course :	AHDS 364		Credit:	2(1+1)	Semester-V
Course title:	Sheep Goat and Poultry Production				

Syllabus

Theory

Importance of sheep and goat production in national economy. Important Indian and Exotic breeds of sheep and goat. Common terminologies used in sheep and goat production. Classification and study of Indigenous and exotic sheep and goat breeds. Housing requirement of sheep and goat. Rearing methods and housing systems of sheep and goat. Breeding seasons and mating systems of sheep and goat. Principles and practices of sheep and goat feeding, flushing of ewes and does. Care and management of pregnant ewes & does. . Care and management of lambs/kids and rams / bucks. Importance, composition and utilization of sheep and goat milk. Marketing of sheep and goat. Study of diseases of sheep and goat. Vaccination and health cover in sheep and goat.

Importance of poultry production in national economy. Common terminologies used in poultry production. Classification and study of Indigenous and exotic poultry breeds. Digestive system and digestion and absorption of nutrients in fowl. Methods of rearing, feeding and management of chicks, pullets, layers and broilers. Selection, incubation, hatching of eggs and brooding in poultry. Preservation, grading, marketing of eggs and its economics. Vaccination and health cover in poultry.

Practical

Study of body parts of sheep, goat and poultry. Study of differences between sheep and goat. Identification marking in sheep, goat and poultry. Management practices in sheep and goat viz. clipping, spraying, dusting, docking, ringing, etc. Management practices in poultry viz. Debeaking. Feeding habits of sheep and goat. Nutrients requirement for different classes of sheep and goat. Computation of ration for different classes of poultry. Shearing of sheep and grading of wool. Judging and culling of sheep and goat. Preparation of animals for slaughter and different methods of slaughter. Study of different meat cuts, dressing percentage, meat bone ratio and edible and non-edible offal's. Candling of eggs. Study of various farm records maintained at sheep and goat farm. Preparation of viable bank proposal. Vaccination and deworming of sheep and goat. Vaccination of poultry. Visit to sheep, goat and poultry farm

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	Importance of sheep, goat and poultry production in national economy	6
2	Common terminologies used in sheep, goat and poultry production	4
3	Classification and study of Indigenous and exotic sheep breeds	6
4	Classification and study of Indigenous and exotic goat breeds	6
5	Classification and study of Indigenous and exotic poultry breeds	6
6	Breeding seasons, mating systems, rearing methods and housing systems of sheep and goat	8
7	Digestive system and digestion absorption of nutrients in fowl	7
8	Principles and practices of sheep and goat feeding, flushing of ewes and doves	7
9	Care and management of pregnant ewes/does, lambs/kids and rams/bucks	8
10	Methods of rearing, feeding and management of chicks, pullets, layers and broilers	7
11	Importance, composition and utilization of sheep and goat milk	5
12	Marketing of sheep and goat	5
13	Selection of eggs, incubation, hatching and brooding in poultry	5
14	Preservation, grading, marketing of eggs and its economics	8
15	Study of diseases of sheep, goat and poultry	6
16	Vaccination and health cover in sheep, goat and poultry	6
	Total	100

b) Practical

Experiment	Topic
1	Study of platform tests and sampling of milk and milk products
2	Determination of fat by Gerber's method
3	Determination SNF, TS, specific gravity and acidity of milk
4	Determination of adulteration in milk and milk products
5	Standardization of milk by Pearson's method
6	Study of cream separator and separation of cream
7	Preparation of flavoured and chocolate milk
8	Preparation of <i>Khoa</i> , <i>Basundi</i> and <i>Rabri</i>

Experiment	Topic
9	Preparation of <i>Paneer, Channa</i> and <i>Rassogolla</i>
10	Preparation of <i>Dahi, Chakka</i> and <i>Shrikhand</i>
11	Preparation of Butter
12	Preparation of <i>Ghee</i>
13	Preparation of Ice-cream and <i>Kulfi</i>
14	Preparation of <i>Pedha</i> and <i>Gulabjamun</i>
15	Study of cleaning and sanitization of dairy equipments
16	Visit to milk processing plant.

Suggested Readings:

- 1) Sheep Production and Breeding – C. L. Arora and R. C. Garg
 - 2) Sheep Production in Tropics and subtropics – S. K. Kaushish
 - 3) Goat and Sheep Production in the Tropics – Devendra&Mcleroy
 - 4) Goat, Sheep and Pig Production and management – Jagdish Prasad
 - 5) Livestock and poultry Production – Harban Singh and Moore, E. N. (1968)
 - 6) Goat, Sheep and Pig Production and Management – Jagdish Prasad, (1996), Kalyani
 - 7) Publishers 1/1, Rajinder Nagar, Ludhiana
 - 8) Text Book of Animal Husbandry – G. C. Banerjee (1999), 9thed Oxford and IBH
 - 9) Publishers, New Delhi.
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