

## LIVESTOCK PRODUCTION AND MNAAGEMENT

### Course Structure – at a Glance

CODE	COURSE TITLE	CREDITS
LPM 601	CATTLE AND BUFFALO PRODUCTION AND MANAGEMENT	2+1
LPM 602	SHEEP AND GOAT PRODUCTION AND MANAGEMENT	2+1
LPM 603	SWINE PRODUCTION AND MANAGEMENT	1+1
LPM 604	LABORATORY ANIMAL PRODUCTION AND MANAGEMENT	1+1
LPM605	SHELTER MANAGEMENT	1+1
LPM 606	PRINCIPLES OF ENVIRONMENTAL HYGIENE AND WASTE MANAGEMENT	2+0
LPM 607	CLIMATOLOGY AND ANIMAL PRODUCTION	1+0
LPM 608	POULTRY FARM AND HATCHERY MANAGEMENT	2+1
LPM 609	FARM ANIMAL BEHAVIOR	1+0
LPM 610	INTEGRATED LIVESTOCK FARMING SYSTEM	2+1
LPM 611	EQUINE PRODUCTION AND MANAGEMENT	1+1
LPM 612	WILD LIFE MANAGEMENT AND CONSERVATION	2+0
LPM 613	LIVESTOCK BUSINESS MANAGEMENT	1+1
LPM 691	MASTER'S SEMINAR	1+0
LPM 699	MASTER'S RESEARCH	20
LPM 701	ADVANCES IN CATTLE AND BUFFALO PRODUCTION AND MANAGEMENT	3+0
LPM 702	ADVANCES IN SHEEP AND GOAT PRODUCTION AND MANAGEMENT	2+1
LPM 703	ADVANCES IN SWINE PRODUCTION AND MANAGEMENT	2+1
LPM 704	ADVANCES IN LABORATORY ANIMAL PRODUCTION AND MANAGEMENT	1+0
LPM 705	ADVANCES IN POULTRY PRODUCTION MANAGEMENT	2+1
LPM 706	ADVANCES IN ENVIRONMENTAL MANAGEMENT	1+1
LPM 707	ADVANCES IN EQUINE MANAGEMENT	2+0
LPM 791	DOCTORAL SEMINAR I	1+0
LPM 792	DOCTORAL SEMINAR II	1+0
LPM 799	DOCTORAL RESEARCH	45

**LPM 601: CATTLE AND BUFFALO PRODUCTION AND MANAGEMENT****2+1**

**Objective:** To acquaint students on basic aspects of dairying in India compared with developed countries, problems and prospectus of dairying, detailed aspects of care and management of different classes of dairy cattle and buffaloes.

**Theory****UNIT I**

Introduction - Development of Dairy Industry in India and world - Present status and future prospects of livestock development in India

**UNIT II**

Important breeds of cattle and buffalo, traits of economic importance and their inter-relationships - Selection of high quality animals - Role of management in improving the reproduction efficiency in farm animals. - Housing and rearing systems.

**UNIT III**

Breeding Management: System of breeding Economic traits. Methods of Breeding - Prenatal and postnatal care and management of cattle and buffalo -Care of neonate and young calves - Management strategies for reducing mortality in calves, age at first calving and calving interval in cattle and buffaloes.

**UNIT IV**

Management of labour, Milking management, Machine milking and hand milking, Different laws governing the livestock sectors to produce quality products on par with international standards - Technique of harvesting clean and hygienic livestock products, transportation of animals, health management. Wallowing in buffaloes- Management of draught animals and summer management

**UNIT V**

Feed and fodder resources used for feeding of cattle and buffaloes- Scientific technique of feeding, watering - Computation of practical and economical ration, supply of green fodder around the year and enrichment of poor quality roughages.

**Practical**

Visits to cattle farms and critical analysis of various types of managerial practices - Study of breeding management in the farm- Analysis of practical feeding management- Disease control- Housing - milking - calf, heifer and adult management- Dairy Cattle and Buffalo judging - Project preparation for external funding and commercial farms and enterprises for dairy products -marketing strategies for milk and milk products and meat.

**Suggested Readings**

Arora SP. 1997. *Feeding of Dairy Cattle and Buffaloes*. Kalyani.

Dutta G. 1994. *Care and Management of Dairy Cattle and Buffaloes*. 3<sup>r</sup> Ed. ICAR.

Thomas CK & Sastry NSR.1991 .*Dairy Bovine Production*. Kalyani.

**LPM 602: SHEEP AND GOAT PRODUCTION AND MANAGEMENT****2+1**

**Objective:** To acquaint students on status of sheep and goat farming in India, importance of record keeping, principles of housing and feeding, breeding management to improve the reproductive efficiency and detailed account on care and management of different classes of sheep and goat.

**Theory****UNIT I**

Introduction - Population structure and importance- Advantages and disadvantages of sheep farming under different systems of management - type of housing and equipments- Important sheep and goat breeds- Advantages and disadvantages of sheep and goat farming.

**UNIT II**

Breeding Management: Breeding seasons - fitness of purchase for first breeding - methods of detection of heat - Natural Service and artificial insemination - Care of the pregnant Animals - Breeding stock - Use of teaser- Culling.

**UNIT III**

Feeding Management: Feeding methods - Principles to be followed in feeding and watering- feeder space, waterer space, Designing feeders and waterers. -Range management - Stocking rate and pasture improvement and utilization; management under stall fed conditions, Transportation of sheep and goat.

**UNIT IV**

Disease Management: Role of management in the prevention and control of diseases. Special Management: Deworming - Dipping and spraying- shearing -Avoidance of goatry odour in milk, Topping

#### **UNIT V**

Wool: Importance of wool - Fiber structure- Fleece characters - Goat fibers -Characters of mohair and pashmina, fur and Angora - Marketing of goat fibers / wool.- Planning of sheep and goat farm of various sizes - Economics of sheep and goat farming.

#### **Practical**

Visit to sheep and goat farms and critical analysis of various managerial practices under different conditions. Study of practical housing management -Analysis of practical diseases control management - Shearing management -Record keeping. - Preparation of project for commercial farming -Characterization of sheep and goats; handling of sheep and goat; daily and periodical operations for sheep and goats - Methods of identification of sheep and goat. Cost of rearing sheep and goat for mutton and wool - Housing plans for various age and categories of sheep and goat - Dipping; Vaccination of sheep and goat - Shearing of wool.

#### **Suggested Readings**

Devendra C & Mecleroy GB. 1982. *Goat and Sheep Production in Tropics*. Longman.

Gupta JL. 2006. *Sheep Production and Management*. BS Publ.

ICAR. 2002. *Handbook of Animal Husbandry* 3<sup>rd</sup> Ed. ICAR.

Kaushish 1994. *Sheep Production in the Tropics and Sub Tropics*. Scientific Publ.

### **LPM 603: SWINE PRODUCTION AND MANAGEMENT**

**1+1**

**Objective:** To impart knowledge on various aspects of swine farming in India, principles of housing, breeding, feeding and health care of pigs, management practices at different stages of growth and economic pig production systems.

#### **Theory**

#### **UNIT I**

Introduction - Population and importance - Economic contribution of pigs -Advantages and disadvantages of swine keeping - Systems of management -Problems in pig farming.

#### **UNIT II**

Breeds of pigs - Selection of breeding stock - Breeding seasons - Age and weight at first services - Methods for detection of heat - Natural service and artificial insemination - Care of pregnant sows, piglets and growers - Care of breeding boar.

#### **UNIT III**

Housing, sanitation and hygiene, disease prevention measures - Housing and equipment -Wallowing - Sanitation and hygiene - Role of management in the prevention and the control of diseases.

#### **UNIT IV**

Feeding and management of new born, weaner and finishers, dry, pregnant and farrowing sows - Feeding principles to be followed - Methods of watering -Feeder space - Water space, etc - Marketing: Methods of marketing in swine production - Record keeping.

#### **Practical**

Visits to piggeries and critical Analysis of various types of managerial practices - Analysis of the trend and structures of pig population - Analysis of practical breeding management methods, practical disease control management - special management methods - Ageing and identification - Judging -Constraints and remedial measures in pig farming - Economics of production -Project preparation for research and commercial farms.

#### **Suggested Readings**

Boden (e) S.1995. *Swine Practice*. WB London.

Narayankhedkar SG. 1997. *Production and Management of Swine, Camel, Equine and Yak*. Tindall Publ.

**LPM 604: LABORATORY ANIMAL PRODUCTION AND MANAGEMENT****1+1**

**Objective:** To educate the students become familiarize with various aspects of rabbit farming, problems and prospectus, principles of housing, breeding, feeding and health care of rabbits,rats, mice and guinea pigs, measures to reduce the mortality in young ones at different seasons .

**Theory****UNIT I**

Introduction - Importance of rabbit for meat and fur production, rats, mice and guinea pigs, - Common breeds and strains.

**UNIT II**

System of housing - Common diseases and their control measure. Management of specific pathogen free and gnotobiotic animals, concepts to related to welfare of laboratory animals

**UNIT III**

Breeding - Age at maturity, litter size - Weaning - Feeding of growers -Selection of replacement stock, transportation of rabbit.

**UNIT IV**

Transportation of Laboratory animals - marketing of meat and fur.

**Practical**

Handling and restraining of laboratory animals - Visits to small animal farms and critical analysis of various types of managerial practices- Analysis of the trend and structures of Laboratory animals population - Analysis of practical breeding management methods - practical disease control management and special management methods - Ageing and identification - Judging -Economics of production.

**Suggested Readings**

Indian Soil Institute.1993. *Rabbit Management*. IBH & Oxford.

Reddy DV. 2007. *Applied Nutrition: (Livestock, Poultry, Human, Pet, Rabbitand Laboratory Animal Nutrition)*. IBH & Oxford.

Ronald N & Penman S. 1991. *A Manual for Small Scale Rabbit Production*. South Asia Publ.

**LPM 605: SHELTER MANAGEMENT****1+1**

**Objective:** To familiarize students with type of houses suited for different livestock under varying climatic conditions.

**Theory****UNIT I**

General principles in planning animal houses- farmstead and animal houses -Selection of site and planning; layouts for livestock farm of different sizes in different climatic zones in India - Farm structures - General principles of construction of enclosures, floor and road.

**UNIT II**

Housing requirements of different classes of Livestock - Preparation of layouts, plans, arrangement of alleys- Fitting and facilities in the houses for horses, dairy cattle, calves, bulls, work cattle, dogs, pigs, sheep, goats, and

poultry.

**UNIT III**

Improvement of existing buildings; water supply; feed and fodder delivery systems - Economics of Livestock housing.

**UNIT IV**

Housing - Disease control measures and sanitation of all classes of livestock

**Practical**

Score card for animal houses - Time and motion study in Animal houses -Preparation of plans for Animal houses for horses, cattle, sheep, pigs, goats, and other livestock - Dogs and other pet animals - Economics of livestock housing - Preparation of plan for animal houses of different sizes and climatic zones of India.

**Suggested Readings**

Sastry NSR & Thomas CK. 2006. *Livestock Production and Management*. Kalyani.

Thomas CK & Sastry NSR 1991. *Dairy Bovine Production*. Kalyani. Wathes CM & Charles DR. 1994. *Livestock Housing*. CABI.

**LPM 606: PRINCIPLES OF ENVIRONMENTAL HYGIENE AND WASTE MANAGEMENT**

**2+0**

**Objective:** To familiarize students on principles of air and water hygiene with reference to impurities and inclusions of water, collection and disposal of waste from the animal house, modern techniques in manure disposal and biosecurity measures to be adapted for hygienic production of livestock products.

**Theory**

**UNIT I**

Animal air hygiene: Definition - Composition of air - Air pollution - Factors affecting outdoor and indoor pollution - Assessment of these factors on animal health and production - Methods to control these factors.

**UNIT II**

Water Hygiene: Importance of water - Impurities and inclusions - Sterilization

Examination of water and water supplies - Collection of samples-Topographical physical, chemical, bacteriological and microscopic examination of water - Hygienic requirements and standards for drinking water

Quantity of water required by domestic animals - Methods of watering.

**UNIT III**

Manure - Quantity of manure voided by domestic animals - Animal excreta a factor in spread of disease - Hygienic and economic disposal of farm waste -Modern techniques used in automation / semi-automation in disposal of farm waste.

**UNIT IV**

Environmental protection act, Air (Prevention and control of pollution) act and water (Prevention and control of pollution) act - Biosecurity measures to be adapted for efficient and healthy production

**UNIT VI**

Effect of environmental pollution on livestock and its products directly and indirectly - Controlling environmental pollution - Different factors affecting the quality of livestock and its products meant for human consumption

**Suggested Readings**

Baba MD. 2007. *Environmental Changes and Natural Disasters*. New India Publ.

Overcash MR. 1983. *Livestock Waste Management*. CRC Press.

Thapliyal DC & Misra DS. 1996. *Fundamentals of Animal Hygiene and Epidemiology*. International Book Distr. Co.

**LPM 607: CLIMATOLOGY AND ANIMAL PRODUCTION**

**1+0**

**Objective:** To familiarize students on climate, weather, various climatic factors and their role in production and health of animals in both temperate and tropics, micro and macroclimatic conditions of animal house and assessing the heat tolerance of bovines.

**Theory**

**UNIT I**

Definition of climate -Classification of climatic regions - Climatic factors-Assessment of climate - Study of climatic factors in relation to animal production.

**UNIT II**

Light, natural and artificial light-mechanism of light action-photo period and light responses - Applications - Importance of light in production of animals and birds.

**UNIT III**

Introduction of breeds into different climatic regions - Agro meteorology and weather forecasting for Animal Husbandry activities - Micro climate modification in animal houses.

**UNIT IV**

Estimation of microclimatic conditions in Animal house - Measurement of Temperature, Relative humidity, Air Velocity and Mean temperature of the surrounding, measurement of intensity of light in animal houses - Construction of climographs and hythergraphs - Estimation of cooling power of atmosphere-heat tolerance test in bovines.

### **Suggested Readings**

Lal DS. 1998. *Climatology*. Sharda Pustak Bhavan, Allahabad.

McDowell RE. 1972. *Improvement of Livestock Production in Warm Climates*. WH Freeman.

Siddhartha K & Roger B. 1996. *Atmosphere, Weather and Climate*. ELBS.

### **LPM 608: POULTRY FARM AND HATCHERY MANAGEMENT**

**2+1**

**Objective:** To acquaint students on basic aspects of housing, feeding, breeding and health care of poultry and comparing the performance under cage and floor system of management of poultry, biosecurity measures to be followed to reduce mortality and efficient hatchery management to produce healthy young ones.

#### **Theory**

##### **UNIT I**

Poultry housing systems Cage Vs floor system, litter management and lights for poultry, rearing turkey, duck and quails.

##### **UNIT II**

Management of chicks, growing, laying and breeding flocks, broiler production, selection and culling of laying flocks.

##### **UNIT III**

Procuring, care and pre-incubation storage of hatching eggs - Method of incubation, sanitation disinfection and management of hatchery.

##### **UNIT IV**

Embryonic development and factors effecting fertility and hatchability of eggs.

##### **UNIT V**

Chick sexing, packing and hatchery business - Transporting management of farm and hatchery waste.

#### **Practical**

Poultry Farm management - Brooding of chicks; selection of laying flocks -Disease preventive measures - Selection and care of hatching eggs; incubator operation, fumigation and candling setting and hatching, packaging of chicks -Waste management - Marketing of products.

### **Suggested Readings**

Ensminger ME. 1992. *Poultry Science*. International Book Distr. Co.

Hued LM. 2003. *Modern Poultry Farming*. Greenworld.

Powell-Owen W. 2008. *Poultry Farming and Keeping*. Daya Books.

Prashad J. 2005. *Poultry Production and Management*. Kalyani.

Singh RA. 1996. *Poultry Production*. 3<sup>rd</sup> Ed. Kalyani.

### **LPM 609: FARM ANIMAL BEHAVIOR**

**1+0**

**Objective:** To make acquainted students on principles of farm animal behaviour with regard to environmental influence, group formation, social behaviour and and behavioural adaptations under domestication.

#### **Theory**

##### **UNIT I**

Introduction to Animal behaviour - Importance of animal behaviour studies -Patterns of behaviour - Daily and seasonal cycles of behaviour - Physiological basis of behaviour.

##### **UNIT II**

Environmental modification of behaviour - Developmental changes in behaviour - Genetic differences in behaviour - Behavioural disorders.

##### **UNIT III**

Group formation - Social relationship, process of socialisation locality and behaviour - Practical application - Behavioural character for managerial practices - Favourable and unfavourable behaviour for domestication -Behavioural adaptations under domestication.

##### **UNIT IV**

Physical environment and behaviour - Common vices and their remedial measures - Analysis of behaviour in relation to location - Analysis of behaviour in relation to climatic environment - Analysis of social behaviour.

### **Suggested Readings**

Arora MP. 1995. *Animal Behaviour*. WB London. Bouenger EG. 1994. *Animal Behaviour*. WB London.

Fraser AF & Broom DM. 1997. *Farm Animal Behaviour and Welfare*. CABI.

Fraser AF & Broom DM. 1999. *Farm Animal Behaviour and Welfare*.

Kumar V. 1996. *Animal Behaviour*. WB London.

## **LPM 610: INTEGRATED LIVESTOCK FARMING SYSTEM**

**2+1**

**Objective:** To familiarize on various aspects viz., scope and limitations of integrated livestock farming system, recent approach and economic feasibility of different integration models for sustainable production

### **Theory**

#### **UNIT I**

Scope and limitation of integrated farming systems - Sustainability of integrated Livestock Farming Systems and their economic importance.

#### **UNIT II**

Integration of fish, arable farming and different livestock enterprises vis-a-vis gobar gas plant, FYM, solar and wind energy utilization, cattle, buffalo sheep, goat, pig, poultry, rabbit, silk worm, bee keeping etc.

#### **UNIT III**

New approach for changing farming systems in present energy crises.

#### **UNIT IV**

Project formulation and evaluation of various livestock enterprises.

### **Practical**

Various livestock farming units and their economic analysis - Evaluation of different farming systems and their economic importance - Preparing feasibility report for various farming projects.

### **Suggested Readings**

Mukherjee TK. 1992. *Integrated Livestock Fish Production Systems*.

Raman KV & Balaguru T. (Eds.). 1992. *Farming Systems Research in India: Strategies for Implementation*.

NAARM. Renard C. (Ed.). 1997. *Crop Residues in Sustainable Mixed Crop/Livestock Farming Systems*. CABI.

Speirs M. & Opsen O. 1992. *Indigenous Integrated Farming System in the Sahel*. World Bank.

## **LPM 611: EQUINE PRODUCTION AND MANAGEMENT**

**1+1**

**Objective:** To educate the students become familiarize with principles of housing, breeding, feeding and health care of different classes of horse, stable routines and measures to reduce the mortality in young ones at different seasons .

### **Theory**

#### **UNIT I**

Equine population in India - Breeds of native and exotic horses - Types and classes of light and work horses

#### **UNIT II**

Housing and routine management practices -Hygiene and maintenance of stable. Color and markings, Dentition and ageing selecting and judging horses- unsoundness and stable vices

#### **UNIT III**

Feeding and breeding of horses donkey and Mules, foaling, care of foal

#### **UNIT IV**

Foot care and shoeing care, Stud farms - Race clubs - Race horses and their care - Horse behaviour and training - Exercising - Basic Horsemanship

#### UNIT V

Health management & diseases control. Control of internal and external parasites of horse- Colic and its prevention

#### UNIT VI

Mode of transport - Facilities requirement - Cleaning, disinfection and preparation of vehicles Transport stress - Management during transport -Regulatory acts of states and centre in animal disease control and welfare. Precautions and requirements before, during and after transport - Laws governing the import and export of livestock and its products- - Horse passport and trading

#### Practical

Control of horse for examination, passing of stomach tube, dentition and ageing, saddling, exercising of horse, hoof care.

#### Suggested Readings

Blanchard TL et al. 2002. *Manual of Equine Reproduction*. Mosby Publ.

Frape D. 1986. *Equine Nutrition and Feeding*. Blackwell Publ.

Kacker RN & Panwar BS. 1996. *Text Book of Equine Husbandry*. Vikas Publ.

Mills DS & Nankervis KJ. 1998. *Equine Behaviour: Principles and Practice*. Blackwell Publ.

Pilliner S. 1994. *Care of the competition Horse*. BT Batsford.

Rose RJ & Hodgson DR. 2000. *Manual of Equine Practice*. WB Saunders.

### LPM 612: WILD LIFE MANAGEMENT AND CONSERVATION

2+0

**Objective:** To acquaint students with the principles and concepts of wild life sanctuaries and national parks, classification of wild animals, role of authorities in conservation and management of wild animals in captivity.

#### Theory

##### UNIT I

Zoo and captive wild animals - Principles and concepts - Ecology of wild life sanctuaries and National parks- wild life legislation in India - Status of forest in India - Biological and ecological basis of management of wild life.

##### UNIT II

Voluntary organization on wild life - Rules and regulations of zoo authority of India -Wild life protection act - Zoological classification of wild animals -Funding agencies for wild life research and preparation of project. -Conservation of wild animals.

##### UNIT III

Wild life health control - Reproduction in zoos - Population analysis -Population manipulation - Habit analysis and design - The resources and its management - Distribution of important Indian animals - Zoo animals and birds - Breeding characteristics - Movements - Cover requirements - Food -Population density - Mortality - Nesting losses caused by predators, predator and prey relationship - Human interference - Refuge rehabilitation

##### UNIT IV

Restraints - Maps - Survey and plans of management systems - Principles, protective measures - Development and conservation of water supply- puberty - Breeding seasons - pregnancy - Parturition - Lactation postnatal survival of the young - Social factors among various species - Miscellaneous management procedures.

#### Suggested Readings

Berwick SH & Saharia VB. (Eds.). 1995. *The Development of International Principles and Practices of Wild Life Research and Management*. Deford Univ. Press.

Bobbins CT. 1983. *Wild Life Feeding and Nutrition*. Daya Publ. House.

Giles RH. 1978. *Wild Life Management*. Wild Life Society.

Giles RH. 1984. *Wild Life Management Techniques*. 3<sup>rd</sup> Ed. Wild Life Society.

Jadhav NV, Baig MI & Devangare AA. 2004. *Handbook of Wild Animals and Livestock Management*.



WWF. 1994. *Wild Life (Protection) Act 1972* (as Amended up to 1991). Natraj Publ.

**LPM 613: LIVESTOCK BUSINESS MANAGEMENT**

**1+1**

**Objective:** To acquaint students with knowledge in principles, planning, technical approach and preparing financial statement in Livestock Business Management and preparing projects for financing.

**Theory**

**UNIT I**

Management principles - Planning - Techniques, strategic planning, organization structure, co-ordination and controlling techniques - Approaches to management.

**UNIT II**

SWOT analysis, financial accounting - Accounting records - Balance sheet, fund flow statement - Cost and analysis for managerial decisions - Budgeting and control .

**UNIT III**

Tools of financial analysis, working capital financing - Long term financial management - Investment analysis - Capital markets - Corporate risk management - Venture capital.

**UNIT IV**

Marketing - Objectives, strategies - Selecting and managing marketing channels - Pricing strategies - Sales promotion - Legislation relating licensing -Company law.

**Practical**

Preparation of financial statements, depreciation accounting methods, trend and variance analysis, cost-volume profit analysis - Financial planning and forecasting - Estimation of working capital requirement - Break even analysis -Visit to livestock business firms and banks - Preparing projects for financing.

**Suggested Readings**

Koontz H & O'Donnel C. 1999. *Essentials of Management*. Tata McGraw Hill.

Kotler P. 2000. *Marketing Management - Analysis, Planning and Control*.Prentice Hall of India.

Maheswari SN. 1998. *Management Accounting*. Tata MGrww Hill.

Massie JL. 1995. *Essential of Management*. Prentice Hall of India.

Srinivasan NP. 1998. *Management Accounting*. Sterling Publications.

**LPM 701: ADVANCES IN CATTLE AND BUFFALO PRODUCTION AND MANAGEMENT**

**3+0**

**Objective:** To acquaint students on latest developments on dairying in India compared with developed countries, problems and prospectus of dairying, detailed aspects of care and management of different classes of dairy cattle and buffaloes.

**Theory**

**UNIT I**

Dairy farming in India - Global scenario - Present status and reasons for the same - Avenues for progress - The needs of the nation and how to achieve it.

**UNIT II**

Advances in housing management of dairy cattle and buffaloes in various agroclimatic zone of India - Management systems for cattle and buffaloes.

**UNIT III**

Establishing Dairy Cattle Enterprise - Characteristics of a successful dairy farm - Choice of the foundation stock - Breeding Management Problems associated with reproduction.

Advances in Feeding Management of cattle and buffalo, Feed for milking herd, dry cows, bulls and calves, Management of high yielding animals.

**UNIT V**

Milking Management - Biosynthesis of milk - Factors affecting the composition and yield of milk - milk ejection reflex - Milking systems - Sanitary standards for the f quality milk - Cessation of milking, advances in herd management- raising calves - growing heifers, replacements and culling -marketing, Computerization of dairy enterprises.

#### **UNIT VI**

Advance in health management of dairy animals, metabolic diseases of high yielders- advances in preventive measures for production related diseases

#### **Suggested Readings**

Clarence HE . 2007. *Dairy Cattle & Milk Production*. Daya Publ. House. Selected articles from journals.

Thomas CK & Sastry NSR. 1991. *Dairy Bovine Production*. Kalyani.

### **LPM 702: ADVANCES IN SHEEP AND GOAT PRODUCTION AND MANAGEMENT**

**2+1**

**Objective:** To educate the students on advances in sheep and goat farming for improving their productivity through different management practices.

#### **Theory**

#### **UNIT I**

Utility origin - Domestication - Numbers and distribution of meat and dual purpose breeds - Methods of rearing - Range sheep production –

#### **UNIT II**

The farm flock - Pure bred flock - Management during breeding season - The sexual seasons and its control - Puberty - Time of the year to breed - Flushing - Ram-Ewe ratio.

#### **UNIT III**

Advances in feeding management, Nutrient deficiencies in range forage, Feed to supplement range forage, General feeding practices, Feeding materials, Lamb feeding, Use of antibiotics and hormones, Hand feeding, Self feeding, Pellet feeding , Feeding lambs and ewes during lactation.

#### **UNIT IV**

Recent development in sheep and goat management and their relevance under Indian economic conditions, needs and possibilities for future research.

#### **UNIT V**

Role of sheep husbandry in dry farming in India, Present development programmes in sheep and goat production, Advances in reproduction, housing, feeding and watering, diseases, Shearing methods and culling of sheep and goat.

#### **UNIT VI**

Role of goat in animal agriculture, Goat farming in India, selection of Breeding stock, Breeding problems, Housing, Principles of feeding, Practices, Crops and crop residues for goats, Milking practices.

#### **Practical**

Study of population trend and structure - Visit to sheep and goat farms and critical analysis of various farm practices, Analysis of breeding, feeding, housing - Disease control management, management of young ones and maturing systems Estimation of fibre diameter medullation percentage crimps, tensile strength, Grease, pH and moisture content of wool - Score card and grading of wool.

#### **Suggested Readings**

Gupta JL. 2006. *Sheep Production and Management*. CBS. Selected articles from journals.

**LPM 703;    ADVANCES IN SWINE PRODUCTION AND MANAGEMENT**

**2+1**

**Objective:** To educate about the latest advances of swine farming in India, principles of housing, breeding, feeding and health care of pigs, management practices at different stages of swine.

**Theory**

**UNIT I**

The past, present and future of Swine production systems in India and production policies adopted in advanced countries.

**UNIT II**

Advances in breeding and selection - Prenatal and postnatal development -Growth reproduction and lactation - Economic traits of swine production.

**UNIT III**

Advances in feeding and nutrition in pigs; automatic feeding and watering techniques, Feed stuffs, Energy, protein, minerals and vitamin sources, metabolic and nutritional disorders - Toxic substances.

**UNIT IV**

Advances in housing of pigs, environmental physiology - Infectious diseases and parasitism. reduction in new born piglet mortality.

**Practical**

Marketing - Study of population trend and structure. Analysis of breeding, feeding, housing, health care, farrowing management, summer management and special management principles practiced.

**Suggested Readings**

Selected articles from journals.

**LPM 704:    ADVANCES IN LABORATORY ANIMAL PRODUCTION AND MANAGEMENT**

**1+0**

**Objective:** To educate the students on the latest advances in problems and prospectus, principles of housing, breeding, feeding and health care of rabbits, rats, mice

& guinea pigs, measures to reduce the mortality in young ones at different seasons .

**Theory**

**UNIT I**

Importance and limitations of rabbits for meat and fur production, rats, mice & guinea pigs - Common breeds and strains .

**UNIT II**

Advances in system of housing, Common diseases and their control measure .

**UNIT III**

Breeding strategies - Age at maturity, litter size , Weaning, Feeding of growers, Selection of replacement stock, transportation of rabbit.

**UNIT IV**

Transportation of Laboratory animals - marketing of meat and fur.

**UNIT V**

Management of specific pathogen free and gnotobiotic animals ,concepts to related to welfare of laboratory animals

**Practical**

Visit to Rabbit farms - Study of the various chores in government farms and private farms - Critical analysis of breeding, feeding, disease control management and housing - Rabbit slaughter technique.

**Suggested readings**

Selected articles from journals.

**LPM 705: ADVANCES IN POULTRY PRODUCTION MANAGEMENT**

**2+1**

**Objective:** To educate the students on advances in housing, feeding, breeding and health care in poultry farming.

**Theory**

**UNIT I**

Planning, organisation, executive and management of poultry farms and hatcheries of various sizes - alternative in poultry production

**UNIT II**

Demand, supply, present status of poultry production.

**UNIT III**

Problems and new management techniques in poultry for egg and meat in India vis-a-vis in other countries of the world, automation in poultry houses, management of specific pathogen free flocks.

**UNIT IV**

Poultry development policies and planning for higher production constraints in development and solutions, Ethology and entology in relation to poultry production

**Practical**

Planning and preparation of research and commercial projects on broiler and layer production management.

**Suggested Readings**

Selected articles from journals.

**LPM 706: ADVANCES IN ENVIRONMENTAL MANAGEMENT**

**1+1**

**Objective:** To educate the students on advances in climate, weather, various climatic factors monitoring and their role in production and health of animals in both temperate and tropics, micro and macroclimatic conditions of animal house and environmental influences on the performance of farm animal production.

**Theory**

**UNIT I**

The animal Industry and the quality of the environment - Management of the living environment - Microenvironment and macro environment.

**UNIT II**

Air Pollution: Indoor and out door - Chemical, physical and bacteriological changes - Causes - Standards and the extent tolerated by animals - Effects on animal production.

**UNIT III**

Fixing standards in relation to CO<sub>2</sub> - Air supply in relation to cubic space, temperature, air, velocity, relative humidity, dust particles, bacterial count, effective temperature and cooling power - Methods to get over pollution -Cleaning and washing - Air conditioning.

**UNIT IV**

Utilisation and disposal of animal waste, Health hazards, Waste utilization, technologies for processing and treatment of animal wastes, Health and economic impacts, Legal constraints, Microbiology of wastes, Waste properties, Gases and odour.

**UNIT V**

Water Pollution: Significance, treatment and control - Funding agencies for animal welfare

**Practical**

Assessment of various factors in Indoor and outdoor environment- Assessment of CO<sub>2</sub>, air supply, dust particles and bacterial count in air - Visit to sewage treatment plant - Planning farm waste disposals - Physical chemical and bacteriological examination of water watering of farm animals.

**Suggested Readings**

Baba MD. 2004. *Environmental Changes and Natural Disasters*. New India Publ. Agency. Selected articles from journals.

**LPM 707: ADVANCES IN EQUINE MANAGEMENT**

**2+0**

**Objective:** To familiarize the students on latest aspects of principles of housing, breeding, feeding and health care of different classes of horse, stable routines and measures to reduce the mortality in young ones at different seasons.

**Theory**

**UNIT I**

New indigenous and exotic horses breeds- Types and classes of light and work horses

**UNIT II**

Advances in housing and routine management practices -Hygiene and maintenance of stable. Color and markings, Dentition and ageing selecting and judging horses- unsoundness and stable vices

**UNIT III**

New Feeding techniques and breeding of horses donkey and Mules, foaling, care of foal

**UNIT IV**

Foot care and shoeing care, Stud farms,Race clubs,Race horses and their care, Horse behaviour and training, Exercising ,Basic Horsemanship

**UNIT V**

Advances in health management & diseases control. Control of internal and external parasites of horse- Colic and its prevention

**UNIT VI**

Mode of transport, Facilities requirement, Cleaning, disinfection and preparation of vehicles Transport stress,Management during transport , Regulatory acts of states and centre in animal disease control and welfare. Precautions and requirements before, during and after transport, Laws governing the import and export of livestock and its products, Horse passport and trading.

**Suggested Readings**

Selected articles from journals.