

## **LIVESTOCK PRODUCTION MANAGEMENT**

**Total Credit Hours: 4+2**

**List of UG Courses (B.V.Sc. & A.H.) As per latest MSVE -2016**

### **THEORY**

<b>Unit No</b>	<b>Topic</b>	<b>No of Lectures</b>	<b>Conducted by the Department</b>
<b>Unit-1</b>	General Livestock Management	14	Livestock Production Management
<b>Unit-2</b>	Fodder Production and Conservation	11	Livestock Production Management
<b>Unit-3</b>	Livestock Production Management – Ruminants	17	Livestock Production Management
<b>Unit-4</b>	Zoo Animals Production Management	12	Livestock Production Management
<b>Unit-5</b>	Animal Welfare	14	Livestock Production Management
<b>Unit-8</b>	Laboratory or Rabbit or Pet Animal Production Management	14	Livestock Production Management
<b>Unit-9</b>	Swine or Equine or Camel, Yak and Mithun Production Management	14	Livestock Production Management
<b>Total Theory Lectures</b>		<b>96</b>	

### **PRACTICAL**

<b>Unit No</b>	<b>Topic</b>	<b>No of Lectures</b>	<b>Conducted by the Department</b>
<b>Unit-1</b>	General Livestock Management	12	Livestock Production Management
<b>Unit-2</b>	Fodder Production and Conservation	6	Livestock Production Management
<b>Unit-3</b>	Livestock Production Management – Ruminants	11	Livestock Production Management
<b>Unit-4</b>	Zoo Animals Production Management	6	Livestock Production Management
<b>Unit-8</b>	Laboratory or Rabbit or Pet Animal Production Management	7	Livestock Production Management
<b>Unit-9</b>	Swine or Equine or Camel, Yak and Mithun Production Management	6	Livestock Production Management
<b>Total Practicals</b>		<b>48</b>	

## **THEORY**

### **Unit – 1**

#### **Title : General Livestock Management**

S. N.	Topic
1	Demographic distribution of livestock & role in Indian economy; Problems & prospects of livestock industry in India
2	Animal holding & land holding patterns in different agro-climatic zones
3	Introduction to Livestock Production systems including Organic livestock production
4	Common animal husbandry terms related to cattle, buffalo
5	Common animal husbandry terms related to sheep, goat, pig
6	Common animal husbandry terms related to horse, camel, yak & mithun
7	Body conformation & methods of identification in livestock
8	Transportation of livestock & wild/zoo animals
9	Common farm management practices including disinfection, isolation, quarantine & disposal of carcasses
10	Common farm management practices including disinfection, isolation, quarantine & disposal of carcasses
11	Introduction to the methods of drug administration.
12	Common vices of animals (cattle, buffalo, sheep & goat), their prevention and care
13	Preparation of animals for show, Judging & BCS for body parts of livestock
14	Culling of animals; Selection & purchase of livestock

### **Unit – 2**

#### **Title : Fodder Production & Conservation**

S. N.	Topic
1	Importance of grasslands and fodder in livestock production.
2	Agronomical Practices for fodder production- Environment , soil type , Land preparation, sowing time , sowing method, seed rate, manure/fertilizer, irrigation , weed control, harvesting time ,method and yield.
3	Agronomical Practices for fodder production-cereal fodder-Kharif and summer season - Jowar ,Bajra,Maize Rabi season -Teosinte and Oats
4	Agronomical Practices for fodder production of annual and perennial grass fodder- Hybrid Napier ,Guinea grass, Para grass, Deenanath , Marvel grass, Rhodes grass, Sudan grass and Anjan grass
5	Agronomical Practices for fodder production -Legume crops Kharif and summer season - Cowpea, Rice bean Velvet bean, Guar and Soyabean
6	Agronomical Practices for fodder production-Legume crops Rabi season -Lucerne, Berseem, Metha and Senji
7	Soil and Water conservation and drainage of water for fodder production.
8	Fodder production for small livestock units (backyard cultivation, intercropping, fodder production on waste land/low lying area bunds, charies, canals, azolla & hydroponics)
9	Structures for storage of feeds and fodders.
10	Preservation of green fodder- Silage and Hay making Scarcity fodder trees- Acacia,Banyan, Peepal, Glyciridia, Mango, Neem, Tamarind, Bilayati ,Subabool, Other sources- Failed crops, Crop residues , Plant oriented wastes, Agro- Industry wastes
11	Recycling of animal washings and wastes in fodders production and use of recycle waste.

### **Unit – 3**

#### **Title : Livestock Production Management-Ruminants**

S. N.	Topic
1	Housing systems, layout and design of different buildings for animals

2	Selection of site. General principles affecting the design and construction of building for housing of cattle & buffalo.
3	Selection of site. General principles affecting the design and construction of building for housing of Sheep & Goat.
4	Building materials used for construction of wall, roof and floor of animal houses, their characteristics, merits and demerits. Utilization of local materials.
5	Arrangements of the building with special reference to Indian conditions.
6	Breeds of cattle and buffalo and descriptions of important breeds.
7	Economic traits of cattle and buffaloes.
8	General management and feeding practices of calves, heifers, pregnant and lactating animals.
9	General management and feeding practices of dry animals, bulls and working animals.
10	Draught ability of cattle and buffaloes.
11	Raising of buffalo males for meat production
12	Routine animal farm operations and labour management
13	Animal farm accounts and records.
14	Methods of milking and precautions. Factors affecting quality and quantity of milk production. Clean milk production
15	Breeds of sheep and goat and their descriptions. Important economic traits for meat, milk and fibre.
16	General management and feeding practices during different stages of growth, development and production (milk, meat and wool).
17	Breeding schedule and management of ram and buck. Weaning and fattening of lambs and kids

#### Unit – 4

##### Title : Zoo Animals Production Management

S. N.	Topic
1	Taxonomy of important wild zoo animals.
2	Taxonomy of important wild zoo animals.
3	Status and conservation practices of wild life in India.
4	Basic principles of habitat and housing of various classes of wild zoo animals.
5	Size and space requirement (dimension) of cubicles, enclosures of important wild zoo animals.
6	Management of livestock in fringe areas, in and surrounding the breeding areas.
7	Feeding habits of captive animals.
8	Feeds and feeding schedules of captive animals.
9	Restraining, capture, handling, physical examination of captive animals.
10	Classification of zoos, general management practices of sanctuaries, national parks etc.
11	Acts and Rules related to captive animals.
12	National and international organization and institutions interlinked to captive animals role and functioning.

#### Unit – 5

##### Title : Animal Welfare

S. N.	Topic
1	Definition of animal welfare and ethics. Human and animal welfare in relation to ecosystem and environmental factors.
2	Role of veterinarians in animal welfare.
3	List of Animal welfare organizations. Animal Welfare Board of India - their role, functions and current status.
4	Rules, regulations, laws on animal welfare. Prevention of Cruelty to Animals (PCA) Act, 1960 {59 of 1960}

5	Role and function of Committee for the Purpose of Controlling and Supervising Experiments in Animals (CPCSEA).
6	Protection of wild life in nature and captivity.
7	Protection and welfare of performing animals.
8	Welfare of animals during transportation.
9	Animal welfare in commercial livestock farming practices. Protection and welfare of working animals.
10	Pet and companion animal welfare.
11	Animal welfare during natural calamities and disaster management.
12	Legal duties of veterinarians, Common offences against animals and laws related to these offences.
13	Provincial and Central Acts relating to animals. Laws relating to offences affecting Public Health.
14	Livestock Importation Act Evidence, liability and insurance. Code of Conduct and Ethics for veterinarians - the Regulations made under the Act.

## Unit – 8

### Title : Laboratory Or Rabbit Or Pet Animal Production Management

S. N.	Topic
1	Importance of lab animals in research and selection of laboratory animals for research.
2	Care and housing standards of mice, rats, hamster, guinea pigs & rabbit.
3	General considerations on feeding and breeding of laboratory animals.
4	Concept of production of specific pathogen free and germ free laboratory animals.
5	Scope of rabbit farming in the country, breeds and their distributions in India. Limitation of rabbit animal production. Selection, care and management of breeding stock for commercial purpose.
6	Identification, care and management of kindling animals. Care of new born, growing stock.
7	Breeding and selection techniques for optimal production of rabbit.
8	Feeds and feeding for rabbit production.
9	Hygienic care and Housing for rabbit production. Disposal, utilization and recycling of waste etc.
10	Preparing projects for micro (Backyard), mini and major rabbit farms.
11	Important breeds of dogs, cats and pet birds.
12	Feeding of dogs, cats and pet birds.
13	Dog show: preparation for show, kennel clubs, important characteristics for judgment.
14	Utility of dogs- guarding, defense, patrolling, riot control, scouting, espionage, mine detection, tracking, guiding, hunting, races, retrieving rescue and other uses.

## Unit – 9

### Title : Swine Or Equine Or Camel, Yak And Mithun Production Management

S. N.	Topic
1	Introduction and scope of swine farming in the country. Demography of swine population.
2	Selection and breeding techniques in swine. Important breeds (exotic and indigenous) & their characteristics.
3	Housing and feeding of swine.
4	Management of breeding and pregnant sows; sows at farrowing and after farrowing:
5	Management of pig-lets, growing stock, lactating sows, and feedlot stock.
6	Equine population of India. Horses, donkeys and mules and their utility. Identification of breeds of horses, colors and markings.
7	Dentition & ageing of horse's .Care and routine management of equines including grooming, saddling and exercise.
8	Stable and its management. Vices of horses. Foot care and shoeing care of horses.

9	Feeding routine for horse, donkeys and mules. Care of stallion.
10	Mating of horses, brood mare and its care. Foaling and care of newborn.
11	Breeding mules. Care of race horses and preparing horses for show. Doping and its detection. Colic and its prevention.
12	Common breeds of camel in India and their utility, peculiarities in camel. Feeding schedule of camel, rutting symptoms in camel.
13	Vices of camel. Care of breeding in camel, pregnancy and parturition of camel.
14	Population statistics and utility, peculiarities of yak. Feeding and breeding of Mithun or Yaks. Yak × cattle crossing, hybrids from Mithun or Yaks and their adaptation to high altitude, milk composition of Mithun or Yaks.

## PRACTICAL

### Unit – 1

#### Title : General Livestock Management

S. N.	Topic
1	General introduction of the Institute animal farm
2	Identification of common tools used on animal farm
3	Familiarization of body points of animals Cattle & Buffalo
4	Familiarization of body points of animals Sheep, Goat, Pig & Horse
5	Methods of Identification (marking, tattooing, branding, tagging & electronic chip)
6	Approaching and handling of animals. Use of rope for knot & halter making.
7	Dentition & ageing of animals Cattle & Buffalo
8	Dentition & ageing of animals Sheep, Goat, Pig & Horse
9	Preparation of animals for show, judging, fairs and melas
10	Selection and culling of animals
11	Preparation of project proposal Cattle & Buffalo
12	Preparation of project proposal Sheep & Goat

### Unit – 2

#### Title : Fodder Production & Conservation

S. N.	Topic
1	Visit to the fodder farm. Familiarization with the various types of fodders in the state and India.
2	Familiarization with various fertilizers and manures
3	Collection, preservation and storage of feed and fodder
4	Damages or loss during transport and storage; methods to prevent them
5	Cost of calculations of fodder production.(One Cereal & one legume crop)-----
6	Livestock waste utilization and recycling.

### Unit – 3

#### Title : Livestock Production Management-Ruminants

S. N.	Topic
-------	-------

1	Layout plans for different livestock houses
2	Visit to different animal farms and Identification of various breeds of cattle, buffalo, sheep and Goat
3	Humane handling , restraining & casting of cattle, buffalo, sheep and Goat
4	Clipping, shearing, dipping, spraying and spotting sick animals.
5	Determination of body weight using different measurements.
6	Familiarization with routine cattle, buffalo, sheep and goat farm operations
7	Milking of dairy animals.
8	Training of breeding males
9	Detection of heat. Identification and care of pregnant animals, care of neonatal and young stock
10	Economics of dairy farm.
11	Economics of sheep or goat farm

#### **Unit – 4**

##### **Title : Zoo Animals Production Management**

<b>S. N.</b>	<b>Topic</b>
1	Visit to nearby wildlife sanctuary/zoo, captive animals centres to study care and management of these animals.
2	To study housing of captive animals.
3	To study feeds and feeding schedule of captive animals.
4	Hygienic preparation, preservation and storage of feeds of captive animals.
5	Familiarization about restraining, handling of captive animals.
6	Physical examination of captive animals.

#### **Unit – 7**

##### **Title : Laboratory Or Rabbit Or Pet Animal Production Management**

<b>S. N.</b>	<b>Topic</b>
1	Identification of body parts and handling, weighing, sexing and weaning of laboratory animals.
2	Marking for identification of laboratory animals for purpose of their individual recording. Maintenance of breeding records of laboratory animals.
3	Computation, feeding schedule of balanced diet for high breeding efficiency of laboratory animals. Prophylactic measures against common disease of laboratory animals. Hygienic care and control of parasites.
4	Shearing of rabbit. Feeding and Housing requirement and equipments for rabbit. Projects report for establishing of rabbit farm.
5	Handling and restraining of dog, cat and pet bird and equipments for pet animals and birds.
6	Brushing or grooming and bathing of dogs and cats. Nail and tooth care, clipping of hairs for show purpose.
7	Care of pups, kitten and weaning.

#### **Unit – 8**

##### **Title : Swine Or Equine Or Camel, Yak And Mithun Production Management**

<b>S. N.</b>	<b>Topic</b>
1	Handling and restraining of swine, equine and camels.
2	Identification of pregnant animals, care during pregnancy, isolation and care of farrowing sows and piglets.
3	Preparation of swine and equine for show and judging.

4	Preparation of plans for sty and stables. Economics of pig farming.
5	Routine inspection of pig, tooth care and Vaccination schedule of pig
6	Horse riding, walking, trotting cantering and galloping.





## List of PG Courses (M.V. Sc.) LIVESTOCK PRODUCTION MANAGEMENT

Course No.	Course Title	Credits
LPM 601*	Cattle and Buffalo Production Management	2+1
LPM 602*	Sheep and Goat Production Management	2+1
LPM 603*	Swine Production Management	1+1
LPM 604*	Climatology and Livestock Production	1+1
LPM 605*	Behaviour and Welfare of Farm Animals	1+1
LPM 606*	Equine Production Management	1+1
LPM 607*	Companion Animal Production Management	1+1
LPM 691	Seminar	1+0
LPM 699	Thesis Research	10
LPM 608	Farm Hygiene and Waste Management	1+1
LPM 609	Integrated Livestock Farming Systems	1+1
LPM 610	Management and Conservation of Wild and Zoo Animals	1+1
LPM 611	Laboratory Animal Production Management	1+1
LPM 612	Livestock Business Management	1+1
LPM 613	Livestock Farm Machinery Management	0+2
LPM 614	Poultry Farm and Hatchery Management	1+1
LPM 615	Regional Animal Production Management	1+1
LPM 699	Thesis Research	20

### Lecture Schedule for the Courses of M. V. Sc in Livestock Production and Management

Course Title: Cattle and Buffalo Production Management

Course Code: LPM 601

Credit Hours: 2+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Development of dairy industry in India and the world. Present status and future prospects of dairying in India and the world. SWOT analysis of the dairy sector in Maharashtra.
2	Production systems in vogue under Indian condition. Breeds of cattle and buffalo with more emphasis on breeds of economic importance.
3	Principles of housing/ shelter management for cattle and buffaloes.
4	Housing and equipment requirements for different classes of cattle and buffaloes.
5	Layout plans and construction details for small farms in different climatic zones of India.

6	Layout plans and construction details for medium farms in different climatic zones of India.
7	Layout plans and construction details for large farms in different climatic zones of India.
8	Ventilation and lighting systems in dairy farms.
9	Feed resources used for feeding cattle and buffaloes.
10	Scientific technique and regimen of feeding of different categories of cattle and buffaloes.
11	Feed and fodder requirements of different categories of cattle and buffaloes. Supply of green fodder round the year.
12	Enrichment of poor quality roughages.
13	Fodder resources used for feeding cattle and buffaloes.
14	Scientific technique and regimen of watering of different categories of cattle and buffaloes.
15	Nonconventional feeding resources for lowering the feeding cost.
16	Pasture management.
17	Traits of economic importance and their inter-relationships in cattle and buffaloes.
18	Methods of selection and breeding.
19	Pre-natal and post-natal care and management of dams.
20	Care of neonates and young calves.
21	Management strategies for reducing mortality in calves. Optimizing age at first calving and calving interval.
22	Strategies of improving breeding efficiency of dairy animals.
23	Management of pregnant and lactating cow and buffalo.
24	Management of dry cow/buffalo and bull.
25	Routine management practices at farm and farm labour management.
26	Milking management and systems of milking.
27	Techniques of harvesting clean milk.
28	Cooling, chilling and transportation of milk.
29	Marketing of milk.
30	Different acts for governing the dairy sector to produce quality products at par international standards.
31	Health management of dairy animals. Summer and winter management of dairy animals.
32	Draught ability and management of draught animals.

Course Title: Cattle and Buffalo Production Management

Course Code: LPM 601

Credit Hours: 2+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visits to small dairy farms and assessment of routine management practices.
2	Visits to medium dairy farms and assessment of routine management practices.
3	Visits to large dairy farms and assessment of routine management practices.
4	Analysis of various livestock records for productivity evaluation.
5	Analysis of various financial records for economic evaluation.

6	Preparation of layout plan for medium dairy farm.
7	Preparation of layout plan for large dairy farm.
8	Computation of practical and economical rations.
9	Housing and management of cattle and buffalo.
10	Dairy Cattle and Buffalo judging.
11	Body Condition Scores (BCS).
12	Project preparation for small dairy farms.
13	Project preparation for medium dairy farms.
14	Project preparation for large dairy farms.

Course Title: Sheep and Goat Production Management

Course Code: LPM 602      Credit Hours: 2+1      Theory Schedule

Sr. No.	Title of the topic to be covered
1	Population structure and importance of small ruminants. Sheep farming under different systems of management.
2	Advantages and limitations of sheep and goat farming. Genetic resources of sheep and goats with special emphasis on breeds of economic importance.
3	Principles of shelter management for small ruminants.
4	Housing and equipment requirements for different classes of sheep.
5	Housing and equipment requirements for different classes of goats.
6	Designing of feeders and waterers for small ruminants.
7	Layout plans and construction details for large size farms in different agro-climatic zones of India.
8	Layout plans and construction details for backyard farms in different agro-climatic zones of India.
9	Feed resources for small ruminants.
10	Fodder resources for small ruminants.
11	Common property resources (CPR's) and their management.
12	Principles and systems of feeding different categories of sheep.
13	Principles and systems of watering different categories of sheep.
14	Principles and systems of feeding different categories of goat.
15	Principles and systems of watering different categories of goat.
16	Pasture utilization and improvement for small ruminants.
17	Traits of economic importance and their inter-relationship.
18	Breeding seasons and breeding management in small ruminants.
19	Selection of breeding animals in small ruminants.
20	Methods of detection of heat, use of teaser, flushing and tugging.
21	Role of estrous synchronization in optimizing reproduction in small ruminants.
22	Natural service, artificial insemination and off-season breeding in small ruminants.
23	Care and management of pregnant animals.
24	Care and management of breeding stock and culling.
25	Disease management in small ruminants.
26	Prevention and control measures including vaccination and deworming.
27	Dipping and spraying in small ruminants.
28	Transportation of small ruminants.
29	Meat, methods of slaughter and dressing percentage.
30	Wool, shearing methods, importance of wool and wool quality.

31	Goat fibers, mohair, pashmina, marketing of goat fibers/ wool.
32	Goat milk, Milking, avoidance of goatly odour in milk, clean milk production and its therapeutic uses.

Course Title: Sheep and Goat Production Management

Course Code: LPM 602 Credit Hours: 2+1 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to modern sheep farm and critical analysis of various managerial practices.
2	Visit to traditional goat farms and critical analysis of various managerial practices.
3	Visit to modern goat farms and critical analysis of various managerial practices.
4	Study of practical housing management of goat.
5	Study of practical housing management of sheep.
6	Study of disease control management of sheep and goat.
7	Study of shearing management in sheep.
8	Record keeping and economics of sheep and goat farming for mutton/ chevon.
9	Record keeping and economics of sheep and goat farming for wool/ fibre.
10	Record keeping and economics of goat farming for milk.
11	Preparation of project report for commercial goat farm.
12	Preparation of project report for commercial sheep farm.
13	Daily farm operations on sheep and goat farm.
14	Periodical farm operations on sheep and goat farm.

Course Title: Swine Production Management

Course code: LPM 603

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Population dynamics: National and world. Contribution of pigs in Indian economy and advantages and disadvantages of swine husbandry. Systems of swine management.
2	Breeds of economic importance: Indian and exotic.
3	Various housing and rearing systems of pigs.
4	Housing (floor, roof, walls, drainage, door and gates etc.) and equipments requirement for different classes of swine. Layout plans and construction for different sized piggery farms.
5	General feeding principles and nutrient requirement of different classes (growing and finishing, breeding, pregnant, farrowing and orphan) of swine.
6	Feeding schedule for different classes of swine.
7	Methods of swine feeding: traditional and scientific.
8	Traits of economic importance in pigs and their interrelationship.
9	Selection of breeding stock. Various reproductive parameters of native, crossbred and exotic pigs.
10	Methods for detection of heat in pig. Different mating systems.

11	Care and management of different classes of swine: pregnant sows, piglets, growers, finishers and boar . Summer management in swine.
12	Economically important diseases, challenges and herd health management programme. Health Management strategies to prevent diseases.
13	Prevention and control measures including sanitation, vaccination, deworming, etc. and biosecurity measures to be adopted at swine farms.
14	Piglet anemia and it's management.
15	Various methods of slaughter and dressing percentage. Methods of marketing. Transportation in pig.
16	Utilization of by-products from the swine industry.

Course Title: Swine Production Management

Course code: LPM 603

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to the modern piggery farm and critical analysis of various types of managerial practices.
2	Visit to the backyard piggery farm and critical analysis of various types of managerial practices.
3	Practical feeding management of various classes of pig. Requirement and supplying basic nutrients. Special consideration in each production phase. Combining different feed ingredients to meet nutrient needs of growing and finishing pigs.
4	Practical feeding management of various classes of pig. Requirement and supplying basic nutrients. Special consideration in each production phase. Combining different feed ingredients to meet nutrient needs for breeding stock, pregnant, farrowing and lactating sow.
5	Breeding management of pig. Different breeding methods. Selection of breeding gilts and boar. Different mating systems and measures to attain early puberty in pigs.
6	Breeding management of pig. Best breeding practices to be followed. Heat detection and mating. Pregnancy and preparation for farrowing.
7	Disease control measures to be adopted on piggery farm including bio- security measures.
8	Steps in judging of different categories of swine.
9	Ranking and evaluation of different traits of different categories of swine using judging core card.
10	Importance of record keeping. Various records to be maintained at pig farm. Advances in record keeping and evaluation of farm performance based on records.
11	Formulation of economic rations for different classes of swine (growing and finishing).
12	Formulation of economic rations for different classes of swine: breeding stock, pregnant and farrowing sow and lactating sow.
13	Project report formulation for backyard pig farm.
14	Project report formulation for commercial pig farm.

Course Title : Climatology and Livestock Production  
 Course Code: LPM 604  
 Credit Hours: 1+1  
 Theory Schedule

Sr. No.	Title of the topic to be covered
1	Climatology and agro-climatic regions of India.
2	Study of climatic factors and their measurements.
3	Effects of climatic stress in livestock (heat stress / cold stress), measurement and amelioration. Temperature humidity index and thermo-neutral zone.
4	Adaptation and acclimatization of farm animals to different climatic conditions.
5	Light: natural and artificial.
6	Importance of photo-period and its effects on growth, production and reproduction in livestock.
7	Mechanism of light action and responses.
8	Application of light in livestock production.
9	Performance of livestock introduced in different climates.
10	Micro-climate modification in animal houses - I
11	Micro-climate modification in animal houses - II
12	Livestock and global warming.
13	Climate-resilient livestock production systems.
14	Different types of natural disasters.
15	Effect of Natural disasters on livestock.
16	Natural disasters mitigation measures.

Course Title: Climatology and Livestock Production  
 Course Code: LPM 604  
 Credit Hours: 1+1  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to modern weather forecast station - I
2	Visit to modern weather forecast station - II
3	Introduction of different instruments used for measurement of climatic factors.
4	Assessment of climate.
5	Microclimatic conditions within the animal house.
6	Measurement of macro-climatic conditions.
7	Measurement of temperature and relative humidity.
8	Estimation of Temperature Humidity Index.
9	Measurement of wind velocity.
10	Measurement of intensity of light.
11	Construction of climographs and hythergraphs.
12	Heat tolerance test in cattle.
13	Heat tolerance test in buffalo.
14	Heat tolerance test in swine.

Course Title : Behaviour and Welfare of Farm Animals

Course Code: LPM 605

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Introduction, evolution, theories and importance of animal behaviour studies.
2	Physiological basis of behaviour. Natural selection, proximate and ultimate causes, fitness, optimality theory, selfish genes, kin selection and game theory.
3	Genetic, environmental and physiological influence on animal behaviour.
4	Daily and seasonal cycles of behaviour. Patterns of behaviour. Favourable and unfavourable behaviours of domestication.
5	Ethogram construction for general behaviour management and its interpretation.
6	Behaviour assisted animal management. Flight zone. Animal learning and training.
7	Conditioning: operant and classical. Animal behaviour based housing designs.
8	Methods of studying animal behaviour. Causes and prevention of vices.
9	Group formation. Social relationships like hierarchy and aggression. The process of socialization. Locality and behaviour.
10	Behavioural characters for management practices.
11	Concepts of animal welfare, animal rights and animal freedoms.
12	Animal welfare organizations.
13	Measurement of animal welfare. Indicators of animal welfare improvement. Animal welfare through selection.
14	The welfare of livestock in commercial farms and captivity. Environmental enrichment.
15	Welfare of livestock during various management activities such as handling, transportation, etc.
16	Legislation and regulations of animal welfare. Welfare and economics.

Course Title : Behaviour and Welfare of Farm Animals

Course Code: LPM 605

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Assessment of behavioural characters in horse, cattle and buffaloes for managemental practices.
2	Assessment of behavioural characters in sheep, goat and pig for managemental practices.
3	Study of behavioural adaptations in horse, cattle and buffaloes under domestication.
4	Study of behavioural adaptations in sheep, goat and pig under domestication.
5	Analysis of behaviour of farm animals in relation to climate.
6	Analysis of social behaviour in cattle.
7	Analysis of social behaviour in goats.
8	Preparation of ethogram (time budgeting) at cattle farm.
9	Preparation of ethogram (time budgeting) at goat farm.
10	Preparation of ethogram (time budgeting) at pig farm.

11	Modifications in animal houses for farm animal welfare.
12	Assessment of animal welfare in terms of health.
13	Assessment of animal welfare in terms of feeding.
14	Assessment of animal welfare in terms of housing.

Course Title: Equine Production Management

Course Code: LPM 606

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Scope of equine husbandry in India. Equine population dynamics.
2	Types and classes in equines and breeds of economic importance.
3	Housing and stable management.
4	Behavior, stable vices and their management.
5	Care and management of stallion.
6	Care and management of brood mare / pregnant mare.
7	Care and management of mare approaching foaling and newborn foal.
8	Different stud farms, race clubs, race-horses and their care, training and exercising.
9	Different methods of doping and horsemanship.
10	Foot care and dental care in equines.
11	General equine health management and diseases control.
12	Colic, equine azoturia : prevention and management.
13	Regulatory acts in equine disease control and welfare.
14	Transportation
15	Laws governing the import and export of equines.
16	Horse passport and trading.

Course Title: Equine Production Management

Course Code : LPM 606

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to different institutional stables.
2	Different identification methods in horses.
3	Ageing and dentition in horses.
4	Determination of soundness in horses.
5	Preparation of soundness certificate in horses.
6	Selection of horses for breeding purpose.
7	Selection of horses for race purpose.
8	Preparation of horses for transportation.
9	Passing of nasogastric tube (Stomach tube) in horses.
10	Types of shoeing and methods of applications in horses.
11	Method of covering in horses.
12	Saddle and curcingle fittings in horses.
13	Different gaits in horses.
14	Colours and markings in horses.



Course Title: Companion Animal Production Management  
 Course Code : LPM 607  
 Credit Hours: 1+1  
 Theory Schedule

Sr. No.	Title of the topic to be covered
1	Various companion animals, evolutionary history, the process of domestication of dog and cat.
2	Breeds of dogs and cats.
3	Ownership. Selection of dog, cat and other companion animals.
4	Dogs/ cat body: structure, movement and special senses.
5	Reproduction and breeding management,
6	Care of newborn and weaner.
7	Reproductive problems of bitch and queen.
8	Socialization in dog and cat.
9	Principles of the feeding of dog and cat
10	Feeding during different life stages and disease conditions.
11	Feeding behavior in dogs and cats
12	Common nutritional problems and their preventive measures.
13	Basic Kennel and health management.
14	Principles of training of dogs and cats.
15	Dog shows. Preparation for the shows. Kennel clubs. Important characters for judgment.
16	Vaccination and deworming schedules for dogs and cats.

Course Title: Companion Animal Production Management  
 Course Code : LPM 607  
 Credit Hours: 1+1  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Recognizing various breeds of dog.
2	Recognizing various breeds of cat.
3	Handling and restraining of dogs.
4	Handling and restraining of cats.
5	Routine management practices of dogs.
6	Routine management practices of cats.
7	Detection of oestrus, mating, whelping (through demonstration) in dogs.
8	Detection of oestrus, mating, kittening (through demonstration) in cats.
9	Kennel design and management.
10	Cattery design and management.
11	Hygiene of kennel and pens.
12	Licensing and identification of companion animals.
13	Visit to dog hostels and dog park.
14	Visit to dog shows.

Course Title: Farm Hygiene and Waste Management  
 Course Code : LPM 608  
 Credit Hours: 1+1  
 Theory Schedule

Sr. No.	Title of the topic to be covered
1	Sources of air pollutants in animal environment.
2	Measures to control air pollutants.
3	Factors affecting outdoor and indoor air pollution.
4	Methods to control outdoor and indoor air pollution.
5	Sources of drinking water in farm animals.
6	Impurities and inclusions of drinking water.
7	Hygienic requirements and standards for drinking water.
8	Purification of water and water conservation.
9	Quantity of dung voided by domestic animals. Manure production.
10	Animal excreta as a factor in the spread of diseases.
11	Hygienic and economic disposal of farm wastes.
12	Drainage in livestock farms. Lagoons, Sewers, septic tanks, drains and traps.
13	Environmental protection act: Air (Prevention and control of pollution) act .
14	Environmental protection act: Water (Prevention and control of pollution) act.
15	Factors affecting environmental pollution.
16	Effect of environmental pollution on livestock and livestock products used for human consumption and controlling measures

Course Title: Farm Hygiene and Waste Management  
 Course Code : LPM 608  
 Credit Hours: 1+1  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Assessment of air pollutants on animal health and production.
2	Collection of water samples from different sources.
3	Physical examination of water samples.
4	Chemical examination of water samples.
5	Bacteriological and microscopic examination of water samples.
6	Biosecurity measures at livestock farms.
7	Modern techniques used in the disposal of solid farm wastes.
8	Modern techniques used in the disposal of liquid farm wastes.
9	Value added products from farm wastes –I.
10	Value added products from farm wastes –II.
11&12	Visit to water filtration plants and study of filtration systems (rapid and slow-sand, etc.).
13&14	Testing of drains in livestock farms.

Course Title : Integrated Livestock Farming Systems  
 Course Code: LPM 609  
 Credit Hours:1+1  
 Theory Schedule

Sr. No.	Title of the topic to be covered
1	Definition of integrated farming system. Classification of livestock-based farming systems. Scope and limitation of integrated farming systems.
2	Principles, drivers and tradeoffs in integrated livestock farming systems.
3	Concept of sustainability in relation to ecological balance and eco-friendly environment.
4	Sustainability of integrated livestock farming systems and their economic importance.
5	Integration of arable farming + cattle and buffalo farm. Integration of arable farming + sheep and goat farm. Integration of arable farming + pig and poultry farm.
6	Integration of fish + pig farm. Integration of fish + poultry and duck farm. Integration of cattle + gobar gas plant and FYM.
7	Integration of silk worm and bee keeping. Biogas production technology.
8	Vermicompost. Solar and wind energy utilization.
9	New approach for changing farming systems in the light of global warming.
10	New approach for changing farming systems in the light of carbon sequestration.
11	New approach for changing farming systems in the light of mitigation of GHGs (reducing carbon footprints).
12	New approach for changing farming systems in the light of mitigation of GHGs (reducing water footprints).
13	Project formulation and evaluation for agriculture + cattle and buffalo and agriculture + sheep and goat.
14	Project formulation and evaluation for fish + poultry + pig, fish + pig and fish + poultry.
15	Project formulation and evaluation for fish + agriculture and agriculture + poultry.
16	Project formulation and evaluation for agriculture + rabbit

Course Title : Integrated Livestock Farming Systems  
 Course Code: LPM 609  
 Credit Hours: 1+1  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to modern integrated livestock farming units and critical analysis of different subunits.
2	Integration of fish and arable farming.
3	Integration of arable farming + cattle and buffalo farm.

4	Integration of arable farming + sheep and goat farm.
5	Integration of arable farming + pig and poultry farm.
6	Integration of fish + pig farm with its economic analysis.
7	Integration of fish + poultry and duck farm with its economic analysis.
8	Integration of cattle + gobar gas plant and fym with its economic analysis.
9	Biogas production technology with its economic analysis.
10	Feasibility report preparation on agriculture + cattle and buffalo.
11	Feasibility report preparation on agriculture + sheep and goat.
12	Feasibility report preparation on agriculture + poultry.
13	Feasibility report preparation on agriculture + rabbit.
14	Feasibility report preparation on animal waste and feed factory.

Course Title : Management and Conservation of Wild and Zoo Animals

Course Code: LPM 610

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Taxonomy and distribution of important Indian wild animals and birds. Ecology of wildlife sanctuaries and national parks.
2	Principles and concepts of zoo and captive wild animals. Status of forest in India. Biological and ecological basis of management of wildlife.
3	Rules and regulations of Zoo Authority of India. Wildlife protection act. Conservation of wild animals. Feeding of captive animals and birds.
4	Habitat Component's (Cover, food, water, space) development and conservation.
5	Wildlife health control.
6	Population dynamics (manipulation, movements, corridors, mortality) of herbivorous wild animals.
7	Population dynamics (manipulation, movements, corridors, mortality) of carnivorous wild animals.
8	Predator and prey relationship.
9	Human-animal conflict and refuge rehabilitation of herbivorous wild animals
10	Human-animal conflict and refuge rehabilitation of carnivorous wild animals.
11	Principles for the protection of wild and zoo animals.
12	Breeding seasons and breeding characteristics (puberty, pregnancy, parturition and postnatal survival of the young) of wild animals.
13	Social factors among various species.
14	Captive animal breeding.
15	Wildlife census methods.
16	Miscellaneous management procedures with reference to wild life.

Course Title : Management and Conservation of Wild and Zoo Animals

Course Code: LPM 610

Credit Hours: 1+1

Practical schedule

Sr. No.	Title of the topic to be covered
1	Visit to wildlife sanctuary/ national park and study of flora and fauna.
2	Visit to biosphere reserves and study of flora and fauna.
3	Visit to conservation breeding center and study of flora and fauna.
4	Visit to nearby zoo and study of flora and fauna.
5	Feeding schedule of wild animals in captivity.
6	Chemical restraining methods.
7	Physical restraining methods.
8	Funding agencies for wildlife research and preparation of project proposals - I
9	Funding agencies for wildlife research and preparation of project proposals - II
10	Funding agencies for wildlife research and preparation of project proposals - III
11	Habitat analysis and design for carnivores
12	Habitat analysis and design for herbivores
13	Habitat analysis and design for omnivores
14	Habitat analysis and design for arboreals

Course Title : Laboratory Animal Production Management

Course Code: LPM 611

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Importance of rabbit and guinea pigs as laboratory animals.
2	Importance of rats, mice and hamster as laboratory animals.
3	Systems of housing for laboratory animals.
4	Layout and design for laboratory animals house.
5	Feeding management for different laboratory animals.
6	Feeding regimen and types of diets for laboratory animals.
7	Production of laboratory animal models for various experiments.
8	Management of specific pathogen free, gnotobiotic and germ-free animals.
9	Concepts related to the welfare of laboratory animals.
10	Biosecurity measures (Sanitary and hygienic measures).
11	Common diseases and their control measures.
12	Transportation in laboratory animals.
13	Breeding, growth, sexual maturity, mating and gestation in different laboratory animals.
14	Care and management during parturition and litter size gestation in different laboratory animals.
15	Weaning in laboratory animals.
16	Selection of breeding stock for replacement.

Course Title : Laboratory Animal Production Management  
 Course Code: LPM 611  
 Credit Hours: 1+1  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to laboratory animal house and critical analysis of various types of managerial practices I.
2	Visit to laboratory animal house and critical analysis of various types of managerial practices II.
3	Handling and restraining of rabbit and guinea pig.
4	Handling and restraining of rat, mice and hamster.
5	Study of housing requirement of laboratory animals.
6	Study of practical breeding methods in rabbit and guinea pig.
7	Study of practical breeding methods in rat, mice and hamster.
8	Study of disease control in laboratory animals.
9	Study of special management for laboratory animals.
10	Study of ageing and sexing in laboratory animals.
11	Study of identification in laboratory animals.
12	Study of economics of laboratory animal production I.
13	Study of economics of laboratory animal production II.
14	Study of nutrient requirements for laboratory animals.

Course Title: Livestock Business Management  
 Course Code: LPM 612  
 Credit Hours: 1+1  
 Theory Schedule

Sr. No.	Title of the topic to be covered
1	Management principles, Planning techniques, Strategic planning and organization structure for livestock business management.
2	Co-ordination and controlling techniques of management.
3	Different approaches to management.
4	Key economic concepts like factors of production, farm enterprises, cost of production, opportunity cost and value of production.
5	Analysis of gross margin, farm profit, net farm family income, substitution, and efficiency return to scarce resources.
6	Risk management in livestock species enterprises.
7	SWOT analysis of livestock enterprises.
8	Livestock production economics, theory of supply and demand, production relationships, production function, cost input variables and profit maximization.
9	Economics and the market.
10	Market intelligence, research and opinion polling.
11	Newer concepts in marketing.
12	Different ways of market surveillance.
13	Different marketing channels.
14	Marketing of livestock and livestock products and laws governing them.
15	Pricing strategies and supply chain management.
16	Different marketing agencies for livestock marketing.

Course Title: Livestock Business Management  
 Course Code: LPM 612  
 Credit Hours: 1+1  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Study of different types of accounting records.
2	Fund flow statements.
3	Cost and benefit analysis.
4	Study of budgeting and control in livestock enterprises.
5	Preparation of financial statements.
6	Depreciation and accounting methods.
7	Trend and variance analysis.
8	Cost-volume profit analysis.
9	Financial planning and forecasting.
10	Estimation of working capital requirement.
11	Break even analysis.
12	Visit to livestock business firms.
13	Visit to livestock business banks.
14	Preparing projects for financing livestock enterprises.

Course Title: Livestock Farm Machinery Management  
 Course Code: LPM 613  
 Credit Hours: 0+2  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to Instructional Livestock Farm Complex and identification of various livestock farm machineries.
2	Familiarization with different parts and functions of tractor (for tillage implements and fodder land development).
3	Familiarization with different parts and functions of power tiller (for tillage implements and fodder land development).
4	Familiarization with different electric motors and diesel engines used for irrigation of fodder field.
5	Use of sprinkler for irrigation of fodder field.
6	Application of solar energy for livestock farm management.
7	Application of wind energy for livestock farm management.
8	Common terms used in harvesting of fodder crops and introduction the post-harvest equipment/ machineries.
9	Hay and forage harvesting equipments, mowers and field choppers.
10	Use of chaff cutters for silage making.
11	Familiarization with different types of silos.
13	Familiarization with forage harvesters.
14	Familiarization with mechanical hay driers.
15	Familiarization with conventional balers, hay stackers and straw combine.
16	Familiarization with different parts of milking machine, handling, operation and cleaning of milking machine after use.

17	Familiarization with shearing machines, handling, operation and cleaning of shearing machine after use.
18	Familiarization with instruments used for milk packaging.
19	Familiarization with automatic feeders.
20	Familiarization with automatic waterers.
21	Familiarization with milk storing equipment and transportation of milk.
22	Familiarization with milk pasteurization equipment.
23	Handling of equipment used for preparation traditional milk products.
24	Introduction to the forage densifying machine/ feed block machine and its use.
25	Preparation of complete feed block (CFB).
26	Visit to feed mill to study use and maintenance of feed grinder and mixture machines in farms.
27	Visit to small milk processing unit.
28	Visit to large milk processing unit.

Course Title : Poultry Farm and Hatchery Management

Course Code: LPM 614

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Poultry housing systems, cage vs floor system.
2	Litter management. Lighting for poultry.
3	Rearing of turkey, duck and quails.
4	Backyard poultry farming.
5	Management of chicks, growing, laying and breeding flocks.
6	Broiler production.
7	Selection and culling of laying flocks
8	Health management and management of birds during disease outbreaks.
9	Procuring, pre-incubation and storage of hatching eggs and methods of incubation.
10	Sanitation, disinfection and management of hatchery.
11	Biosecurity in poultry farms.
12	Embryonic development and factors affecting fertility of eggs.
13	Factors affecting hatchability of eggs.
14	Chick sexing, packing and hatchery business.
15	Transport management of eggs and poultry birds.
16	Waste management on the poultry farm.

Course Title : Poultry Farm and Hatchery Management

Course Code: LPM 614

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to poultry farm and observation and recording of poultry farm management.
2	Study of brooding of chicks.
3	Study of selection of laying flocks.



4	Study of disease preventive measures on the poultry farm
5	Study of selection and care of hatching eggs.
6	Study of incubator operation on the hatchery.
7	Study of fumigation and sanitization of hatchery.
8	Study of candling setting and hatching of eggs.
9	Study of packaging and transportation of chicks.
10	Study of waste management on the poultry farm.
11	Study of marketing of poultry products.
12	Study of layer and broiler management.
13	Study of feeding different age groups of birds.
14	Study of housing for poultry birds.

Course Title: Donkey Production Management

Course Code: LPM 615

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Advantages & constraints of Donkey rearing in Maharashtra.
2	Donkey population and its demographic distribution in Maharashtra.
3	Types of donkeys found in Maharashtra.
4	Economic importance of donkeys in rural societies of Maharashtra.
5	Housing management for donkeys, cost effective housing in rural areas.
6	Traditional donkey rearing practices in Maharashtra.
7	Feeding management and nutritional requirements of donkeys.
8	Breeding management in donkeys.
9	Scientific method of donkey rearing.
10	Care and management of jack, brood jennet and foal.
11	Transportation of donkeys.
12	Vices in donkeys and their correction.
13	Care of hoof, health management practices and disease control.
14	Welfare of working donkeys.
15	Handling and restraining of donkeys.
16	Use of donkey for DAP, dairy and hide production. Composition of donkey milk and its use.

Course Title: Donkey Production Management

Course Code: LPM 615

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit to nearby donkey farm.
2	Visit to donkey sanctuary/ melas.
3	Study of handling and restraining of donkeys.

4	Study of identification methods in donkeys.
5	Study of ageing and dentition in donkeys.
6	Study of transportation of donkeys.
7	Study of hoof disorders, care and shoeing in donkeys.
8	Study of body condition scoring donkeys.
9	Study of body measurements in donkeys.
10	Welfare assessment in donkeys in relation with feeding.
11	Welfare assessment in donkeys in relation with housing and health.
12	Study of economics of rearing donkeys in Maharashtra.
13	Study of vaccination schedule and deworming practice for donkeys.
14	Study of donkey's milk analysis.



## List of PhD Courses :

Course No.	Course Title	Credits
LPM 701*	Recent Developments in Large Ruminants Production Management	2+1
LPM 702*	Recent Developments in Small Ruminants Production Management	2+1
LPM 703*	Recent Developments in Swine Production Management	1+1
LPM 704*	Livestock and Environment	1+0
LPM 705*	Organic Livestock Production	1+0
LPM 791	Seminar-I	1+0
LPM 792	Seminar-II	1+0
LPM 799	Research	15
LPM 706	Recent Developments in Welfare of Farm Animals	1+0
LPM 707	Entrepreneurship in Livestock Production	1+1
LPM 708	Precision Livestock Farming	1+1
LPM 709	Recent Developments in Poultry Production Management	2+1
LPM 799	Research	20
LPM 799	Research	20
LPM 799	Research	20

## Lecture Schedule for the Courses of Ph.D. in Livestock Production and Management Course

Title: Recent Developments in Large Ruminants Production Management

Course Code: LPM 701

Credit Hours: 2+1

Theory schedule

Sr. No.	Title of the topic to be covered
1	Present status of dairying in India vis-à-vis global and South Asian scenarios.
2	Production dynamics, recent policy initiatives in dairy development. Conservation of indigenous germplasm.
3	Advances in housing management, viz., design and layout.
4	Construction materials, cost of construction suits to various agro-climatic zones of India.
5	Low-cost housing for large ruminants.
6	Ideal shelter management practices for better productivity.
7	Recent approaches in breeding and reproductive management of dairy animals.
8	Optimization of reproductive traits.
9	Recent advances in estrus synchronization.
10	Recent advances in MOET.
11	Modern approaches towards using sexed semen.

12	IVF in dairy animals. Recent approaches in cloning and IVF for optimization of production potential.
13	Recent approaches in feeding of dairy bovines.
14	Recent management in phased feeding and transition period.
15	Different standards for drinking water and water hygiene.
16	Recent advances in eco-feeding. Hydroponic technology.
17	Advances in health management in dairy animals.
18	Preventive measures for production-related diseases in dairy animals.
19	Bio-security measures on farm.
20	Recent approaches towards reducing calf mortality.
21	Milking management.
22	Atomization in milking management.
23	Sanitary and phytosanitary standards for the production of quality milk.
24	Post-harvest processing of milk.
25	Establishment of small dairy enterprises and SWOT analysis.
26	Establishment of medium dairy enterprises and SWOT analysis.
27	Establishment of large dairy enterprises and SWOT analysis.
28	Computerization for dairy enterprise. Best management practices.
29	Advances in herd management and data analysis
30	Advances in the management aspects of buffaloes
31	Salvaging of buffalo calves.
32	Advances in work animal management.

Course Title: Recent Developments in Large Ruminants Production Management

Course Code: LPM 701

Credit Hours: 2+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Critical analysis of various types of managerial practices at cattle dairy farm.
2	Critical analysis of various types of managerial practices at buffalo dairy farm.
3	Preparation of layout and designs for construction of sheds of various sizes in Konkan region of Maharashtra.
4	Preparation of layout and designs for construction of sheds of various sizes in Western region of Maharashtra.
5	Preparation of layout and designs for construction of sheds of various sizes in Marathwada region of Maharashtra.
6	Preparation of layout and designs for construction of sheds of various sizes in Vidharbha region of Maharashtra.
7	Cost analysis of dairy bovine housing.
8	Organization of milking machines.
9	Dairy Cattle and Buffalo judging.
10	Study of BCS of cattle and buffaloes of different age groups.
11	Farm record analysis.
12	Project report preparation for small dairy farm.
13	Project report preparation for medium dairy farm.
14	Project report preparation for large dairy farm.

Course Title : Recent Developments in Small Ruminants Production Management

Course Code: LPM 702

Credit Hours: 2+1

Theory schedule

Sr. No.	Title of the topic to be covered
1	Relevance of small ruminants in the Indian economy.
2	Population and production dynamics of small ruminants.
3	Systems of rearing of small ruminants.
4	Needs and possibilities for research in future in small ruminants.
5	Recent approaches in breeding management in small ruminants.
6	Reproductive management of small ruminants.
7	Management during the breeding season/ mating seasons.
8	Control of breeding season in small ruminants.
9	Recent approaches in reproductive biotechnologies in small ruminants.
10	MOET in small ruminants.
11	Cloning and transgenic in small ruminants.
12	Small ruminants genomics and accelerated lambing.
13	Recent approaches in feeding management in small ruminants.
14	Pasture management for small ruminants.
15	Grazing management for small ruminants.
16	Phase feeding in small ruminants.
17	Feed resources for small ruminants.
18	Feeding techniques under different systems in small ruminants.
19-24	Recent approaches in housing systems with reference to different agro-climatic zones and rearing systems wrt. a) Western and eastern Himalayan region b) Lower , middle, upper and trans gangetic plains c) Eastern, central, western and southern plateau and hill region d) East and west plains and hill region e) Gujarat and western plains and hill region f) Islands region
25	Prospects of small ruminant management under stall-fed conditions.
26	Management of small ruminates during scarcity periods.
27	Migratory pattern and flock management.
28	Recent approaches in exploiting goat's, milk quality and safety.
29	Production aspects of dairy goats.
30	Wool/ fiber production and its quality.
31	Recent approaches in health care management,
32	Parasitic control in present ecological and environmental changes.

Course Title : Recent Developments in Small Ruminants Production Management  
 Course Code: LPM 702  
 Credit Hours: 2+1  
 Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit and Critical analysis of various farm practices in small ruminants.
2	Preparation of layout and designs for construction of sheds of large size farms in different agro-climatic zones of India.
3	Preparation of layout and designs for construction of sheds of backyard rearing in different agro-climatic zones of India.
4	Cost analysis of housing in small ruminants.
5	Organization of shearing in sheep.
6	Sheep and goat judging techniques.
7	Study of BCS in small ruminants.
8	Study of farm record analysis at small ruminants farms.
9	Disease control management in small ruminants.
10	Structuring of score card and grading of wool.
11	Project report preparation for large commercial sheep units.
12	Project report preparation for small commercial sheep units.
13	Project report preparation for large commercial goat units.
14	Project report preparation for small commercial goat units.

Course Title: Recent Developments in Swine Production Management  
 Course Code: LPM 703  
 Course Credit: 1+1  
 Theory Schedule

Sr. No.	Title of the topic to be covered
1	Trends in pig population and pork production in India and world.
2	Different pig production systems followed in developed countries.
3	Recent approaches/strategies in improvement of economic traits of swine.
4	Prenatal and postnatal development of piglet. Care and management of newborn piglet.
5	Growth: Types of growth, factors affecting growth rate in pigs.
6	Breeding and reproduction management: Systems of breeding, fundamental rules of breeding. Puberty and factors affecting age at puberty.
7	Breeding and reproduction management: sexual behavior of sow and boar, oestrous cycle and detection of oestrous.
8	Pregnancy, reproductive efficiency. Analysis of different mating systems in swine.
9	Care and management of sow before, at and after farrowing and during lactation period.
10	Strategic management measures in feeding, phase feeding, split sex feeding and individual feeding of various classes of swine.

11	Recent advances in automatic feeding and watering techniques on piggery farm.
12	Different feed resources available, their nutritive value and feeding systems/methods.
13	Recent approaches/developments in housing. Environmental physiology and summer management of pig.
14	Recent approaches in manure management.
15	Occurrence/incidence of common diseases and strategies to reduce mortality in different classes and of pigs.
16	Important diseases of pigs. Herd health management. Biosecurity measures to be adopted at piggery.

Course Title: Recent Developments in Swine Production Management

Course Code: LPM 703

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	Visit and critical analysis of various types of managerial practices at small scale farms.
2	Visit and critical analysis of various types of managerial practices at large scale farms.
3	Preparation of layout and designs for construction of sites for the backyard piggeries.

4	Preparation of layout and designs for construction of sites for the commercial piggeries.
5	Judging of various classes of pigs.
6	Assessment of Body Condition Score in swine.
7	Use of BCS to adjust feed intake.
8	Records and registers to be maintained at piggery farm.
9	Recent tools used for analysis of farm records.
10	Preparation of Project report for commercial piggery.
11	Preparation of Project report for backyard piggery.
12	Various marketing strategy.
13	Study of marketing channels.
14	Study of import and export of piggery products



Course Title: Livestock and Environment

Course Code: LPM 704

Credit Hours: 1+0

Theory Schedule

Sr. No.	Title of the topic to be covered
1.	Effect of livestock on the environment: Role of ruminants in global warming, Impact of slaughterhouse waste, tannery waste, stray and fallen animal on environment.
2.	Strategies for mitigation of methane emission from the livestock sector.
3.	Animal waste management.
4.	A life cycle assessment of the environmental impacts of livestock in different production systems.
5.	Effect of environment on livestock and quality of products.
6.	Effect of heat and cold stress on livestock production.
7.	Effect of heavy metals and pesticide residues pollution on livestock and quality of products.
8.	Management of micro and macro-environment with respect to the animal well being.
9.	Concept of Water footprints in farm animals and products.
10.	Concept of carbon footprints and carbon sequestration of farm animals and products.
11.	Thermal load indices and comfort zones for livestock.
12.	Carbon trading. Mechanisms and opportunities in the livestock sector.
13.	Selection of breeds of livestock for hot climate.
14.	Recent advances in shelter management practices under the impending climate change scenario.
15.	Effect of climate on reproduction of animals.
16.	Relation between environment and diseases in farm animals.

Course Title : Organic Livestock Production

Course Code: LPM 705

Credit Hours: 1+0

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Historical background and origin, organic livestock farming vis-a-vis conventional livestock farming.
2	Current status of organic farming in India and world. Objectives and importance of organic livestock farming. Opportunities and problems of organic livestock farming in India.
3	Key consideration and selection of animals for organic production.
4	Housing management of livestock for organic production.
5	Feeding management for organic livestock production.
6	Breeding and health care management for organic livestock production.
7	Record keeping, processing and labeling and marketing of organic products.

8	Conversion of livestock farm into an organic farm. ITKs used in organic livestock production.
9	Organic farming standards in India and the world.
10	IFOAM basic standards.
11	WHO/FAO Codex Alimentarius, NSOP of India.
12	Role of organic livestock farming in environmental protection and biodiversity advancement.
13	Accreditation of inspection and certification agencies.
14	Organic certification mark. Guidelines for organic certification of livestock modalities in the certification of organic products.
15	The economic value of organic livestock products,
16	Pricing strategy and marketing of organic products.

Course Title: Recent Developments in Welfare of Farm Animals

Course Code: LPM 706

Credit Hours: 1+0

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Ethology: Definition, it's scope & importance in animal welfare. Animal Behaviour and its relation with physical and mental health of animal. Adaptation of different animals to changing environmental conditions.
2	Different physiological conditions of animals as a guide to assess animal welfare.
3	Scientific strategies to avoid unnecessary injury, pain and stress to animals in animal houses by amelioration of climatic stress.
4	Scientific strategies to avoid unnecessary stress in animals during handling.
5	Scientific strategies to avoid unnecessary stress in animals during slaughter.
6	Scientific strategies to avoid unnecessary stress in animals during milking, shearing and transportation.
7	Scientific strategies to avoid unnecessary stress in bullocks during carting.
8	Scientific strategies to avoid unnecessary stress in animals during feeding.
9	Health care, providing safety, feeding and watering and let off to free roam to the unproductive, orphaned, injured animals and birds.
10	Good management of Goshalas and safe shelters for unproductive, orphaned, injured animals and birds.
11	Conversion of their wastes into VAP to meet part cost of running shelters.
12	Education of the general public, especially children to avoid cruel harm to animals via lectures in schools, TV and radio talks, leaflets, etc.
13	Importance of animal welfare measures in well being of animals.
14	Evaluation of animal welfare measures as an 'instrument' of good animal husbandry.
15	Evaluation of animal welfare measures as an 'instrument' of production of quality products.
16	Evaluation of animal welfare measures as an 'instrument' of enhanced income to farmers.

Course Title: Entrepreneurship in Livestock Production

Course Code: LPM 707

Credit Hours: 1+1

Theory schedule

Sr. No.	Title of the topic to be covered
1.	Understanding livestock entrepreneurship, concept and characteristics of entrepreneurship.
2.	Role of entrepreneur in relation to enterprise and functions of the entrepreneur in the economy.
3.	Process of entrepreneurship development.
4.	Barriers in entrepreneurship development.
5.	The institutional interface in the development of entrepreneurship, incubation centers, startups.
6.	PPP prospective in the animal husbandry sector.
7.	Essential criteria for the development of entrepreneurship in livestock sectors.
8.	Techno economic feasibility of livestock enterprises under different conditions.
9.	Importance of training and development of management skills in livestock enterprises.
10.	Business acumen.
11.	Business communication.
12.	Interpersonal skills for establishing an entrepreneurship.
13.	Entrepreneurial training/ development programmes at the state and national level.
14.	Livestock Insurance.
15.	Bank and government support for entrepreneurship/ financial credit and financial management.
16.	General principles and practices/ analyzing project appraisals and reports/ capital expenditure decisions/ reinvestment and payback.
17.	Preparing projects for bank appraisal/ banking requirements.
18.	Procurement management quality issues/ standardization/ grading and packaging.

Course Title: Entrepreneurship in Livestock Production

Course Code: LPM 707

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1.	Visit to business incubation centre.
2.	Extrapolation of existing financial models in livestock entrepreneurship.
3.	Approach to the preparation of entrepreneurial project on livestock.
4.	Preparation of bankable project for small sized dairy enterprise.
5.	Preparation of bankable project for large sized dairy enterprise.
6.	Preparation of bankable project for small sized goat/sheep enterprise.
7.	Preparation of bankable project for large sized sheep farms.
8.	Preparation of bankable project for large sized goat farms.

9.	Preparation of bankable project for ram lamb/male goat production.
10.	Preparation of bankable project for small sized pig production enterprise.
11.	Preparation of bankable project for large sized pig production enterprise.
12.	Preparation of bankable project for small and medium sized broiler poultry enterprise.
13.	Preparation of bankable project for large sized broiler poultry enterprise.
14.	Preparation of bankable project for small sized layer poultry enterprise.
15.	Preparation of bankable project large sized layer poultry enterprise

Course Title: - Precision Livestock Farming

Course No.:- LPM 708

Credit Hours: 1+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Concept of precision livestock farming, It's Scope and limitations.
2	Utilities of precision tools in livestock farming and present level of usage of precision tools- in India.
3	Implementation of sensor systems and ICTs in animal health.
4	Implementation of sensor systems and ICTs in animal productivity and welfare.
5	Animal identification and tracking and radio frequency identification (RFID)
6	Livestock identification and trace back System (LITS) and real-time locating systems (RTLS).
7	Application of geo-tagging and virtual fencing in animal productivity.
8	Use of GPS and GIS in exploration of feeding resources and grasslands.
9	Automation in water resource management at livestock farm I.
10	Automation in water resource management at livestock farm II.
11	Development of early warning system and decision support systems for animal health.
12	Evaluation of early warning system and decision support systems for animal health.
13	Development of early warning system and decision support systems for animal
	welfare.
14	Evaluation of early warning and decision support systems for animal welfare.
15	Application of different software's for database creation of livestock farms.
16	Computation and analysis of the data.

Course Title: Precision Livestock Farming

Course No.: LPM 708

Credit Hours: 1+1

Practical Schedule

Sr. No.	Title of the topic to be covered
1	GPS/ GIS application in the exploration of breeding tracts of cattle breeds of India.
2	GPS/ GIS application in the exploration of breeding tracts of buffalo breeds of India.
3	GPS/ GIS application in the exploration of breeding tracts of sheep breeds of India.
4	GPS/ GIS application in the exploration of breeding tracts of goat breeds of India.
5	GPS/ GIS application in the exploration of breeding tracts of pig breeds of India.
6	GPS/ GIS application in the exploration of forage.
7	GPS/ GIS application in the exploration of grassland profiles.
8	Visit to precision livestock farms (Dairy Cattle Farm) having automation and its critical analysis.
9	Visit to precision livestock farms (Buffalo Farm) having automation and its critical analysis.
10	Visit to precision livestock farms (Sheep & Goat Farm) having automation and its critical analysis.
11	Visit to precision livestock farms (Piggery Farm) and its critical analysis.
12	Use of various advanced tools in reproductive management of livestock
13	Application of various advanced tools in health care of livestock.
14	Use of different softwares in farm routine operation.

Course Title: Recent Developments in Poultry Production Management

Course Code: LPM 709

Credit Hours: 2+1

Theory Schedule

Sr. No.	Title of the topic to be covered
1	Planning, organization, executive and management of small scale broiler production.
2	Planning, organization, executive and management of large scale broiler production.
3	Planning, organization, executive and management of small scale layer production.
4	Planning, organization, executive and management of large scale layer production.
5	Planning, organization, executive and management of hatcheries (small scale production).

6	Planning, organization, executive and management of hatcheries (large scale production).
7	An alternative in broiler production.
8	An alternative in layer production.
9	Demand and supply of broiler meat production in India.
10	Demand and supply of egg production in India.
11	Present status of broiler production in India.
12	Present status of layer production in India.
13	Problems and new management techniques in poultry for egg production in India.
14	Problems and new management techniques in poultry for meat production in India.
15	Problems and new management techniques in hatcheries in India.
16	Recent advance management techniques in poultry for egg production in other countries.
17	Recent advanced management techniques in poultry for meat production in other countries.
18	Automation in broiler houses.
19	Automation in layer houses.
20	Advances in management of specific pathogen -free broiler flock.
21	Advances in management of specific pathogen -free layer flock.
22	Advances in management of specific pathogen -free broiler breeder flock.
23	Broiler development policies and planning for higher production in India.
24	Layer development policies and their planning for higher production in India.
25	Constraints in development and its solution for broiler production.
26	Constraints in development and its solution for layer production.
27	Constraints in development and its solution for backyard poultry production.
28	Ethology in relation to avian welfare in intensive layer production.
29	Ethology in relation to avian welfare in intensive backyard poultry production.
30	Ethology in relation to avian welfare in intensive broiler production.
31	Ethology in relation to avian welfare in intensive deep litter layer production.
32	Ethology in relation to avian welfare in intensive deep litter broiler production.

Course Title: Recent Developments in Poultry Production Management

Course Code: LPM 709

Credit Hours: 2+1

Practical schedule

Sr. No.	Title of the topic to be covered
1	Planning, preparation of research and commercial project on small scale broiler production
2	Planning, preparation of research and commercial project on large scale broiler production.
3	Planning, preparation of research and commercial project on small scale layer production

4	Planning, preparation of research and commercial project on large scale layer production.
5	Small scale project on hatchery management.
6	Large scale project on hatchery management.
7	Commercial project on broiler breeder.
8	Commercial project on layer breeder.
9	Preparation of project report on back yard poultry farming.
10	Quails as an alternative for poultry farming.
11	Visit to poultry slaughter houses.
12	Visit to broiler poultry farm.
13	Visit to layer poultry farm.
14	Visit to hatchery.