## LIVESTOCK PRODUCTION AND MANAGEMENT

### Course Structure (2009-2010)

#### First Semester

<table>
<thead>
<tr>
<th>Major Courses</th>
<th>COURSE TITLE</th>
<th>CREDITS</th>
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</thead>
<tbody>
<tr>
<td>LP 611</td>
<td>Cattle and Buffalo Production and Management</td>
<td>2+1</td>
</tr>
<tr>
<td>LP 612</td>
<td>Livestock Reproduction Management</td>
<td>2+1</td>
</tr>
<tr>
<td>LP 613</td>
<td>Livestock Shelter Management</td>
<td>1+1</td>
</tr>
<tr>
<td>LP 614</td>
<td>Poultry and Rabbit Production and Management</td>
<td>2+1</td>
</tr>
<tr>
<td>LP 615</td>
<td>Climatology and animal production</td>
<td>1+0</td>
</tr>
<tr>
<td>LP 619</td>
<td>Seminar</td>
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</tr>
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<tr>
<td>Minor disciplines</td>
<td>DCB / DCN / DCP (Any course from the chosen minor discipline)</td>
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#### 2nd Semester

<table>
<thead>
<tr>
<th>Major Course</th>
<th>COURSE TITLE</th>
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<tbody>
<tr>
<td>LP 621</td>
<td>Sheep and Goat Production and Management</td>
<td>2+1</td>
</tr>
<tr>
<td>LP 622</td>
<td>Management of Swine, Equine and Wildlife</td>
<td>2+1</td>
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<tr>
<td>LP 623</td>
<td>Principles of Environmental Hygiene and Waste Management</td>
<td>2+0</td>
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<tr>
<td>LP 624</td>
<td>Farm Animal Behaviour</td>
<td>2+1</td>
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<tr>
<td>LP 625</td>
<td>Integrated Livestock Farming System</td>
<td>2+1</td>
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<tr>
<td>LP 626</td>
<td>Livestock business management</td>
<td>1+1</td>
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<tr>
<td>LP 629</td>
<td>Seminar</td>
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**Supporting** *(DCB/DCN/DCP/DESM) Courses depending upon requirement of student from other than minor/major discipline of the student*

### NON CREDIT COURSES: for master degree to be covered in third semester.

- **GS-632** Technical writing (1+1)
- **GS-633** Intellectual property and its management in agriculture (1+0)
- **GS-634** Basic concepts in laboratory techniques/practices (0+1)
- **GS-635** Disaster Management (1+0)
### Ph.D. 1st Semester

<table>
<thead>
<tr>
<th>CODE</th>
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<tbody>
<tr>
<td>LP 711</td>
<td>Advances in Cattle and Buffalo Production and Management</td>
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<tr>
<td>LP 712</td>
<td>Advances in Swine and Equine Management</td>
<td>2+1</td>
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<tr>
<td>LP 713</td>
<td>Advances in Applied Ethology</td>
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<tr>
<td>LP 719</td>
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**Minor disciplines**

- DCB / DCN / DCP (Any course from the chosen minor discipline)  

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<td><strong>DCB / DCN / DCP (Any course from the chosen minor discipline)</strong></td>
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### 2nd Semester

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<tr>
<th>CODE</th>
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<tbody>
<tr>
<td>LP 721</td>
<td>Advances in Sheep and Goat Production and Management</td>
<td>3+0</td>
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<tr>
<td>LP 722</td>
<td>Advances in Poultry Production and Management</td>
<td>2+1</td>
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<tr>
<td>LP 723</td>
<td>Advances in Environmental Management</td>
<td>3+0</td>
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<tr>
<td>LP 729</td>
<td>Seminar - II</td>
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**Supporting**

- (DCB/DCN/DCP/DESM) Courses depending upon requirement of student from other than minor/major discipline of the student  

<table>
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<tbody>
<tr>
<td></td>
<td><strong>Supporting</strong></td>
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</table>
LIVESTOCK PRODUCTION AND MANAGEMENT
Course Contents

LP 611 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- milking - calf, heifer and adult management- Dairy Cattle and Buffalo judging and body condition scoring - Project preparation for external funding and commercial farms and enterprises for dairy products – marketing strategies for milk and milk products and meat. Management of labour, labour norms. Use of computers for record keeping, care and maintenance of dairy farm equipments.
Suggested Readings
Arora SP. 1997. *Feeding of Dairy Cattle and Buffaloes.* Kalyani.45
Dutta G. 1994. *Care and Management of Dairy Cattle and Buffaloes.* 3rd Ed. ICAR.

**LP 612  LIVESTOCK REPRODUCTION MANAGEMENT**  (2+1)

**Objectives:**
To acquaint students with knowledge in principles, planning, technical approach for reproduction management in different farm animals. Controlled reproduction in farm animals.

**Theory:**
UNIT I
Functional morphology of male and female reproductive organs of farm animals.

UNIT II
Managemental strategies for attaining early maturity in farm animals

UNIT III

UNIT IV
Post A.I. management, pregnancy development and diagnosis. Management of down calvers.

UNIT V

UNIT VI

UNIT VII
Planning and management of frozen semen bank and bull station. Handling of frozen semen. Maintenance of records for artificial breeding and frozen semen bank.

**Practical:**
Suggested Readings
Hafez, E.S. E.( 2002). Reproduction in Farm Animals

LP 613  LIVESTOCK 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
Wathes CM & Charles DR. 1994. Livestock Housing. CABI.
LP 614  POULTRY AND RABBIT PRODUCTION AND MANAGEMENT  (2+1)

Objective
To acquaint students on basic aspects of housing, feeding, breeding and health care of poultry and rabbit. 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. Management of chicks, growing, laying and breeding flocks, broiler production, selection and culling of laying flocks.
UNIT II
Procuring, care and pre-incubation storage of hatching eggs - Method of incubation, sanitation disinfection and management of hatchery. Embryonic development and factors effecting fertility and hatchability of eggs. Chick sexing, packing and hatchery business -
UNIT III
Introduction - Importance of rabbit for meat and fur production, - Common breeds and strains. System of housing – Common diseases and their control measure.
UNIT IV
Management of specific pathogen free and gnotobiotic animals, concepts to related to welfare of laboratory animals.
UNIT V
Breeding - Age at maturity, litter size - Weaning – Feeding of growers –Selection of replacement stock, transportation of rabbit. Transportation of poultry and rabbit – marketing of meat and fur.

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.

Handling and restraining of laboratory animals - Visits to Rabbit farms and critical analysis of various types of managerial practices- Analysis of practical breeding management methods - practical disease control management and special management methods - Ageing and identification – Judging -Economics of production.

Suggested Readings
Bhujabaruah et. al. 1995. Rabbit Production


**LP 615 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**


**LP 621 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, Tupping

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

LP 622 MANAGEMENT OF SWINE, EQUINE AND WILDLIFE (2+1)

Objective
To impart knowledge on various aspects of swine and equine in India, principles of housing, breeding, feeding and health care of swine, equine species,
management practices at different stages of growth and economic pig and equine production systems. Wildlife it’s significance and management.

Theory

UNIT I

UNIT II
Breeds of pigs and equine species - 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 animals young ones and growing stocks. - Care of breeding males. Biological and ecological basis of management of wild animals.

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. Wildlife protection acts – zoological classification of wild animals.

UNIT IV
Feeding and management of new born, weaner and finishers, dry, pregnant and farrowing and foaling animals - Feeding principles to be followed - Methods of watering – Feeder space – Water space, etc - Record keeping. Breeding season pregnancies – parturition, lactation in wild animals.

Practical
Visits to Pig, Stud Farms, wildlife Institute and critical Analysis of various types of managerial practices - Analysis of practical breeding management methods, practical disease control management - Ageing and identification – Judging – Practical care and management at farrowing and foaling. Economics of production - Project preparation for research and commercial farms.

Suggested Readings
**LP 623 PRINCIPLES OF ENVIRONMENTAL HYGIENE AND WASTE MANAGEMENT**

**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 V**
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**
LP 624  FARM ANIMAL BEHAVIOR   (2+1)

Objective
To make acquainted students on principles of farm animal behaviour with regard to environmental influence, group formation, social behaviour 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 Managemental practices - Favourable and unfavourable behaviour for domestication - Behavioural adaptations under domestication.
UNIT IV

Practical

Suggested Readings
Fraser AF & Broom DM. 1997. Farm Animal Behaviour and Welfare. CABI.
LP 625  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-à-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

LP 626  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

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

LP 711 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 zones of India - Management systems for cattle and buffaloes.

UNIT III

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

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

Suggested Readings
Selected articles from journals.  

LP 712 ADVANCES IN SWINE AND EQUINE 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. 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
The past, present and future of Swine production systems in India and production policies adopted in advanced countries. New indigenous and exotic horses breeds- Types and classes of light and work horses.

UNIT II
Advances in breeding and selection – Prenatal and postnatal development - Growth reproduction and lactation - Economic traits of swine production. New indigenous and exotic horses breeds- Types and classes of light and work horses. Advances in health management & diseases control in swine and horses.

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
UNIT V
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
Visit to leading stud farms. Marketing - Study of population trend and structure. Analysis of breeding, feeding, housing, health care, farrowing management, summer management and special management principles practiced. Foot care and shoeing care, Stud farms, Race clubs, Race horses and their care, Horse behaviour and training, Exercising, Basic Horsemanship.

Suggested Readings
Selected articles from journals.

LP 713 ADVANCES IN APPLIED ETHOLOGY (2+0)

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

UNIT I
Recent advances and development in applied ethology, role of ethology in animal science, philosophies and ethics in ethology. Ethology in Agriculture and veterinary education, Behavioural origins and its physiology, Neuro sensory features.

UNIT II
Thermo regulation, communicative behaviour, emotions, man animal interaction, motivation, behavioural chemistry, innate and learned aspects, Quotidian behaviour.

UNIT III
Behavioural developments-Kinetic behaviour of the foetus and neonate, neonatal sensory developments, Imprinting, changes in group formation, bonding and play. Behaviour of maintenance-reactivity, ingestive, exploratory, kinetic, body care and territoriality. Dynamics of reproductive behaviour-nursing and maternal care.

UNIT-IV
Behavioural disorders-Vices, their etiology, prevention and cure. Management of behaviour-Building of animal ethograms. Ethology and international Animal regulations

Suggested Readings:
LP 721 ADVANCES IN SHEEP AND GOAT PRODUCTION AND MANAGEMENT (3+0)

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.

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

LP 722 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-à-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
Visit to commercial poultry farms and hatcheries. Planning and preparation of research and commercial projects on broiler and layer production management.

Suggested Readings
Selected articles from journals.

LP 723  ADVANCES IN ENVIRONMENTAL MANAGEMENT  (3+0)

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 CO₂ - 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 CO₂, 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
Selected articles from journals.

LIVESTOCK PRODUCTION AND MANAGEMENT

List of Journals
- Asian Journal of Buffalo Production and Management
- Australian Journal of Animal Science
- British Poultry Science
- Canadian Journal of Animal Science
- Indian Dairyman
- Indian Journal of Animal Nutrition
- Indian Journal of Animal Production and Management
- Indian Journal of Animal Science
- Indian Journal of Dairy Science
- Indian Journal of Poultry Science
- Indian Journal of Field Veterinarians
- Internal Journal of Animal Science
- Journal of Animal Sciences
- Journal of Dairy Sciences
- Livestock Production Science
- Poultry Science
- The Indian Veterinary Journal
- World Poultry Science Journal

e-Resources
- www.pork.org
- www.ilri.org
- www.fao.org
- www.defra.org.uk
- www.aciar.gov.au
Suggested Broad Topics for Master’s and Doctoral Research

**Dairy cattle and buffalo Production**
- Pre and postpartum management of dairy animals
- Reducing age at first calving
- Reducing calf mortality
- Reducing calving intervals
- Increasing reproductive efficiency
- Farming system research / extension approach
- System approach to livestock development
- Housing management of animals in semi arid region

**Poultry Production**
- Poultry housing system
- Stocking density in poultry
- Environmental effects on poultry
- Feeding management of poultry
- Methods of processing poultry manure
- System of approach for poultry development

**Small ruminant production**
- Sheep and goat housing system
- Impact study on scientific management of sheep and goat
- Environmental effects on sheep and goat
- Feeding management of sheep and goat

**Rabbit production**
- Rabbit housing system
- Feeding management of rabbit
- Productive and reproductive performance of rabbit under tropical climate

**Swine production**
- Swine housing system
- Feeding management of swine
- Productive and reproductive performance of pigs under tropical climate