

B. Voc. Livestock Production and Management
Credit Total: 144 (136+8{OE}); Total Marks: 3100

Course Structure

1 st SEMESTER					
Course Code	Course Title	Maximum Marks		Credit	
		End Semester	Sessional		
BVOCLPM-101	Fish Culture Management	70	30	4	600
BVOCLPM-102	Fish Pond Management	70	30	4	
BVOCLPM-103	Culturable Fish species	70	30	4	
BVOCLPM-104	General Sericulture -I	70	30	4	
BVOCLPM-105	Laboratory Course	70	30	4	
Discipline Specific Elective (DSE)					
BVOCLPM(OE)-01	Aquarium Management & Earning Practices	70	30	4	
Compulsory Course					
AECC-01*	Remedial English/Urdu				
2 nd SEMESTER					
Course Code	Course Title	Maximum Marks		Credit	
		End Semester	Sessional		
BVOCLPM-201	Captive Breeding of fish	70	30	4	600
BVOCLPM-202	Small farm Animal Breeding	70	30	4	
BVOCLPM-203	Avian Production Management	70	30	4	
BVOCLPM-204	General Sericulture -II	70	30	4	
BVOCLPM-205	Laboratory Course	70	30	4	
Discipline Specific Elective (DSE)					
BVOCLPM(OE)-02	Apiculture	70	30	4	
Compulsory Course					
AECC-02*	Environmental Studies				
3 rd SEMESTER					
Course Code	Course Title	Maximum Marks		Credit	
		End Semester	Sessional		
BVOCLPM-301	Conservation of Animal Genetic Resource	70	30	4	600
BVOCLPM-302	Organic Livestock Farming	70	30	4	
BVOCLPM-303	Selection Methods and Breeding Systems	70	30	4	
BVOCLPM-304	Animal Biochemistry	70	30	4	
BVOCLPM-305	Laboratory Course	70	30	4	
Elective (Any two from following)					
BVOCLPM-306	Aquafarms & Nutrients	70	30	4	
BVOCLPM-307	Economics of Avian Production	70	30	4	
Compulsory Course					
SEC-01*	Skill Enhancement Course				
4 th SEMESTER					
Course Code	Course Title	Maximum Marks		Credit	
		End Semester	Sessional		
BVOCLPM-401	Livestock Production and Management-I	70	30	5	400
BVOCLPM-402	Livestock Production and Management-II	70	30	5	
BVOCLPM-403	Minor Project-I	70	30	10	
BVOCLPM-404	Laboratory Course	70	30	4	
Compulsory Course					
SEC-02*	Skill Enhancement Course				

5th SEMESTER					
Course Code	Course Title	Maximum Marks		Credit	400
		End Semester	Sessional		
BVOCLPM-501	Commercial Poultry Production and Hatchery management-I & Practicals	70	30	5	
BVOCLPM-502	Commercial Poultry Production and Hatchery management-II & Practicals	70	30	5	
BVOCLPM-503	Minor Project-II	70	30	10	
BVOCLPM-504	Laboratory Course	70	30	4	
Compulsory Course					
SEC-03*	Skill Enhancement Course				
6th SEMESTER					
Course Code	Course Title	Maximum Marks		Credit	
		End Semester	Sessional		
BVOCLPM-601	Fodder Production & Grassland Management	70	30	8	500
BVOCLPM-602	Dissertation Report & Comprehensive viva	280	120	16	
Compulsory Course					
SEC-04*	Skill Enhancement Course				

* Classes will be held as per university guideline.

B.Voc. in Livestock Production and Management

Eligibility criteria:

- 1. A pass in intermediate (10+2) with Biological Sciences/Zoology/Animal Science/Sericulture or related discipline from a recognized institution with 45% marks (40% for SC/ST/PH).**
- 2. 50% seats are reserved to SC/ST**

B.Voc. in Livestock Production and Management

Syllabus

SEMESTER- I

FISH CULTURE MANAGEMENT **BVOCLPM-101**

Credit: 04

Unit I:

Integrated fish farming: principles, Poultry-cum-fish culture, Duck-cum-fish culture, Pig-cum-fish culture, Paddy-cum-fish culture, Mushroom-cum-fish culture, Vermicomposting-cum-fish culture, Fish-cum-horticulture, Sewage-fed fish culture: Fish-cum-sericulture, Aquatic Plant-cum-fish culture, livestock management in relation to fish culture.

Unit II:

Design and construction of cage and pen; Carp culture in cage and pen. Running water re-circulatory system of aquaculture for industrial production:

Unit III:

Exotic fish species and their impact on Indian freshwater aquaculture.

Unit IV:

Different methods of fishing. Preservation, processing and transport of fish.

Unit V:

By products of fishing industry. Fish fertilizers.

FISH POND MANAGEMENT **BVOCLPM-102**

Credit: 04

Unit I:

Layout of fish farm and its requirement: Construction and maintenance of fish ponds. Important factors for fish pond. Fish seed collection and management. Weed, insect and pest control of fish pond. Management of fish culture programme.

Unit II:

Design and construction of aqua-hatcheries: Carp hatcheries, prawn hatcheries, catfish hatcheries.

Unit III

Aeration in aquaculture: Principles of aeration, aeration, requirements, types of aeration devices, aeration equipments. Pumps: Concept of energy transfers, types of water pumps, wind mill, selection of pumps.

Unit IV:

Aquaculture equipments: Automatic feeders, demand feeders, weed control equipments, harvesting equipments, handling, preservation and transportation equipments.

Unit V: Design and construction of intensive aquaculture facilities: Carps, flow-through systems, recirculatory systems.

**CULTURABLE FISH SPECIES
BVOCLPM-103****Credit: 04****Unit I**

History, definition, scope and significance of aquaculture, comparison of aquaculture with agriculture and commercial fisheries. Different aquaculture systems. Aquaculture Global and Indian Scenario.

Unit II

Introduction to edible, ornamental and game fish: General characters of fishes, and shell fishes. Freshwater cultivable fishes and their biology.

Unit III

Culture of air breathing fishes - *Channa*, *Heteropneustes*, *Clarius*, and *Anabas*.
Cultivable species of freshwater prawns and their biology.

Unit IV

Criteria for the selection of cultivable edible, ornamental and game fish. Collection and processing of cultivable fish.

Unit V

Factors affecting fish culture; abiotic and biotic factors

GENERAL SERICULTURE-I**BVOCLPM-104****Credit: 04****Unit I**

- Introduction to sericulture,
- Origin and History of Sericulture,
- Types of mulberry and non-mulberry silkworms.

Unit II

- Nursery management.
- Different types of Plantation Patterns in Mulberry.
- Pruning methods and importance for mulberry.
- Mulberry pathology: Diseases and pests of mulberry.
- Weeds in mulberry garden and their management.

Unit III

- Life cycle of *Bombyxmori*.
- Morphological features of egg, larva, pupa and adult.

Unit IV

- Rearing Plan.
- Rearing and Environment.
- Disinfections and hygiene-principle of disinfection, types of disinfectants, disinfecting methods-preparation of solution-maintenance of hygienic conditions in the rearing house.
- Rearing technology for young and late age silkworms
- Cocoon harvest technology.

LABORATORY COURSE

BVOCLPM-105

Credit: 04

- i. Visit to fish aqua farm (approach towards understanding of integrated fish farming) and its report.
- ii. Identification of ornamental, game and edible fresh water fishes from local fish market.
- iii. Demonstration of fish preservative methods; salting, drying, cold preservation methods.
- iv. Biochemical estimation of nutrient content (total protein, lipids) of fish flesh/ muscles before and after fish preservation
- v. Demonstration of different methods of fishing.
- vi. Demonstration of induced breeding by stripping method in fish.
- vii. Mulberry Cultivation.
- viii. Silkworm rearing.

Discipline Specific Elective (DSE)

Aquarium Management & Earning Practices

BVOCLPM(OE)-01

Credits: 04

Unit I Design of aquarium

Introduction, Different types of fish tanks, Materials required for constructions of tanks, Construction of all glass aquarium glass tank, Method of construction of all glass tanks (flow chart), Fabrication of glass tank file.

Unit II Aquarium equipments

Aeration and Filtration: Introduction of aeration. Types of aerator, Types of pumps, spray bar, filter media, filters: Canister (external and Internal), Trickle filter, Submersible power filter (box filter / corner filter), Submersible air-lifting filter (inside filter / corner filter).

Unit III Aquarium step up and water monitoring

Steps involved in setting up of aquarium, Care and maintenance, Water quality parameters: pH, Chlorine, Water hardness, Carbon dioxide, Temperature, Dissolved oxygen.

Unit IV Ornamental fish and fish feed

Different types of freshwater and aquatic ornamental fish, Types of fish feed, Artificial feeds, Food/Feed production unit, Different kinds of feeders.

SEMESTER- II

SMALL FARM ANIMAL BREEDING 1 BVOCLPM-201

Credit-04

Unit I

Demographic distribution of sheep and goat and their role in economy. Association of sheep and goat in Indian society. Common terms.

Unit II

Breeds of sheep and classification based on utility and their distribution. Breeds of goat and classification based on utility and their distribution. Goat production systems

Unit III

Sheep and Goat production systems, Management of young, growing and adult stock. Mating System. Shelter management of sheep and goat, Management of migratory sheep flock. Shearing of sheep

Unit IV

Introduction and scope of swine farming in the country. Demography of swine population. Breeds and their role in economy. Management of different categories of swine for optimal production: breeding and pregnant sows; sows at farrowing and after farrowing: pig-Ms, growing stock, lactating sows, feed lot stock. Mating technique in swine. Housing of swine. Swine feeds and feeding. Economics of pig fanning.

Unit V

Identification of Indian and exotic breeds of swine; handling of swine; Routine inspection. Identification of diseases, examination and control of parasites, vaccination, Identification of pregnant animals. Care during pregnancy, isolation and care of farrowing sows, care of pig lings, Castration, culling, tooth cutting. Calculation of profits and preparation of feasibility reports and projects for piggery. Layout plans of swine houses; routine operations of swine farms. Feeding of swines.

SMALL FARM ANIMAL BREEDING-II BVOCLPM-202

Credit: 04

Unit I

Physical and chemical properties of wool. Important bans for meat milk and fibre. Weaning and fattening of lambs and kids. Glossaries of terms in wool industry. Shearing of sheep. Impurities in wool, factors influencing the quality of wool grading. Recovery of wool wax and its use.

Unit II

Goat and Sheep milk production and storage; Methods of milking and precautions. Factors affecting quality and quantity of milk production. Clean max production. Dairy farm accounts and records. Concepts of input and output cost of dairy farming (small and large holdings). Importance of sheep and goat milk. Nutritional composition of goat and sheep milk.

Unit III

Comparative study of flesh contents and composition of sheep and goat. Problems and prospects of dairy, meat and wool industry in India. Animal and animal products market and marketing.

Unit IV

General management and feeding-practices during different stages of growth, development and production (milk, meat and wool) in small and large holdings. Breeding schedule and management of ram and buck.

Unit V

Housing systems, layout and design of different buildings. Judging for the quality and confirmation of body parts of sheep and goat. Culling of animals.

AVIAN PRODUCTION MANAGEMENT BVOCLPM - 203

Credit: 04

Unit I

Indian Poultry industry-brief outline of the different segments-poultry statistics. Classification of poultry, common breeds of poultry including duck, quail, turkey & guinea fowl and their descriptions. Description of indigenous fowls.

Unit II

Reproduction in fowl, male and female reproduction systems, formation of eggs, structure of eggs.

Unit III

Importance of economic traits of poultry, egg production, egg weight egg quality, growth, feed consumption and feed efficiency, fertility and hatchability, plumage characteristics and comb types.

Unit IV

Scavenging system of management raising of chicks, scavenger feed base of village. Low input technology; backyard and semi intensive unit of various sizes; their description,

Unit V

Management and economic achievements of poultry industry.

General Sericulture -II

BVOCLPM-204

Credit: 04

Unit I

- Silkworm Seed Technology,
- Introduction,
- Different type of granges,
- Grange operations,
- Different Type of egg production.

Unit II

- Assessment of cocoon properties,
- Study of different type of defective cocoons.
- Different types of Cocoon Stifling, Cooking, and Brushing Methods.

Unit III

- Reeling- definition of reeling
- Principle involved – direct system and indirect system of reeling
- Study of different type of Silk reeling machines.

Unit IV

- Silk Re-reeling, purpose
- Structure of Re-Reeling Machine.

LABORATORY COURSE

BVOCLPM-205

Credit: 04

- i. Visit to poultry and goatary farm and its report.
- ii. Demonstration of body parts and reproductive organs of chicks.
- iii. Estimation of casein content in sheep/goat milk.
- iv. Comparative biochemical assay of nutrient contents of different livestock animals.
- v. Modern equipments & techniques to enhance the production and income via livestock production
- vi. Practical related to granges & silk Reeling.

Discipline Specific Elective (DSE)

Apiculture
BVOCLPM(OE)-02

Credits: 04

Unit I: Introduction of Apiculture

History, Classification and Biology of Honey Bees, Social Organization of Bee Colony (Queen, Drone, Worker).Economic Importance.Scope of Apiculture.

Unit II: Rearing and Extraction

Rearing of Bees, Artificial Bee rearing (Apiary) and appliances, Beehives Bee Pasturage, Selection of Bee Species for Apiculture, Bee Keeping Equipment, Methods of Extraction of Honey

Unit III: Threat to Apiculture

Diseases (Galleria and Mites) and Enemies, Control and Preventive measures, Conservation of Honey Bees. Foraging and communication behavior.

Unit IV: Instrumentation & Practical aspects

Preparation of honey bee boxes. Extraction of honey and venom, Purification of honey,Apparatus of honey bee, Identification of components of life cycle of honey bee Mouth Parts, Pollen Basket preparation

SEMESTER-III

CONSERVATION OF ANIMAL GENETIC RESOURCE BVOCLPM-301

Credit: 04

Unit I

History of Genetics. Chromosome numbers and types in livestock and poultry. Mitosis, Meiosis and gametogenesis.

Unit II

Overview of Mendelian principles; Modified Mendelian inheritance: gene interaction; multiple alleles; lethals; sex-linked, sex limited and sex influenced traits; linkage and crossing over, Mutation, Chromosomal aberrations

Unit III

Cytogenetics, Extra-chromosomal inheritance. Gene concept -classical and molecular. Population genetics: Genetic structure of population: Gene and genotypic frequency: Hardy -Weinberg law and its application; Forces (eg. Mutation, migration, selection and drift) changing gene and genotypic frequencies.

Unit IV

Quantitative genetics: Components of phenotypic and genotypic variance; Concept of genotype and environment interaction, Resemblance between relatives; Heritability, genetic and phenotypic correlations.

ORGANIC LIVESTOCK FARMING BVOCLPM-302

Credit: 04

Unit I

Principles and practices of organic farming; farms as ecological systems; the certification process and agencies.

Unit II

Organic matter management to support the soil food web and nutrient availability; managing biodiversity, crop rotations, plant competition, ground cover, and plant health;

Unit III

Farming systems including diversified vegetables, perennial fruit, agronomic field crops, integrating crops and animals; organic animal husbandry practices.

Unit IV

Biodiversity management: Concept of biological diversity. Conservation in India and abroad. Wildlife conservation programmes. The wildlife (protection) Act-1972, Biological diversity Act- 2002, Basic concept of Zoo Management.

SELECTION METHODS AND BREEDING SYSTEM
BVOCLPM-303

Credit: 04

Unit I

Type of selection and their genetic consequences. Response to selection and its prediction and improvement of response to selection. Theoretical aspects of accuracy and efficiency of different base of selection.

Unit II

Prediction of breeding value using different criteria. Combined Selection. Correlated response to selection and efficiency of indirect selection.

Unit III

Selection of several traits. Evaluation of short term and long term selection experiments viz: bidirectional selection and asymmetry of response, selection plateau and limit.

Unit IV

Genetic aspects and consequences of various mating systems. Effects of mating systems on mean and variance. Application of various mating system in animal improvement. Selection for general and specific combining ability. Genetic polymorphysim and its application in genetic improvement. Practical Estimation of breeding values from different sources of information. Prediction of direct and correlated response to different bases of selection.

Animal Biochemistry
BVOCLPM- 304

Credit: 04

Unit I: Introduction to Biochemistry

Structure and function of basic biomolecules such as Carbohydrates, Proteins, Lipids, Fats, Nucleic Acids. Concept of pH, buffer, homeostasis, properties of water, enzymes.

Unit II: Biochemical basis of animal production

This unit covers the topic of important biomolecules in livestock that contribute to their economic productivity. Biochemistry of meat production and dairy chemistry, Biochemical basis of conditions related to nutrient deficiency and excess.

Unit III: Methods in biochemical analysis

Estimation of Biomolecules such as carbohydrates, proteins, fats, nucleic acids. Introduction to techniques used in estimation of biomolecules- blood profile, spectrometry, HPLC

Unit IV: Metabolic pathways and physiology

Regulation and integration of metabolic pathways. Metabolism of Ca, P, Mg, Na, K. Carbohydrate metabolism, protein metabolism, nucleic acid metabolism. Diet and nutritional status of animals, digestion, absorption in ruminants, equine and poultry. Metabolic disorders of poultry, fish and cattle.

Suggested Readings

- Conn EE & Stumpf PK. 1987. Outlines of Biochemistry. John Wiley. Metzler DE. 2006. Biochemistry. Vols. I, II. Wiley International.
- Nelson DL & Cox MM 2004. Lehninger Principles of Biochemistry. 4th Ed. MacMillan.
- Voet D, Voet JG & Pratt CW. 2007. Fundamentals of Biochemistry. John Wiley.

LABORATORY COURSE

BVOCLPM-304

Credit: 04

- i. Morphological description of common exotic poultry breeds like White Leghorn (WLH), Rhode Island Red (RIR), Plymouth Rock, Cornish and New Hampshire.
- ii. Diagrammatic illustration of body parts of chicken, duck, quail, guinea fowl and turkey.
- iii. Conservation of indigenous germ plasm; listing of conservation techniques.
- iv. Housing, equipments, nesting and brooding requirements. Preparation of projects for rural people on poultry and other species (duck, quail, guinea fowl and turkey).

ELECTIVE PAPER

AQUAFARMS AND NUTRIENTS

BVOCLPM -305

Credit: 04

Unit I:

Repair and maintenance of aquafarms: Repair of dykes, water channels, inlet and drainage structures, seepage control, disposal of wastewater, wastewater treatment, aquaculture equipments, electrical installations.

Unit II

General concepts of ecology, productivity, carrying capacity, food chain and food web. Ecology of culture ponds; Selection of site, physico-chemical conditions of soil and water optimum for culture.

Unit III

Nutrient cycles, Nitrogen Phosphorous and Carbon. Laws of limiting factor.

Unit IV

Fertilizations and manuring. Liming and application of fertilizers and manures, role of nutrients, the NPK contents of various fertilizers and manures, rate and

precautions in the application of fertilizers and manures.

Unit V

Significance and important groups of phytoplankton, zoo plankton and benthos in culture ponds. nutrient dynamics, algal blooms.

ECONOMICS OF AVIAN PRODUCTION BVOCLPM-306

Credit: 05

Unit I

New colored feathered birds developed in public and private sectors for meat and egg production for rural poultry; their acceptability and assimilation in rural ecosystem. Mixed farming and poultry raising.

Unit II

Concept of self-local market unit Brooding and rearing practices used for chicken, duck, quail, turkey and guinea fowl. Economic production of chicken and other classes of poultry.

Unit III

Hatching and feeding norms for different species of poultry. Vaccination, medication and incubation requirements.

Unit IV

Marketing of poultry and poultry products. Descriptive specialties of indigenous birds, listing of its advantageous value in rural areas. Demonstration of newly developed breeds in rural environment

Unit V

Setting of farms for different classes of poultry. Organic and hill farming. Diagrammatic representation of scavenging, backyard and semi intensive units; with habitats, feed base and shelter.

SEMESTER- IV

LIVESTOCK PRODUCTION MANAGEMENT-I (GENERAL PRINCIPLES AND RUMINANTS) BVOCLPM-401

Credit: 05

Unit I

Livestock in India- association of livestock to Indian society during vedic, medieval and modern era. Demographic distribution of livestock and role in economy. Animal holding and land holding patterns in different agro-ecologies. Introductory animal husbandry. Common animal husbandry terms. Body conformation and identification. Dentition and ageing of animals. Transport of livestock by rail, road, air and on foot. Common farm management practices including disinfection, isolation, quarantine and disposal of carcass. Introduction to methods of drug administration. Common vices of animals, their prevention and care.

Unit II

General principles affecting the design and construction of building for housing for various livestock species. Selection of site. Arrangements of the building with special reference to Indian conditions. Utilization of local materials. Building materials used for construction of wall, roof and floor of animal houses, their characteristics, merits and demerits.

Unit III

Demography of cattle and buffalo population. Breeds and breed descriptors of important breeds. Important traits of cattle and buffaloes. General management and feeding practices of calves, heifers, pregnant, lactating and dry animals in bulls and working animals. Draught ability of cattle and buffaloes. Raising of buffalo mates for meat production.

Unit IV

Housing systems, layout and design of different buildings for dairy animals including backyard dairy and mixed farms. Routine dairy farm operations and labour management Methods of milking and precautions. Factors affecting quality and quantity of milk production. Clean max production. Dairy farm accounts and records. Concepts of input and output cost of dairy farming (small and large holdings). Problems and Prospects of dairy meat industry in India. Animal Fairs and Melas. Animal pounds and Goshalas.

**LIVESTOCK PRODUCTION MANAGEMENT - II
(MONOGASTRIC AND LABORATORY ANIMALS)
BVOCLPM-402**

Credit -05

Unit I

Equine population of India. Horses, donkeys and mules and their utility. Identification of breeds of horses. Dentition and ageing of horses. Handling, restraining, care and routine management of equines including grooming, saddling and exercise. Stable and its management Feeding routine for horse, donkeys and mules. Vices of horses. Care of stallion. Mating of Horses broodmare and its care. Foaling and care of newborn. Breeding mules. Care of race horses and preparing horses for show. Doping and its detection. Visit to races, polo, horse show. Importance of laboratory animal breeding care and housing standards of mice, rats and guinea pigs. General considerations on feeding and breeding of laboratory animals. Prophylactic measures for commonly occurring laboratory animal diseases. Concept of production of specific pathogen free (SPF) and germ free laboratory animals.

Unit II

Scope of rabbit farming in the country, breeds and their distributions in India and abroad.

Unit III

Limitation of rabbit animal production. Selection, care, and management of breeding stock for commercial purpose. Identification, care and management of landing animals and kindling. Care of new born, growing stock. Harvesting of products. Breeding and selection techniques for optimal production. Feeds and feeding for rabbit production- Housing of rabbit Shearing/slaughtering and preservation of products. Diseases and parasite control, hygienic care. Disposal, utilization and recycling of wastes etc.

Unit IV

Economic aspects of rabbit production, accounting their expenditure, income, etc. Manpower- requirements and personnel/labour management Preparing projects for micro (backyard) mini, and major rabbit farms.

REFERENCE BOOKS

1. Sastry, N.S.R. and Thomas, C.K. (2005)-Livestock Production Management 4th Ed.
2. Anderson, R.S. and Edney, A.T.B (1991)-Practical Animal Handling
3. Warren, M.D. (2002)Small Animal Care and Management, 2nd Ed. Poole. T. (1994)The UFAW Handbook on the Care and Management of Laboratory Animals, 6th Ed.

4. Lebas, F; Coudert, P; Rouvier, R and Rochambean, H. (1986). The Rabbit – Husbandry, Health and Production
5. Brega, J. (1996)The Horse – Breeding and Young Stock
6. Fielding, D. Tropical Agriculturist – Rabbits
7. Wolfenson. S and Lloyd, M. (1994) Handbook of Laboratory Animal Management and Welfare
8. Holness. D.H. (1993) The Tropical Agriculturist – Pigs
9. Sharda, D.P.(2005) Swine Production

**Minor Project-I
BVOCLPM-403**

Credit: 10

- i. Minor Project – I**
- ii. Field Visit & report**

**LABORATORY COURSE
BVOCLPM-404**

Credit: 04

- (i)** Identification of various breeds of cattle, buffalo, sheep and goat Familiarization with body points of animals.
- (ii)** Approaching, handling and restraining of cattle, buffalo, sheep and goat Clipping, shearing, dipping, spraying and spotting sick animals.
- (iii)** Detection of vices. Feeding of animals. Methods of identification (marking, tattooing, branding, tagging and electronic chip).
- (iv)** Determination of age. Determination of body weight using different measurements.
- (v)** Layout plans for dairy and sheep/goat farms. Familiarization with routine farm operations. Selection and culling of animals. Milking of dairy animals. Training of breeding mates. Detection of heat Identification and care of pregnant animals. Care of neonatal and young stock. Maintenance, cost accounting, economic analysis and preparation of balance sheet of dairy and sheep/goat farm records. Structure of wool and its differentiation from hair fibre. Determination of staple length, crimps, diameter and strength of wool fibre. Sorting, packaging and grading of wool. Recovery of wax from wool. Scouring and carbonisation of wool.
- (vi)** Visit to different animal farms/ demonstration centres/ individual rural, urban and peri-urban animal units/ wool production centres & industries/ wool, meat and live animal markets. Preparation of project proposals.

REFERENCE BOOKS

1. Sastry, N.S.R. and Thomas, C.K. (2005) Livestock Production Management 4th Ed.
2. Thomas, C.K. and Sastry, N.S.R (1991) Dairy Bovine Production
3. Cockrill, R.W. (1974) The Husbandry and Health of the Domestic Buffalo
4. Ensminger, M.E. (2002) Sheep and Goat Science, 6th Ed.
5. Clutton Brock, J. (2004) A Natural History of Domesticated Mammals, 2nd Ed.
6. Watson, J.A.S. and Mills, W.J. (2005) Farm Animals and their Management
7. Taylor, R.E. and Field, T.G. (1977) Scientific Farm Animal Production
8. Pagot, J. (1992) Animal Production in the Tropics and Sub-tropics
9. Mason, I.L. (1988) World Dictionary of Livestock Breeds, 3rd Ed.
10. Anderson, R.H. and Edney, A.T.B. (1991) Practical Animal Handling

SEMESTER- V

COMMERCIAL POULTRY PRODUCTION AND HATCHERY MANAGEMENT- I & PRACTICALS BVOCLPM-501

Credit-05

Unit I

HEALTH CARE- Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies. Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care.

Medication: Types of administration-general principles and precautions with emphasis on administering medication through water and feed; commonly used drugs in poultry diseases.

Disinfection: Types of disinfectants; mode of action; recommended procedure; precaution and handling.

Unit II

ECONOMICS- Economics of layer and broiler production; Projects reports layer in different systems of rearing. Projects reports for broilers.-Feasibility studies on poultry rearing- in context of small units and their profitability. Designer meat and egg production. Export/import of poultry and poultry products.

Unit III

BREEDER FLOCK MANAGEMENT- Layer and broiler breeder flock management housing & space requirements. Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination.

Unit IV

HATCHERY PRACTICES - Management principles of incubation. Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene. Disposal of hatchery waste; Sexing, grading, packing and dispatch of day old chicks. Economics of hatchery business; Trouble shooting hatch failure: importance of hatchery records, break even analysis of unhatched eggs. Computer applications for hatchery management.

Suggested Readings:

- Falconer DS & Mackay TFC. 1996. An Introduction to Quantitative Genetics. Longman.
- Jain JP. 1982. Statistical Techniques in Quantitative Genetics. Tata McGraw-Hill.

- Tomar SS 1996. Text Book of Population Genetics. Vol. I. Qualitative
- Inheritance; Vol. II. Quantitative Inheritance. Universal Publ.

COMMERCIAL POULTRY PRODUCTION AND HATCHERY MANAGEMENT- II & PRACTICALS
BVOCLPM-502 **Credit-05**

- (i)** HOUSING - Location of poultry. Types of poultry houses. Different types of rearing- advantages and disadvantages. Space requirement for different age groups under different rearing systems. Environmentally controlled housing.
- (ii)** BROODING MANAGEMENT- Brooding: Types of brooders; preparation of shed to receive chicks; importance of environment (temperature, humidity and ventilation). Feeding and vaccination in early stage of chicks.
- (iii)** REARING AND MANAGEMENT- Care and management of growing, laying/broiler birds of both breeders and commercial categories of poultry. Battery cage management different types and sizes. Poultry judging.
- (iv)** LITTER MANAGEMENT- Litter materials, litter-borne diseases and control; potential for poultry litter used as fertilizers; recycling for livestock feeding and power generation; Special management care in adverse weather conditions/ stress; summer management modification of housing light reflectors; insulators, sprinklers, loggers and other methods; dietary modification to minimize heat stress; special management during rainy and winter season; other stress management- vices in poultry and its remedial measures.
- (v)** WATER MANAGEMENT- Standard for drinking water in terms of total solids. pH, minerals levels, sanitizers and water sanitations, diseases spread through water contamination prevention.
- (vi)** BIOSECURITY- Proactive measures to minimize entry of infections in farm premises- farm fencing, disinfectant pits, personnel management restriction of movement etc. Poultry welfare and behaviour.
- (vii)** FEEDING- digestive system and digestion in chicken. Classification, selection of common feed ingredients and their nutrient composition. Nutrient requirement for different age groups. Feed formulations, economics of feed formulation-cost/, unit nutrient Feeding systems and feeding management economization of poultry feeding. Feed restriction, separate male feeding, non-nutrient feed additives including herbal bio-enhancers; anti-nutritional factors and toxins.

REFERENCE BOOKS

1. Scanes, C.G.; Brant, G and Ensminger, M.E. (2004) Poultry Science, 4th Ed.
2. Sreenivasaiah, P.V. (2006)Scientific Poultry Production – a unique encyclopedia, 3rd Ed.
3. Jull, M.A. (2003)Successful Poultry Management
4. Sainsbury, D. (1984)Poultry Health and Management
5. Roberts, V. (2003)British Poultry Standards
6. Leeson, S and Summers, J.D. (1993)Commercial Poultry Production
7. North, M.O and Bell, D.D. (1990)Commercial Chicken Production Manual, 4th Ed.
8. Murd, L.M. (2003)Modern Poultry Farming
9. Leeson, S and Summers, J.D. (1993)Commercial Poultry Nutrition
10. Johari, D.C.and Hussain, K.Q. (1996)Commercial Broiler Production

Minor Project-II

BVOCLPM- 503

Credit- 10

LABORATORY COURSE

BVOCLPM-504

Credit: 4

Male and female reproductive system. Artificial insemination. Selection of breeder flock. Working of hatchery Incubation requirement; incubators working, care. Hatchery layout and equipments. Handing of eggs prior and during incubation. Candling. Fumigation. Project reports of setting up a hatchery. Hatchery records and maintenance. Exposure to commercial broiler and layer farms-different system of housing. Demonstration of litter and cage rearing systems. Feed equipments and maintenance; hammer mill, mixture, pellet mill-types, principle of working, comparison of different types, premix preparations, quality control of raw materials. Feed mill operation. Demonstration of different types of feeder, waterer, fogger, sprinklers etc. Maintenance of farm records. Medicationdemonstration of routinely employed methods of administration. Vaccination practice in general and demonstration of different roots of administration in particular.

SEMESTER VI

FODDER PRODUCTION AND GRASSLAND MANAGEMENT BVOCLPM-601

Credit: 08

THEORY

Unit I

Importance of grasslands and fodders in-livestock production. Agronomical practices for production of leguminous and non-leguminous fodders in different seasons. Soil and water conservation and irrigation drainage for fodder production. Farm, power and agro-energy. Farm machinery and equipment Harvesting and post harvest techniques "for fodder preservation. Storage of feeds and fodders. Scarcity fodders. Feed and fodder management for individual animals. Fodder production for small units through inter cropping or back yard cultivation. Recycling of animals washings and wastes in fodder production.

PRACTICAL

Visit to the fodder farm. Familiarisation with the various types of fodder crops utilised in the state and the samples of fodder in India. Fodder cropping routines-familiarisation. Collection, preservation and storage of feed and fodder; possible damages/loss and methods to prevent them. Cost calculations of fodder production. Familiarisations with the back yard fodder cropping and intercropping of fodder. Livestock waste utilisation and recycling. Calculation on the economic aspects of fodder cropping and procurement of feed.

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4. I.C.A.R. Handbook of Agriculture
5. Merkel, J. Managing Livestock Wastes
6. Wiseman, Finch and Samuel. Crop Husbandry including Grassland
7. Sastry, N.S.R. Thomas, C.K. and Singh, R.A. Livestock Production Management
8. Humphreys, L.R. Tropical Forages
9. I.C.A.R Grasses and Legumes
10. Ranjan, S.K. Animal Nutrition in the Tropics

DISSERTATION REPORT & COMPREHENSIVE VIVA BVOCLPM-602

Credit 16