COURSE CAPSULES

First Semester

AS 5101 Introduction to Aquaculture and Fisheries (3)
Status of global fisheries and fisheries in Sri Lanka; Fishery potential of Sri Lanka; Present and future trends of aquaculture; Importance of aquaculture; Types of aquatic environments; Physico-chemical and biological characteristics of aquatic systems; Important biological characteristics of fish; Breeding patterns and practices; Feeding and management of fish; Pond fish culture; Coastal aquaculture; Impact of aquaculture on environment; Mariculture; Ornamental fish and aquatic plant production; Culture based fisheries; Fishing gear and methods of fishing; Capture fisheries; Reservoir fisheries.

AS 5102 Comparative Anatomy and Physiology of Farm Animals (3)
Structures, functions and regulation of the neuro-endocrine system, Digestive system, Reproductive system and mammary system of farm animals: mechanism of thermoregulation and adaptation. Reproductive system and photoperiodism in avian; Techniques in reproduction (semen technology, artificial insemination).

AS 5103 Introduction to Animal Production (2)
Status of the livestock & poultry industry in Sri Lanka; State sponsored programmes; Involvement of NGO & cooperate sector; Animal feed industry; Important breed characteristics of farm animals; Principles of housing, breeding, feeding and general management of farm animals; Farm records.

AS 5104 Principles of Animal Nutrition (2)
Classification, importance, digestion, metabolism and requirements of nutrients in farm animals; Anti-nutritional factors in feeds; Feed additives; Principles of feed evaluation; Energy and protein evaluation of feeds; Estimation of nutrient requirements.

AS 5105 Anatomy and Physiology of Fish (2)
Anatomy and physiology of nervous system, endocrine system, sensory system, circulatory system, digestive system, reproductive system and osmoregulatory system of fish; Physiology and endocrinology of growth, reproduction, thermo-regulation and osmoregulation.

AS 5106 Aquaculture Based Farming Systems (2)
Different aquaculture based farming systems; Selection of fish species, culture systems and management; Mitigatory measures for pollution through aquaculture based farming systems; Rational resource utilization and aquaculture; Case studies, Applications to local situations; Benefits and constraintsDifferent aquaculture based farming systems; Selection of fish species, culture systems and management; Mitigatory measures for pollution through aquaculture based farming systems; Rational resource utilization and aquaculture; Case studies, Applications to local situations; Benefits and constraints.

AS 5108 Avian Reproduction, Embryology and Hatchery Management (2)
Poultry reproduction: Physiology of avian reproduction, Photoperiodism, Manipulation of reproduction, Techniques in reproduction (semen technology, artificial insemination), Embryology: Gametes and fertilization, cleavage, formation of the primitive steak, establishment of germ layers, extra embryonic membranes and their functions; Critical stages of embryonic development, Nutrition and other requirements of the embryo; Hatchery management: Production and selection of eggs for hatching; Systems of incubation; Types of incubators; Management and maintenance of incubators and equipment; Bio-security in hatcheries; Hatchery record keeping; Factors affecting hatchability, candling; Sexing, culling, handling and transportation of chicks; Regulations for franchise breeders.

AS 5109 Dairy Chemistry (2)

Composition of milk and milk products; Milk constituents and their physico-chemical characteristics; Milk coagulation and protein denaturation; Milk clotting enzymes and cheese chemistry; Milk fermentation. Processing - induced changes of milk constituents; Nutritive value and health implications of milk & milk products; Quantitative analysis of milk and milk products; Testing of physico-chemical quality parameters related to dairy products.

AS 5110 Health Management of Fish (2)
Principles of health management and immunity in fish; Etiology, diagnosis, control, prevention and treatment of common viral, bacterial, fungal, parasitic and metabolic diseases of finfish and shellfish; Handling of fish for observation and sample collection; Laboratory diagnostic techniques for common diseases; Effect of environment and management on diseases; Application of bio-security measures.

AS 5113 Fish Systematics and Morphometrics (2)
Principles of classification of aquatic biota; Basic morphology of finfish and shellfish; Development of identification keys for finfish and shellfish species; Parameters used in nomenclature and classification of fish; Morphometrics and meristics of fish, molecular systematics of fish; Specimen collection and preservation.

AS 5114 Integrated Livestock Systems (3)
Livestock based farming systems with special reference to the different Agro-ecological zones and their cropping patterns in Sri Lanka; Resource base and their allocation for crop and livestock components; Criteria for monitoring and evaluating crop-livestock systems. Models to describe livestock based production systems; Livestock databases; Livestock simulation programs; Exercises on databases and simulation programs

AS 5115 Laboratory Techniques in Animal Nutrition (2)
Laboratory safety, handling of glassware and equipment; Preparation of feed samples; Analysis of animal feeds for proximate, detergent fibre, mineral & energy; Digestibility and metabolism experiments in farm animals by in-vitro, in-sacco and in-vivo methods; Enumeration of gut microflora; Estimation of microbial protein synthesis in the rumen.

AS 5116 Laboratory Techniques in Fisheries and Water Quality (2)
Use and maintenance of laboratory equipments; Analysis of water for physical, chemical and biological parameters; Analysis of fish and feed samples; Quantitative and qualitative analysis of plankton; Sampling and tagging.

AS 5117 Layer and Parent Stock Management (3)
Review of the parent stock and layer industry in Sri Lanka; Production systems in Sri Lanka and the World; Breeder farm operation, Regulations for franchise breeders, Bio-security in breeder farms, vaccination of breeders and layers, Planning of poultry farms; Criteria for selection of layers; Commercial breeds, crosses and their characters; Brooding and grower management; Management, housing, feeding of layers and parent stock; Management for continuous egg production and improved fertility; Feeding and egg quality.

AS 5118 Mariculture (2)
Biology of Mariculture species; Selection of species (Marine finfish, Mollusc, edible Echinoderms etc.); Site selection; Culture systems and management; Collection of spats; Brackish water and coastal farming, deep water farming, depuration; Corals and their role; Coastal pollution; Economics and constraints.

AS 5119 Meat Science (2)
Introduction; Structure of muscle; Myogenesis: Composition of muscle; Conversion of muscle to meat; Ante & post mortem changes; Carcass quality; Meat quality; Sensory evaluation; Nutritive value & health aspects of meat.

AS 5120 Endocrinology of Farm Animals (2)

Classes of hormones, modes of action, quantification of hormones; Neuro-endocrine system; Origin, chemistry, biosynthesis, specific mode of action and functions of metabolic hormones (pituitary hormones, adrenal hormones, thyroid hormones, pancreatic hormones, parathyroid hormones and gastro-intestinal hormones); Endocrine disorders.

AS 5121 Monogastric Nutrition (3)

Review of digestion, absorption and metabolism of nutrients in monogastric animals. Review of the animal feed industry in Sri Lanka; Feedstuffs available in Sri Lanka for pigs and poultry; Energy and protein evaluation of pig and poultry feeds, Estimation of energy and protein requirements of pigs and poultry, Nutrient requirement and feeding standards of poultry & swine; Recent advances in the use of feed additives, nutragenomics and metabolomics in monogastrics; Special topics in pig and poultry nutrition. Balance experiments and metabolism trials, Respiration experiments, Fibre digestion in non-ruminants and the effects of dietary fibre; Feed microbiology and micotoxins; Feed processing methods and equipment; Animal feed legislation; Feed formulation. Practical feeding of poultry & swine.

AS 5122 Physiology of Lactation (2)

Primitive and higher order mammals; Mammogenesis and endocrine control; Indices of mammary growth and differentiation; Lactogenesis and endocrine regulation; Biosynthesis of milk components in ruminants and non ruminants; Lactation, galactopoiesis and endocrine control; Mechanism of milk secretion; Nutrient partitioning for lactation; Mammary gland involution; Metabolic and other disorders of the mammary gland.

AS 5124 Procuring, Processing and Marketing of Fluid Milk (2)

Global dairy industry; Production zones and milk collection network in Sri Lanka; Clean milk production; Processing and quality control of liquid milk products ; Fluid milk processing equipment; Dairy hygiene and sanitation of dairy plants; Administrative, commercial and legal aspects of milk procuring, handling and marketing.

AS 5125 Processing of Dairy Products (2)

Manufacturing and Quality Management of fermented milk products; Cheese & panneer; Frozen desserts: ice cream & frozen yoghurt: Cream-based products: butter & ghee; Concentrated and dry milk products; Whey processing & products; Dairy plant waste management.

AS 5126 Quantitative and Molecular Genetics of Farm Animals (2)

Basic genetics; Genes in populations, forces changing gene frequency; changes in small populations; Relationship and inbreeding, inbreeding depression; Genetic and phenotypic variance components; Estimation of heritability; Analysis of full-sibs and half-sibs; Pedigree analysis; Correlation among relatives; Genotype-Environment interaction; Specific and common environments; Repeatability; Prediction of breeding values; Selection intensity, accuracy and response to selection; Breeding value and heritability estimation using SAS; Molecular genetics in animals; Nucleic acids and their manipulations;
PCR; DNA sequencing; DNA markers in animals; Gene mapping; Marker assisted selection

AS 5127 Ruminant Nutrition (3)

Review of digestion, absorption and metabolism of carbohydrates, proteins and fats in ruminants. Kinetics and theories of rumen fermentation; Methanogenesis& its control; Manipulation of rumen fermentation for better digestion and nutrient utilization; Importance of minerals in animal feeding; Absorption, metabolism and excretion of essential minerals; Interaction of minerals in animal body. Present problems related to feed resources, feeds and feeding of ruminants; Green forage/Roughage feeds & feed supplements; Importance of supplementary feeding; Balancing nutrients to improve productivity; Application of biotechnology in animal nutrition. Modern techniques in the estimation of digestibility.

AS 5128 Reproductive Physiology of Farm Animals (3)

Sexual differentiation and development; Regulation of gonadal function; Physiology and endocrinology of gametogenesis, puberty, ovulation and its manipulation, fertilization and implantation; Maternal recognition of

pregnancy; Physiology and endocrinology of parturition and post-partum; Physiology and endocrinology male reproduction ; epididymal & accessory glandular functions; Seasonality of reproduction in males and females; Nutrition and reproduction interaction; Reproduction disorders in males & female.

AS 5129 Selection Index and Mixed Model Methodology (3)

Matrix algebra; Prediction of breeding values: with own and relatives records, single and repeated records; Accuracy of prediction; Genetic gain and correlated response; Derivation of selection index; Formulation of indices with repeated and relatives records of multiple traits; Accuracy of indices; Restricted selection index; Determination of economic values; Constituent indices. Fixed, random and mixed models; Ordinary and generalized least

squares; Estimability. Deviation of mixed model equations; Best linear unbiased prediction; Sire model , sire-maternal grand sire model, animal model; Relationship matrix; Multiple trait analysis; Repeated records; Group effects; Reduced animal model; Multiple trait analysis; Partition of phenotypic variance; Sib analysis; Henderson methods; Maximum likelihood and restricted maximum likelihood concepts; Computational aspects.

AS 5130 Shrimp Production (3)

Global shrimp production; Shrimp farming systems; Site selection; Use of supra-tidal and inter-tidal zones for farming; Reproductive biology of shrimps; Artificial spawning; Broodstock selection and management; Management of post larval production systems;; Construction of backyard and intensive hatcheries; Hatchery and nursery management; Assessment of post larval quality; Transport of larvae; Water quality management; Harvesting & marketing of shrimp; Environmental pollution and mitigation.

AS 5131 Slaughter House Planning and Management (2)

Introduction; Site selection for slaughter house; Requirements and layout of slaughter house: Planning and design of slaughter houses; Sanitary and hygienic conditions; Slaughter house equipment; Operation and management; Labour management; Handling & transportation of animals; Waste handling & disposal; Capital and running costs; HACCP.

AS 5132 Aquatic Microbiology (1)

Culturing, sampling and enumeration of microbes from water and aquatic food; Factors affecting the growth of microorganisms; Detection and identification of bacteria, fungi, and viruses in aquatic environments; Pollution indicator organisms; Microbial problems associated with aquatic food products; Control of microbial problems in aquatic environment.

AS 5133 Fish Biotechnology (1)

Importance of Biotechnology over conventional methods; Ploidy manipulation of fish and production of Mon-sex fish for commercial purposes; Improvement of nutrition, growth, disease prevention of fish by bioencapsulation, microencapsulation and probiotics use in Aquaculture; Development of new fish species and strains using biotechnological application.Molecular biology of fish; Nucleic acids and their manipulations; PCR; DNA sequencing; Molecular markers in fish and their use; Disease diagnosis.

AS 5134 Poultry Meat Processing Technology (1)

Introduction to poultry meat industry; Processing fresh poultry; Quality maintenance of poultry carcass; Microbiology of poultry meat; Carcass decontamination; Composition and nutritive value; Classification & grading of carcasses; Preservation of poultry meat: refrigeration, caning, dehydration, curing, and smoking; Value addition; Poultry slaughter house design; HACCP; Poultry welfare and slaughter house regulation; By-products of poultry industry.

AS 5135 Egg Technology (1)

Introduction to egg industry; Structure and composition of egg; Physical, chemical, nutritional and functional properties of egg, Egg quality; Grading of eggs; Storage of eggs; Processing of eggs; Microbiology of egg and egg products; Production of functional eggs; Quality assurance in production and processing of eggs.

AS 5136 Introduction to Molecular Biology in Animal Science (3)
Nucleic Acids: Types, extraction/purification, quantification, manipulating enzymes and methods; Genes and gene expression: Central dogma, transcription, translation and gene expression regulation, post transcriptional regulations; PCR: Principle, methods and applications, gel electrophoresis; DNA sequencing; Nucleic acid labeling and hybridization; Microarrays, next generation sequencing; RNA-seq, small RNAs; Recombineering: Vectors, cloning, transfection, selection of clones; Molecular markers; Types, uses; Proteins: Synthesis, structures, protein/peptide purification and identification, polyacrylamide gelelectrophoresis (PAGE), immuno-precipitation, CHIP-seq, "Omics" in Molecular Biology; Concepts of Epigenetics; Basic Bioinformatics: Databases, software and applications.

AS 5151 Biochemical Genetics and Cytogenetics (2)
Inborn errors metabolism; Sex limited inheritance; type of gene action and type of disease; Inherited Breeding disorders: sexual Abnormalities; Familial disorders; Liability and threshold; Multifactorial models; Genetic and environmental control of inherited diseases. Cytogenetics and animal breeding; Chromosomes and their identification; Standard kryotype of different farm animals; Sex determination; Chromosomal aberration; Frequency and effect of aberrations; Genetic polymorphism; Importance of cytogenetics in animal breeding.

AS 5152 Livestock Bio-diversity and Conservations (2)
Definitions of Bio-diversity; Levels of Bio-diversity; Livestock diversity and its importance; Agro-biodiversity and livestock diversity; Livestock Production Systems and diversity; Animal genetic resources; Conservation of animal genetic resources; World states of conservation of AnGR; Sri Lankan situation of conservation AnGR; Tools for genetic conservation of livestock; Monitoring genetic diversity using DNA technology; Community participation in AnGR conservation and Livestock bio-diversity; Research and policy priorities.

AS 5154 Tropical Animal Production I (3)
Breeds and breeding of poultry species (chicken, ducks, turkey, guinea fowl and quails), pigs and rabbits; swine and rabbit production systems in tropical countries; planning of houses to hot/humid environments; Feed resources for non-ruminants and compounded feed industry in tropical countries; General management practices of layers, broilers, swine and rabbits under tropical conditions, Product technologies under tropical conditions.

AS 5155 Fisheries Management (3)
Fisheries industry; History of fisheries management; Management zones; Stock assessment; Fishery and interaction of its components, case studies in reservoir fisheries, coastal fisheries and deep sea fisheries; Regulations in fisheries management, licensing; Top-bottom management; Community based fisheries management; General administrative functions; Resource management technologies and tools; Coastal fisheries extension methodology, welfare activities, co- operative societies; Kattudel and Beach-seine fisheries management, selected case studies; Types of fishing gear and crafts, monofilamentous nets; Post-harvest handling. Code of Conduct, IUU and Ghost Fishing.

AS 5197 Proposal Formulation and Scientific Writing (2)
Proposal development, problem identification and hypothesis development, research design, methodology and budgeting, application for funding; Literature search and reference management system, literature review, analysis of scientific papers and writing a critique, abstract writing; Thesis and manuscript writing, writing statistics, data presentation and interpretation.

AS 5198 Directed Study (5)
Independent learning exercise guided by a supervisor to carry out a limited study or produce a publishable review manuscript.

AS 5199 Seminar (1)
Features of an effective scientific presentation; development of structure, preparation of visual aids, rehearsal and delivery, effective discussion.

Second Semester

AS 5201 Advances in Forage Production and Utilization (2)

Role of forages in productive Agriculture; Novel techniques of forage Evaluation; Forage – Animal- soil relationships; Importance of trees & shrubs in animal feeding; Nutritional limit to animal production from tropical forages; Identification and mitigation; Importance of forage conservation in tropics; Advances in forage conservation as silage and hay; Feed conservation; Biological residues; Measurement of forage intake by grazing ruminants.

AS 5202 Animal Biotechnology (3)

Principles and techniques used in animal reproduction: Semen technology, Artificial insemination; Superovulation; Surgical and ultra sound guided oocyte retrieval; *In vitro* maturation of oocytes; In vitro fertilization, Intra- cytoplasmic spermatozoa injection; *In vitro* embryo culture; Embryo transfer; Transgenic animal technology. Principles and techniques used in animal nutrition: Use of molecular techniques to study and manipulate rumen function; Reduction of Methanogenesis; .Use of nuclear and colorimetric techniques for the estimation of rumen microbial protein supply; Use of nuclear and related techniques for predicting and improving the efficiency of feeding ruminants on tanniniferous tree foliage; Biodegradation of lignocellulosic materials.

AS 5203 Animal-Environment Interactions (2)

Definitions and Terminology; Ecological rules; Abiotic and biotic components and their variations; Conformers and regulators; Thermal environment; Thermoregulatory mechanisms; Integrated behavioural, biochemical, physiological and morphological responses; Thermal zones and thermal stress; Altitude and its effects; Effects of nutrition on growth, production and reproduction; Psychometrics; Strategies to alleviate thermal stress.

AS 5204 Aquatic Resources Management (2)

Water as a resource; Physical and chemical properties of aquatic resources and biota; Environmental laws and aquatic resources management, Water harvesting; Anthropogenic influence and role of fish in aquatic resources; Influence of introduced fish on the aquatic ecosystems; Aquatic pollution and mitigation; Development of co-management and other suitable management strategies.

AS 5205 Avian Health and Hygiene (2)

Nature and importance of poultry health and hygiene; Role of disease control measures in the development of the poultry industry; Management skills in maintaining flock hygiene and Boisecurity; Effect of housing and feeding on health; Viral and bacterial diseases, parasitic infestations, and their control; Vaccination procedures, schedules and techniques;. Nutritional disorders and prevention; Egg borne diseases and transmission; Hatchery sanitation and disease control operations.

AS 5206 Broiler Production (2)

Review of the broiler industry in Sri Lanka, past and present; Selection and breeding of broilers; Broiler production systems in Sri Lanka and the World, Out-grower contracts, Planning of broiler farms; Management of broilers: housing, feeding and disease prevention; measurement of broiler performance, Factors affecting broiler performance; Feeding and meat quality; Records, Cost-benefit analysis of broiler production;

AS 5207 Dairy Engineering (2)

Dairy farm automation; Machine milking: Principles, different classes of milking machines; Robotic milking; Heat measurement, transfer and control; Steam generation and its uses in dairy industry; Electrical power and equipment; Hydraulics and pumping ; Principles of refrigeration; Insulation and cold storage rooms & tanks; Heaters & coolers, modes of heat-exchange & equipment; Cream separation, clarification, ultra filtration & reverse osmosis, homogenizing, pasteurizing and sterilizing & UHT equipment; Evaporation and drying equipment; Mechanical can & bottle washing equipment; Filling units; Equipment for cream, butter & cheese manufacture ; Equipment maintenance; Dairy plant design & construction; Energy and its use in dairy plant.

AS 5209 Fish Feeds and Nutrition (3)

Nutritional requirements and deficiencies of shellfish and fin-fish larvae, post-larvae and adults; Digestion, absorption and metabolism of nutrients in fish; Forms of fish feeds; Feed quality; Application of HACCP system for feed management; Feed storage and packing; Preparation and processing of fish feeds; Supplementary and complete feeds; Additives in compounded feeds; Formulation of feeds, Methods of feeding and feeding standards; Nutrients and energy balance experiments. Role of live food organisms in Aquaculture; Selection of live food organisms for hatcheries; Techniques used in mass culture, isolation and application to local conditions; Management of cultures.

AS 5210 Fish Population Dynamics (2)
Catch and effort statistics, fish growth, age composition, length-weight relationship; von Bertalanffy, Ford, Brody and logistic curves; Total, natural and fishing mortalities; Equilibrium among reproduction, natural mortality and fishing intensity; Estimation of population size: Petersen estimates, swept area method, Leslie s method, Stratified sampling; Virtual population and cohort analysis; Yield-per-recruit assessment; Surplus-yield models; Multispecies models; Model development and parameter estimation using computer packages.

AS 5211 Genetics and Breeding of Fish (2)
Structure and behavior of fish chromosomes; Evolution of Karyotypes and fish species; Mutation and Lethal genes in fishes; Pleiotrophic effects; Sex determination and non-chromosomal heredity; Inheritance of economic traits; Selection methods for qualitative traits in ornamental fish; Development and maintenance of colours and shapes; Genetic variability of qualitative traits; Estimation of genetic parameters; Offspring-parent regression; Formation of varieties and inbred lines; Hatchability; Survival and growth of young fish with inbreeding; Exploitation of heterosis; Hybridization and breeding strategies for different fish species. Selection of brood fish and their characteristics; Breeding techniques; Production of different desired strains for commercial aquaculture; Genetic differences among cultured, wild and aquarium fishes; Development of fish breeds.

AS 5212 Genetics and Breeding of Poultry (2)
Poultry Breeding: Evaluation of fowl species; types of poultry breeds; Karyotype of domestic fowl; Sex determination and sex linked inheritance; Genes controlling feathers, muscles, nerve and skeleton; Lethal genes in domestic fowl; Traits of economic importance; Heritability estimates: Correlation Among traits; Breeding objectives, Selection; Performance recording; Inbreeding in poultry; Breeding stock; Development of lines and strains; Cross breeding methods; Breeding of miscellaneous poultry species.

AS 5213 Livestock Breeding (3)
Traits of economic importance of dairy cattle, beef cattle, buffaloes, goats and swine; Breeding objectives; Economic aspects of breeding; Profit maximization and efficiency; Selection deferential; Intensity and Accuracy of selection; Response to selection; Generation interval; Rate of genetic gain; Selection criteria for different animal species; Single trait and Multiple traits selection; Prediction of breeding value; Correlation between traits; Genetic abnormalities; Inbreeding depression; Development of breeds, varieties, lines and strains; Cross breeding methods; Individual, maternal and parental heterosis; Genetic and environmental interaction; Synthetic breeds; Use of reproductive technologies in animal breeding; Breeding methods for cattle, buffaloes, goat and swine; Design of breeding programs for different species; Breeding policy planning.

AS 5214 Livestock Health and Hygiene (2)
Livestock diseases of major importance; ; Basic Principles of disease recognition; Control and preventing bacterial, viral, protozoan and fungal diseases of livestock; Internal and external parasites and their control: Regulations and acts related to contagious diseases; Livestock sanitation, prevention, control and eradication of diseases of farm animals.

AS 5215 Marine Fisheries Management (2)
Classification of marine waters and fisheries resources; Deep sea fisheries; Multi day boats, trawling; Law of the Sea and international laws; Technology development and management issues; Effect of fish and fisherman

migration on management; Kattudel and Beach-seine fisheries management; Case studies in marine fisheries management.

AS 5216 Meat Processing Technology (2)
Introduction; Processing of meat: sausage making, curing and smoking, non-meat ingredients; Meat cookery and cooked meat products; Chemical preservation of meat, radiation, low temperatures, high temperatures, high pressure, drying and fermentation; Testing of quality parameters related to meat products. Labelling and packaging, Functional meat products.

AS 5217 Microbiology of Dairy, Meat, Fish and Egg Products (3)
Classification of bacteria, fungi and viruses encountered in food; Microbiology of raw & heat treated milk products; Control and destruction of micro-organisms; Types, metabolism and bacteriophages of starter cultures; Microbiology of cheese, fermented milk, butter & cream, frozen desserts and dry & concentrated milk products; Quality assurance in dairy value chain; Importance & applications of probiotics and prebiotics in dairy products; The incidence and types of micro-organisms & spoilage in meat & meat products, eggs and sea food; Detection of microbial populations in dairy, meat fish & egg; Animal product borne diseases.

AS 5218 Non-Ruminant Animal Production (3)
Management of pigs: Genetic selection and breeding; Growth, reproduction and lactation; Feeding management; Planning of swine farms; Housing; Management of stock. Management of rabbits: Planning of rabbit farms; Breeds; Breeding, selection and reproduction; Housing and equipment; Rabbit production systems; Record keeping; Handling and management of kids, growers, does and bucks of rabbits; Health and diseases; Slaughtering process. Importance of microlivestock; Breeds, management and production of crocodile, wild boar. Origin and domestication of miscellaneous poultry species; Breeds of ducks, turkeys, geese, guinea fowl, Japanese Quails, Ostrich, Pigeons; Their importance and utility; Methods and practices of rearing; Special aspects of management of the above species; Housing requirements; Nutrient requirements; Feeding standards and production rates; Disease control.

AS 5219 Ornamental Fisheries Management (3)
Ornamental fish and aquatic plant industry; Global situation; Types and scales of ornamental fish farms; Maintenance of fresh water and marine ornamental fish tanks; Management of ornamental fish and aquatic plants; Selection of species for commercial production, Development of a commercial farm, Broodstock and back ups; Farm lay out; Management strategies for sustainable development; Specialized harvesting technologies; Mitigatory measures for genetic, mutational and disease conditions; Ornamental aquatic plants; Methods of collection, propagation and transport; Economics of ornamental fisheries enterprises: cost-benefit analysis, IRR; Trade; Export requirements; Legal aspect of import and export of ornamental fish and aquatic plants; Environmental issues.

AS 5220 Ruminant Livestock Production (3)
Dairy cattle and buffalo production: Critical analysis of dairy production systems and breeds in different agro-climatic zones of Sri Lanka; Evaluation of available resources for dairy animal production; Planning cattle and buffalo farms for commercial milk production; Management of dairy cattle and buffalo during different physiological stages; Factors influencing production of quality and hygienic milk. Goat and sheep production: Present status, potentials and constraints; Feed resources and strategic feeding; feeding, social and sexual behavior; Advances in reproduction, breeding and health; management for sustainability and high productivity.

AS 5221 Shrimp and Fish Processing (2)
Gross chemical composition of fish and shrimp; Post-harvest biochemical changes in fish and shrimp; Grading and processing of shrimp; Processing and preservation of fish; Utilization of by-products from fish and shrimp processing industries; HACCP in fisheries industries.

AS 5222 Wildlife Environment (3)

Introduction to wildlife ordinance; Wildlife as integral component of ecosystem; Potentials and limitation of wild life conservation; Animal behaviour; Feed resources and feeding patterns; Habitat degradation, conservation and development; Zoonotic diseases; Human-animal conflict & competition; Nonconsumptive value of wildlife; Eco-tourism.

AS 5251 Advances in Equine Nutrition and Feeding (2)
Concentrate and roughage feeds; Types of feeds; Digestive system and digestion of carbohydrates, proteins and fats in the peptic stomach and small intestine; Hind gut fermentation and microbiology; Nutritional requirements for different functions and growth stages; Poisonous substances in feeds; Nutritional disorders.

AS 5252 Animal Quarantine, Welfare and Legislation (1)
Introduction; Quarantine requirements for import and export of animals and products; Animal welfare norms and regulations; Animal experimentation and welfare; Legislation and implementation.

AS 5253 Animal Waste Handling and Management (2)
Introduction; Defining and understanding the problems related to waste disposal; Waste collection and characteristics: Poultry, Dairy, Swine, other animals; Waste management: Control of animal waste pollutants, In- house alterations, Lagoons; Waste utilization: Methane, Fuels, Manure; Treatment of livestock wastes. Statistics of fish wastes; Trawler and fish processing wastes; Characteristics of fish wastes; Effluent discharge to sedimentation tanks; Waste water and recirculation systems; Effects of fish wastes on environment; Use of probiotics; Regulations on waste handling.

AS 5254 Tropical Animal Production II (3)
Adaptation of breeds of ruminants (cattle, buffaloes, goats and sheep) to tropical environments; Critical analysis of ruminant production systems in the tropics; Evaluation of available resources and constraints for ruminant animal production; Feeds and feeding strategies for ruminants; Reproduction, breeding, disease control, housing and product processing in ruminants under tropical conditions.

AS 5255 Fish Farm Designing, Construction and Management (2)
Site selection; Environment impact assessment; Principles of designing and planning, Construction program; Constructions of fish ponds and hatchery jars; Pumps and pumping; Aeration and flow patterns; Maintenance and record keeping, Budgeting; Mitigation of environmental problems.

AS 5256 Slaughter House By-product Technology (2)
Introduction; Processing of by-products: blood, organ meat, offal, horns, bones, hoof, wool, hair and feather; Nutritive value of by-products; Utilization of by-products: pet food, gelatin, pharmaceutical, bile acid, enzymes and hormones, meat and blood meal, bone meal; Manufacturing of lard & tallow; Silage production. Leather Processing Technology.

AS 5257 Fish Seed Production and Larval Rearing (3)
Overview of endocrinology in fish reproduction; Manipulation of reproduction, ovulation induction, collection of fish and spawning methods; Artificial and semi-artificial propagation; Hypophysation; Ovarian biopsy, Preservation of gametes; Management of brood stock; Estimation and evaluation of eggs, post larvae, fry and fingerlings; Nursery management; Seed production planning and marketing.

AS 5297 Field Visits – Animal Science (1)
Visits to government and non-government cattle, poultry, and swine enterprises including production & breeder farms. Assessment will be based on the report submitted by the candidates after every field visit.

AS 5298 Industrial Visits – Poultry Science and Technology (1)
Visits to poultry feed manufacturers: poultry breeders: small, medium and commercial scale poultry producers: processing units/plants; Visits to government and non-government poultry farms. Assessment will be based on the report submitted by the candidates after every field visit.

AS 5299 Industrial Visits - Dairy and Meat Product Technology (1)
Visits to small, medium and large scale commercial dairy & meat processing plants; Visits to government and non-government cattle, poultry, swine enterprises including production & breeder farms. Assessment will be based on the report submitted by the candidates after every field visit.

AS 5258 Animal Food Safety (2)
Introduction; Animal food hygiene and sanitation, quality assurance of animal food products and processing facilities; Presence, analysis & effects of food additives, adulterants, contaminants and natural toxins in animal food products; Microbial hazards, antimicrobial resistance and antibiotic residues in animal food products; Emerging pollutants and environmental issues related to animal food products and processing. Genetically modified feed additives and safety of animal food products. Animal food products and non-communicable diseases.

AS 5259 Dairy Biotechnology (2)
Introduction to biotechnological intervention on GM starter cultures, Food grade bio-preservatives, Recombinant dairy enzymes and proteins, Accelerated cheese ripening, Bioactive peptides, Functional foods and neutraceuticals, Recombinant chymosin, Development of starter cultures using food grade vectors, Metabolic engineering of Lactic Acid bacteria, Molecular cloning techniques, Expression of gene for recombinant dairy enzymes and proteins, Bacteriophage resistance development.

AS 5260 Dairy Sanitation and Hygiene (1)
An introduction to sanitation and dairy hygiene in cow - consumer dairy value chain; Types of microorganisms encountered in dairy industry; Spoilage organism, milk -borne pathogens including zoonetic agents: detection, bio-safety, impact on human health; Residues in milk and their effects; Bio-film & milk stone formation, HACCP (ISO 22000); Hygienic requirements of a dairy processing plant. CIP procedure for plants and equipments; Application of processing technologies & quality assurance tests to eliminate milk borne pathogens.

AS 5261 Coast Conservation and Management (1)
Importance of coastal resources; Coastal habitats; Coastal erosion; Coastal pollution; Regulations and compliance monitoring; Initial environmental examination; Environmental impact assessment; Demarcation of refuge areas; Conservation strategies; Case studies.

AS 5262 Marine Environment Pollution Prevention (1)
International organizations related to marine environment pollution; Law of the sea; Internal waters and ports; Delimitation and Jurisdiction; Territorial waters; Territorial sea convention; Contiguous zone; Exclusive economic zone; The high seas; Deep seabed mining; Ballistic waters; Oil spills; Marine Environment Pollution Prevention Act; Preventive measures; Case studies.

AS 5263 Global Warming and Animal Production (2)
Introduction to global warming, agriculture related contributors to global warming, role of livestock, means of contribution from livestock sector, effects on sustenance and improvement of animal productivity, health and feed resources, management strategies in mitigating the influence through livestock sector.

AS 5264 Cell Biology in Animal Science (2)
Cellular Components; Structures of biological membranes, lipids and lipid modification, membrane proteins, localization of cellular proteins, identification of functions; Cell signaling and signal transductions: membrane receptors, ligands, second messengers, signaling pathways (protein kinases, VEGF, Wnt, JAK/STATS, Notch,

JNK, IGF-1, TGF,Ca^{2+} signaling); Protein synthesis and secretion; Cell Cycle: check points, control; Cell Death: Apoptosis, mechanisms, measurement of cell death, induced cell death; Cytoskeleton; Cell–Cell Interactions: cell adhesion and mechanisms, motility, extra-cellular matrix; Principles of Glycobiology; Angiogenesis; Cancer; Stem Cells.