# Compulsory courses

## 01- Anatomy and Embryology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Advanced General Anatomy external anatomy of birds - Advanced special anatomy of birds - Advanced special anatomy of fish - Advanced General Embryology | Advanced general and special Anatomy and general embryology | 301-3011 |
| • Advanced comparative anatomy of Digestive system in domestic animals - Advanced Embryology of Digestive system in domestic animals - Advanced comparative anatomy of Respiratory system in domestic animals - Advanced of Respiratory system in domestic animals | Advanced comparative anatomy and embryology of Digestive and respiratory systems in animals | 301-3012 |
| • Advanced comparative anatomy of urinary system in domestic animals- Advanced embryology of urinary system in domestic animals- Advanced comparative anatomy of male genital system in domestic animals -<br>• Advanced embryology of male genital system in domestic animals - Advanced comparative anatomy of female genital system in domestic animals -Advanced embryology of female genital in domestic animals | Advanced comparative anatomy and embryology of urogenital systems in domestic animals | 301-3013 |
| • Advanced comparative anatomy of circulatory system in domestic animals-<br>• Advanced embryology of circulatory system in domestic animals- Advanced comparative anatomy of nervous system in domestic animals-Advanced embryology of nervous system in domestic animals | Advanced comparative anatomy and embryology of Circulatory and nervous system in animals | 301-3014 |

## 02- Histology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Developmental stages of membrane biosynthesis of cell organelles, cell cycle and division, developmental stages of blood cells formation, developmental stages of estrous cycle in the ovarian tissue, spermatogenesis and developmental stages of spermatogenic cycle with reference chromosomal anomalies. All these studies in relation to genomic function. | Postnatal tissue developmental biology | 302-3021 |
| • Basis and theories of immunohistochemistry, production of primary reagents immunohistochemical methods heat-mediated antigen retrieval techniques multiple labeling technique and immunohistochemistry in practice | Advanced tissue immunohistochemistry | 302-3022 |
| • Molecular structure of membranes, Membrane-protein-lipid interaction, ,Membrane biosynthesis and organelle genesis and subcellular organelles structure | Membranology and subcellular organelles | 302-3023 |
| • In situ hybridization, primed in situ synthesis (PRINS), in situ PCR protocols, fluorescence In situ hybridization (FISH). | Molecular histology of body tissues | 302-3024 |

## 03- Physiology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Functional structure of the digestive system - digestion and absorption of food - The movement of different parts of the digestive system- Mechanism of waste disposal-Factors that | Physiology of digestion and metabolism) | 303-3031 |

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| affect the metabolism | | |
| • Functional structure of the heart and physiological characteristics of the heart muscle and the source of heart rate- Blood pressure -Structure of the excretory organs and its relevant to its function - Mechanism of excretory substances in animals | Physiology of circulation and excretion | 303-3032 |
| • Function of the reproductive system of males of different animals, and the fundamental differences between different species of animals and method of reproduction and the nature of each species- Function of the reproductive system of females of different animals, and the fundamental differences between them and the way of reproduction and how they are affected by environmental factors and examine the factors that influence the activity of the ovary | Physiology of reproduction | 303-3033 |
| • Respiration - Reproduction- excretion- digestion in birds - endocrine glands and hormones and their functions- Adaptation of aquatic and wild birds | Physiology of birds | 303-3034 |

## 04- Biochemistry

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Advanced studies in: Molecular structure of carbohydrates, molecular structure of proteins and amino acids, molecular structure of lipids, lipoproteins and apolipoproteins, chemistry of vitamins, putrefaction and detoxification, animal pigments and hormones | Advanced molecular biology | 304-3041 |
| • Interrelation and metabolic disorders:<br>• Metabolic inter-relationships between carbohydrates, lipids and protein metabolism in various nutritional and hormonal states. Metabolism in well-fed state and starved state (starved-feed cycle). Metabolic disorders related to carbohydrate, lipid and protein metabolism | Metabolic disorders and inborne errors | 304-3042 |
| • Liver functions, nitrogen metabolites and renal functions, gastric, pancreatic, myocardial and intestinal functions ,biochemical aspects of hematology, porphyrins and disorders of porphyrin metabolism, clinical chemistry of pregnancy, lysosomal storage diseases | Advanced Clinical biochemistry | 304-3043 |
| • Health and Safety requirements for working in a laboratory - common laboratory equipment and techniques- Preparation of analytical quality solutions and dilution series to determine concentrations of biological molecules - Design and execution of a strategy for cloning of recombinant proteins, from primer design to the amplification, purification, restriction enzyme digest, ligation and transformation of DNA; through to the analysis of DNA sequencing data. | Practical Skills in Biochemistry | 304-3044 |

## 05- Animal, Poultry and Fish Breeding and Production

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Qualitative and quantitative traits - -Relationship and mating systems-Genetic parameters-Genetic selection response and | Advanced quantitative genetics and genetic improvement in | 305-3051 |

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|---|---|---|
| selection deferential -Directional selection (individual, family and combined selection)-Economic selection index for single and multiple traits | animals | |
| • Dairy Herd Reproductive Efficiency - Milk Yield and Composition - Lactation Curve and Persistency - Body Condition score - Beef production systems - Carcass characteristics affecting beef palatability - Growth and development of beef cattle, and growth promoter - | Advanced dairy and beef cattle production | 305-3052 |
| • Advanced Production of Poultry Breeders and layer - Advanced Broiler production - Incubators and hatchers design and requirements - Freshwater Fish Breeding and Production - Fish Ecology and Water Quality criteria and management - Marine Species Reproduction and Production | Advanced Poultry and Fish Production | 305-3053 |
| • Biotechnology and animal breeding<br>• Molecular biotechnologies<br>• Reproductive biotechnologies | Biotechnology of animal production | 305-3054 |

## 06- Veterinary Economics and Farm Management

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Application of economic information in veterinary practice - Management of veterinary business - Marketing of veterinary practices and resources - Problems of veterinary practices and its management | Advanced veterinary economic | 305-3061 |
| • Application of advanced economic information on animal, poultry and fish production - Management of animal, poultry and fish production farms - Marketing of animal, fish and poultry production products - Economic problems in animal fish and poultry production farms | Economics of animal, poultry and fish production | 305-3062 |
| • Quality management and its application in animal production farms - Basis of management of animal production farms - Evaluation of management quality in animal farms- Application of management principles on animal production farms- Measures of management problems of animal farm management. | Integrated systems of animal production farms | 305-3063 |
| • Application of advanced methods for controlling diseases of animals and poultry - Methods used for assessing the economic benefits of diseases control - Application of management principles for animal and poultry diseases prevention | Economics of animal diseases | 305-3064 |

## 07- Genetics and Genetic Engineering

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Advanced cytogenetics - Gene mapping on chromosome<br>• Somatic cell hybridization - FISH technique - X-chromosome inactivation - Maternal imprinting | Cytogenetic | 305-3071 |
| • DNA sequencing - Polymerase chain reaction (PCR), types and applications - Real time PCR - Restriction Fragment | Advanced methods of DNA manipulation | 305-3072 |

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| Length Polymorphisms- DNA fingerprinting<br>• Molecular genetic methods of gene mapping | | |
| • Restriction Endonucleases - Recombinant vectors - Steps of recombinant DNA technology - Applications of Genetic engineering | Genetic engineering | 305-3073 |
| • DNA sequencing - Polymerase chain reaction (PCR), Types and applications - Real time PCR - Restriction Fragment Length Polymorphisms - DNA fingerprinting<br>• Molecular genetic methods of gene mapping | Advanced methods for genome study | 305-3074 |

## 08- Pharmacology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Receptor theories- Dose determination-- Side effects and adverse effects of drugs - Drug kinetics and dynamics- Autacoids and anti-inflammatory drugs. | Advanced general pharmacology | 306-3081 |
| • Central nervous system pharmacology and drugs - Autonomic nervous system pharmacology and drugs- Local anaesthesia theories- General anaesthesia and pre-anaesthetic medications | Advanced nervous system pharmacology | 306-3082 |
| • Cardiovascular drugs- Gastrointestinal drugs- Reproductive drugs- Urinary drugs- Skin and Eye drugs. | Advanced systemic pharmacology | 306-3083 |
| • Antimicrobials- Antibiotics- Anthelmintic- Antiprotozoal, antifungal and antiviral drugs- Growth promoters- Antiseptics and disinfectants. | Advanced chemotherapy | 306-3084 |

## 09- Pathology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Molicular characterization of irreversible cell injury – genetic analysis of biological chemeical mediators | Molecular aspect of inflammation and irreversible cell injury | 307-3091 |
| • Types of hemorrhage and thrombus – mechanism of thrombosis – role of endothelial cells and thrombocytes in hemostasis | Hemostasis and Thrombo-hemorrhagic balance | 307-3092 |
| • Gene analysis of some growth disorders- westernblot for phenotypic growth disorders | Molecular aspect of cell growth disorders | 307-3093 |
| • Characterization of molecular effects of some oncogenes – genetic analysis of viral oncogenes – role of chemicals in carcinogenesis | Molecular aspect and Viral & Cell Oncogenes and Chemical carcinogenes of carcinogenesis | 307-3094 |

## 10- Parasitology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Advanced studies on taxonomy, molecular biology, pathogenesis, immunology and serology of helminthes of veterinary importance | Advanced Helminthology | 308-3101 |
| • Origin, evolution, regional and seasonal distribution, forecasting insect and<br>• acarine population through biological modelling.<br>• Population dynamics of insects and acarines in relation to biotic and abiotic factors. Recent developments pertaining to insects of veterinary importance. Recent developments pertaining to arachnids of veterinary importance. Chemical, | Advanced Veterinary medical Entomology | 308-3102 |

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|---|---|---|
| **biological, immunological control measures and in-depth study of integrated pest management. Modulation of vector competence to transmit parasitic infections using molecular genetics by developing transgenic vectors.** | | |
| • **Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of protozoan parasites.**<br>• **Application of proteomic and genomics in diagnosis and development of vaccines against protozoal infection.** | **Advanced Protozoology** | **308-3103** |
| • **DNA and RNA technology, Gene expression and regulation. Recombinant protein production. Hybridoma technology and its application in parasitology. Molecular diagnosis and Phylogeny. Expression of antigens and antibody fragments useful as diagnostic reagents and vaccines. Restriction Fragment Length Polymorphism (RFLP), Polymerase Chain Reaction, modified PCR and related techniques, Random Amplified Polymorphic DNA (RAPD), Nucleic acid probe and Cleavage Length Fragment Polymorphism (CFLP).** | **Advanced Diagnostic Parasitology** | **308-3104** |

## 11- Nutrition and Clinical Nutrition

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • **Nutrient requirements for Broilers, Nutrient requirements for Layers and Breeders, Rabbit nutrition, Nutritional deficiency diseases affecting poultry, Metabolic diseases affecting poultry, Nutritional deficiency diseases affecting Rabbit, Metabolic diseases affecting Rabbit** | **Poultry Nutrition** | **309-3111** |
| • **Feedstuffs of the pet animals - Nutrient requirements for pet animals - Deleterious substances in the feeds affecting pet animals - Nutritional deficiency diseases affecting pet animals - Metabolic diseases affecting pet animals** | **Pets Nutrition** | **309-3112** |
| • **Dairy nutrition - Beef nutrition - Sheep and Goat Nutrition - Camel nutrition** | **Ruminant Nutrition** | **309-3111** |
| • **Feedstuffs of the Fish, Nutrient requirements for Fish, Deleterious substances in the feeds affecting Fish, Nutritional deficiency diseases affecting Fish, Metabolic diseases affecting Fish** | **Fish and Shrimp Nutrition** | **309-3112** |

## 12- Bacteriology, Mycology and Immunology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • **Introduction, advances in bacterial structure, bacterial growth and reproduction advances in bacterial genetics, bacterial virulence** | **Advanced General Bacteriology** | **310-3121** |
| • **Introduction, advances in bacterial classification, advances in Gram-positive and Gram-negative bacteria** | **Advanced Systematic Bacteriology** | **310-3122** |
| • **Introduction, advances in immunology, innate immunity, advances in complement, advances in phagocytosis, advances in antigen, immunoglobulin, cell-mediated, autoimmune diseases, hypersensitivity** | **Advanced Immunology** | **310-3123** |
| • **Introduction, advanced fungal structure, advanced fungal Growth and reproduction. Advanced fungal genetics, advanced fungal virulence, moulds, yeasts and diphasic fungi** | **Advanced Mycology** | **310-3124** |

## 13- Virology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Definition of Virus, Virus shape, virus structure, virus replication, virus tropism, Effect of viruses on host cells, | Advanced Virology | 311-3131 |
| • Polymerase chain reaction (PCR), Reverse Transcriptase-Polymerase chain reaction.( RT- PCR), Sequencing | Biotechnology Diagnostic Virology | 311-3132 |
| • Viral DNA structure, molecular structure of the genes, functions of genes, mutation, viral genetics and evolution | Molecular Biology of viruses | 311-3131 |
| • Viral host immunity, interferon, types of vaccines, adjuvant, preparation of vaccines | Preparation and Evaluation of viral vaccines | 311-3132 |

## 14- Forensic Medicine and Toxicology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Analytical toxicology - Drug toxicity- General and clinical toxicology - Occupational and environmental toxicology - General forensics - Postmortem examination and medico-legal reports | Forensic Toxicology | 312-3141 |
| • Essential Clinical Toxicology - Analytical Techniques<br>• Essential Therapeutics - Toxic Metals - Drug Abuse and Forensics - Management of intoxicated case - Laboratory and personal safety - Practical Project and Dissertation | Special and analytical toxicology | 312-3142 |
| • Dose response relationship - Duration of toxicity studies, acute, sub-acute, chronic - Testing for acute and chronic toxicity - Selection of animal species and dose level - Pathological techniques in toxicology - Hematology and clinical chemistry in toxicology studies<br>• Antidotal studies - Evaluation of toxicity in animal subjects | Designing of toxicological studies | 312-3143 |
| • Introduction to mechanistic toxicology - Types of toxic responses - Organ-selective toxicity - Cellular transport and selective accumulation of potentially toxic xenobiotics - Bioactivation of xenobiotics to reactive metabolites - Xenobiotic-Induced oxidative Stress - Immune mechanisms - Cytokine-mediated toxicity | Mechanistic toxicology | 312-3144 |

## 15- Hygienic control of Meat and Meat products

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Quality of meat and meat products - Diseases transmitted through meat and meat products - Testing of meat and meat products - | Role of meat and meat products in diseases transmission to human | 313-3151 |
| • Product inspection - Factory and social audits - Laboratory testing | Hygienic requirements for processing and preservation of meat and meat products | 313-3152 |
| • Meat additive - Direct food additive - Indirect food additives - color additive - Probiotics in food safety | Meat additives | 313-3153 |
| • Chemical composition of meat and meat products<br>• Types of adulteration meat and meat products - Modern methods for analysis | Advanced methods for detection of meat and meat products adulteration | 313-3154 |

## 16- Hygienic control of Milk and Dairy products

| Compulsory courses | | |
|---|---|---|
| **Contents** | **Courses** | **Code** |
| • **Dairy farm design and layout- Dairy farm environment hygiene - Animal health and Quality of dairy animal feeds - Milking machines hygiene - Hygiene of fluid milk technology - Cleaning and sanitation of dairy equipments at the farm levels- Monitoring of sanitation of equipment hygiene - Water quality at the farm levels**<br>• **Application of GHP at dairy farm** | **Hygiene, Technology and control of fluid milk production** | **313-3161** |
| • **Hygiene of dairy plants - Platform tests at dairy plants**<br>• **Dairy plant design and layout - Application of GMP at dairy plants - Functional foods - HACCP definition and principles - Monitoring and verification of end products**<br>• **Dairy plant management - Hygiene of dairy plant technology** | **Hygiene, Technology and control of dairy products production** | **313-3162** |
| • **Hygiene of table egg production - Composition, nutritive values of table eggs and advanced methods for analysis of table egg constituents - Hygienic handling of table eggs and fats and oils - Basic technology of table egg products and fats and oils - Quality control tests of table eggs, fats and oils.** | **Hygiene, Technology and control of table eggs, fats and oils.** | **313-3163** |
| • **Factors affecting nutritive values of food of animal origin - Food additives and the permitted food additives - Legislation regulates food additives - Lists of approved food additives application - Allowable limits for different food additives in animal foods -** | **Food of animal origin and Food additives legislation and regulations** | **313-3164** |

## 17- Clinical Pathology

| Compulsory courses | | |
|---|---|---|
| **Contents** | **Courses** | **Code** |
| • **Basic Biology of Hemopoiesis - Molecular Biology and Cytokines - Transplantation of Stem Cells – Anemias - Basic Principles of Hemostasis - Bleeding Disorders, Thrombophilia, Thromboembolic Disease, and Antithrombotic - Therapy Transfusion Medicine and Immunohematology** | **Advanced hematology** | **314-3171** |
| • **Assessment of Renal Function tests, Liver Function tests, pancreatic Function tests, Cardiac Function Tests, Respiratory Disorders, Nutrition and Digestive Function, Endocrine Function tests, Reproductive Endocrinology and Fetal Testing, Malignancy Disorders and Testing, Markers for Inflammatory Conditions,**<br>• **Markers of bone metabolism** | **Organ function tests** | **314-3172** |
| • **Basis of analysis of body fluids for diagnostic, prognostic and monitoring purposes - Cerebrospinal Fluid Analysis - Synovial Fluid Analysis- Serous Fluid- Peritoneal Analysis- Amniotic Fluid Analysis- Semen Analysis - Urine analysis - Fecal Analysis** | **Diagnostic cytology and body fluids examination** | **314-3173** |
| • **Antigens, antibodies and complement system- Principles of Antibody-Based Techniques: Immunoassays- Testing of cellular immune function**<br>• **Testing the immune response to infectious agents- Diagnosis of Autoimmunity- Diagnosis of immunodeficiencies** | **Clinical immunology and molecular diagnostics** | **314-3174** |

## 18- Fish Diseases

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| Types of fish culture - Fish types for fish cultures - Fish Management in intensive culture - Advantages and Disadvantages of intensive fish culture - Fish diseases in intensive culture system - Prevention and control | Fish Diseases under stress of Intensive Fish culture | 315-3181 |
| • Types of ornamental fish - Patterns of ornamental fish aquarium - Contents of ornamental fish hospital - Diseases of ornamental fish - Prevention & Control of ornamental fish diseases | Ornamental fish Diseases | 315-3182 |
| • Predisposing factors of fish diseases - Pathophysiology of diseases - Using of prebiotics - Using of probiotics<br>• Immunonutritive materials | Raising fish combating against diseases | 315-3183 |
| • Preliminary diagnosis of diseases - Confirmatory disease diagnosis - Prevention of fish diseases - Treatment of fish diseases | Diagnosis and treatment of fish diseases | 315-3184 |

## 19- Infectious Diseases

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Control of infectious diseases based on disease dynamics - infectious diseases epidemiology and disease prediction - sensitivity and specificity of serological tests - risk and risk analysis - outbreak investigation - monitoring and survey - data collection and data analysis<br>control and prevention of infectious diseases | Applied epidemiology of infectious diseases | 316-3191 |
| • Diagnosis of bacterial diseases - Diagnosis of viral diseases - Diagnosis of parasitic diseases - Diagnosis of mycotic diseases - | Methods for diagnosing infectious diseases | 316-3192 |
| • Basic concepts on vaccination - Notes on vaccine manufactures - Types of different vaccines - Vaccines and animal diseases - Vaccination programs in different animal species. | Programs of vaccination and prevention of infectious diseases | 316-3193 |
| • Viral diseases of laboratory animals - bacterial diseases of laboratory animals - parasitic diseases of laboratory animals - Mycotic diseases of laboratory animals | Infectious diseases of experimental animal | 316-3194 |

## 20- Internal Medicine

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Introduction on skin diseases and lesions - General manifestations and treatment of skin diseases - Diseases of dermis and epidermis - Diseases of hair and hair follicles. | Skin diseases | 316-3201 |
| • Introduction on Diseases of nervous system - General signs associated with nervous system diseases - Diagnosis and treatment of Diseases of nervous system<br>• Prevention of Diseases of nervous system | Nervous system diseases | 316-3202 |
| • Introduction on Diseases of Endocrine system - General signs associated with Endocrine system diseases - Diagnosis and treatment of Diseases of Endocrine system - Prevention of | Endocrine Diseases | 316-3203 |

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|---|---|---|
| **Diseases of Endocrine system** | | |
| • **Introduction on musculoskeletal system - general manifestations and treatment of musculoskeletal system diseases - muscle diseases - joint diseases - bone diseases** | **Musculoskeletal system diseases** | **316-3204** |

## 21- Veterinary Surgery

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • **Surgical operations of the head and neck** | **Head and Neck Surgery** | **317-3211** |
| • **Surgical operations of the abdomen - Digestive system surgical affections - Urogenital systems surgical affections.** | **Abdominal Surgeries** | **317-3212** |
| • **Diagnosis and classification of lameness - Clinical anatomy of the equine and bovine foot- Hoof and claw affections - Fore limb affections - Hind limb affections.** | **Lameness** | **317-3213** |
| • **Orthopedic surgical procedures - medial patellar luxation, femoral head/neck ostectomy - lateral approach to the femur, feline mandibular symphysis fracture repair, joint taps, epidural injections and amputation of the pelvic and thoracic limbs.** | **Orthopedic Surgery** | **317-3214** |

## 22- Theriogenology

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • **Reproductive biotechnologies in Theriogenology**<br>• **Advanced controlled reproduction such as ReSync,**<br>• **Double Ovsync … etc. - - Reproductive and breeding management - Evaluation of reproductive performance** | **Improving reproductive performance animals** | **318-3221** |
| • **Molecular regulation of reproductive hormones secretion and functions - Molecular regulation of folliculogensis, ovulation, fertilization, CL formation and function - Molecular regulation of pregnancy.**<br>• **Molecular regulation of spermatogenesis and semen plasma secretion - - Molecular markers of semen quality.** | **Molecular biology in reproduction** | **318-3222** |
| • **Effect of heat stress on reproduction in male and female animals- Effect of environmental pollution on male and male fertility - Immunological causes of male infertility- Immunological causes of female infertility.** | **Management and immunological causes of infertility** | **318-2223** |
| • **Collection and evaluation of oocytes - In vitro maturation of oocytes and its molecular - regulation**<br>• **In vitro Fertilization and its molecular regulation - Freezing of embryos and molecular regulation of - feasibility of embryos.** | **Artificial Insemination and Embryo transfer in farm animals** | **318-2224** |

## 23- Animal and Poultry Behavior and Management

### Compulsory courses

| Contents | Courses | Code |
|---|---|---|

| | | |
|---|---|---|
| • Abnormal behavior of equine - Abnormal behavior of broilers<br>• Abnormal behavior of layers - Abnormal behavior of water fowl - Abnormal behavior of animals - Causes, dangerous and control of abnormal behavior | Abnormal Behaviors of Animals and Poultry | 319-3231 |
| • Patterns of behavior of animal and poultry under stress conditions - Management of dairy animal under stress conditions - Management of poultry under stress conditions- Management of beef animal under stress conditions | Management of Animals and Poultry Under Stress Factors | 319-3232 |
| • Identification of dairy animal - Definition of dairy animal common terms - Special Behavior of dairy animal- Special Management of dairy animal - Vices in dairy animal | Behavior and Management of Dairy Animal | 319-2233 |
| • Identification of broilers - Definition of broilers common terms - Special Behavior of broilers - Special Management of broilers - Vices in broilers -How to maximize the performance of broilers | Behavior and Management of Broilers poultry | 319-2234 |

## 24- Animal, Poultry and Environment hygiene

Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Classification of insecticides -Insecticides used in veterinary fields-Precautions of using insecticides-Hygienic disposal of insecticide residues | Animal, poultry and environmental Hygiene (Advanced) | 319-3241 |
| • Types of animal wastes -characterization of animal and poultry wastes- methods of treatment of animal wastes | Environmental Hygiene and pollution (advanced) | 319-3242 |
| • Hygiene of water used in aquaculture - Monitoring and treatment of Pollution of water | Epidemiology (Advanced) | 319-3241 |
| • Rodent control – Disinfestations- Role of rodents in diseases spread | Combating of Infectious Disease | 319-3242 |

## 25- Zoonoses

Compulsory courses

| Contents | Courses | Code |
|---|---|---|
| • Classification of zoonoses, Temporal and spatial trends of Zoonoses, Emerging and Transboundary Virosis, Emerging and Transboundary Bacterioses, Burden of Emerging and Transboundary Zoonoses, Prevention strategies | Emerging and Transboundary Zoonoses | 319-3251 |
| • Diagnostic tests for zoonoses, surveillance strategies and methods for zoonoses, identification and assessment of zoonotic risk factors. | Detection, Surveillance and Risk Assessment of Zoonoses | 319-3252 |
| • Zoonoses Prevention strategies, Biosafety and Biosecurity with regard to Zoonoses, Basics of health education and communication with regard to zoonoses. | Prevention and combating of Zoonoses | 319-3251 |
| • Principles of One health, Socio-ecology of zoonotic diseases, One health approach in zoonotic diseases surveillance and One health approach in zoonotic diseases prevention and control. | One health Approach in Zoonoses | 319-3252 |

## 26- Poultry Diseases

Compulsory courses

| Contents | Courses | Code |
|---|---|---|

| | | |
|---|---|---|
| • Marek's disease, Adenovirus, Mycoplasma, Salmonella, Escherichia coli, Pseudomonas ornithobacterium - Rhinotracheal Aspergillus. | Diseases causing early chick mortality | 320-3261 |
| • Newcastle disease - Infectious bronchitis disease - avian flu – Adenovirus - Rhinotracheal | Respiratory viral diseases in poultry | 320-3262 |
| • Marek's disease – Leukosis - Reticuloendotheliosis- Lymphoma in turkey | Tumor diseases in poultry | 320-3261 |
| • Aspergillosis- Candidiasis- Avian ring worm- Avian Mycotoxicsis | Bacterial and mycotic disease problems in the hatchery | 320-3262 |

# Elective Courses

## 1- Anatomy and Embryology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Advanced anatomy of bird integument and associated cutaneous glands and horny structures, feathers, bird skeleton and muscles, bird digestive system, bird respiratory system, bird urogenital system, bird circulatory and nervous systems. | Advanced anatomy of bird | 301-301E |
| • Advanced anatomy of fish external anatomy, fins and scales, fish skeleton and muscles, fish digestive system, fish respiratory system, fish urogenital system, fish circulatory and nervous systems. | Advanced anatomy of fish | 301-302E |
| • Advanced molecular changes associated with gametogenesis, fertilization, cleavage, gastrulation, placentation, congenital anomalies. | Advanced molecular embryology | 301-303E |

## 2- Histology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Histology of thymus that produce T lymphocyte, bone marrow and bursa that produce B lymphocyte, histology of antigen presenting cells. Structure of antibody producing cells, and finally the structure of allergy associated cells.<br>• Advanced histological and histochemical structure of different organs of immune system. | Cellular immunity and immune system | 302-301E |
| • Advanced histological and histochemical structure different organs of nervous and endocrine systems | Stem cell technology | 302-302E |
| • Advanced comparative histology and histochemistry of ovary , uterine tube , uterus , vagina , vulva ; testes , epididymis, ductus deferens , accessory genital glands , penis ; and urinary system ( kidney , ureter , urinary bladder , urethra). | Advanced comparative histology and histochemistry urogenital systems | 302-303E |
| • Advanced histological and histochemical structure of blood forming organ, red blood cells, leukocytes, thrombocytes, erythropoiesis, leucopoiesis and thrombopoiesis. | Advanced comparative histology and histochemistry of blood and heamopoiesis. | 302-304E |
| • Advanced histological and histochemical structure of different organs of respiratory and cardiovascular systems | Advanced comparative histology and histochemistry of respiratory and | 302-305E |

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|---|---|---|
| | **cardiovascular systems** | |

## 3- Physiology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • **Respiration, excretion and digestion in fish- endocrine glands and hormones and their functions- reproduction , induced spawning and monosex production in fishes- Osmoregulation in fish- growth and moulting in crustacean- reproduction in shrimps-** | **Physiology of Aquatic Biology** | **303-301E** |
| • **Function of the reproductive system of females of different animals, and the fundamental differences between them and the way of reproduction and how they are affected by environmental factors and examine the factors that influence the activity of the ovary – physiology of lactation** | **Reproductive physiology and milk production** | **303-302E** |
| • **Respiration - Reproduction - excretion - digestion endocrine glands and hormones and their functions**<br>• **Adaptation** | **Physiology of poultry and rabbit** | **303-303E** |
| • **Functional structure of the nervous system - mechanical transmission of nerve signals and the functional division of the nervous system to the Central nervous system and peripheral nervous system - In addition to studying the functional area of the brain and the spinal cord -Functional structure of muscles** | **Physiology of CNS and muscles** | **303-304E** |
| • **Physiology Of microbial digestion- Digestion of cellulose - Digestion of protein - Fate of microbial Digestion - Rumination- Energetic of absorbed nutrients**<br>• **Specific dynamic action** | **Physiology of ruminants** | **303-305E** |

## 4- Biochemistry

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • **DNA structure, conformation, repair, synthesis and recombination - RNA structure, transcription and processing - Protein synthesis, translation and post-translational modification - Recombinant DNA and biotechnology - Regulation of gene expression- Molecular bases of inherited diseases** | **Advanced molecular biology** | **304-301E** |
| • **Molecular structure and metabolism of carbohydrates, lipids and proteins and amino acids in birds and fishes. Biochemistry of vitamins, coenzymes, and hormones in ruminants.** | **Ruminant animal Biochemistry** | **304-302E** |
| • **Types of pollutants and xenobiotics. Xenobiotics regulatory elements. Xenobiotics metabolizing enzymes.** | **Metabolism of xenobiotic** | **304-303E** |
| • **Molecular structure and metabolism of carbohydrates, lipids and proteins and amino acids in birds and fishes. Biochemistry of vitamins, coenzymes, and hormones in fish.** | **Advanced Biochemistry of Fish** | **304-304E** |
| • **Molecular structure and metabolism of carbohydrates, lipids and proteins and amino acids in birds and fishes. Biochemistry of vitamins, coenzymes, and hormones in birds.** | **Advanced Biochemistry of birds** | **304-305E** |
| • **Molecular structure and metabolism of carbohydrates, lipids and proteins and amino acids in birds and fishes. Biochemistry of vitamins, coenzymes, and hormones in pet** | **Pet animals Biochemistry** | **304-306E** |

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|---|---|---|
| animals. | | |

## 5- Animal, Poultry and Fish Breeding and Production

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Major Histocompatibility Complex and immune response- Methods of disease control and eradication- -Biometrical consideration and immune response -Selection for disease resistance and high immune response - -Genetic parameters in diseased and disease free population | Breeding for disease resistance and immune response in animals | 305-301E |
| • Biotechnology and animal breeding - Molecular biotechnologies- Reproductive biotechnologies | Biotechnology and animal breeding | 305-302E |
| • Animal traits of economic importance - Describing breeding populations -Components of phenotypic variance - Mating systems- Selection principles | Genetic improvement in farm animals | 305-303E |
| • Reproduction-Production cycle - Reproductive performance of cattle and buffaloes - Breeds of cattle and buffaloes - Factors affecting milk yield and composition - Judging dairy cattle - Correction of milk records for non-genetic factors | Advanced cattle and Buffaloes production | 305-304E |
| • Poultry Housing – Breeder and commercial layer productivity and their requirements - Broiler and other poultry meat production | Advanced poultry production | 305-305E |

## 6- Veterinary Economics and Farm Management

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Importance of animal breeds in improving the economic and productive efficiency of animal production farms - Economic basis for selecting animal breeds - Most important economic breeds under Egyptian condition | Economic basis for selection of the animal breeds | 305-307E |
| • Feasibility studies and its economic importance for fish production farms-Divisions of feasibility studies. for fish production farms | Basis of feasibility studies of fish production Farms | 305-308E |
| • Feasibility studies and its economic importance for poultry production farms-Divisions of feasibility studies for Poultry production farms | Feasibility studies of poultry farms production | 305-309E |
| • Application of advanced economic information on Veterinary institutions -Management of Veterinary institutions -System of management of Veterinary institutions Application of management principles on Veterinary institutions - Measures of management problems of Veterinary institutions | Veterinary institutions management | 305-310E |
| • Economics of aquaculture -Management and marketing of fish farming-Economic evaluation of fish farm production | Aquaculture economics | 305-311E |

## 7- Genetics and Genetic Engineering

### Elective Courses

| Contents | Courses | Code |
|---|---|---|

| | | |
|---|---|---|
| • Why employ transgenic animals - Making transgenic mammals- Random DNA integration - X-chromosome inactivation- Transgenic live stock | Trans-genes and transgenic animals | 305-312E |
| • Restriction Endonucleases - Recombinant vectors - Steps of recombinant DNA technology- Applications of Genetic engineering | Advanced Genetic Engineering | 305-313E |
| • Viral Nucleic acid, Bacteriophages- Oncogenic viruses- Viruses used in Genetic Engineering | Viral genetics | 305-314E |
| • Bacterial genome, Transduction- Transformation, Conjugation | Bacterial genetic | 305-315E |

## 8- Pharmacology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Mechanisms of drug action, types of drug-drug interaction, the effects of drug drug interaction (desirable and undesirable effects) | Drug/drug interaction | 306-301E |
| • Pharmacokinetics, pharmacodynamics and interactions- Drugs affecting autonomic and central nervous systems - Autacoids and anti-inflammatory drugs - Drugs affecting digestive, urinary and reproductive, respiratory and cardiovascular systems - The general principles of clinical pharmacology and the baselines of drug selection in different field cases | Clinical pharmacology | 306-302E |
| • Definition and causes of toxicity - The pathogenesis of toxin mechanism and fate of poisons in the body - General symptoms of poisoning - Special drug toxicology | Drug toxicity | 306-303E |
| • Effects of drugs on water and electrolyte metabolism and acid base balance, inorganic metabolism, carbohydrate metabolism - Growth promoting agents | Pharmacology of metabolism | 306-304E |
| • Effects of drugs on infectious respiratory diseases, neoplastic diseases, avian Adeno virus diseases, bacterial diseases, parasitic diseases, deficiency diseases. | Poultry pharmacology | 306-305E |

## 9- Pathology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Pathology of kidney, ureter and urinary bladder - pathology of female genital system-pathology of male genital system | Pathology of the urogenital system | 307-301E |
| • Pathology of oral cavity- pathology of esophagus, stomach, intestine, pancreas and liver | Hepatobiliary and alimentary system Pathology | 307-302E |
| • Pathology of brain - Pathology of spinal cord and nerves | Neuropathology | 307-303E |
| • Pathology of spleen, lymph nodes and lymph vessels - pathology of blood | Lymphoreticular and | 307-304E |

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|---|---|---|
| | haematopioetic Pathology | |
| • Pathology of muscles- pathology of bone - pathology of skin | Skin and Musculoskeletal system Pathology | 307-305E |
| • Pathology of vitamins disorders- pathology of mineral disorders- pathology of metabolic disorders | Pathology of nutritional deficiencies and metabolic disorders | 307-306E |
| • Viral diseases - bacterial diseases- parasitic diseases- nutritional diseases- mycotic diseases | Poultry Pathology | 307-307E |
| • Viral diseases - bacterial diseases- parasitic diseases- nutritional diseases- mycotic diseases | باثولوجيا الاسماك<br>Fish Pathology | 307-308E |

## 10- Parasitology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Clinical and laboratory diagnosis of different parasitic infections in animals, birds and fishes. | Clinical parasitology | 308-301E |
| • Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of meat by-products | Parasites of meat by-products | 308-302E |
| • Morphology, epidemiology, pathogenesis, clinical signs, diagnosis and control measures of cestodes, trematodes, nematodes and protozoa parasites infecting dogs and cats. | Parasites of pet animals | 308-303E |
| • Types of immunity in parasitic infections. Cellular and humoral immunity to parasites, hypersensitivity, regulation of the immune response - Immunodiagnostic tests and their techniques; application of biotechnological tools in the diagnosis and control of parasitic diseases | Parasitic immunity and molecular diagnosis of parasitic infection | 308-304E |
| • Feeding and nutritional physiology of cestodes, trematodes, nematodes and protozoa; Alimentary, surface and transtegumentary absorption of nutrients and their enzymes involved in digestion; Carbohydrate metabolism and energy | Physiology and biochemistry of parasites | 308-305E |
| • History and classification of phylum protozoa; Evaluation of symbiotic protozoa; Haemoflagellates and other Zoomastigophora; Histomonas, Parhistomonas & related forms; Trichomonads and other flagellates; Amoeba and Giardia; Apicomplexa, Coccidia proper and Hepatozoans; Cryptosporidium, Plasmodium, Haemoproteus and Leucocytozoans; Sarcocystis, Toxoplasma and related protozoa; Piroplasms; Ciliata and Gregarina. | Protozoology | 308-306E |
| • Arthropods as a cause and carrier of diseases- Development and Classification of insects and arachnids. Morphology; life cycle, medical importance and control of insects and arachnids. | Veterinary Medical Entomology | 308-307E |

## 11- Nutrition and Clinical Nutrition

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Relationship between diet and carcass quality characteristics- Feeding system and meat quality | Nutrition and Meat quality | 309-301E |
| • Nutritional factors affecting milk composition<br>• Nutritional factors affecting milk quality | Nutrition and Milk quality | 309-302E |
| • Enteral and parental feeding - Anorexia Nutritional diseases - Dietary management of clinical disease - Nutrition and old age | Therapeutic nutrition | 309-303E |
| • Gene-nutrient interaction - Effect of genetically modified ingredients on animal and human health - Effect of genetically modified microorganisms and their products as feed additives on animal performances | Biotechnology Nutrition and | 309-304E |
| • Role of nutrition in ameliorating hazard effect of weather, water or feed pollution stress on animals | Nutrition and Environment | 309-305E |

## 12- Bacteriology, Mycology and Immunology

| Elective Courses | | |
|---|---|---|
| **Contents** | **Courses** | **Code** |
| • Advanced serology, collection and preparation of serological samples. Advanced Agglutination tests, precipitation tests, complement fixation test, immunofluorescence tests, different ELISA tests | **Advanced Immunological diagnostic Methods** | **310-301E** |
| • Advanced methods of antimicrobial resistance in bacteria, bacterial mutation, efflux pump, Beta-lactamases, plasmid-mediated resistance, porin selective permeability, mechanisms of actions of antibiotics on bacterial cells | **Advanced Antimicrobial Resistance** | **310-302E** |
| • Advanced isolation and identification methods of contaminating bacteria and fungi including Salmonella, Staphylococcus aureus, Enterotoxigenic E. coli, Enterohaemorrhagic E. coli O157:H7, Listeria, etc. and Mycotoxicosis. | **Advanced Food Contamination Bacteria and Fungi** | **310-303E** |
| • Advanced isolation and identification methods of bacteria and fungi pathogenic for poultry including Salmonella, avian pathogenic E. coli, Mycoplamsa, Avibacterium, Pasteurella, Staphylococcus aureus, etc. and Aspergillus spp. and Mycotoxins | **Advanced Poultry Bacteriology and Mycology** | **310-304E** |
| • Advanced isolation and identification methods of bacteria and fungi pathogenic for fishes including Aeromonas, Edwardsiella, Streptococcus iniae, Renibacterium salmoninarum, Flexibacter columnaris, Saprolegnia species, etc. | **Advanced Fish Bacteriology and Mycology.** | **310-305E** |
| • Advanced isolation and identification methods of bacteria and fungi causing mastitis including Staphylococci, Strepococci, Corynebacteria, coliforms, Pasteurella, Pseudomonas, Mycoplasma, Candida, Cryptococcus, Aspergillus etc. | **Advanced Mastitis Causing Bacteria and Fungi** | **310-306E** |
| • Advanced isolation and identification methods of bacteria and fungi important for the public health including Salmonella, Brucella, Mycobacteria, Coliform, Enterohaemorrhagic E. coli O157:H7,Staphylococci, Strepococci, Candida, Aspergillus, Mycotoxins etc. | **Advanced Public Health and Environmental Bacteriology and Mycology** | **310-307E** |
| • Advanced isolation and identification methods of important zoonotic bacteria and fungi including, Brucella, Mycobacteria, Salmonella, Bacillus anthracis, Enterohaemorrhagic E. coli O157:H7, Listeria, Candida, Aspergillus, Mycotoxins etc. | **Advanced Zoonotic Bacteriology and Mycology** | **310-308E** |
| • Advanced isolation and identification methods of important bacteria and fungi infecting the reproductive system including, Brucella, Campylobacter, Taylorella equigenitalis, Listeria, Leptospira, Candida, Aspergillus, etc. | **Advanced Reproductive Bacteriology and Mycology.** | **310-309E** |
| • Advanced isolation and identification methods of important bacteria and fungi transmitted through A. I. including, Brucella, Campylobacter, Taylorella equigenitalis, Listeria, Leptospira, etc | **Advanced Artificial Insemination Bacteriology and Mycology** | **310-310E** |
| **13- Virology** | | |
| Elective Courses | | |
| **Contents** | **Courses** | **Code** |
| • Study of Viruses infect Poultry and Rabbits as Newcastle disease virus, infectious bursal disease virus, Rabbit hemorrhagic septicemia virus | **Viruses of poultry and rabbit Advanced** | **311-301E** |
| • Study of viruses infect bovine and camels as cattle plague, foot and mouth disease virus | **Viruses of Bovine and camel Advanced** | **311-302E** |
| • Study of viruses infect equine as equine herpes virus 1 and 4, equine, Coital exanthema virus | **Advanced Viruses of Equine** | **311-303E** |
| • Study of viruses infect wild animals and birds as Rabies and Newcastle disease virus and equine herpes virus type 9 | **Advanced Viruses of Wild Birds and Animals** | **311-304E** |
| • Study of Viruses infect fish | **Advanced Fish viruses** | **311-305E** |
| • Study of Viruses infect pet animals as Rabies, canine distemper virus | **Advanced Viruses of Pet animals** | **311-306E** |
| • Study viruses that causes tumors as Marek's disease virus, avian leukosis viruses | **Oncogenic Viruses** | **311-307E** |
| **14- Forensic Medicine and Toxicology** | | |

| Elective Courses | | |
|---|---|---|
| **Contents** | **Courses** | **Code** |
| • Basic of general toxicology - Toxicokinetics and toxicodynamics of carcinogenic agents - Classification of carcinogenic agents - Epigenetic mechanisms involved in carcinogenesis - Molecular targets of carcinogenic agents - Evaluation of carcinogenesis | **Carcinogenic agents** | **312-301E** |
| • Principles of toxicology - Male reproductive toxicology - Female reproductive toxicology - Developmental toxicology- Teratology - Developmental and Reproductive Toxicity Risk Assessment for Environmental Agents- Developmental and reproductive toxicity testing- Analysis of toxicity testing | **Developmental and reproductive toxicology** | **312-302E** |
| • Basis of DNA profiling and DNA database - Samples analyzed, methodology, analytical issues- Polymerase chain reaction (PCR), mitochondrial DNA- DNA extraction methodologies and techniques- DNA quantitation methodologies and techniques- STR DNA typing analysis | **DNA fingerprinting** | **312-303E** |
| • Principles of toxicology - Pesticides toxicity<br>• Heavy metals toxicity- Analytical methods for pesticides and heavy metals - Biomarkers of exposure and susceptibility factors- Approaches to primary and secondary prevention | **Pesticides and heavy metals toxicity** | **312-304E** |
| • General Principles of Toxicology- Organ-Specific Toxicology - Assessment of Toxicity- Perspectives in Aquatic Toxicology- Environmental Toxicology of Air Pollutants- Analysis of industrial and environmental toxicants | **Industrial and environmental toxicants** | **312-305E** |
| • Basic of general toxicology -Toxicants from plants<br>• Toxicants from animals - Bacterial intoxications<br>• Fungal intoxications- Chemical intoxications | **Analysis of toxicants in feed** | **312-306E** |
| • Adulteration types: poisonous substances, foreign matter, cheap substitutes, spoiled parts. Adulteration through Food Additives – Intentional and incidental.<br>• Methods of Detection: in milk, and milk products, meat and processed meat. Molecular techniques for detecting food adulteration- Food safety and standards authority - Adulteration health hazards and risks | **Food adulteration** | **312-307E** |
| • Toxicokinetics and toxicodynamics - Dose-response relationships- Risk assessment and the precautionary principle- Biological effect of common toxicants<br>• Drugs abuse - Animal toxicity | **Biosynthesis of toxins** | **312-308E** |
| • General Principles of Toxicology - Perspectives in Aquatic Toxicology- Clinical spectrum of aquatic poisoning- Clinical diagnostic techniques<br>• General approach to treatment - Water pollution monitoring project -Water management | **Toxicity in aquaculture** | **312-309E** |

## 15- Hygiene Control of Meat and Meat products

| Elective Courses | | |
|---|---|---|
| **Contents** | **Courses** | **Code** |
| • Types - Traditional techniques for detection - Recent techniques for detection | **Advanced methods for detection of harmful contaminants and residues in meat and meat products** | **313-301E** |
| • Types and uses - Economic importance<br>• Principle technologies - Future in meat byproducts industry | **Economic importance of meat by-products.** | **313-302E** |
| • Technology of different meet products<br>• Defects in different meet products | **Technology of meat products** | **313-303E** |
| • Sources of contamination of meat and fish and their products - Factors affecting microbial growth-Indicator organisms<br>• Microbiology of meat- Microbiology of different meat products- Diseases transmitted through meat and its | **Microbial contamination of meat.** | **313-304E** |

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| products- Meat-borne pathogens and spoilage organisms | | |

## 16- Hygiene Control of Milk and Milk products

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Removal of contained organisms - Heat processing<br>• Irradiation - Low temperature storage - Chemical preservation- Preservation with natural additives - control of water activity | Food preservation | 313-306E |
| • Food- borne biological toxicants - Chemical food toxicants<br>• | Food toxicants | 313-307E |
| • Sampling of food -Nutrient analysis -Principles of food analysis techniques - Food inspection- National and international standards - Milk analysis by ordinary, rapid and advanced methods -Dairy products analysis by ordinary, rapid and advanced methods -Milk adulteration Testing dairy products for adulteration -Detection of potential hazardous substances in food by ordinary, rapid and advanced methods - Testing physical and chemical constants of fats and oils - Testing of table eggs | Advanced food analysis | 313-308E |
| • Steps involved in new product development - Food product development strategies- Feasibility studies on product development- Developed food product inspection<br>• Product life cycle and cost analysis - Consumer assessment tests- Nanotechnology & Biotechnology and food development - Chemistry of food- Food structure, shelf life modelling and sensory analysis | Food products development concept | 313-309E |

## 17- Clinical Pathology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Collection of specimens in viral diseases- antigen-antibody reactions- serological examinations- hematological changes in viral infections | Clinical pathology of viral disease | 314-301E |
| • Collection and preservation of samples- bone marrow and blood picture- effect of different toxins on liver and kidney - tests for detection of toxic substances - envenomation | Laboratory clinical diagnosis of toxic cases | 314-302E |
| • Diagnosis of effective and ineffective erythropoiesis - clinical diagnosis of hematological disorder of erythrogram, leukogram and blood platelets- hemostasis | Laboratory clinical diagnosis of hematological disorder | 314-303E |
| • Liver function tests - pancreatic function tests- kidney function tests<br>• | Organs functions tests | 314-304E |
| • Laboratory construction - laboratory equipment - major types of laboratory assays - quality of laboratory results- evaluation and validation of laboratory methods | Clinical Laboratory management | 314-305E |
| • Nutritional deficiency effect on blood picture - nutritional deficiency effect on bone marrow- nutritional imbalances | Clinical pathology of | 314-306E |

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| effect on blood chemistry profiles- nutritional deficiency effect on immune status | nutritional diseases | |

## 18- Fish Diseases

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • The cause of disease, type of disease occurrence, sample size, screening and diagnostic tests | Epizootiology of fish diseases | 315-301E |
| • The use of molecular biological methods in diagnosis of bacterial, parasitic, mycotic and viral fish diseases | Biotechnology in fish diseases diagnosis | 315-302E |
| • Modern methods adopted for prevention and control of bacterial, parasitic, fungal and viral diseases in cultured and wild fish | Modern methods in fish diseases control | 315-303E |
| • Water quality parameters - Factor affecting water quality- Primary productivity of water --Aquatic weeds and its control in fish pond | Investigations of aquaculture water quality | 315-304E |

## 19- Infectious Diseases

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Diagnosis, treatment and control of Infectious bacterial diseases of cattle and buffaloes- | Bacterial Diseases of cattle and buffaloes | 316-301E |
| • Diagnosis, treatment and control of Infectious bacterial diseases of sheep and goat | Bacterial Diseases of sheep and goats | 316-302E |
| • Diagnosis, treatment and control of Infectious bacterial diseases of equines | Bacterial Diseases of equines | 316-303E |
| • Diagnosis, treatment and control of Infectious viral diseases of cattle and buffaloes- | Viral Diseases of cattle and buffaloes | 316-304E |
| • Diagnosis, treatment and control of Infectious viral diseases of sheep and goat | Viral Diseases of sheep and goats | 316-305E |
| • Diagnosis, treatment and control of Infectious viral diseases of equines | Viral Diseases of equines | 316-306E |

## 20- Internal Medicine

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Diseases of upper digestive system - Diseases of stomach Diseases of liver and biliary system - Diseases of intestine | Diseases of Digestive system | 316-307E |
| • General manifestation of respiratory diseases - Diseases of upper respiratory system - Diseases of lung and bronchi- Diseases of pleura | Diseases of Respiratory system | 316-308E |
| • Introduction on Diseases of cardiovascular system - Clinical | Diseases of Cardiovascular | 316-309E |

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|---|---|---|
| examination of heart - General manifestation of cardiovascular system diseases - Diagnosis and treatment of cardiovascular system diseases | system | |
| • General manifestation of urinary tract diseases - Kidney and ureters diseases - Diseases of bladder | Diseases of Urinary system | 316-310E |
| • Studying the general signs of animal diseases as Variation in body temperature- Disturbance of body fluids and electrolytes - Disturbance in acid base balance | General Medicine | 316-311E |

## 21- Veterinary Surgery

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Diagnosis and classification of lameness - Clinical anatomy of the equine and bovine foot- Hoof and claw affections - Fore limb affections- Hind limb affections. | Hoof and Claw Affections | 317-301E |
| • Diagnosis and classification of lameness - Clinical anatomy of the equine foot- Hoof affections - Fore limb affections- Hind limb affections. | Surgery of the Limbs in Equine | 317-302E |
| • Experimental animal model- Anaesthesia of experimental animals -Surgical operations of the head and neck- Surgical operations of the chest- Surgical operations of the abdomen- Surgical operations of the musculoskeletal system | Experimental Surgery | 317-303E |
| • Pre-anaesthetic medications - Types of anaesthesia - Surgical operations of birds and Reptiles | Anesthesia and Surgery of birds and Reptiles | 317-304E |

## 22- Theriogenology

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Non-traditional methods for semen evaluation- - Molecular markers of semen quality- Seminal plasma markers of semen quality | Fertility markers in semen | 318-301E |
| • Processing of sexed semen- Evaluation of sexed semen- Breeding methods by sexed semen | Technology of sexed semen | 318-302E |
| • Estrogen receptors modulators- Effect of heavy metal on reproduction | Environmental pollution and reproduction | 318-303E |
| • Breeding management in camels - Protocol of embryo transfer in camels- IVM, IVF and IVP of embryos in camelidae. | Embryo transfer and IVP of embryos in Camelidae | 318-304E |
| • Basics of reproductive nanotechnology- Therapeutic nanotechnology therapy for reproductive problems | Applied nanotechnology in reproduction | 318-305E |
| • Reproduction in poultry - Reproduction in fish | Reproduction in fish and poultry | 318-306E |

## 23- Animal and Poultry Behavior and Management

| Elective Courses | | |
|---|---|---|
| **Contents** | **Courses** | **Code** |
| • Identification of beef animal<br>• Definition of beef animal common terms<br>• Special Behavior of beef animal<br>• Special Management of beef animal<br>• Vices in beef animal | **Behavior and management of dairy and fattening animals** | **319-301E** |
| • Identification of Layers<br>• Definition of Layers common terms<br>• Special Behavior of Layers and broilers<br>• Special Management of Layers broilers<br>• Vices in Layers broilers | **Behavior and management of broiler and layer fowl** | **319-302E** |
| • General and Patterns of behavior of equine<br>• Breed s of equine<br>• Definition of equine common terms<br>• Description and identification of equine<br>• Management of Equine<br>• Vices of equine | **Behavior and management of racing and draught equine** | **319-303E** |
| • Feeding behavior of Aquatic Livestock<br>• Reproductive behavior of Aquatic Livestock<br>• Communication of Aquatic Livestock<br>• Principles of Pond construction<br>• Factors affecting Aquatic Livestock performance | **Behavior and management of sea livestock** | **319-304E** |
| • Patterns of behavior of Newly Born Animals<br>• Feeding behavior of Newly Born Animals k<br>• Social behavior of Newly Born Animals<br>• Identification of Newly Born Animals<br>• Factors affecting Newly Born Animals performance<br>• Special management of newly born animals | **Behavior and management of newly born animals** | **319-305E** |
| • Hatchery construction,<br>• Management of hatching eggs,<br>• Egg store and quality,<br>• Hatching problems and candling,<br>• Factors affecting incubation period. | **Hatchery management** | **319-306E** |

## 24- Animal, poultry and environment hygiene

| Elective Courses | | |
|---|---|---|
| **Contents** | **Courses** | **Code** |
| • Rodent control<br>• Disinfestations<br>• Role of rodents in diseases spread | **Combating Rodent and Vectors of Diseases** | **319-307E** |
| • Biosecurity definitions and measures<br>• Assessment of biosecurity programs in different establishments | **Biosecurity of cattle and Farms poultry** | **319-308E** |
| • Introduction to surveillance, designing surveillance, sampling methods and sample size, questionnaire design, data collection, use of diagnostic tests, field work, data analysis, report writing | **Animal disease Surveillance** | **319-309E** |
| • Cattle, sheep ,and equine housing, Ventilation<br>• Air and water hygiene - Disinfections and disinfestations | **Cattle, sheep ,and equine Hygiene** | **319-310E** |
| • Rabbit housing, Ventilation - Air and water hygiene<br>• Disinfections and disinfestations | **Rabbit Hygiene** | **319-311E** |
| • Laboratory animals housing, Ventilation - Air and water hygiene - Disinfections and disinfestations | **Laboratory animals Hygiene** | **319-312E** |
| • Camel housing, Ventilation- Air and water hygiene<br>• Disinfections and disinfestations | **Camel Hygiene** | **319-313E** |
| • Abattoir hygiene - Hatchery hygiene- Livestock house hygiene - Disposal of wastes | **Veterinary establishments hygiene** | **319-315E** |

## 25- Zoonoses

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Virulence, survival & resistance of Bacterial & Rickettsial pathogens, Transmission of Bacterial & Rickettsial zoonoses, Public health hazards of Bacterial & Rickettsial zoonoses and Prevention strategies of Bacterial & Rickettsial zoonoses | Bacterial and Rickettsial Zoonoses | 319-316E |
| • Virulence, survival and resistance of Viral & Prion pathogens, Transmission of Viral & Prion zoonoses, Public health hazards of Viral & Prion zoonoses and Prevention strategies of Viral & Prion zoonoses. | Viral and Prion Zoonoses | 319-317E |
| • Virulence, survival and resistance of parasitic pathogens, Transmission of Parasitic zoonoses, Public health hazards of Parasitic zoonoses and Prevention strategies of Parasitic zoonoses. | Parasitic Zoonoses | 319-318E |
| • Virulence, survival and resistance of Mycotic pathogens, Transmission of Mycotic zoonoses, Public health hazards of Mycotic zoonoses and Prevention strategies of Mycotic zoonoses | Mycotic Zoonoses | 319-319E |
| • Principles of One health, Socio-ecology of zoonotic diseases, One health approach in zoonotic diseases surveillance and One health approach in zoonotic diseases prevention and control. | One health approach in Zoonoses | 319-320E |

## 26- Poultry Diseases

### Elective Courses

| Contents | Courses | Code |
|---|---|---|
| • Vaccines of Viral Diseases of birds– Vaccines of Bacterial Diseases | Evaluation of protective poultry vaccines | 320-301E |
| • Viral Diseases of birds– Bacterial Diseases- Parasitic Diseases- Mycotic Diseases | Laboratory diagnosis of poultry diseases | 320-302E |
| • Viral Diseases of birds– Bacterial Diseases- Parasitic Diseases- Mycotic Diseases | Ostriches Diseases | 320-303E |
| • Viral Diseases of birds– Bacterial Diseases- Parasitic Diseases- Mycotic Diseases | Diseases of water Fowl | 320-304E |
| • Viral Diseases of birds– Bacterial Diseases- Parasitic Diseases- Mycotic Diseases | Diseases Causing Egg Drop in Poultry | 320-305E |
| • Viral Diseases of birds– Bacterial Diseases- Parasitic Diseases- Mycotic Diseases | Immunosuppressive Diseases of Poultry | 320-306E |