

## **BACHELOR OF SCIENCE IN ANIMAL HEALTH AND PRODUCTION**

### **Course Description**

#### **UCU 100: Communication Skills**

Reading skills: intensive and critical reading, interpretation of non-verbal information, content tables, indices. Listening skills: in lectures, predicting structure of a lecture, following tutorial discussions. Library skills; Collecting and abstracting information: note-taking, classification and storage of information. Speaking skills: in tutorials, presenting a paper, Writing skills: and editing various types of writing, indicating references, Study techniques:, storing and retrieving information

#### **UCU 103: Introduction to Critical and Creative Thinking**

Topics as self-examination, individuality, collectivity, morality. Meaning of education: criticality and creativity, intellectual standards (accuracy, clarity, precision, relevance), intellectual dispositions, elements of reasoning, assumptions, evidence, inferences, deduction, induction, validity, soundness, fallaciousness and their consequences.

#### **UCU 104: Development Studies**

Introduction to Development Studies, Factors in Africa's Development and Underdevelopment, Gender and Development, Current Development Strategies and Indicators, Science, Technology and Development, Rural Development, Urbanization, Industrialization and development, Population, Resources and Development, Politics, Law, Social Justice and Development and Regional and International Cooperation for Development

#### **KCU 100: History and Development of Agriculture in East Africa**

Climate and soils of East Africa; history and development of agriculture in Kenya: agricultural production systems, agriculture and the Kenyan economy; factors limiting crop and animal production in Kenya; agriculture and enterprise development: nature of entrepreneurship development in agriculture, characteristics of entrepreneurs; agricultural organization and research.

#### **KST 112: Agricultural Botany**

Study of microscope (its parts, functions and precautions); plant cell; preparation of temporary slides to show cell structure, cell division, starch grains, plastids; plant tissues; anatomical studies of plant parts with temporary staining and mounting; preparation of solutions of different concentration for physiological studies, plasmolysis, osmosis, diffusion & permeability; study of microorganisms and their economic

importance; algae, fungi, bacteria and viruses (one typical example of each); preparation of microbiological slides; preservatives (FAA, IAA) their uses and precautions.

### **SZL 100: General Zoology**

Origins of the universe, earth and life forms. Principles and significance of classification of protistan and Animal Kingdoms. An evolutionary and taxonomic review of the main phyla of these two kingdoms. Brief overview of membranes, cells, resistance to diseases, homeostasis, thermoregulation, respiration, reproduction, nervous system, skeletal system, excretion and osmoregulation, circulatory system, micro and macro-evolution.

### **SZH 106: Fundamentals of Animal Ecology**

Fundamentals of animal ecology; adaptation, fitness and evolution, migration, dispersal, distribution. Population dynamics, abundance, competition, predation, parasitism, mutualism. Community ecology: the nature of community, influx of energy and matter, the influence of competition, predation and disturbance on community structure; Ecosystem levels: island and community structure, diversity and stability. Wildlife ecology

### **SZH 101: Comparative Anatomy**

Study of the macroscopic anatomy of vertebrates based on detailed dissection of the dog, sheep or goats. Structural anatomy of organs and tissues: Musculo-skeletal, nervous, circulatory, respiratory, reproductive. Comparison with other domestic species will be emphasized.

### **SZH 104: Embryology**

Development of vertebrates. Gametogenesis, fertilization, cleavage, gastrulation, differentiation and organogenesis. Extra-embryonic membranes, gradient field and vertebrate metamorphosis. Viviparity in mammals and its origin. Molecular aspects of cellular development.

### **SZH 100: Cell Biology and Systemic Histology**

Light and electron microscopy. The cell: theory, history and evolution; structure and ultrastructure. Organelles and biological membranes. Prokaryotic and eukaryotic cells. Levels of organization: typical cell, specialized cells and tissues. The cell cycle: mitosis, meiosis. Cell separation and fractionation. Cellular locomotion. Amoeboid, ciliary. Transport across membranes: osmosis, diffusion, active transport. Germ cells. Histology and histochemical techniques. Systemic histology: structure of cells and tissues: Skin, blood, nervous tissue, epithelia, skeletal and smooth muscle, cardiac muscle, reproductive and excretory. Interpretation of prepared sections.

**SZH 103:Animal Physiology**

Physiological mechanisms of vertebrates: Structure, functions and organization of physiological systems: Digestion, respiration, circulation, osmoregulation, excretion, reproduction and nervous system. Homeostasis and constancy: regulatory and coordinating systems. Senses: smell, hearing and vision.

**SZH 105:Introduction to Genetics**

Structure of chromosomes.DNA and inheritance. DNA replication. The nature of genes. Genes and enzymes. The genetic code and protein synthesis. Genetic control of development and metabolic pathways. Jacob-Mond hypothesis. Variations: mendelism, monohybrid and dihybrid inheritance, test and back cross. Chromosomal basis of inheritance, independent assortment. Linkage and gene mapping. Sex determination and sex linkage. Gene interactions. Variation and mutations.

**SBC 229:Basic Biochemistry**

Introduction to principles and techniques in biochemistry. Physical and chemical properties of biologically important compounds and their metabolism. Chemical elements and bond type of biomolecules. Functional groups of carbon compounds and their reactions Water and its special properties. . Acid, bases and buffers. Metabolic energy: generation and storage. Solutions, colloids, emulsions and suspensions.

**SZH 206: Basic Microbiology**

History of microbiology: Pastures' postulates, General characteristics and classification of bacteria, viruses, protozoa, rickettsia, fungi, algae. Isolation and identification of bacteria, fungi and viruses from natural systems; Bacterial phylogeny, structure and function of bacterial cells, ecology and physiological diversity of bacteria and bacteriophages, bacteria and viruses as agents of disease, human applications of bacteriology, microbial genetics and genomics.

**KAP301:Bacterial and Fungal Diseases**

Aetiology, occurrence, symptomatology, morbidity, diagnosis, treatment, prevention, control, and economic importance of; Anthrax, clostridial diseases – blackquater, entrotoxaemia (pulpy kidney, lamp dysentery), tetanus, contagious bovine pleuropneumonia, contagious caprine pleuropneumonia, foul in the foot (foot rot), foot abscess in sheep, swine erysipelas, actinomycosis, actinobacillosis, streptothricosis, and mycotic dermatitis. Fowl typhoid, pullorum, fowl cholera, salmonellosis and colibacillosis in poultry

**KAP 201:Quantitative Genetics and Animal Breeding**

Qualitative and quantitative traits; Traits of economic importance; Random mating; Repeatability; Heritability; Genetic correlation; Selection, Improvement of multiple traits; Selection indices; Genetic response to selection; Crossbreeding; Inbreeding; Computation of breeding values; mating systems; Application of breeding methods to improve traits of economic importance; Breeding programmes; Advances and application of biotechnology; policy, Marker assisted selection and introgression; Legal and institutional considerations.

### **KRM 306:Pastures and Fodder Production and Conservation**

Forages, botany and identification of pasture grasses, legume and fodder crops; ecology and distribution of natural grassland in Kenya; agronomy, production, conservation and utilization of pastures and fodder crops; crop improvement of pastures and fodders.

### **KAP 311:Viral and Rickettsial Diseases**

Geographical distribution, aetiology, symptomatology, morbidity, mortality, diagnosis, treatment, and control of diseases of economic importance caused by viruses, Rickettsia, including Foot and Mouth Disease, Malignant Catarrhal Fever, Rabies, Blue Tongue, Nairobi Sheep Disease, Pox infections; Lumpy Skin Disease, Rift valley fever, pestes des ruminates, Swine Fever, Avian Influenza, New castle disease, Gumboro Disease, Fowl Pox, Mareks disease, Anaplasmosis, Heartwater. Bovine petechial fever, Chlamydiosis, Ehrlichiosis

### **KAP 305:Parasitic Diseases**

Parasitic diseases of major economic and public health importance in domestic animals in Kenya. Major disease caused by protozoa – Trypanosomosis, East Coast Fever, Babesiosis, Trichomoniasis; helminthes – nematodes, Cestodes and Trematodes; arthropods – Ticks, tsetse flies, fleas, lice and other biting and nuisance flies. Emphasis is laid on their aetiology, species affected, transmission, pathogenesis, clinical manifestations, diagnosis, and control.

### **KAP 307:Beef and Camel Production**

Beef and camel industry and systems of production. Breeds and breed improvement, Nutrition, health and facilities in beef production. Beef cattle slaughter and meat hygiene. Growth and development in meat animals. Marketing and economics of beef and camel production.

### **KAP 306:Dairy Production**

Daily industry and systems of production. Breeds application of principles in breeding and selection, reproductive physiology, housing, nutrition, health, hygiene and facilities in dairy production. Milk synthesis, ejection and handling. Marketing of milk and milk products. Economics of dairy production.

### **KAP 308: Sheep and Goat Production**

Goat production systems and the role of goats in agriculture. Breeds, application of principles in breeding and selection, physiology, nutrition and disease control in management of goats for meat and milk production. Goat products processing and marketing.

### **KAP310: Pig Production**

Pig industry and production systems: Breeds. Application of the principles in breeding and selection, reproductive physiology, nutrition, housing and health in the management of a pig enterprise. Evaluation and processing of pig carcass. Marketing of pigs and pig products.

### **KAP 304: Routine Livestock Practices**

Animal handling; management practice for farm animals: dairy cows, poultry (layers, broilers), pigs, shoats, bees. Animals' environment; hygiene and handling livestock products. Handling and restraint of farm animals. Animal health tools and equipment. Animal behavior, Response to intrusion by usual and unusual persons/ animals/ objects. Physical examination, samples and sampling – blood, milk, faeces, urine and saliva. Post mortem, preservation of specimen, blood and gland smears. Syringes, needles and their care. Weighing and weight estimation, drenching, aging and spraying. Vaccination including poultry, and handling of vaccines and their storage

### **SZH 302: Pharmacology**

Principle of veterinary drug action, absorption, distribution, biotransformation and elimination of drugs. Pharmacological properties of drugs at cellular, organ and system level. Modes of action of pharmaceutical drugs: Bioavailability, mechanisms of action, models for studies of drug action.

### **ASC 300: Rural Sociology**

Principles of sociology; influence of social systems in food production and agricultural development; analysis of human relationships as influenced by life among the rural communities and societies; rural populations; rural social institutions and stratification; process of change in agricultural technology and community decision-making; social factors influencing agribusiness in rural areas.

### **ENS 349: Rangeland Resources**

Taxonomy and autecology of common range plants. Terminology in range management, the range environment, plant resources and products. Productivity and nutrition, multiple and proper use

concepts. Grazing management and range science principles in range management. Livestock production systems in the Kenyan rangelands,. Grazing in relation to plant ecology. Types of ranching organizations groups, co-operative, company partnership, individual and grazing blocks. Livestock and wildlife - their impact on rangelands.

### **KCU 300:Field Attachment**

The students are posted to the field under the supervision of field officers in order to expose them to livestock production practices, disease control, laboratory, extension, pharmaceutical and enterprise management. Teaching staff will visit the student to assess them in the course of the attachment period.

### **KST 408:Agricultural Extension and Rural Development**

Meaning of rural development and rural poverty, gender and poverty, development theories and strategies in rural development; Nature and scope of agricultural development; Role of Agriculture in socio economic development; Theories of agricultural development; Approaches and strategies to rural development, e.g millennium development goals, decentralization, community development, integrated rural development, gender approaches to development etc. rural project planning, identification, design, monitoring and evaluation.

### **SZH 408:Biometrics and Research**

Methods of acquiring knowledge: Non-scientific and scientific methods; steps in scientific research. Preparing a research proposal: Problem sources and formulation, problem statement, research objectives, formulation of the research hypothesis, identification of variables, literature review and background information. Research and sampling designs. Types of research; Exploratory, experimental, descriptive, correlational, explanatory, evaluation and participatory research. Data collection methods: experimental and survey research. Participatory Rural Appraisal (PRA) techniques and methods. Data processing, analysis and hypothesis testing. Computer applications in research: SPSS and other software. Report writing and presentation.

### **BBA 310:Entrepreneurship and Small Business Development**

Concepts and definitions, entrepreneurial motivation, leadership and networking, risk taking and small business management, decision making, instituting and managing change, enterprise management strategies, policies and goals.

### **KBT 208:Farm Management**

Typical farm enterprises in Kenya: subsistence farming, small scale market farming and large scale commercial farming. Decision making with risk and uncertainty. Economics of land tenure, conservation, mechanization, rotation at the farm level. Extension as an educational process. Adaptation and diffusion of innovation. Fact-finding surveys and extension programmes. The extension campaign and its execution. Change agents. Individual, group and mass approaches. Evolution of extension programmes. Extension organization.

#### **KAP 409: Animal Welfare, Ethics and Laws**

Policy and law and animal welfare in veterinary practice, leadership and communication skills: Livestock development policy. Legislations in Animal Health and Production; Veterinary Ethics. Definition and assessment of animal welfare issues. The veterinarian and animal welfare, protection legislation. Description of legal, professional and ethical values guiding the veterinary profession, understanding, evaluating and improving interpersonal relations with clients and colleagues

#### **KAP 404: Apiculture. Aquaculture and Emerging Livestock**

The fish industry. Culture fisheries; breeding and production Fish diseases, parasites and their control. feeding habits, reproduction, harvesting and handling. Fish processing, grading and marketing. The role of bees in agriculture in Kenya. Biology of the honeybee. Breeding, diseases and pests. The management of a bee colony with respect to flowering vegetation, foraging behavior and feeding. Swarm control. Types of hives. Harvesting, handling, processing, grading and marketing of honey and wax. The honey and wax industry.

#### **KAP 408: Zoonosis and One Health Concept**

Classification of zoonoses. Epidemiology, clinical signs in man and animals, control and precautions with regard to: Cysticercosis, Hydatidosis, Brucellosis, Salmonellosis and Tuberculosis, Anthrax, Ringworm, Ornithosis/Psittacosis, Rabies, Rift Valley Fever, Cow pox, Leptospirosis, Bovine spongiform encephalopathy (Mad Cow Disease), cryptosporidiosis/cyclospora Avian Influenza, Newcastle Disease, Bubonic Plague, Toxoplasmosis, Pastuerellosis, Q fever, Mange. Introduction to One Health Concept. Interaction of Human, Animal and Environmental Health.

#### **SZH 412: Ambulatory**

Applied principles of herd health management, including assessment of reproductive performance. Record keeping, diseases surveillance and control. Visit to farms and attend to clinical cases inside and outside university Farms. Herd health programmes and farm procedures

### **KAP411:Metabolic, Nutritional and Reproductive Diseases**

Neo-natal diseases of cattle, sheep, goats, pigs and camels. Normal parturition and neonatal care. Causes, clinical signs, diagnosis and treatment of: bloat, milk fever, pregnancy toxemia, grain overload and ketosis, grass tetany, water intoxication. Mineral deficiencies, including – iron, copper, zinc, phosphorous, selenium, vitamin and cobalt and their excesses. Vitamins A,D,E,K, and B complex.

### **SZH407:Public Health and Epidemiology**

Ecological concepts of animal diseases: Host parasite interactions, epidemics, pandemics, endemic. Epidemiology of parasitic diseases: vector-borne, communicable, non-communicable diseases, food and waterborne diseases of public importance, zoonotic infections, wildlife diseases and reservoirs. Hygienic practices in meat slaughter and handling, processing and cooking. Microbial contamination of meat, milk and other foods. Meat biochemistry. Water hygiene: Pathogenic bacteria in water, sources contamination, fecal contamination indicators. Waterborne diseases and epidemics. Techniques in veterinary epidemiological studies: questions formulation, design of study, data collection and management. Epidemiological interventions.

### **KAP401:Poultry Production**

Poultry industry and production systems, breeds and strains. Physiology of egg formation and embryo development. Egg incubation and hatching. Brooding, feeding, housing and disease control. Application of science and technology in the management of breeding stock, layers for consumption, eggs and meat birds. Egg grading and handling, poultry processing. Marketing of poultry and poultry products.

### **KCU 400:Research Project**

Students carry out research project either individually or in groups under supervision by a professor and/or lecturer. Students give individual oral presentation and written reports on completed or proposed research projects or subjects related to animal production.

### **KAP 410: Herd Health**

Introduction to Herd Health, objectives, Herd Health programming. Examination of the environment, sample taking and diagnosis of diseases in the field and laboratory. Basic surgical procedures and types of anesthesia. First Aid and Emergency Intervention. Basic reproductive management. Planned animal health and production in livestock. Principles of Disease Control.



**SZH 404: Clinical Medicine**

Common diseases affecting small and large animals, their diagnosis and treatment: Bovidae, shoats, horses, donkeys, camels; Companion animals; dogs and cats. Skin diseases, common bacterial diseases of large animals: Anthrax, Clostridium diseases, mastitis. Protozoal disease: Theileriasis, Babesiosis. Diseases affecting different organ systems. Drug dosage and treatment regimes, indication and contraindication.