

**Veterinary Education
Model Core Curriculum
2019**

(Partially revised in 2021)

Japanese Association of Establishments
for Veterinary Education

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Lecture subjects

Introductory and Basic Veterinary Education

Lecture 1-1. Principles of Veterinary Medicine

Subject Aims

The aim of this subject is to provide a clear overview of veterinary medicine and the role of veterinarians. Learn the historical considerations of veterinary affairs in the relationship between people and animals, the history of veterinary education in Japan, an overview of the mission of veterinarians and veterinary medicine in modern Japan, the role of veterinarians in the international community, the objectives of the One Health initiative, and the social demands on veterinarians in the international community.

Subject Details

(1) The relationship between people and animals and the mission of veterinarians

Goals

To understand the diverse relationships between people and animals, the concepts of the One Health initiative, and the social needs of veterinarians

Objectives

- 1) To be able to explain the role of veterinarians with an understanding of the diverse relationships between people and animals
- 2) To be able to explain the social demands on veterinarians based on the objectives of the One Health initiative

Subject Details

(2) The history of veterinary medicine

Goals

To learn the historical overview of veterinary services

Objectives

- 1) To be able to explain the relationship between people and animals and the domestication of animals in ancient times
- 2) To be able to explain the origin of veterinary medicine and the development of modern veterinary medicine

Subject Details

(3) The role of companion animal veterinarians

Goals

To understand the role of veterinarians in providing care for companion animals

Objectives

- 1) To be able to explain the characteristics of companion animal diseases and the appropriate veterinary care

Subject Details

(4) The role of farm animal veterinarians

Goals

To understand the role of veterinarians in providing care for farm animals

Objectives

1) To be able to explain the characteristics of farm animal diseases and the appropriate veterinary care

Subject Details

(5) The role of civil servants and public health veterinarians

Goals

To understand the requirements of veterinarians acting as veterinary and livestock administration, animal health, veterinary public health, and environmental health professionals.

Objectives

- 1) To be able to explain the role of livestock and veterinary administrator
- 2) To be able to explain the basics of veterinary epidemiology
- 3) To be able to explain the principles of animal health and veterinary public health
- 4) To be able to explain the current status of zoonotic diseases
- 5) To be able to explain food hygiene and the HACCP (Hazard Analysis Critical Control Point) system

Subject Details

(6) The role of veterinarians in wildlife conservation

Goals

To understand the role that veterinarians play in biodiversity/wildlife conservation and management

Objectives

1) To be able to explain the basics of veterinary medicine applicable to wildlife conservation

Subject Details

(7) The diversity of veterinary occupations

Goals

To understand the diverse activities that veterinarians perform in a wide range of occupations, including education and research and development

Objectives

1) To be able to explain the basics of various educational and research activities performed by veterinarians

Subject Details

(8) The role that veterinarians play in international relations

Goals

To understand the contributions that veterinarians make to international activities and international relations

Objectives

- 1) To be able to explain the basics of international activities related to veterinary medicine

Subject Details

- (9) Quality assurance in veterinary services

Goals

To understand the importance of improving the quality of veterinary services and the related social demands

Objectives

- 1) To be able to explain how to improve the quality of veterinary services

Lecture 1-2. Veterinary Ethics and Animal Welfare

Subject Aims

The aim of this subject is to help students acquire a comprehensive understanding of the fundamental principles of bioethics, veterinary ethics, and animal welfare as core concepts of veterinary science and medicine. Students will gain the ability to apply veterinary ethics to practices that contribute to veterinary medicine, animal welfare, the development of the livestock and fisheries industry, education, research, environmental conservation, and social services.

Subject Details

(1) Introduction to animal bioethics

Goals

To understand the fundamental principles of animal bioethics and the wide range of views concerning animals across different circumstances, cultures, and points in history

Objectives

- 1) To be able to explain the ethics and bioethics relevant to veterinarians
- 2) To be able to understand diverse relationships between people and animals, including the various attitudes people have towards animals, and to explain different types of ethical issues related to animals

Subject Details

(2) The concept and assessment of animal welfare

Goals

To understand the definition and theoretical basis of animal welfare and to acquire basic knowledge about assessing animal welfare

Objectives

- 1) To be able to understand the fundamental principles related to animal welfare and explain the differences between animal rights and animal welfare
- 2) To be able to explain the physiological and behavioral parameters of animal welfare assessment and the definition of animal cruelty/abuse

Subject Details

(3) Animal welfare and its relation to society

Goals

To acquire basic knowledge about practices for improving animal welfare and how it relates to society

Objectives

- 1) To be able to describe the history of the national and international animal welfare/protection movements, animal protection laws, and other major guidelines related to animal welfare
- 2) To be able to explain the influences of education, animal protection activities, and economic activities on animal handling

Subject Details

(4) Veterinary medical ethics

Goals

To understand the philosophy behind professional ethics as well as the codes of ethics and professional conduct set by veterinary associations and other bodies; to understand issues regarding conflicts of interest and to apply theories to real-world ethical issues; and to understand the ethics of scientists regarding research

Objectives

- 1) To be able to explain professional ethics and the ethical obligations of veterinarians
- 2) To be able to explain the various roles of veterinarians
- 3) To be able to explain the importance of informed consent and various moral dilemmas related to veterinary medicine

Subject Details

(5) Companion animal welfare and ethics

Goals

To understand welfare issues related to companion animals and the fundamental principles of veterinary medical ethics

Objectives

- 1) To be able to explain ethical considerations related to companion animals and their owners in veterinary practice
- 2) To be able to describe welfare issues related to owning cats and dogs and the control of free-roaming cats and dogs

Subject Details

(6) Farm animal welfare and ethics

Goals

To understand the general issues related to farm animal welfare as well as the current circumstances in Japan and overseas and related measures

Objectives

- 1) To be able to explain the current situation and concerns in use of farm animals
- 2) To be able to describe welfare issues and measures related to breeding, transportation, and slaughter of farm animals

Subject Details

(7) Laboratory animal welfare and ethics

Goals

To understand the necessity of and alternatives to animal experiments as well as welfare considerations for laboratory animals

Objectives

- 1) To be able to describe necessity of and ethical considerations for animal experiments and public attitudes towards the use of animals in scientific experiments
- 2) To be able to explain welfare considerations for laboratory animals and related measures

Subject Details

(8) Zoo/working animal welfare and ethics

Goals

To understand the roles of animals kept and exhibited at zoos and aquaria as well as working animals and related welfare considerations

Objectives

- 1) To be able to explain the significance of animal exhibitions, assistant dogs, and animal assisted interventions
- 2) To be able to explain welfare issues related to zoo and working animals and related measures

Subject Details

(9) Wild animal welfare and ethics

Goals

To acquire basic knowledge about the use and conservation of wild animals and related welfare considerations

Objectives

- 1) To be able to explain welfare and management issues related to wild animals

Lecture 1-3. Veterinary Legislation

Subject Aims

The aim of this subject is to understand the laws and regulations that one should know in undertaking duties as a veterinarian.

Subject Details

- (1) Basic knowledge of law

Goals

To understand the basics of law, including what laws are; the classification, interpretation, and primacy of laws; and to understand the legal system of administration and relevant provisions of criminal code and civil law.

Objectives

- 1) To be able to explain the difference between laws and ethics (morals) and the function of law
- 2) To be able to classify laws in various ways
- 3) To be able to explain how to read provisions of law and interpret laws
- 4) To be able to explain the primacy of laws and when they become applicable
- 5) To be able to explain legal system of administration, and legal orders, administrative orders and regulations
- 6) To be able to understand relevant provisions of the criminal code and civil law related to the activities of veterinarians

Subject Details

- (2) Laws related to veterinary affairs

Goals

To understand the mission, scope of activities, duties, and responsibilities of veterinarians prescribed by Veterinary Licensing Act and to understand how veterinary service is provided in accordance with the Veterinary Practice Act.

Objectives

- 1) To be able to explain the mission, activities, duties, and responsibilities of veterinarians under the Veterinary Licensing Act.
- 2) To be able to explain the legal process involved in becoming a veterinarian, including the veterinary medical licensing examination
- 3) To be able to explain the civil, criminal, and administrative responsibilities in the event of a veterinary accident
- 4) To be able to explain the objective of the Veterinary Practice Act.
- 5) To be able to explain the procedures for establishing veterinary hospitals and clinics, structural equipment standards, management standards, and medical radiation regulations
- 6) To be able to explain the basic national guidelines and prefecture plans for provision of veterinary practice.
- 7) To be able to explain the advertising regulations based on the Veterinary Practice Act.

Subject Details

(3) Laws related to animal health

Goals

To understand the system for preventing animal infectious diseases based on the Domestic Animal Infectious Diseases Control Law, the Law on the Special Measures Against Bovine Spongiform Encephalopathy (BSE), the Cattle Traceability Law, and the Livestock Hygiene Service Center Law, and to learn the duties and responsibilities of veterinarians and roles of animal quarantine officers and prefectural animal disease control officers under these laws

Objectives

- 1) To be able to explain the purpose of the Domestic Animal Infectious Diseases Control Law; the system for preventing and controlling animal infectious diseases; the quarantine and inspection system for importing and exporting animals and animal products; and the roles of veterinarians, animal quarantine officers and prefectural animal disease control officers under this law
- 2) To be able to explain the purpose of the Law on the Special Measures Against BSE as well as the system for controlling BSE under this law
- 3) To be able to explain the purpose of the Cattle Traceability Law and the system for transmitting cattle identification information under this law
- 4) To be able to explain the standards for establishing a prefectural livestock hygiene service center and its scope of activities under the Livestock Hygiene Service Center Law

Subject Details

(4) Laws for assuring the safety of pharmaceuticals and other products used for animal production

Goals

To understand the systems for ensuring the safety of veterinary pharmaceutical products, livestock feed, and pet food based on the Pharmaceutical Affairs Law, Feed Safety Law, and Pet Food Safety Law

Objectives

- 1) To be able to explain the purpose of the Pharmaceuticals and Medical Devices Law and the system for ensuring the quality, efficacy, and safety of veterinary pharmaceutical products under this law
- 2) To be able to explain the purpose of the Feed Safety Law and the system for ensuring the quality and safety of livestock feed under this law
- 3) To be able to explain the purpose of the Pet Food Safety Law and the system for ensuring the safety of pet food under this law
- 4) To be able to explain issues related to drugs that veterinarians should be aware of based on laws and regulations other than the Pharmaceutical Affairs Law

Subject Details

(5) Laws to ensure food safety

Goals

To understand the systems for ensuring food safety based on the Food Safety Basic Law, the Food Sanitation Law, the Abattoir Law, and the Poultry Inspection Law, and to learn the duties and responsibilities of veterinarians under these laws

Objectives

- 1) To be able to explain the purpose and philosophy of the Basic Food Safety Law, the responsibilities and roles of stakeholders based on this law, and the risk assessment roles of the Food Safety Commission and risk management role of other Ministries.
- 2) To be able to explain the purpose of the Food Sanitation Law and the system for ensuring food safety based on this law
- 3) To be able to explain the purpose of the Abattoir Law and the system for ensuring meat safety based on this law
- 4) To be able to explain the purpose of the Poultry Inspection Law and the system for ensuring the safety of poultry meat based on this law
- 5) To be able to explain the basics of other food-related laws and regulations

Subject Details

- (6) Laws governing the prevention and control of infectious diseases

Goals

To understand the system for preventing and controlling infectious diseases based on the Infectious Diseases Control Law and the Rabies Prevention Law, and to learn the duties and responsibilities of veterinarians under these laws

Objectives

- 1) To be able to explain the purpose of the Infectious Diseases Control Law, the system for preventing infectious diseases based on this law, and the role of veterinarians in preventing zoonotic diseases
- 2) To be able to explain the purpose of the Rabies Prevention Law, the system for preventing rabies, and the roles of veterinarians and rabies prevention personnel under this law

Subject Details

- (7) Laws governing the humane treatment, management, and protection of animals

Goals

To understand the systems for the humane treatment, management, and protection of animals based on the Law on Welfare and Management of Animals (Animal Welfare and Management Law) and the Protection and Control of Wild Birds and Mammals and Hunting Management Law (Wildlife Protection Law)

Objectives

- 1) To be able to explain the purpose and basic principles of the Animal Welfare and Management Law as well as the system for protecting and managing animals under this law
- 2) To be able to explain the purpose of the Wildlife Protection Law and the system for protecting animals under this law

Subject Details

- (8) Other laws related to the practice of veterinary medicine

Goals

To understand other laws related to other tasks that may be undertaken by veterinarians

Objectives

- 1) To be able to explain the basics of laws related to livestock production and fisheries
- 2) To be able to explain the basics of laws related to public health and environmental health

Lecture 1-4. Veterinary Anatomy

Subject Aims

The aim of this subject is to understand the gross anatomical structure of the major organs in the skeletal, muscular, digestive, respiratory, urogenital, endocrine, cardiovascular, lymphatic and nervous systems, and common integuments and sense organs of cattle, horses, pigs, dogs, cats, rabbits, and fowls, as well as the anatomical differences between these animals, the relationship between organ structures and functions, and the clinical importance of organs.

Subject Details

(1) Anatomical terms of positions, planes and directions of body, and organ classification

Goals

To learn the terms for describing the position and orientation of body and for classifying organ systems

Objectives

- 1) To be able to explain the parts of the body, the structure and position of the coelom, and relationship between the coelom and the organs
- 2) To be able to explain the terms for the parts and orientation of body as well as the position of body and organs
- 3) To be able to explain the terms for basic organ systems that compose body

Subject Details

(2) General structure and classification of bones / Bones of the head and trunk

Goals

To understand the general structure and classification of bones, as well as terms for the bones in the head and trunk

Objectives

- 1) To be able to explain the basic structure and classification of bones
- 2) To be able to explain the structure and position of the bones in the head and trunk as well as interspecies differences

Subject Details

(3) Bones of the forelimb and hindlimb

Goals

To understand the structure of bones of the forelimb and hindlimb

Objectives

- 1) To be able to explain the structure and position of the bones in the forelimb and hindlimb as well as interspecies differences

Subject Details

(4) Articulation

Goals

To understand the basic structure, types, and terms related to articulation

Objectives

- 1) To be able to explain how bones connect and the structure and types of articulation

Subject Details

- (5) The general structure of muscles / Muscles of the head and trunk

Goals

To understand the general structure and terms for muscles, tendons, synovial sheaths, and synovial bursas, as well as the position and function of the major muscles of the head and trunk

Objectives

- 1) To be able to explain the general structure and general classification of skeletal muscle
- 2) To be able to explain the position and function of the major muscles of the head and trunk as well as interspecies differences

Subject Details

- (6) The muscles of the forelimb and hindlimb

Goals

To understand the terms, position, and function of muscles in the forelimb and hindlimb

Objectives

- 1) To be able to explain the position and function of muscles in the forelimb and hindlimb as well as interspecies differences

Subject Details

- (7) The digestive system

Goals

To understand the structure of the oral cavity, pharynx, digestive tracts, liver, and pancreas

Objectives

- 1) To be able to explain the structure and position of the oral cavity, pharynx, and related organs and tissues (salivary glands, teeth, tongue) as well as interspecies differences
- 2) To be able to explain the structure and position of the esophagus, stomach, and intestines as well as interspecies differences
- 3) To be able to explain the terms for each part of the liver as well as interspecies differences
- 4) To be able to explain the position and terms for each part of the pancreas

Subject Details

- (8) The respiratory system

Goals

To understand the structure of the respiratory organs

Objectives

- 1) To be able to explain the structure and position of the nasal cavity, paranasal sinuses, larynx, and trachea
- 2) To be able to explain the structure and position of the bronchi and lungs as well as interspecies differences

Subject Details

(9) The urogenital system

Goals

To understand the structure and position of the urinary organs, genital organs, external parts of genital organs as well as related terms

Objectives

- 1) To be able to explain the structure of the kidney, ureter, urinary bladder, and urethra as well as interspecies differences
- 2) To be able to explain the structure and position of the male genital organs (testis, epididymis, spermatic cord, accessory genital glands) and external parts of genital organs as well as interspecies differences
- 3) To be able to explain the structure and position of the female genital organs (ovary, oviduct, uterus, vagina, vaginal vestibule) and external parts of genital organs as well as interspecies differences

Subject Details

(10) The endocrine system

Goals

To understand the structure and position of the endocrine organs

Objectives

- 1) To be able to explain the structure and position of the thyroid gland, parathyroid gland, adrenal gland, and pituitary gland as well as interspecies differences

Subject Details

(11) The sense organs

Goals

To understand the structure and position for each part of the sense organs as well as related terms

Objectives

- 1) To be able to explain the structure of the visual organ
- 2) To be able to explain the structure of vestibulocochlear organ
- 3) To be able to explain the structure of olfactory organ and vomeronasal organ

Subject Details

(12) The common integuments

Goals

To understand the structure and position of the skin, cornified organs, and mamma

Objectives

- 1) To be able to explain the structure and position of the skin, horns, hair, pads, chestnut, ergot, claw, hoof, and mamma

Subject Details

(13) The cardiovascular system

Goals

To understand the structure and position of heart and the major arteries and veins

Objectives

- 1) To be able to explain systemic circulation and pulmonary circulation
- 2) To be able to explain the structure of the heart
- 3) To be able to enumerate and explain the major arteries
- 4) To be able to enumerate and explain the major veins

Subject Details

(14) The lymphatic system

Goals

To understand the course of the major lymphatic vessels and related terms as well as the structure and position of the lymphatic organs

Objectives

- 1) To be able to explain the general terms for lymphatic vessels and the flow route of lymph
- 2) To be able to explain the position of the thymus, spleen, tonsils, and lymph nodes (lymphocenter) as well as related terms

Subject Details

(15) The central nervous system

Goals

To learn the general structure of central nervous system, and its morphology and position considering the flow of information transmission

Objectives

- 1) To be able to explain the structure and function of the central nervous system

Subject Details

(16) The peripheral nervous system

Goals

To understand the form and position of the somatic nervous system and autonomic nervous system considering the flow of information transmission

Objectives

- 1) To be able to explain the course and function of the cranial nerves, spinal nerves and autonomic nerves

Subject Details

(17) Anatomy of fowls

Goals

To understand the anatomical structure and position of each part of fowls as well as related terms

Objectives

- 1) To be able to explain the terms for characteristic bones, muscles, and integuments
- 2) To be able to explain the characteristics and terms of the major viscera and organs in each organ system

Lecture 1-5. Veterinary Histology

Subject Aims

The aim of this subject is to examine the structure of cells and how they are organized into the tissues and organs in cows, horses, pigs, dogs, and laboratory animals (mice and rats). The student will learn important cytological and histological terms and be able to explain the main functions of organs and organ systems in the context of their cell and tissue structures.

Subject Details

(1) Cell structure

Goals

To understand the fine structure and function of cell

Objectives

- 1) To be able to explain the structure and function of the cell membrane as well as the transport process of substances across the cell membrane
- 2) To be able to explain the structure and function of the nucleus and organelles
- 3) To be able to explain the classification, structure, intracellular distribution/localization, and functions of the cytoskeleton and junctional complex

Subject Details

(2) Epithelial, connective, and supporting tissues

Goals

To understand the basic structure of connective tissues, including epithelial and supporting tissues

Objectives

- 1) To be able to explain the classification of epithelia including the endothelium, mesothelium, and related glands according to their structure and function
- 2) To be able to explain the classification and structure of supporting tissue (connective tissue, cartilage, and bone)

Subject Details

(3) Muscular and nervous tissues

Goals

To understand the histological structure of muscular and nervous tissues

Objectives

- 1) To be able to explain the histological structure of smooth, skeletal, and cardiac muscles
- 2) To be able to explain the structure of nervous tissue

Subject Details

(4) Blood and bone marrow

Goals

To understand the morphology of blood and bone marrow

Objectives

- 1) To be able to explain the blood cells in terms of their classification by morphology, the process of their differentiation and maturation, and to explain the histological structure of bone marrow

Subject Details

- (5) The cardiovascular and lymphatic systems

Goals

To understand the histological structure of the heart, blood vessels, and lymphatic vessels

Objectives

- 1) To be able to explain the histological structure of arteries, veins, capillaries, and lymphatic vessels

Subject Details

- (6) Lymphatic tissues and organs

Goals

To understand the general structure of lymphatic tissues and the histological structure of lymphatic organs

Objectives

- 1) To be able to explain the histological features of lymphatic organs
- 2) To be able to explain the histological structure of the thymus, lymphatic nodule, lymph node, spleen, and bursa of Fabricius

Subject Details

- (7) The digestive system

Goals

To understand the histological structure of the digestive system

Objectives

- 1) To be able to explain the histological structure and function of the teeth and tongue
- 2) To be able to explain the esophagus, stomach, small intestine, and large intestine in terms of their basic structure, histological difference, and function
- 3) To be able to explain the histological structure of the major salivary glands (the parotid, mandibular, and sublingual glands)
- 4) To be able to explain the histological structure and function of the liver
- 5) To be able to explain the exocrine pancreas and endocrine pancreas in terms of the histological structure and function

Subject Details

- (8) The respiratory system

Goals

To understand the histological structure of the respiratory system

Objectives

- 1) To be able to explain the histological structure of the nasal mucosa, trachea, bronchi, and lungs

Subject Details

- (9) The urinary system

Goals

To understand the histological structure of the urinary system

Objectives

- 1) To be able to explain the histological structure of the kidney
- 2) To be able to explain the histological structure of the ureter, urinary bladder, and urethra

Subject Details

- (10) The male genital system

Goals

To understand the histological structure of the male genital system

Objectives

- 1) To be able to explain the histological structure and function of the testes
- 2) To be able to explain the histological structure of the epididymis, ductus deferens, accessory genital glands, and penis

Subject Details

- (11) The female genital system

Goals

To understand the histological structure of the female genital system

Objectives

- 1) To be able to explain the histological structure and function of the ovaries
- 2) To be able to explain the histological structure of the oviduct, uterus, vagina, and vaginal vestibule

Subject Details

- (12) The endocrine system

Goals

To understand the histological structure of endocrine organs

Objectives

- 1) To be able to explain the endocrine system in terms of the classification by the mode of secretion (endocrine, paracrine, and autocrine secretions) and the basic structure

- 2) To be able to explain the histological structure of the hypothalamus, hypophysis, adrenal glands, thyroid gland, parathyroid gland, and pancreatic islets

Subject Details

(13) The sense organs

Goals

To understand the histological structure of the sense organs

Objectives

- 1) To be able to explain the histological structure of the eyes, ears, taste buds, and olfactory organs

Subject Details

(14) The nervous system

Goals

To understand the histological structure of the nervous system

Objectives

- 1) To be able to explain the histological structure of the cerebrum, cerebellum, and spinal cord

Subject Details

(15) The integument

Goals

To understand the histological structure of the integument

Objectives

- 1) To be able to explain the histological structure of the skin, cutaneous appendages including cutaneous glands and mammary glands

Lecture 1-6. Veterinary Embryology

Subject Aims

The aim of this subject is to understand the ontogenesis and the regulation mechanism of differentiation and maturation process of cells, tissues, and organs through the study for the developmental process of individuals or tissues and organs composing of the animal body, which is the subject of veterinary medicine.

Subject Details

- (1) Origin of primordial germ cells, spermatogenesis, oogenesis, fertilization, and cleavage

Goals

To understand the origin of primordial germ cells, the differentiation and development of germ cells (sperms, ova), and the cleavage pattern and its mechanism from fertilization to early embryogenesis

Objectives

- 4) To be able to explain the origin of primordial germ cells
- 5) To be able to explain the formation of sperms and ova
- 6) To be able to explain fertilization, cleavage and cleavage forming the early embryo

Subject Details

- (2) The gastrula stage

Goals

To understand the developmental process from implantation to blastoderm formation

Objectives

- 1) To be able to explain early development from implantation to the gastrulation
- 2) To be able to explain the differentiation of the blastoderm

Subject Details

- (3) Differentiation of the ectoderm

Goals

To understand the formation and development of ectoderm-derived organs, including the formation and development of neural tube and neural crest

Objectives

- 1) To be able to explain the development and differentiation of the neural tube in relation to the neural ectoderm
- 2) To be able to explain the development and differentiation from the surface ectoderm (excluding the organs derived from the nervous system)

Subject Details

- (4) Differentiation of the paraxial mesoderm, development of the bones, skeletal muscles, and connective tissues

Goals

To understand the process of organogenesis and differentiation of the paraxial mesoderm

Objectives

- 1) To be able to explain the formation of bone, cartilage, skeletal muscle, and subcutaneous connective tissue with the dermis developed by the mesodermal somite

Subject Details

- (5) Differentiation of intermediate mesoderm, development of the urogenital organ

Goals

To understand the process of organogenesis with differentiation of the intermediate mesoderm

Objectives

- 1) To be able to explain the development of the urinary organ, the male and female gonads, the genital ducts, and accessory glands, and the adrenal gland

Subject Details

- (6) Differentiation of the extraembryonic mesoderm and lateral mesoderm, development of the cardiovascular system, part of the celoma, and the skeleton of limbs

Goals

To understand the process of organogenesis with the differentiation of the extraembryonic mesoderm and the lateral mesoderm (visceral mesoderm, parietal mesoderm)

Objectives

- 1) To be able to explain the development of the extraembryonic mesoderm in the amnion and serosa
- 2) To be able to explain the development of blood islands from the visceral mesoderm associated with the yolk sac, and the development of blood and blood vessels differentiated from blood islands
- 3) To be able to explain the organs that develop from the visceral mesoderm
- 4) To be able to explain the organs that develop from the parietal mesoderm
- 5) To be able to explain the overview of cardio genesis as well as fetal circulation

Subject Details

- (7) Differentiation of the endoderm

Goals

To understand the process of organogenesis with the differentiation of the endoderm

Objectives

- 1) To be able to explain the development of the digestive organs

- 2) To be able to explain the development of the pharynx, parts of the urogenital organs, and the related organs that differentiate from the endoderm
- 3) To be able to explain the development of the respiratory organs

Subject Details

(8) Placentation and function of the placenta

Goals

To understand the formation process of the mammalian placenta, comparative gross anatomical and histological structures, and functional differences

Objectives

- 1) To be able to explain the fetal membranes and fetal appendages
- 2) To be able to explain the classification of placenta, and the relationship between the placenta and fetal membranes

Lecture 1-7. Veterinary Physiology

Subject Aims

The aim of this subject is to understand the physiological functions of mammalian cells, tissues, and organs; to understand the mechanisms of homeostasis; to develop an integrated approach to examining biological phenomena; and to recognize the diversity of functions arising from differences between animal species.

Subject Details

(1) Introduction to veterinary physiology

Goals

To understand the interaction of animal cells with their surrounding environment and that maintaining the homeostasis of the internal environment homeostasis is essential for multicellular organisms

Objectives

- 1) To be able to explain the general environment surrounding animal cells and the mechanisms of homeostasis
- 2) To be able to explain fluid compartments, differences between intracellular and extracellular fluids, and the mechanism by which body fluids are transported
- 3) To be able to explain the basic structure of animal cells and the functions of their components
- 4) To be able to explain the mechanisms and carriers involved in membrane transport (active transport, passive transport, and cytosol)

Subject Details

(2) Basic properties of neurons

Goals

To understand action potential generation, conduction and synaptic transmission, and the molecular and regulatory mechanisms of neurons

Objectives

- 1) To be able to explain ion balance, equilibrium potential, and resting membrane potential
- 2) To be able to explain the significance of voltage-dependent channels and the mechanism of action of potential generation and conduction
- 3) To be able to explain the mechanism of excitatory and inhibitory synaptic transmission

Subject Details

(3) The central nervous system

Goals

To understand the functions of the central nervous system, each part of the brain, and the brain as a whole

Objectives

- 1) To be able to explain the roles and functions of each region of the cerebrum
- 2) To be able to explain the structure and role of the brainstem, and the formation of integrated control of biological functions
- 3) To be able to explain the regulatory role of the cerebellum in motor control in conjunction with the cerebrum

Subject Details

- (4) The somatic nervous system and sense

Goals

To understand the structure and function of the somatic nervous system, and the mechanisms that control the senses and movements of animals

Objectives

- 1) To be able to explain the relationship between types of sensations, receptive mechanisms, and sensory intensity
- 2) To be able to explain the mechanism of hearing and equilibrium, the sound transmission mechanism, and the function of the inner ear
- 3) To be able to explain the mechanism of vision, and the optics and color vision of the eye
- 4) To be able to explain the functions of muscle spindles and tendons
- 5) To be able to explain the spinal reflex and postural reflex controlled by the brain stem

Subject Details

- (5) The autonomic nervous system

Goals

To understand the role of the autonomic nervous system in regulating the function of organs

Objectives

- 1) To be able to explain the organization of the autonomic nerves, the efferent autonomic pathways, and the ganglia
- 2) To be able to explain the neurotransmitters and their receptors at the autonomic junctions, and the interaction between sympathetic and parasympathetic nerves in each organ

Subject Details

- (6) Muscle contraction

Goals

To understand the molecular mechanism of skeletal muscle contraction and how it differs from other muscle contractions

Objectives

- 1) To be able to explain the contractile machinery of skeletal, cardiac, and smooth muscle

Subject Details

(7) Basic properties of the endocrine system (General review of endocrinology)

Goals

To understand the process of biosynthesis; the secretory regulation and biological actions of various hormones; and the significance of the integrated regulation of the internal environment by the endocrine system

Objectives

- 1) To be able to explain characteristics of the endocrine system that differ from those of the exocrine and paracrine systems, as well as differences between hormones and other mediators

Subject Details

(8) Regulation of growth, metabolism and reproduction

Goals

To understand the hormones that regulate growth and metabolism and their mechanisms

Objectives

- 1) To be able to explain the hormones involved in growth
- 2) To be able to explain the biosynthesis process, secretory regulation, and biological actions of the thyroid hormones
- 3) To be able to explain the hormones that regulate blood glucose
- 4) To be able to explain the hormones that regulate reproduction

Subject Details

(9) Regulation of water and electrolyte balance

Goals

To understand the hormones that regulate water and electrolytes balance and their homeostatic mechanisms

Objectives

- 1) To be able to explain the hormones that regulate extracellular fluid volume

Subject Details

(10) Regulation of calcium metabolism

Goals

To understand the hormones that regulate calcium metabolism and to understand bone physiology

Objectives

- 1) To be able to explain biosynthesis process, secretory regulation, and biological actions of parathyroid hormone, calcitonin, and active vitamin D3
- 2) To be able to explain bone metabolism and its regulation

Subject Details

(11) Endocrine responses to stress

Goals

To understand the stress theory and how animals respond to stress

Objectives

- 1) To be able to explain the roles of the hypothalamus-pituitary-adrenal gland axis and the secretory mechanism and actions of adrenocortical hormones

Subject Details

(12) Nutrient digestion and absorption

Goals

To understand the digestive and absorptive process of nutrients, and the functional difference in parts of the gastrointestinal tract

Objectives

- 1) To be able to explain the digestion and absorption of carbohydrates, proteins, and lipids
- 2) To be able to explain the absorption of water, electrolytes, and vitamins

Subject Details

(13) Regulation of the digestive tract

Goals

To understand the regulation of digestive tract functions, and their nervous and humoral regulatory mechanisms

Objectives

- 1) To be able to explain the functions of the enteric nervous system in the digestive tract
- 2) To be able to explain the regulatory mechanism of secretion of digestive juices
- 3) To be able to explain the types and biological actions of gastrointestinal hormones

Subject Details

(14) Metabolism and thermoregulation

Goals

To understand heat production and heat transfer in homeothermal animals and the mechanism of thermoregulation

Objectives

- 1) To be able to explain the regulatory mechanism of body temperature

Subject Details

(15) Constituents and functions of blood

Goals

To understand blood cells and plasma constituents in the blood and their functions

Objectives

- 1) To be able to explain the classification, structure, and function of blood cells and the significance of changes in blood cells

Subject Details

(16) Pulmonary respiration and gas exchange

Goals

To understand pulmonary respiration and the mechanisms for oxygen-consumption and carbon dioxide-excretion in animals

Objectives

- 1) To be able to explain the functional structure of the respiratory organs
- 2) To be able to explain the role of pulmonary alveolar surfactants and lung compliance
- 3) To be able to explain transport of oxygen and carbon dioxide by the blood
- 4) To be able to explain the pH-buffering capacity of blood and acid–base equilibrium

Subject Details

(17) Respiratory regulation

Goals

To understand respiratory movements and their regulatory mechanisms

Objectives

- 1) To be able to explain respiratory regulation by the respiratory center and peripheral chemical sensors

Subject Details

(18) Cardiac functions

Goals

To understand the mechanism by which the heart pumps blood, and the regulatory mechanism of cardiac output

Objectives

- 1) To be able to explain the structure and automaticity of cardiac muscle cells and the specialized conduction system of the heart
- 2) To be able to explain the cardiac cycles, ejecting force, and pressure-volume curves
- 3) To be able to explain electrocardiograms
- 4) To be able to explain the nervous and humoral regulation of cardiac functions

Subject Details

(19) Organization and functions of the circulatory system

Goals

To understand blood circulation in tissues, the functions of each vessel type, and the regulation of blood pressure

Objectives

- 1) To be able to explain the types and functions of blood vessels
- 2) To be able to explain the relationship between blood pressure and circulating blood volume
- 3) To be able to explain the functions of the capillaries and lymph vessels, and the importance of material exchange between blood and interstitial fluid
- 4) To be able to explain the nervous and humoral regulation of blood vessels

Subject Details

(20) Urine production

Goals

To understand urine generation in the kidney and the mechanisms and regulation of glomerular filtration, reabsorption, condensation

Objectives

- 1) To be able to explain the structure and function of nephrons and the mechanism of urine generation
- 2) To be able to explain the importance of clearance, renal plasma flow, and glomerular filtration rate

Lecture 1-8. Veterinary Biochemistry

Subject Aims

The aim of this subject is to understand the structures and functions of the biological molecules that compose mammalian cells and organs in order to understand the biochemical reactions relevant to veterinary medical science.

Subject Details

(1) Electrolytes and buffer solutions

Goals

To understand electrolytes and buffer reactions in body fluid

Objectives

- 1) To be able to explain electrolytes
- 2) To be able to explain the pH of solutions
- 3) To be able to explain buffer solutions

Subject Details

(2) Molecules that make up living organisms

Goals

To understand the kinds of molecules that make up living organisms and their constituent units

Objectives

- 1) To be able to explain the organization of molecules that make up animal cells.
- 2) To be able to explain the localization of the molecules inside and outside of cells

Subject Details

(3) Structures of nucleic acids

Goals

To understand the structures and behavior of nucleotides and nucleic acids

Objectives

- 1) To be able to explain the structures of nucleotides
- 2) To be able to explain the structures of nucleic acids

Subject Details

(4) Vitamins and trace elements

Goals

To understand the vitamins and trace elements necessary for maintaining biological functions

Objectives

- 1) To be able to explain vitamins

- 2) To be able to explain trace elements

Subject Details

- (5) Enzymes

Goals

To understand the enzymes that catalyze chemical reactions in living organisms

Objectives

- 1) To be able to explain the structures and functions of enzymes
- 2) To be able to explain allosteric enzyme
- 3) To be able to explain enzymatic kinetics
- 4) To be able to explain enzymatic inhibition

Subject Details

- (6) Carbohydrate metabolism

Goals

To understand the conversion of substances involved in carbohydrate metabolism and their contribution to energy production

Objectives

- 1) To be able to explain the structure of monosaccharides
- 2) To be able to explain the structure of polysaccharides
- 3) To be able to explain energy production by glycolysis
- 4) To be able to explain the citric acid cycle and oxidative phosphorylation (i.e., ATP synthesis)
- 5) To be able to explain glycogen metabolism and gluconeogenesis and their regulation by hormones

Subject Details

- (7) Lipid metabolism

Goals

To understand the conversion of substances involved in lipid metabolism and their contribution to energy production

Objectives

- 1) To be able to explain the structures of lipids
- 2) To be able to explain the structure and function of biological membranes
- 3) To be able to explain the characteristic composition of fatty acids
- 4) To be able to explain the characteristic composition, transport, and decomposition of triacylglycerol and cholesterol
- 5) To be able to explain the beta-oxidation of fatty acids and associated energy (ATP) production
- 6) To be able to explain the metabolism of ketone bodies
- 7) To be able to explain the metabolism of cholesterol

- 8) To be able to explain the crosstalk between lipid metabolism and carbohydrate metabolism and their regulatory mechanisms

Subject Details

- (8) Metabolism of proteins, amino acids, and nitrogen compounds

Goals

To understand the conversion of substances involved in the metabolism of proteins, amino acids, and nitrogen compounds and the associated equilibrium/excretion of nitrogen

Objectives

- 1) To be able to explain the structure of amino acids
- 2) To be able to explain the structure of peptides and proteins
- 3) To be able to explain the catabolism, anabolism, and utilization of amino acids
- 4) To be able to explain nucleotide metabolism
- 5) To be able to explain the crosstalk between nitrogen compound and carbohydrate metabolism

Subject Details

- (9) Metabolic cooperation among organs

Goals

To understand the unique metabolic profiles of organs, their correlations, and their relation to diseases

Objectives

- 1) To be able to explain the unique metabolic profiles of major organs and their respective roles
- 2) To be able to explain the metabolic cooperation among organs and the regulation thereof

Subject Details

- (10) Animal species-specific metabolic mechanisms

Goals

To understand the unique metabolic profiles of animal species and their relation to diseases

Objectives

- 1) To be able to explain nutrient utilization by luminal fermentation
- 2) To be able to explain the metabolic profile and metabolic disorders of ruminants
- 3) To be able to explain the metabolic profile and metabolic disorders of carnivores

Subject Details

- (11) Transmission and expression of genetic information

Goals

To understand the regulatory mechanisms of transmission and expression of genetic information

Objectives

- 1) To be able to explain the structure of genomes and genes
- 2) To be able to explain DNA replication
- 3) To be able to explain transcription and its regulation, and RNA processing
- 4) To be able to explain translation and post-translational modifications
- 5) To be able to explain the intracellular localization of proteins
- 6) To be able to explain the degradation of proteins

Subject Details

(12) Intercellular communication

Goals

To understand intercellular communication and intracellular signal transduction

Objectives

- 1) To be able to explain the intercellular transmitters and their receptors
- 2) To be able to explain the molecular mechanisms of reception of intercellular transmitters
- 3) To be able to explain the molecular mechanisms of intracellular signal transduction and responses

Subject Details

(13) Recombinant DNA technology

Goals

To understand the principle of the molecular biology techniques used for the diagnosis and pathological analysis of diseases

Objectives

- 1) To be able to explain restriction enzymes and DNA ligase
- 2) To be able to explain gene cloning
- 3) To be able to explain DNA sequencing
- 4) To be able to explain DNA/RNA detection methods
- 5) To be able to explain the polymerase chain reaction (PCR)

Lecture 1-9. Veterinary Pharmacology

Subject Aims

The aim of this subject is to understand the pharmacokinetics and pharmacodynamics of the major drugs used in veterinary medicine, including interspecies differences and the pathobiology of various diseases.

Subject Details

(1) Pharmacological action

Goals

To understand the process of drug actions

Objectives

- 1) To be able to explain fundamental pharmacology, the mechanisms of drug action, and the potency and efficacy of medicine
- 2) To be able to explain factors affecting the duration of pharmacological effects, and the potency and efficacy of medicine

Subject Details

(2) Pharmacokinetic

Goals

To understand pharmacokinetics (absorption, distribution, metabolism, and excretion)

Objectives

- 1) To be able to explain the relationships between pharmacokinetics (absorption, distribution, metabolism, and excretion) and the onset of drug actions
- 2) To be able to explain reactions involved in drug metabolism, as well as interspecies differences
- 3) To be able to explain factors affecting pharmacokinetics
- 4) To be able to explain the mechanisms of biliary and urinary excretions

Subject Details

(3) Adverse effects

Goals

To understand adverse drug effects

Objectives

- 1) To be able to explain adverse drug effects in terms of factor classification and interspecies differences

Subject Details

(4) Medical standards and the development of medical supplies

Goals

To understand proper drug handling; the procedures for collecting, evaluating, processing, providing, and managing drug information; the regulation of residual substances; the development of pharmaceutical products; and attitudes about the ethical use of animals

Objectives

- 1) To be able to explain the development of veterinary pharmaceutical products in accordance with applicable laws and regulations
- 2) To be able to explain how to conduct animal experiments in an ethical manner

Subject Details

- (5) Drugs affecting the peripheral nerve system

Goals

To understand the major drugs affecting the peripheral nervous system in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions, based on an understanding of the anatomy and physiology of the peripheral nervous system

Objectives

- 1) To be able to explain the major local anesthetics and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain the major drugs affecting the parasympathetic nervous system and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain the major drugs affecting the sympathetic nervous system and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 4) To be able to explain the major drugs affecting nerve ganglia and neuromuscular junctions and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

- (6) Drugs affecting the central nervous system

Goals

To understand the major general anesthetics, sedatives, tranquilizers, behavior drugs, antiepileptic drugs, and analgesics in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions

Objectives

- 1) To be able to explain the major general anesthetics and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain the major sedatives and tranquilizers, and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain the major behavior drugs and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

- 4) To be able to explain the major antiepileptic drugs and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 5) To be able to explain the major analgesics and to describe them in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

- (7) Physiologically active substances and their antagonists

Goals

To understand the major physiologically active substances and their antagonists in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions, based on an understanding of the physiological effects of active substances

Objectives

- 1) To be able to explain histamine and its antagonists in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain renin-angiotensin system inhibitors in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain cytokines, growth factors, and their related compounds in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

- (8) Anti-inflammatory drugs

Goals

To understand the major anti-inflammatory drugs in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions, based on an understanding of the pathology of inflammation

Objectives

- 1) To be able to explain nonsteroidal anti-inflammatory drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

- (9) Drugs affecting the cardiovascular and respiratory systems

Goals

To understand the major drugs affecting the cardiovascular and respiratory systems in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions, based on an understanding of the pathobiology of cardiovascular and respiratory tract disorders

Objectives

- 1) To be able to explain the major drugs used for the treatment of heart failure in the veterinary clinical setting, in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain the major antiarrhythmic drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain the major vasodilators in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 4) To be able to explain the major drugs affecting the respiratory system (respiratory stimulants, antitussives, bronchodilators) in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

(10) Drugs affecting blood

Goals

To understand the major drugs affecting blood and hematopoiesis in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions, based on an understanding of the mechanisms of blood coagulation and the pathobiology of anemia

Objectives

- 1) To be able to explain the major hemostatic drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain the major antithrombotic drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain the major antianemic drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

(11) Drugs affecting the renal system

Goals

To understand the drugs affecting the renal systems in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions, based on understanding the pathophysiology of acid–base imbalance and edema

Objectives

- 1) To be able to explain the major diuretics in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

(12) Drugs affecting digestive system

Goals

To understand the major drugs affecting the digestive systems in terms of pharmacology,

mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions, based on understanding the pathobiology of diarrhea and ulcers

Objectives

- 1) To be able to explain the major drugs affecting gastrointestinal motility and absorption in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain the major antiulcer drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain the major antiemetic drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

(13) Hormones and their antagonists

Goals

To understand the hormones and their antagonists that are used in the veterinary clinical setting in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions

Objectives

- 1) To be able to explain the major drugs used for the treatment of abnormal hormone secretion in the veterinary clinical setting in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain steroids in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain the drugs affecting contractility of the uterus in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

(14) Drugs affecting the immune system

Goals

To understand the drugs affecting the immune systems used in the veterinary clinical setting in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions

Objectives

- 1) To be able to explain the drugs affecting T lymphocytes in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

(15) Antiseptics and disinfectants

Goals

To understand the antiseptics and disinfectants used in the veterinary clinical setting, in terms of mechanisms of action, adverse effects, and clinical applications

Objectives

- 1) To be able to explain the major antiseptics and disinfectants in terms of mechanism of actions and applications

Subject Details

- (16) Drugs used for the treatment of microbial infectious diseases

Goals

To understand the drugs used for the treatment of microbial infectious diseases in the veterinary clinical setting in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions

Objectives

- 1) To be able to explain the major antimicrobial drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications as well as the mechanisms of bacterial resistance acquisition and countermeasures against resistance
- 2) To be able to explain antifungal drugs in terms of pharmacology, mechanisms of action, and what diseases they are effective against
- 3) To be able to explain the major antiviral drugs in terms of pharmacology, mechanisms of action, and what diseases they are effective against
- 4) To be able to explain the major biological preparations used for the treatment of microbial infectious diseases and describe their clinical applications

Subject Details

- (17) Drugs used for the treatment of neoplastic diseases

Goals

To understand the drugs used for the treatment of neoplastic diseases in the veterinary clinical setting in terms of pharmacology, mechanisms of action, adverse effects, clinical applications, and interspecies differences in drug actions

Objectives

- 1) To be able to explain the major alkylating and platinum agents in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 2) To be able to explain the major antimetabolites in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 3) To be able to explain the major topoisomerase inhibitors (including antitumor antibiotics) in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 4) To be able to explain the major mitotic inhibitors in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 5) To be able to explain the major hormonal agents in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications
- 6) To be able to explain the major molecule-targeting therapeutic agents and miscellaneous antitumor drugs in terms of pharmacology, mechanisms of action, adverse effects, and clinical applications

Subject Details

(18) Drugs used for the treatment of parasitic diseases

Goals

To understand the drugs used for the treatment of parasitic diseases in the veterinary clinical setting in terms of mechanisms of action, adverse effects, and clinical applications

Objectives

- 1) To be able to explain the major antihelminthics and antiprotozoan drugs in terms of mechanisms of action, adverse effects, and clinical applications

Subject Details

(19) Ectoparasiticides

Goals

To understand the ectoparasiticides used in the veterinary clinical setting in terms of mechanisms of action, adverse effects, and clinical applications

Objectives

- 1) To be able to explain the major ectoparasiticides in terms of mechanisms of action, adverse effects, and clinical applications

Subject Details

(20) Drugs used for the treatment of poisoning

Goals

To understand the drugs used for the treatment of poisoning and to describe their scientific basis for their use

Objectives

- 1) To be able to explain the major drugs used for the treatment of poisoning and to describe their mechanisms of action

Lecture 1-10. Animal Genetics and Breeding

Subject Aims

This aim of this subject is to understand the principles of genetics, with an emphasis on genetic mutation, genotype–phenotype (trait) relationship, change in allele frequency over generations, theory of animal breeding, and molecular mechanisms underlying genetic disorders.

Upon completion, students should be able to recognize and describe genetic phenomena, animal breeding methods, and the prevention of genetic disorders.

Subject Details

(1) Basics of genetics

Goals

To understand the fundamentals of genetics and genetic mutations.

Objectives

- 1) To be able to explain Mendel's law and the basic concepts and mechanisms of heredity including epistasis
- 2) To be able to explain the mechanism of meiosis, the genetic linkage and recombination
- 3) To be able to explain the structure of genomes, the structure and structural abnormalities of chromosomes.
- 4) To be able to explain the causes of genetic mutations and factors affecting gene function and translation

Subject Details

(2) Basics of animal breeding

Goals

To understand the basic concepts of animal breeding and population genetics theory

Objectives

- 1) To be able to explain genetic parameters.
- 2) To be able to explain the advantages and disadvantages of artificial selection
- 3) To be able to explain the genetic improvement of livestock animals

Subject Details

(3) Genetics of qualitative traits

Goals

To understand certain genetic traits controlled by a few genes

Objectives

- 1) To be able to explain the inheritance of traits controlled by a few genes (e.g., coat color and blood type).
- 2) To be able to explain the inheritance of some productive traits and disease susceptibility

Subject Details

(4) Applied molecular genetics

Goals

To understand the methods and application of genetic analysis

Objectives

- 1) To be able to explain familial analysis and linkage analysis with DNA markers
- 2) To be able to explain how mutations are identified and how DNA markers are used for individual identification and parentage tests

Subject Details

(5) Genetic disorders in animals

Goals

To understand genetic characteristics and major genetic disorders in domestic animals

Objectives

- 1) To be able to explain the genetic features of domestic animal populations
- 2) To be able to explain the factors affecting genetic diversity and genetic disorders (e.g., inbreeding)
- 3) To be able to explain the clinical presentations, pathological features, and genes involved in genetic disorders in domestic animals
- 4) To be able to explain the clinical presentations, pathological features, and genes involved in genetic disorders in companion animals

Lecture 1-11. Veterinary Ethology

Subject Aims

The aim of this subject is to understand common and species-specific behaviors and their underlying mechanisms, as well as animal welfare-friendly management techniques and the basic concepts of Clinical Veterinary Behavior.

Subject Details

(1) Basic concepts of ethology

Goals

To understand the basic concepts of ethology

Objectives

- 1) To be able to explain the history of ethology
- 2) To be able to explain Tinbergen's four questions in the context of behavioral research
- 3) To be able to explain the major theories of behavioral ecology

Subject Details

(2) Evolution of behavior

Goals

To understand the evolutionary changes of behavior, using domestication as an example

Objectives

- 1) To be able to explain the evolution of behavior
- 2) To be able to explain the process of domestication
- 3) To be able to explain the changes in behavior associated with domestication

Subject Details

(3) Development of behavior

Goals

To understand the developmental changes of behavior

Objectives

- 1) To be able to explain the developmental processes in precocious and altricial animals
- 2) To be able to explain the developmental stages throughout the life of an animal and the characteristic changes in behavior at each stage
- 3) To be able to explain the effects of genetic and environmental factors on behavioral development

Subject Details

(4) Biological rhythms

Goals

To understand the various biological rhythms of behavior

Objectives

- 1) To be able to explain the diurnal rhythm of behavior
- 2) To be able to explain the annual rhythm of behavior
- 3) To be able to explain the other rhythms of behavior

Subject Details

- (5) Motivation and emotion underlying behavior

Goals

To understand the brain functions underlying motivation and emotion

Objectives

- 1) To be able to explain the motivations underlying behavior
- 2) To be able to explain the effect of the limbic system on the expression of emotions
- 3) To be able to explain the control of emotions by the cerebral neocortex

Subject Details

- (6) Signaling molecules involved in behavior

Goals

To understand the signaling molecules involved in the expression of behavior

Objectives

- 1) To be able to explain the relationship between neurotransmitters/neuromodulators and behavior
- 2) To be able to explain the relationship between hormones and behavior
- 3) To be able to explain the major bioactive compounds that affect behavior

Subject Details

- (7) Communication behavior

Goals

To understand communication behavior

Objectives

- 1) To be able to explain the communication behavior and sensory world of animals
- 2) To be able to explain visual and auditory communication behavior
- 3) To be able to explain olfactory communication behavior

Subject Details

- (8) Reproductive behavior

Goals

To understand reproductive behavior

Objectives

- 1) To be able to explain the reproductive strategies of mammals
- 2) To be able to explain sexual behavior
- 3) To be able to explain parental behavior

Subject Details

- (9) Social behavior

Goals

To understand social behavior

Objectives

- 1) To be able to explain social structures
- 2) To be able to explain agonistic behavior
- 3) To be able to explain affiliative behavior

Subject Details

- (10) Maintenance behavior

Goals

To understand maintenance behavior

Objectives

- 1) To be able to explain feeding behavior
- 2) To be able to explain elimination behavior
- 3) To be able to explain grooming behavior

Subject Details

- (11) Behavior change and learning theory

Goals

To understand learned behavior

Objectives

- 1) To be able to explain the relationship between stimulus and response
- 2) To be able to explain classical and operant conditioning

Lecture 1-12. Laboratory Animal Science

Subject Aims

The aim of this subject is to understand genetics, breeding, reproduction, and other issues related to the quality of laboratory animals, and husbandry and experimentation methods for laboratory animals, from the perspective of comparative biology, and to learn measures for the appropriate conduct of animal experimentation, in consideration of animal welfare and in accordance with the laws and standards of society.

Subject Details

(1) Significance and ethics of animal experimentation, and related laws and regulations

Goals

To understand the history and significance of animal experimentation, the ethical issues involved, and related laws and regulations

Objectives

- 1) To be able to explain the significance of animal experiments to the modern world and related ethical issues, based on the historical background to animal experimentation
- 2) To be able to explain the laws and regulations related to laboratory animals and animal experimentation

Subject Details

(2) Planning and evaluating results of animal experiments

Goals

To understand the requirements for planning of animal experiments and creation of animal experiment protocols, and the statistical analysis and extrapolation required for evaluation of the results of animal experiments

Objectives

- 1) To be able to explain the selection of experimental animals suited to the purpose of the experiment
- 2) To be able to explain the principles of the three Rs and the concepts of animal welfare
- 3) To be able to explain the justification for an animal experiment and the other major items required to be stated in the experiment protocol
- 4) To be able to explain the statistical analysis methods suitable for evaluation of experiment results
- 5) To be able to explain the extrapolation of results from animal experiments

Subject Details

(3) Basic techniques for animal experiments

Goals

To understand the basic techniques suitable to obtain reproducible and highly accurate experimental results from each type of experimental animal

Objectives

- 1) To be able to explain the principal methods for the handling, restraint, identification, administration, blood collection, and sampling for each type of laboratory animal
- 2) To be able to explain the principal methods for administering anesthesia and analgesics, and for performing euthanasia and autopsies in a suitable manner for each type of laboratory animal

Subject Details

- (4) Genetics and breeding of laboratory animals

Goals

To understand the classification, principles, and methods employed in laboratory animal thermatology, and the genetic monitoring involved

Objectives

- 1) To be able to explain the concepts of species, breed, and strain for laboratory animals, and strain classification and its associated characteristics in the context of breeding
- 2) To be able to explain the principles and methods of breeding laboratory animals
- 3) To be able to explain the genetic monitoring of laboratory animals
- 4) To be able to explain genetic homology across animal species

Subject Details

- (5) Reproduction of laboratory animals

Goals

To understand the reproduction and rearing of all types of laboratory animal that form the basis for animal production and supply for experimentation.

Objectives

- 1) To be able to explain the mechanisms of sexual maturation, the estrous cycle, and mating behavior in laboratory animals
- 2) To be able to explain the mechanisms of egg and sperm maturation, fertilization, implantation, pregnancy/gestation, parturition, nursing, and weaning
- 3) To be able to explain techniques for laboratory animal rearing

Subject Details

- (6) Laboratory animal husbandry

Goals

To understand how the biological functioning of laboratory animals can be affected by environmental factors, and how improving the husbandry environment can improve the reproducibility and accuracy of the results of animal experiments

Objectives

- 1) To be able to explain the climatic, physical, and chemical factors within a husbandry environment, and their effects on the biological functioning of laboratory animals

- 2) To be able to explain nutritional, biological, and habitat-related factors for laboratory animals
- 3) To be able to explain the structure, management, and operation of laboratory animal facilities

Subject Details

- (7) Characteristics of laboratory animals by type

Goals

To gain a wide-ranging understanding of species differences in organ morphology and function, and to understand the morphological, behavioral, and physiological characteristics of major laboratory animal species, which are central elements in creating protocols for, and interpreting the results of, animal experiments.

Objectives

- 1) To be able to explain the morphological, behavioral, and physiological characteristics of mice, the traits of mice as laboratory animals, and the characteristics of representative mouse strains
- 2) To be able to explain the morphological, behavioral, and physiological characteristics of rats, the traits of rats as laboratory animals, and the characteristics of representative rat strains
- 3) To be able to explain the classification and the morphological, behavioral, and physiological characteristics of hamsters, gerbils, guinea pigs, shrews, and rabbits, and their traits as laboratory animals
- 4) To be able to explain the classification and the morphological, behavioral, and physiological characteristics of dogs, cats, ferrets, pigs, goats, and sheep, and their traits as laboratory animals
- 5) To be able to explain the classification and the morphological, behavioral, and physiological characteristics of monkeys, and their traits as laboratory animals
- 6) To be able to explain the classification and the morphological, behavioral, and physiological characteristics of the main non-mammalian experimental animals, and their traits as laboratory animals

Subject Details

- (8) Microbiological monitoring of laboratory animals

Goals

To understand the significance of microbiological monitoring and the basic principles and measures to control infectious disease in laboratory animals

Objectives

- 1) To understand the significance of microbiological monitoring, and the basic principles and measures for controlling infectious diseases in laboratory animals
- 2) To be able to explain the basic principles and specific methods for controlling infectious disease in laboratory animals

Subject Details

- (9) Infectious disease in laboratory animals

Goals

To understand infectious disease in laboratory animals, including etiology, susceptible animals, epidemiology, routes of infection, clinical symptoms, pathology, diagnosis, prevention, effects on experimental results, and risk of zoonosis

Objectives

- 1) To be able to explain viral infectious disease in laboratory animals, including etiology, susceptible animals, epidemiology, routes of infection, clinical symptoms, pathology, diagnosis, prevention, effects on experimental results, and the risk of zoonosis
- 2) To be able to explain bacterial infectious disease in laboratory animals, including etiology, susceptible animals, epidemiology, route of infection, pathology, diagnosis, prevention, effects on experimental results, and risk of zoonosis
- 3) To be able to explain mycotic, protozoan, and parasitic infectious diseases in laboratory animals, including etiology, susceptible animals, epidemiology, routes of infection, pathology, diagnosis, prevention, effects on experimental results, and risks of zoonosis

Subject Details

(10) Animal models of disease

Goals

To understand the basic concepts and methods of producing animal models of disease, and their characteristics and applications

Objectives

- 1) To be able to explain the essential concepts, production methods, and classification of animal models of disease
- 2) To be able to explain major animal models of disease and their characteristics (relevant disease names, strain names, etc.)

Subject Details

(11) Genetic engineering

Goals

To understand the technologies and applications of genetic engineering, including the creation of transgenic and targeted-gene–modified mice

Objectives

- 1) To be able to explain the creation of transgenic mice, and their applications
- 2) To be able to explain the creation targeted-gene–modified mice, and their applications
- 3) To be able to explain the creation of cloned animals, and their applications
- 4) To be able to explain the key technologies and applications in the genetic engineering field

Lecture 1-13. Veterinary Basic Radiology

Subject Aims

The aim of this subject is to understand basic knowledge of radiation and its biological effects as well as the concept of radiation safety, practical techniques, and applicable laws and regulations in the field of veterinary medicine.

Subject Details

(1) The basic characteristics of ionizing radiation

Goals

To understand the types and properties of ionizing radiation and the interaction of each type of radiation with biological matter

Objectives

- 1) To be able to explain the types of radiation and radioisotopes
- 2) To be able to explain the characteristics of radiation and the how radiation is produced
- 3) To be able to explain the interaction between radiation and biological matter

Subject Details

(2) Radiation measurements and units

Goals

To understand the principles and methods involved in measuring different types of radiation as well as the meaning of different units of radiation

Objectives

- 1) To be able to explain the methods of measuring different types of radiation
- 2) To be able to explain the radioactivity, radiation dose, and units used for protection

Subject Details

3) The biological effects of ionizing radiation

Goals

To understand the effects of radiation on biological matter from biochemistry to whole organisms

Objectives

- 1) To be able to explain the effects of radiation on biochemistry and their underlying mechanisms
- 2) To be able to explain the effects of radiation on cells and their underlying mechanisms
- 3) To be able to explain the difference in radiosensitivity of normal tissues
- 4) To be able to explain the effect of radiation on whole organisms

Subject Details

4) Radiation generators and utilization of radiation in veterinary medicine

Goals

To understand the imaging diagnosis used in veterinary medicine and the related principles as well as radiotherapy equipment and radiation generators

Objectives

- 1) To be able to explain the principle, concepts, and application of X-rays in veterinary medicine
- 2) To be able to explain the apparatus, concepts, and principle of diagnostic ultrasound
- 3) To be able to explain the apparatus, concepts, and principle of nuclear magnetic resonance imaging
- 4) To be able to explain the concept of nuclear medicine
- 5) To be able to explain the principle of radiotherapy and radiation generators in veterinary medicine

Subject Details

- 5) Radiation protection and radiation-related regulations

Goals

To understand the basic safety techniques in the context of veterinary medicine and applicable laws and regulations

Objectives

- 1) To be able to explain the radiation protection methods required for safely and handling radiological equipment and radioisotopes
- 2) To be able to explain the basic concept of radiation protection and safety and applicable laws and regulations

Lecture subjects

Pathological Veterinary Education

Lecture 2-1. Veterinary Pathology

Subject Aims

The aim of this subject is to understand the pathological characteristics, etiology, pathogenesis, classification, and differential diagnoses of animal diseases and to acquire the basic skills necessary to apply this knowledge.

Subject Details

- (1) The history and concept of pathology

Goals

To understand the basic principles of veterinary pathology

Objectives

- 1) To be able to explain the etiology and intrinsic and extrinsic causes of diseases

Subject Details

- (2) The basic mechanisms of cellular injury

Goals

To understand basic mechanism of cellular injury

Objectives

- 1) To be able to explain the causes and mechanisms of cellular injury
- 2) To be able to explain the morphological changes in cells and tissues caused by cellular damage, altered metabolism, and aging
- 3) To be able to explain the morphological features of death in both cells and tissues

Subject Details

- (3) Adaptation and abnormal differentiation of cells

Goals

To understand the processes of adaptation against various stressors and stimuli, as well as abnormal differentiation of cells

Objectives

- 1) To be able to explain the processes of adaptation against various stressors and stimuli as well as abnormal differentiation of cells

Subject Details

- (4) Cell proliferation and the regeneration and repair of tissues and organs

Goals

To understand the mechanisms of cell proliferation and the regeneration and repair of tissues and organs

Objectives

- 1) To be able to explain the mechanism of cell proliferation
- 2) To be able to explain the regenerative ability of stem cells and developed cells, the regenerative processes of bone and peripheral nerve tissues, and the process of wound healing

Subject Details

- (5) Circulatory disorders

Goals

To understand the causes and pathophysiology of the circulatory disorders

Objectives

- 1) To be able to explain the causes and pathophysiology of hyperemia, congestion, ischemia, and hemostasis
- 2) To be able to explain the classification, causes, and pathophysiology of hemorrhage
- 3) To be able to explain the type, etiology, and outcome of thrombosis
- 4) To be able to explain the classification and pathophysiology of embolism and infarction
- 5) To be able to explain the pathophysiology and pathological features of edema and shock

Subject Details

- (6) Inflammation

Goals

To understand the concept, course, and healing process of inflammation

Objectives

- 1) To be able to explain the definition and mechanism of inflammation
- 2) To be able to explain inflammatory cells
- 3) To be able to explain the difference between acute and chronic inflammation and their respective courses
- 4) To be able to explain the classification and pathological features of inflammation
- 5) To be able to explain the pathological features of allergy types I–IV
- 6) To be able to explain the pathological features of auto-immune diseases and immunodeficiency

Subject Details

- (7) Tumor (neoplasia)

Goals

To understand abnormal cell proliferation and the definition and classification of tumors

Objectives

- 1) To be able to explain the definition and classification of tumors pathologically
- 2) To be able to explain the causes of tumors and tumorigenesis
- 3) To be able to explain the metastatic patterns and systemic effects of tumors
- 4) To be able to explain the pathological features of representative tumors in animals

Subject Details

(8) Chromosomal, genetic, and developmental abnormalities

Goals

To understand the concept and classification of congenital abnormalities

Objectives

- 1) To be able to explain malformations caused by genetic, infectious, chemical, and physical factors

Subject Details

(9) Pathology of the cardiovascular system

Goals

To understand the pathological features of cardiovascular diseases

Objectives

- 1) To be able to explain the pathological features of congenital cardiac diseases
- 2) To be able to explain the pathological features of diseases of the base of the heart and the pericardium
- 3) To be able to explain the pathological features of myocardial diseases
- 4) To be able to explain the pathological features of diseases in the endocardium and conducting system of the heart
- 5) To be able to explain the lesions of arteries, veins, and lymphatic vessels

Subject Details

(10) Pathology of the hematopoietic system

Goals

To understand the pathological features of hematopoietic diseases

Objectives

- 1) To be able to explain the pathological features of bone marrow
- 2) To be able to explain the pathological features of lymph adenitis
- 3) To be able to explain the pathological features of lymphocytic and other hematopoietic tumors
- 4) To be able to explain the pathological features of splenic lesions

Subject Details

(11) Pathology of the thoracic and abdominal cavities

Goals

To understand the pathological features of disease in thoracic and abdominal cavities

Objectives

- 1) To be able to explain the pathological features of diseases in the thoracic and abdominal cavities

Subject Details

(12) Pathology of the respiratory system

Goals

To understand the pathological features of respiratory diseases

Objectives

- 1) To be able to explain the pathological features of inflammatory and proliferative disorders in the upper respiratory tract
- 2) To be able to explain the pathological features of pneumonia, bronchitis, and respiratory proliferative disorders

Subject Details

(13) Pathology of the digestive system

Goals

To understand the pathological features of diseases of the digestive system

Objectives

- 1) To be able to explain the pathological features of inflammatory diseases in the oral cavity (mucosa, teeth, salivary glands)
- 2) To be able to explain the pathological features of proliferative diseases in the oral cavity (mucosa, teeth, salivary glands)
- 3) To be able to explain the pathological features of esophageal and gastric diseases
- 4) To be able to explain the pathological features of diseases of the small and large intestines

Subject Details

(14) Pathology of the liver and pancreas

Goals

To understand the pathological features of hepatic and pancreatic diseases

Objectives

- 1) To be able to explain the pathological features of congenital, degenerative, and circulatory disorders in the liver
- 2) To be able to explain the definition, classification, and pathological features of hepatitis
- 3) To be able to explain the pathological features of liver fibrosis, cirrhosis, hepatic tumors, and bile duct lesions
- 4) To be able to explain the pathological features of pancreatic exocrine lesions
- 5) To be able to explain the pathological features of pancreatic islet lesions

Subject Details

(15) Pathology of the urinary system

Goals

To understand the pathological features of renal and other urinary diseases

Objectives

- 1) To be able to explain congenital, degenerative, and circulatory disorders of the kidney
- 2) To be able to explain the causes, mechanisms, and classification of glomerular nephritis
- 3) To be able to explain the pathological features of tubular and interstitial lesions
- 4) To be able to explain the pathological features of ureteral, bladder, and urethral lesions

Subject Details

(16) Pathology of the reproductive system

Goals

To understand the pathological features of the genital diseases

Objectives

- 1) To be able to explain the pathological features of male genital lesions
- 2) To be able to explain the pathological features of female genital lesions.
- 3) To be able to explain the pathological features of abnormal delivery (spontaneous abortion, stillbirth, etc.)
- 4) To be able to explain the pathological features of lesions of the mammary gland

Subject Details

(17) Pathology of the nervous system

Goals

To understand the pathological features of neurological diseases

Objectives

- 1) To be able to explain basic pathological changes in the nervous system
- 2) To be able to explain the pathological features of congenital and degenerative brain disorders
- 3) To be able to explain the classifications and pathological features of encephalitis and meningitis
- 4) To be able to explain the pathological features of representative tumors in the brain and spinal cord
- 5) To be able to explain the pathological features of disorders in the spinal cord and peripheral nerves

Subject Details

(18) Pathology of the sensory organs

Goals

To understand the pathological features of diseases of the visual and auditory systems

Objectives

- 1) To be able to explain the pathological features of ocular diseases
- 2) To be able to explain the pathological features of otologic diseases

Subject Details

(19) Pathology of the endocrine system

Goals

To understand the pathological features of endocrine and metabolic diseases

Objectives

- 1) To be able to explain the pathological features of disorders of the pituitary gland
- 2) To be able to explain the pathological features of disorders of the thyroid and parathyroid glands
- 3) To be able to explain the pathological features of adrenal diseases

Subject Details

(20) Pathology of bones and muscles

Goals

To understand the pathological features of diseases of bones and muscles

Objectives

- 1) To be able to explain the classifications and pathological features of bone diseases
- 2) To be able to explain the causes and pathological features of articular diseases
- 3) To be able to explain the basic pathological changes in skeletal muscles
- 4) To be able to explain the pathological features of muscular disorders

Subject Details

(21) Pathology of the integumentary system

Goals

To understand the pathological features of skin diseases

Objectives

- 1) To be able to explain the basic pathological changes in the skin
- 2) To be able to explain the pathological features of representative skin diseases
- 3) To be able to explain the pathological features of representative skin tumors

Lecture 2-2. Veterinary Immunology

Subject Aims

The aim of this subject is to understand the mechanisms of self- vs. non-self-recognition in the context of immune response, which has an important role in biological processes ranging from homeostatic maintenance to the development and progression of disease. In addition, students should develop practical skills necessary for relating immunology with other subjects.

Subject Details

- (1) History of immunology and functions of immunocompetent cells

Goals

To understand the fundamental discoveries in the field of immunology as well as the basic functions of immune cells

Objectives

- 1) To be able to explain the fundamental discoveries in the field of immunology and the basic functions of immune cells

Subject Details

- (2) Concepts of immunology

Goals

To understand the basic mechanisms and functions of innate and acquired immunity

Objectives

- 1) To be able to explain the concept of self vs. non-self
- 2) To be able to explain innate immunity
- 3) To be able to explain acquired immunity
- 4) To be able to explain humoral immune response
- 5) To be able to explain cellular immune response

Subject Details

- (3) Defense mechanism in innate immunity

Goals

To understand the defense mechanism in innate immunity common to all living organisms

Objectives

- 1) To be able to explain physical/chemical barriers against microbial invasion
- 2) To be able to explain the basics of the recognition of molecular patterns by innate immune cells

Subject Details

- (4) Innate immunity against infections

Goals

To understand the defense mechanism of innate immunity against infections

Objectives

- 1) To be able to explain the process by which infections initiate at the site of microbial invasion, including inflammatory responses
- 2) To be able to explain the defense mechanism in innate immunity caused by phagocytes, complements, and natural killer cells

Subject Details

- (5) The role of B cells in acquired immunity

Goals

To understand the structures of antibodies and roles of antibodies and B cells in acquired immunity

Objectives

- 1) To be able to explain the types and roles of antibody molecules
- 2) To be able to explain the differentiation and maturation of B cells

Subject Details

- (6) The role of the major histocompatibility complex (MHC) molecules and antigen-presenting cells in acquired immunity

Goals

To understand the structures and roles of MHC molecules in antigen-presenting cells and their interaction with T cells

Objectives

- 1) To be able to explain the diversity and structures of MHC molecules and the types and characteristics of antigen-presenting cells
- 2) To be able to explain antigen-presenting process and interaction of antigen-presenting cells with T cells

Subject Details

- (7) The role of T cells in acquired immunity

Goals

To understand T cell receptors (TCRs) and roles of T cells in acquired immunity

Objectives

- 1) To be able to explain the structure of TCR, and the mechanisms for antigen-recognition and activation of T cells

Subject Details

- (8) Acquired immunity against infections

Goals

To understand how the cells and molecules of acquired immunity eliminate pathogens and establish long-term protective immunity

Objectives

- 1) To be able to explain protective immunity against viral infections
- 2) To be able to explain protective immunity against bacterial infections and infections by protozoa, worms, and ticks

Subject Details

- (9) Failure of the host defense system (immunodeficiency and allergies)

Goals

To understand the basic mechanisms of immunodeficiency and allergies

Objectives

- 1) To be able to explain the types and causes of different kinds of immunodeficiency and allergies

Subject Details

- (10) Tumor immunology

Goals

To understand the immune response to tumors and mechanisms of evasion from the immune system by tumors

Objectives

- 1) To be able to explain the characteristics of the immune response to tumors and how tumors evade the immune system

Subject Details

- (11) Transplantation immunology

Goals

To understand the mechanism of immunological rejection of transplanted cells and organs

Objectives

- 1) To be able to explain the mechanism of immunological rejection of transplanted cells and organs

Subject Details

- (12) Specific characteristics present in the immune system of animal species

Goals

To understand differences in immune systems among animal species

Objectives

- 1) To be able to explain differences in cell types, molecules, and mechanisms of the immune system among animal species

Subject Details

(13) Vaccines

Goals

To understand the different types of vaccines and their mechanisms of action

Objectives

- 1) To be able to explain the different types of vaccines and their mechanisms of action

Subject Details

(14) Immunodiagnostic techniques

Goals

To understand the immunodiagnostic techniques

Objectives

- 1) To be able to explain immunodiagnostic techniques that use antibodies

Lecture 2-3. Veterinary Microbiology

Subject Aims

The aim of this subject is to understand the basics of microbes in the context of veterinary science, including classification, microstructure, ecology, growth and development, modes of transmission, and effects on infected hosts as well as the causes of animal infections and zoonotic diseases, including interspecies differences, chemotherapy and resistance, normal flora, and sterilization and disinfection.

Subject Details

(1) History of microbiology

Goals

To understand the history of microbiology

Objectives

- 1) To be able to explain the history of bacteriology, including treatment and prevention
- 2) To be able to explain the history of virology, including treatment and prevention

Subject Details

(2) Bacterial classification and microstructure

Goals

To understand the basics and significance of bacterial classification and the structure of bacterial cells, and how they differ from eukaryotic cells

Objectives

- 1) To be able to explain the taxonomy, classification, identification, nomenclature, and typing of bacteria
- 2) To be able to explain the morphology, structure, and function of bacteria

Subject Details

(3) Bacterial growth and metabolism

Goals

To understand the structure and function of bacteria as well as their growth and metabolism, and how they differ from eukaryotic cells

Objectives

- 1) To be able to explain the conditions necessary for bacterial growth, the kinetics of their growth, and their substance acquisition mechanisms
- 2) To be able to explain the catabolic and anabolic metabolism and secretory mechanisms of proteins

Subject Details

(4) Bacterial genetics

Goals

To understand bacterial genetic phenomena, including the expression and regulation of bacterial genes, and how they differ from eukaryotic cells on

Objectives

- 1) To be able to explain the structure and replication of bacterial genomes, plasmids, and bacteriophages
- 2) To be able to explain the mechanisms of genetic mutations and horizontal gene transfer
- 3) To be able to explain the basic constitution of genes, factors related to gene expression, and their regulatory systems

Subject Details

(5) Bacterial infection and development

Goals

To understand the mechanisms by which bacteria infect animals, the maintenance of infection status, and the processes leading to the onset of disease as well as the physicochemical basis of toxins produced by bacteria and their effects on living organisms

Objectives

- 1) To be able to explain mechanisms of infection, infectious diseases and pathogenicity, and defense mechanisms of infection on living organisms

Subject Details

(6) Special bacteriology

Goals

To understand the properties of various bacteria and the diseases they cause

Objectives

- 1) To be able to explain the pathogenic bacteria belonging to *Enterobacteriaceae*, *Vibrionaceae* and *Aeromonadaceae* and their infectious diseases
- 2) To be able to explain Gram-negative facultative anaerobic non-spore-forming bacteria and other Gram-negative bacteria (including *Pasteurellaceae*) and their infections
- 3) To be able to explain spiral bacteria, spirochetes (*Spirochaetales*, *Leptospiraceae*), and their infectious diseases
- 4) To be able to explain Gram-positive cocci and their infectious diseases
- 5) To be able to explain Gram-positive spore-forming and non-spore-forming bacilli and their infectious diseases
- 6) To be able to explain bacteria belonging to the genus *Mycobacterium* and in the phylum *Actinobacteria*, and their infectious diseases
- 7) To be able to explain the order *Legionellales* (including *Coxiella*), mycoplasma, rickettsia, chlamydia, and their infectious diseases

Subject Details

(7) General characteristics and classification of viruses

Goals

To understand the structure of viruses and the classification of animal viruses

Objectives

- 1) To be able to explain the differences between viruses and other microorganisms
- 2) To be able to explain the structure and chemical composition of virus particles
- 3) To be able to explain the criteria used for classification of viruses and the viruses important in the veterinary clinical setting

Subject Details

(8) Viral growth and mutation

Goals

To understand the viral propagation cycle and characteristics

Objectives

- 1) To be able to explain the method for culturing viruses and the change in cells caused by the propagation of viruses
- 2) To be able to explain the virus quantification method
- 3) To be able to explain the viral growth process and its infection mode at the cell level
- 4) To be able to explain the interactions at the gene and protein levels associated with virus co-infection
- 5) To be able to explain the mechanisms of viral mutation and evolution

Subject Details

(9) Viral infection and development in the host

Goals

To understand the onset mechanism leading to viral infection, the mode of infection, and the host immune mechanism for recovery from infection

Objectives

- 1) To be able to explain the processes of invasion, propagation, and release of viruses in hosts
- 2) To be able to explain the onset mechanism and mode of viral infection in hosts
- 3) To be able to explain the oncogenic mechanism of viruses
- 4) To be able to explain the immune system response of the host to recover from a viral infection

Subject Details

(10) Special virology and prions

Goals

To understand the properties of various viruses and the diseases they cause

Objectives

- 1) To be able to explain polyomavirus, papillomavirus, adenovirus, and their infectious diseases
- 2) To be able to explain herpesvirus and its infectious diseases
- 3) To be able to explain poxvirus, asfarvirus, iridovirus, and their infectious diseases
- 4) To be able to explain parvovirus, circovirus, anellovirus, and their infectious diseases
- 5) To be able to explain hepadnavirus, kolmiovirus, and their infectious diseases
- 6) To be able to explain reovirus, birnavirus, picobirnavirus, and their infectious diseases
- 7) To be able to explain picornavirus and its infectious diseases
- 8) To be able to explain calicivirus, hepevirus, astrovirus, nodavirus, and their infectious diseases
- 9) To be able to explain flavivirus, togavirus, matonavirus, and their infectious diseases
- 10) To be able to explain coronavirus, tobanivirus, arterivirus, and their infectious diseases
- 11) To be able to explain paramyxovirus, pneumovirus, rhabdovirus, filovirus, bornavirus, and their infectious diseases
- 12) To be able to explain orthomyxovirus, bunyavirales, arenavirus, and their infectious diseases
- 13) To be able to explain retrovirus and its infectious diseases
- 14) To be able to explain prions and their infectious diseases

Subject Details

(11) Mycology

Goals

To understand the characteristics of fungi and their infectious diseases

Objectives

- 1) To be able to explain the morphology and functions of fungal cells and their life cycle and classification
- 2) To be able to explain the classification of fungal infections, the microbiological characteristics of fungal species, and the symptoms of infected hosts

Subject Details

(12) Microbial sterilization and disinfection

Goals

To understand the differences between sterilization and disinfection, their respective characteristics, and the appropriate use of various sterilization and disinfection methods

Objectives

- 1) To be able to explain the definition and significance of sterilization, and the principles and characteristics of various sterilization methods
- 2) To be able to explain the difference between disinfection and sterilization, the significance of disinfection, and the comparative advantages and disadvantages of various disinfection methods

Subject Details

(13) The treatment of infectious diseases

Goals

To understand the treatment of bacterial and viral infections

Objectives

- 1) To be able to explain the types of antimicrobial agents, and their mechanisms of action and resistance.
- 2) To be able to explain the appropriate selection and use of antimicrobial agents for bacterial infections and their related problems
- 3) To be able to explain the principles and characteristics of antiviral drugs

Subject Details

(14) The prevention of infectious diseases

Goals

To understand various vaccines and vaccinations

Objectives

- 1) To be able to explain the types and characteristics of vaccines and their respective side effects
- 2) To be able to explain vaccines against bacterial and viral infections

Lecture 2-4. Poultry Diseases

Subject Aims

The aims of this subject are to understand poultry disease in the context of the poultry industry and hygiene management.

Subject Details

(1) Summary of poultry industry and hygiene management

Goals

To understand the characteristics of the poultry industry relevant to veterinary science

Objectives

- 1) To be able to explain the characteristics of the poultry industry relevant to veterinary science, including management of parent stocks, hatching, introduction of hatchlings, rearing, harvest and slaughter, and hygiene management

Subject Details

(2) Viral infectious diseases in chickens

Goals

To understand the major infectious diseases caused by viruses in chickens

Objectives

- 1) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of monitored viral diseases in chickens
- 2) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of major viral diseases other than the monitored viral diseases in chickens

Subject Details

(3) Bacterial infectious diseases and mycoses in chickens

Goals

To understand the major infectious diseases caused by bacteria and fungi in chickens

Objectives

- 1) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of monitored bacterial diseases in chickens
- 2) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of major bacterial diseases other than the monitored bacterial diseases in chickens
- 3) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of the major mycoses in chickens

Subject Details

(4) Protozoan diseases in chickens

Goals

To understand the major protozoan diseases in chickens

Objectives

- 1) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of the major protozoan diseases in chickens

Subject Details

- (5) Parasitic diseases in chickens

Goals

To understand the major parasitic diseases in chickens

Objectives

- 1) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of the major ectoparasitic diseases in chickens
- 2) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of the major helminthic diseases in chickens

Subject Details

- (6) Non-infectious diseases in chickens

Goals

To understand the major non-infectious diseases in chickens

Objectives

- 1) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of the major circulatory, nutritional, and metabolic disorders in chickens
- 2) To be able to explain the causes, symptoms, pathology, diagnoses, and prevention of toxicosis in chickens

Lecture 2-5. Animal Infectious Diseases

Subject Aims

The aim of this subject is to understand the control of infectious diseases in animals, including factors related to the occurrence, spread, transmission mode, and mechanism of pathogenesis; the diagnosis, prevention, and treatment of infectious diseases; the etiology, epidemiology, pathophysiology, biological defense, diagnosis, treatment, and prophylaxis of infectious diseases in food-producing and companion animals; and the Act on Domestic Animal Infectious Diseases Control and other applicable laws and regulations.

Subject Details

- (1) The occurrence and pathogenesis of infectious diseases and the transmission and spread of pathogens

Goals

To understand the definition, occurrence, and pathogenesis of infectious diseases, and the transmission of infectious diseases in susceptible populations

Objectives

- 1) To be able to explain the concept of infectious diseases
- 2) To be able to explain factors of the occurrence of infectious diseases
- 3) To be able to explain mechanisms of the pathogenesis of infectious diseases
- 4) To be able to explain transmission and persistence of infectious diseases in susceptible populations

Subject Details

- (2) Diagnosis and examination of infectious diseases and biohazard countermeasures

Goals

To understand the diagnosis and examination of infectious diseases and biohazard issues related to the containment of pathogens

Objectives

- 1) To be able to explain basics principles of diagnosing infectious diseases
- 2) To be able to explain collection and handling of specimens that are required for laboratory diagnosis
- 3) To be able to explain laboratory diagnoses of infectious diseases
- 4) To be able to explain biosafety measures for the prevention of the spread of infectious diseases and containment of pathogens

Subject Details

- (3) Prevention and treatment of infectious diseases

Goals

To understand the prevention and treatment of infectious diseases

Objectives

- 1) To be able to explain preventive measures against infection in individuals
- 2) To be able to explain the strategy for prevention of infection in populations
- 3) To be able to explain prudent use of antibiotics in animals and the mechanism and prevention of antimicrobial-resistant bacteria

Subject Details

- (4) The control of infectious diseases

Goals

To understand the control of infectious diseases

Objectives

- 1) To be able to explain outline of control measures for infectious diseases
- 2) To be able to explain outline of laws related to infectious disease control
- 3) To be able to propose and explain control measures and eradication way against infectious diseases

Subject Details

- (5) Animal infectious diseases defined as domestic animal infectious diseases in the Act on Domestic Animal Infectious Diseases Control

Goals

To understand the characteristics and control measures for the infectious diseases defined as domestic animal infectious diseases in the Act on Domestic Animal Infectious Diseases Control, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain animal infectious diseases defined as domestic animal infectious diseases in the Act on Domestic Animal Infectious Diseases Control in mammals and honeybees

Subject Details

- (6) Notifiable infectious diseases in cattle defined by Act on Domestic Animal Infectious Diseases Control

Goals

To understand the characteristics and control measures for infectious diseases in cattle that are defined by the Act on Domestic Animal Infectious Diseases Control, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain notifiable infectious diseases in cattle defined by the Act on Domestic Animal Infectious Diseases Control

Subject Details

- (7) Notifiable infectious diseases in sheep and goats defined by the Act on Domestic Animal Infectious Diseases Control

Goals

To understand the characteristics and control measures for each notifiable infectious disease in sheep and goats that are defined by the Act on Domestic Animal Infectious Diseases Control, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain notifiable infectious diseases in sheep and goats defined by the Act on Domestic Animal Infectious Diseases Control

Subject Details

- (8) Notifiable infectious diseases in pigs defined by the Act on Domestic Animal Infectious Diseases Control

Goals

To understand the characteristics and control measures for each notifiable infectious disease in pigs that are defined by the Act on Domestic Animal Infectious Diseases Control, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain notifiable infectious diseases in pigs defined by the Act on Domestic Animal Infectious Diseases Control

Subject Details

- (9) Notifiable infectious diseases in horses defined by Act on Domestic Animal Infectious Diseases Control

Goals

To understand the characteristics and control measures for each notifiable infectious disease in horses that are defined by the Act on Domestic Animal Infectious Diseases Control, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis.

Objectives

- 1) To be able to explain notifiable infectious diseases in horses defined by the Act on Domestic Animal Infectious Diseases Control

Subject Details

- (10) Infectious diseases in cattle other than monitored infectious diseases defined by the Act on Domestic Animal Infectious Diseases Control (Monitored infectious diseases in the Act includes the domestic animal infectious diseases and notifiable infectious diseases in the Act)

Goals

To understand the characteristics and control measures for infectious diseases in cattle other than monitored infectious diseases defined by the Act on Domestic Animal Infectious Diseases Control, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment and prophylaxis

Objectives

- 1) To be able to explain important infectious diseases in cattle other than monitored infectious diseases defined by the Act on Domestic Animal Infectious Diseases Control. (Monitored infectious diseases in the Act includes the domestic animal infectious diseases and notifiable infectious diseases in the Act.)

Subject Details

- (11) Infectious diseases in pigs other than monitored infectious diseases defined by the Act on Domestic Animal Infectious Diseases Control

Goals

To understand the characteristics and control measures for infectious diseases in pigs other than monitored infectious diseases, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain important infectious diseases in pigs other than monitored infectious diseases

Subject Details

- (12) Infectious diseases in horses other than monitored infectious diseases defined by the Act on Domestic Animal Infectious Diseases Control

Goals

To understand the characteristics and control measures for infectious diseases in horses other than monitored infectious diseases, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain important infectious diseases in horses other than monitored infectious diseases

Subject Details

- (13) Monitored infectious diseases in honeybees and rabbits

Goals

To understand the characteristics and control measures for notifiable infectious diseases in honeybees and rabbits that are defined by the Act on Domestic Animal Infectious Diseases Control, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain notifiable infectious diseases in honeybees defined by the Act on Domestic Animal Infectious Diseases Control.
- 2) To be able to explain notifiable infectious diseases in rabbits defined by the Act on Domestic Animal Infectious Diseases Control.

Subject Details

(14) Infectious diseases in dogs

Goals

To understand the characteristics and control measures for infectious diseases in dogs, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain notifiable infectious diseases in dogs defined by the Act on Domestic Animal Infectious Diseases Control and important infectious diseases in dogs

Subject Details

(15) Infectious diseases in cats

Goals

To understand the characteristics and control measures for infectious diseases in cats, through the learning of etiology, epidemiology, pathophysiology, clinical symptoms, diagnosis, treatment, and prophylaxis

Objectives

- 1) To be able to explain important infectious diseases in cats

Lecture 2-6. Veterinary and Clinical Parasitology

Subject Aims

The aim of this subject is to understand the classification, morphologies, life cycles, pathogenicities, epidemic conditions, epidemiology, diagnoses, treatments, prophylaxes, and protective mechanisms of hosts with respect to the parasites relevant to clinical veterinary medicine and public health, as well as the mechanisms underlying their occurrence and methods of considering protective countermeasures.

Subject Details

(1) Introduction to general and clinical parasitology

Goals

To understand the basics of parasitology, including the key terms associated with parasitism and parasitic biology; the host–parasite relationship; and the development, mechanism of aggravation, diagnosis, treatment, and prevention of parasitic disease

Objectives

- 1) To be able to explain parasitic phenomenon, classification of parasites, and the life cycle, development, and reproduction of each parasite
- 2) To be able to explain the diagnosis, examination, treatment, and prophylaxes for parasitic diseases (parasite infection)
- 3) To be able to explain the interaction between the pathogenesis of parasites and parasitic diseases, the characteristics of the host defense system against parasitic infection, and larva migrans

Subject Details

(2) Introduction to protozoa

Goals

To understand the biological characteristics and infectious diseases of protozoa relevant to clinical veterinary medicine and public health

Objectives

- 1) To be able to explain the classification, morphological characteristics, development (morphological change), and reproduction of protozoa

Subject Details

(3) Detailed explanation of Protozoa I (Amoebozoa and Excavata)

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important protozoan species in Amoebozoa and Excavata

Objectives

- 1) To be able to explain *Entamoeba histolytica*
- 2) To be able to explain *Giardia intestinalis*, *Histomonas meleagridis*, and *Tritrichomonas foetus*

- 3) To be able to explain *Trypanosoma cruzi*, *T. brucei*, *T. evansi*, and *Leishmania* spp.

Subject Details

- (4) Detailed explanation of Protozoa II (SAR [Apicomplexa])

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important protozoan species in Apicomplexa

Objectives

- 1) To be able to explain *Eimeria* spp., *Cystoisospora* spp., and *Cryptosporidium* spp.
- 2) To be able to explain *Toxoplasma gondii*, *Nesopora caninum*, and *Sarcocystis* spp.
- 3) To be able to explain *Theileria* spp. and *Babesia* spp. that cause piroplasmosis
- 4) To be able to explain *Leucocytozoon caulleryi*

Subject Details

- (5) Detailed explanation of Protozoa III (Opisthokonta)

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important protozoan species in Opisthokonta

Objectives

- 1) To be able to explain *Nosema apis*

Subject Details

- (6) Introduction to Trematoda

Goals

To understand the biological characteristics and infectious diseases of the important Trematoda in clinical veterinary medicine and public health

Objectives

- 1) To be able to explain the classification, morphological characteristics, development (morphological change), and reproduction of Trematoda

Subject Details

- (7) Detailed explanation for Trematoda

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important Trematoda species

Objectives

- 1) To be able to explain *Fasciola* spp.
- 2) To be able to explain *Eurytrema* spp. and *Dicrocoelium* spp.

- 3) To be able to explain *Paragonimus westermani*
- 4) To be able to explain *Clonorchis sinensis*

Subject Details

(8) Introduction for Cestoda

Goals

To understand the biological characteristics and infectious diseases of the important Cestoda in clinical veterinary medicine and public health

Objectives

- 1) To be able to explain the classification, morphological characteristics, development (morphological change), and reproduction of Cestoda

Subject Details

(9) Detailed explanation for Cestoda

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important Cestoda species

Objectives

- 1) To be able to explain *Spirometra erinaceieuropaei*
- 2) To be able to explain *Moniezia benedeni*, *M. expansa*, and *Anoplocephala perfoliata*
- 3) To be able to explain *Dipylidium caninum*
- 4) To be able to explain *Taenia solium* and *T. saginata*
- 5) To be able to explain *Echinococcus multilocularis* and *E. granulosus*

Subject Details

(10) Introduction for Nematoda

Goals

To understand the biological characteristics and infectious diseases of the important Nematoda in clinical veterinary medicine and public health

Objectives

- 1) To be able to explain the classification, morphological characteristics, development (morphological change), and reproduction of Nematoda

Subject Details

(11) Detailed explanation of Nematoda I (Secernentea [=Phasmodia])

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important Secernentea (Phasmodia) species

Objectives

- 1) To be able to explain *Strongylus vulgaris*, *S. edentatus*, and *S. equinus*
- 2) To be able to explain *Haemonchus contortus*, *Ostertagia ostertagi*, and *Mecistocirrus digitatus*
- 3) To be able to explain *Ancylostoma caninum* and *Bunostomum phlebotomum*
- 4) To be able to explain *Dictyocaulus viviparus* and *Metastrongylus elongatus*
- 5) To be able to explain *Strogylodes stercoralis* and *S. papillosus*
- 6) To be able to explain *Ascaris suum*, *Toxocara canis*, *T. cati*, *Toxascaris leonina*, and the family of Anisakidae (*Anisakis* spp., *Pseudoterranova* spp., and *Contracaecum* spp.)
- 7) To be able to explain *Dirofilaria immitis* and *Setaria digitata*

Subject Details

(12) Detailed explanation of Nematoda II (Adenophrea [=Aphasmidia])

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important Adenophrea (Aphasmidia) species

Objectives

- 1) To be able to explain *Trichuris vulpis* and *T. suis*
- 2) To be able to explain *Trichinella* spp.

Subject Details

(13) Introduction for Arthropods

Goals

To understand the classification, morphological characteristics, development (morphological change), reproduction, the relationship and control of important arthropods (especially insects, ticks, and mites) in clinical veterinary medicine and public health

Objectives

- 1) To be able to explain the classification, morphological characteristics, development (morphological change), and reproduction of arthropods (especially insects, ticks, and mites)
- 2) To be able to explain the relationship between arthropods and veterinary hygiene

Subject Details

(14) Detailed explanation for Arthropods I (Acarina)

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important tick and mite species

Objectives

- 1) To be able to explain *Rhipicephalus (Boophilus) microplus* and *Haemaphysalis longicornis*
- 2) To be able to explain *Sarcoptes scabiei* and *Psoroptes ovis*
- 3) To be able to explain *Ornithonyssus sylviae* and *Dermanyssus gallinae*
- 4) To be able to explain *Varroa destructor* and *Acarapis woodi*

Subject Details

(15) Detailed explanation of Arthropods II (Insects)

Goals

To understand the biology, epidemiology, etiology, pathology, and disease control of the important insect species

Objectives

- 1) To be able to explain fleas, lice, and biting lice
- 2) To be able to explain mosquitoes, black flies, biting midges, gadflies (horse flies, deer flies), biting flies, louse flies, and tsetse flies
- 3) To be able to explain horse bot-flies, cattle warble-flies, sheep blow flies, and myiasis

Lecture subjects

Applied Veterinary Medicine

Lecture 3-1. Fish Medicine

Subject Aims

The aim of this subject is to understand the diagnoses, prevention, and treatment of fish diseases by infectious and non-infectious causes and their pathogenesis and epidemiology as well as to develop basic skills for clinical diagnoses, treatments using antibiotics, vaccination and international epidemiological certifications that are applicable to clinical workups of companion animals and exhibited animals at zoos and aquaria.

Subject Details

- (1) Basic knowledge of fish aquaculture

Goals

To understand the basic phylogenetic classification and methods used for the aquaculture of major fish species

Objectives

- 1) To be able to explain the basic phylogenetic classification of major aquaculture fish species
- 2) To be able to explain the equipment and systems for the aquaculture and rearing of major fish species

Subject Details

- (2) Fish anatomy and physiology

Goals

To understand the external and internal anatomy, histology, and physiology of major fish species

Objectives

- 1) To be able to explain structures and functions of the musculoskeletal system of major fish species
- 2) To be able to explain structures and functions of the dermal system of major fish species
- 3) To be able to explain structures and functions of the gills of major fish species
- 4) To be able to explain structures and functions of the cardiovascular system of major fish species
- 5) To be able to explain structures and functions of the digestive system of major fish species
- 6) To be able to explain structures and functions of the endocrine system of major fish species
- 7) To be able to explain structures and functions of the urinary system of major fish species
- 8) To be able to explain structures and functions of the reproductive system of major fish species
- 9) To be able to explain structures and functions of the hematopoietic/lymphoid system of major fish species
- 10) To be able to explain structures and functions of the nervous system of major fish species
- 11) To be able to explain structures and functions of the sensory system of major fish species
- 12) To be able to explain structures and functions of the swim bladder of major fish species

Subject Details

- (3) Immunology of the teleosts

Goals

To understand the immune system and self-defense mechanisms of the teleosts against various pathogens

Objectives

- 1) To be able to explain the cellular and humoral factors of the teleost immune system
- 2) To be able to explain the characteristics of the teleost immune system

Subject Details

- (4) Essential concepts and knowledge of legal regulations and clinical medicine for major fish species

Goals

To understand the legal regulations and basic clinical examinations and procedures of major fish species

Objectives

- 1) To be able to explain the legal regulations relating to the aquaculture of major fish species
- 2) To be able to explain the restraint (analgesis/anesthesia), euthanasia and diagnostic procedures of major fish species
- 3) To be able to explain disease treatment and prevention procedures, including vaccinations, of major fish species

Subject Details

- (5) Viral diseases

Goals

To understand the pathogenicity, pathogenesis, clinical history, epidemiology, diagnosis, and prevention of each major viral pathogen of fish

Objectives

- 1) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each viral disease of major fish species
- 2) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each viral disease of major crustacean species
- 3) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each imported viral disease of fish

Subject Details

- (6) Bacterial diseases

Goals

To understand the pathogenicity, pathogenesis, clinical history, epidemiology, diagnosis, treatment, and prevention of each major bacterial pathogen of fish

Objectives

- 1) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each gram-positive bacterial disease of major fish species
- 2) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each gram-negative bacterial disease of major fish species

Subject Details

(7) Fungal diseases

Goals

To understand the pathogenicity, pathogenesis, clinical history, epidemiology, diagnosis, treatment, and prevention of each major fungal pathogen of fish

Objectives

- 1) To be able to explain the pathogen, clinical history, epidemiology, diagnosis and prevention of each fungal disease due to water mold of major fish species
- 2) To be able to explain the pathogens, clinical histories, epidemiology, diagnoses, and preventions of other fungal diseases of major fish species

Subject Details

(8) Microsporidian diseases

Goals

To understand the pathogenicity, pathogenesis, clinical history, epidemiology, diagnosis, treatment and prevention of each major microsporidian pathogen of fish

Objectives

- 1) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each microsporidian disease of major fish species

Subject Details

(9) Protozoan diseases

Goals

To understand the pathogenicity, pathogenesis, clinical history, epidemiology, diagnosis, treatment, and prevention of each major protozoan pathogen of fish

Objectives

- 1) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each flagellate and ciliate disease of major fish species

Subject Details

(10) Myxozoan diseases

Goals

To understand the pathogenicity, pathogenesis, clinical history, epidemiology, diagnosis, treatment, and prevention of each major myxozoan pathogen of fish

Objectives

- 1) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each myxozoan disease of major fish species
- 2) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, prevention, and treatment of each imported myxozoan fish disease

Subject Details

(11) Larger parasitic infestation/infection

Goals

To understand the pathogenicity, pathogenesis, clinical history, epidemiology, diagnosis, treatment, and prevention of each major monogenean, trematode, nematode, acanthocephalan and crustacean pathogen of fish

Objectives

- 1) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each monogenean disease of major fish species
- 2) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each trematode disease of major fish species
- 3) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each nematode disease of major fish species
- 4) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each acanthocephalan disease of major fish species
- 5) To be able to explain the pathogen, clinical history, epidemiology, diagnosis, and prevention of each crustacean disease of major fish species

Subject Details

(12) Miscellaneous diseases

Goals

To understand the pathogenesis, clinical history, diagnosis, treatment, and prevention of each miscellaneous (nutritional, environmental, and neoplastic) fish disease

Objectives

- 1) To be able to explain the pathogenesis, clinical history, diagnosis, and prevention of each nutritional disease of major fish species
- 2) To be able to explain the pathogenesis, clinical history, diagnosis, and prevention of each environmental disease of major fish species
- 3) To be able to explain the pathogenesis, clinical history, diagnosis, and prevention of each neoplastic disease of major fish species

Lecture 3-2. Animal Hygiene

Subject Aims

The aim of this subject is to understand the necessity and importance of disease prevention and eradication, rearing environments, and food hygiene administration to secure safe livestock products and rear healthy production animals while securing livestock productivity using animal welfare-based approaches as well as the laws related to disease control.

Subject Details

(1) Overview of livestock hygiene

Goals

To understand the principles, significance, roles of animal husbandry and livestock hygiene

Objectives

- 1) To be able to explain animal husbandry and history of livestock hygiene
- 2) To be able to explain livestock production-related issues from the perspective of public health and food hygiene in the food chain
- 3) To be able to explain the current situation with regard to animal disease and production disease, starting with farm animals

Subject Details

(2) Domestic (Japanese) and international controls for livestock infectious diseases

Goals

To understand domestic (Japanese) and international controls for livestock infectious diseases

Objectives

- 1) To be able to explain the guidelines and organizations related to disease control in Japan based on the Act on Domestic Animal Infectious Diseases Control, the prevalence of infectious diseases in domestic livestock, and the relevant control programs
- 2) To be able to explain international trends in livestock infectious diseases, and the system for preventing the invasion of transboundary animal diseases
- 3) To be able to explain the guidelines on specific livestock infectious diseases
- 4) To be able to explain the infectious diseases listed by the World Organization for Animal Health (OIE) as well as the role of the OIE

Subject Details

(3) Hazard Analysis Critical Control Point (HACCP) planning for farms and production hygiene

Goals

To understand food safety with respect to livestock products and enhancing livestock productivity through hygiene management protocols (farm HACCP plans) and utilizing HACCP planning for each stage in the production of animal-derived foodstuffs and livestock products

Objectives

- 1) To be able to explain farm HACCP planning
- 2) To be able to explain hygiene management guidelines.
- 3) To be able to explain the standards of rearing hygiene management

Subject Details

- (4) Disinfection at animal-rearing facilities

Goals

To understand cleaning and disinfection methods for animal-rearing facilities

Objectives

- 1) To be able to explain cleaning and disinfection methods appropriate for animal-rearing facilities

Subject Details

- (5) Livestock vaccines and vaccination programs

Goals

To understand livestock vaccine types and vaccination programs

Objectives

- 1) To be able to explain livestock vaccine types, the prophylactic efficacy of vaccines, and the relevant vaccination programs

Subject Details

- (6) Livestock environmental hygiene

Goals

To understand the relationships between livestock environment and health and disease, as well as the effects on productivity due to changes in the surrounding environment on individual animals and animal populations

Objectives

- 1) To be able to explain the effects of changes in environmental conditions (e.g., temperature, humidity, wind, light, sound, atmospheric gas concentrations, altitude) on livestock productivity
- 2) To be able to explain the effects of heat and cold on livestock health and productivity
- 3) To be able to explain the effects of rearing density on livestock health and productivity
- 4) To be able to explain appropriate barn structure and layout
- 5) To be able to explain barn ventilation and its effect on livestock health and productivity
- 6) To be able to explain risk factors and preventative measures for transportation diseases

Subject Details

- (7) Cattle management and hygiene

Goals

To understand husbandry conditions and forms of husbandry for dairy and beef cattle

Objectives

- 1) To be able to explain husbandry conditions and forms of husbandry for dairy and beef cattle
- 2) To be able to explain pasture management, grazing animal management, and pasture disease as well as methods for disease prevention
- 3) To be able to explain correct milking techniques and risk factors for mastitis, as well as methods for mastitis prevention

Subject Details

(8) Pig management and hygiene

Goals

To understand husbandry conditions and forms of husbandry for pigs

Objectives

- 1) To be able to explain husbandry conditions and forms of husbandry for pigs

Subject Details

(9) Poultry management and hygiene

Goals

To understand husbandry conditions and forms of husbandry for layer and broiler chickens

Objectives

- 1) To be able to explain husbandry conditions and forms of husbandry for layer and broiler chickens

Subject Details

(10) Honeybee management and hygiene

Goals

To understand husbandry conditions and forms of husbandry for honeybees

Objectives

- 1) To be able to explain husbandry conditions and forms of husbandry for honeybees

Subject Details

(11) Poisoning of livestock and feed safety

Goals

To understand feed safety and the mechanisms of poisoning of livestock by plants, agrochemicals, fungi, and bacteria from the perspective of animal hygiene

Objectives

- 1) To be able to explain toxins from poisonous plants, agrochemicals, fungi, and bacteria, and livestock poisoning due to deteriorated feed

- 2) To be able to explain the Act on Safety Assurance and Quality Improvement of Feeds, and the relevant Maximum Residue Standards [the “Positive List System” of the Japanese Ministry of Health, Labour and Welfare (MHLW)]

Subject Details

- (12) Initiatives for environmentally sustainable farming with livestock waste and livestock environmental management

Goals

To understand, livestock environmental management, livestock waste, and domestic animal excreta management and processing

Objectives

- 1) To be able to explain livestock environmental management, including livestock waste processing
- 2) To be able to explain management and processing methods for livestock waste

Lecture 3-3. Veterinary Public Health

Subject Aims

The aim of this subject is to understand the basic concept of public health, including national health promotion, animal welfare, the global environment, and related issues.

Subject Details

(1) Concept and overview of public health

Goals

To understand disease prevention, preserving and promoting human health, as well as the application, significance, and approaches to public health activities

Objectives

- 1) To be able to explain the aim of public health and the promotion of the public health activities
- 2) To be able to explain the process of outbreaks, the precautionary principle, and disease prevention activities
- 3) To be able to explain the utilization of the national health index in public health activities

Subject Details

(2) The role of veterinary public health

Goals

To understand the relationship of primary prevention activities and veterinary science in public health; the role of veterinarians working in the field of food hygiene; the monitoring and prevention of zoonoses; environmental hygiene and animal welfare; and the diverse and complicated social needs related to public health

Objectives

- 1) To be able to explain the activities and the role of veterinarians in food hygiene
- 2) To be able to explain the activities and the role of veterinarians in the monitoring and prevention of zoonoses
- 3) To be able to explain the activities and the role of veterinarians in environmental hygiene
- 4) To be able to explain animal welfare and the activities and role of veterinarians with respect to the symbiosis of humans and animals

Subject Details

(3) Risk and risk analysis

Goals

To explain risk assessment, risk management, and risk communication in risk analysis

Objectives

- 1) To be able to explain risk analysis
- 2) To be able to explain risk assessment and the main index
- 3) To be able to explain risk management

- 4) To be able to explain risk communication

Subject Details

- (4) Public health administration

Goals

To understand the public health system; the legal basis for the administration of public health; the principle of regulations and government public health activities; and the role and significance of public health in society

Objectives

- 1) To be able to explain the system of public health laws
- 2) To be able to explain the laws concerning veterinary public health
- 3) To be able to explain the framework of public health administration and the system of veterinary public health administration

Lecture 3-4. Food Hygiene

Subject Aims

The aim of this subject is to understand the role that veterinarians play in the field of food hygiene to ensure food safety throughout the entire process from farm to fork.

Subject Details

(1) Definition of food hygiene

Goals

To understand the definition and basic principles of food hygiene

Objectives

- 1) To be able to explain the future countermeasures for ensuring food hygiene based on an understanding of the principles, history, and social context of food hygiene

Subject Details

(2) Legislation and administration associated with food hygiene

Goals

To understand the role of administration, based on legislation regarding food hygiene

Objectives

- 1) To be able to explain legislation concerning food hygiene
- 2) To be able to explain the role of administration regarding food hygiene

Subject Details

(3) Overview of foodborne health damage

Goals

To understand the principles of foodborne health damage

Objectives

- 1) To be able to explain the causes of food hazards
- 2) To be able to explain the definition of food poisoning, classifications of causative agents, and the status of incidents

Subject Details

(4) Bacterial food poisoning

Goals

To understand food poisoning caused by bacteria and their preventive measures

Objectives

- 1) To be able to classify bacteria that cause food poisoning and explain the identification methods of causative bacteria, pathogenic mechanisms, epidemiology, clinical symptoms, and countermeasures for prevention

Subject Details

- (5) Viral food poisoning

Goals

To understand food poisoning caused by viruses and their preventive measures

Objectives

- 1) To be able to classify viruses that cause food poisoning and to explain the identification methods of causative virus, pathogenic mechanisms, epidemiology, clinical symptoms, and countermeasures for prevention

Subject Details

- (6) Parasitic and protozoan food poisoning

Goals

To understand food poisoning caused by parasites and protozoa and their preventive measures

Objectives

- 1) To be able to classify parasites and protozoa that cause food poisoning and to explain the identification methods of causative bacteria, pathogenic mechanisms, epidemiology, clinical symptoms, and countermeasures for prevention

Subject Details

- (7) Natural toxin

Goals

To understand food poisoning caused by natural toxins and their preventive measures

Objectives

- 1) To be able to classify natural toxins produced by animals and plants that cause food poisoning and to explain the identification methods of causative natural toxins, pathogenic mechanisms, epidemiology, clinical symptoms, and countermeasures of prevention

Subject Details

- (8) Harmful substances

Goals

To understand the health hazards caused by harmful substances and their preventive measures

Objectives

- 1) To be able to classify harmful substances that cause food poisoning and to explain the identification methods of causative harmful substances, pathogenic mechanisms, epidemiology, clinical symptoms, and countermeasures for prevention

Subject Details

- (9) Food additives

Goals

To understand the concept of food additives and their benefits and risks

Objectives

- 1) To be able to classify food additives, understand safety evaluations, and explain their benefits and risks

Subject Details

- (10) The harmful effect of foods produced by vital reactions

Goals

To understand allergic reactions to foods, digestive disorders, and harmful effects induced by the interaction between intestinal microbiota and foods as well as adverse events caused by functional foods, and to explain countermeasures for prevention

Objectives

- 1) To be able to explain food allergies
- 2) To be able to explain the mechanisms that cause health hazards in humans from the interaction between intestinal microbiota and foods

Subject Details

- (11) Mechanisms of decomposition and deterioration of foods and their prevention

Goals

To understand the mechanisms of decomposition and deterioration of foods, their effects on health and countermeasures for their prevention

Objectives

- 1) To be able to explain microbial contamination, putrefaction, and deterioration of foods, and their effects on health as well as methods of examination and countermeasures for the prevention of food putrefaction

Subject Details

- (12) Regulation of food and food labeling

Goals

To understand the standards for food safety and quality, and food labeling

Objectives

- 1) To be able to explain the standards and criteria for food safety and quality, as well as indicator microorganisms for food contamination
- 2) To be able to explain the Food Labelling Act and Quality Labeling Standards for Foods

Subject Details

(13) Food hygiene management

Goals

To understand the concept of "farm to table" in the context of food hygiene management

Objectives

- 1) To be able to explain prerequisite programs (PRP), good manufacturing practices (GMP), and hazard analysis critical control point (HACCP)

Subject Details

(14) Hygiene of milk and milk products

Goals

To understand the hygiene of milk and milk products

Objectives

- 1) To be able to explain hygiene management during production, transportation, processing, distribution, and consumption of milk and milk products

Subject Details

(15) Hygiene of meat and poultry meat

Goals

To understand the hygiene of meat and poultry meat

Objectives

- 1) To be able to explain hygiene management and slaughtering inspections of meat and poultry meat

Subject Details

(16) Hygiene of eggs

Goals

To understand the hygiene of eggs

Objectives

- 1) To be able to explain the hygiene management during production, transportation, processing, distribution, and consumption of eggs

Subject Details

(17) Hygiene of fishes and shellfishes

Goals

To understand the hygiene of fish and shellfish

Objectives

- 1) To be able to explain the hygiene management during production, transportation, processing, distribution, and consumption of fish and shellfish

Subject Details

(18) Hygiene of vegetables and fruits

Goals

To understand the hygiene of vegetables and fruits

Objectives

- 1) To be able to explain the hygiene management during production, transportation, processing, distribution, and consumption of vegetables and fruits

Subject Details

(19) Food functionality

Goals

To understand the overview of “Food with health claims” based on their functions

Objectives

- 1) To be able to explain the purpose, types, and legislation of “Food with health claims” based on their functions

Lecture 3-5. Environmental Hygiene

Subject Aims

The aim of this subject is to acquire the history, current situation, countermeasures against the environmental problems, the relationship between the environment and the health; and related laws and regulations in order to maintain a desirable environment for humans and animals and to preserve the global ecosystem.

Subject Details

(1) Overview of environmental hygiene

Goals

To understand the risk to the ecosystem and the human health caused by environmental pollution, countermeasures against environmental pollution, and the roles of veterinarians in these fields

Objectives

- 1) To be able to explain the history, concept, and current issues regarding environmental hygiene
- 2) To be able to explain the involvement of veterinary science in environmental hygiene
- 3) To be able to explain the philosophy of the Basic Act on the Environment as well as related environmental quality laws and regulations

Subject Details

(2) The natural environment

Goals

To understand the importance of the natural environment and conservation measures

Objectives

- 1) To be able to explain the importance of the natural environment and nature conservation systems
- 2) To be able to explain the meaning of biodiversity and measures to conserve biodiversity
- 3) To be able to explain the environmental impact assessment system

Subject Details

(3) The living environment I (water)

Goals

To understand the involvement of water in human health, measures to ensure drinking water safety, and sewage treatments

Objectives

- 1) To be able to explain various hazards that may be found in water
- 2) To be able to explain the water supply system and the water quality standard
- 3) To be able to explain the sewerage system and the mechanism of sewage treatment

Subject Details

(4) The living environment II (air)

Goals

To understand the involvement of air in human health and indexes and standards for air and indoor environments

Objectives

- 1) To be able to explain the major indexes and phenomena related to weather and air quality
- 2) To be able to explain the components of air and their effects on human health
- 3) To be able to explain indoor environments and related standards

Subject Details

- (5) The living environment III (waste)

Goals

To understand the current situation of and countermeasures against waste problems

Objectives

- 1) To be able to explain the appropriate sorting and treatment of waste
- 2) To be able to explain the current situation and problems related to waste
- 3) To be able to explain the issue of exported waste and related countermeasures

Subject Details

- (6) The regional environment

Goals

To understand the history and current situation of and countermeasures against environmental pollution

Objectives

- 1) To be able to explain the definition and history of environmental pollution
- 2) To be able to explain the current situation of and countermeasures against environmental pollution as well as the environmental quality standards

Subject Details

- (7) The global environment

Goals

To understand global environmental issues and their countermeasures

Objectives

- 1) To be able to explain the cause and current situation of and countermeasures against global warming
- 2) To be able to explain the cause and current situation of and countermeasures against ozone layer depletion
- 3) To be able to explain the cause and current situation of and countermeasures against acid rain

- 4) To be able to explain the cause and current situation of and countermeasures against tropical forest destruction and desertification
- 5) To be able to explain the cause and current situation of and countermeasures against marine pollution

Subject Details

- (8) Chemicals and radioactive materials

Goals

To understand the current situation of and countermeasures against environmental contamination with chemicals and radioactive materials

Objectives

- 1) To be able to explain the toxicity of major chemical substances and intoxication cases
- 2) To be able to explain the management system and regulation of chemical substances
- 3) To be able to explain the use and regulation of radioactive materials as well as major historical contamination incidents

Subject Details

- (9) Hazardous animals

Goals

To understand hazardous animals, the harm they cause, and related countermeasures

Objectives

- 1) To be able to explain hazardous animals, the harm they cause, and related countermeasures

Lecture 3-6. Veterinary Toxicology

Subject Aims

The purpose of this course is to provide student knowledge to understand the harmful action of chemicals to humans, animals and environments, and the role of veterinary doctors for prevention. Student will understand toxicokinetics, mechanism of actions of toxicological effects by chemicals in the body as well as the effects of chemicals on the regional and global environment. Students will also understand importance of comprehensive analysis, risk analysis and regulation method of chemicals.

Subject Details

- (1) Mechanism of toxicology and the toxicological mode of action

Goals

To understand the mechanism of toxicology and toxicological mode of action.

Objectives

- 1) To be able to explain the outline of mechanism of toxicology and mode of toxicological actions by chemicals

Subject Details

- (2) Toxicokinetics

Goals

To understand the toxicokinetics of chemicals and factors affecting it.

Objectives

- 1) To be able to explain absorption, distribution, metabolism and excretion of chemicals in relation to toxicological effects

Subject Details

- (3) Risk analysis

Goals

To understand the evaluation of probability of occurrence of toxicity, and explain legal regulation to avoid

Objectives

- 1) To be able to explain outline of risk analysis of chemicals
- 2) To be able to explain regulations and organizations that are related to risk analysis of chemicals

Subject Details

- (4) Toxicological test and evaluation

Goals

To understand the criterion, method and evaluation of toxicological tests

Objectives

- 1) To be able to explain variety of toxicological tests and evaluation methods
- 2) To be able to explain the purpose and outline of Good Laboratory Practice (GLP)

Subject Details

- (5) Genotoxicity

Goals

To understand the property of genotoxicity as well as their mechanisms, and explain test methods to detect.

Objectives

- 1) To be able to explain outline, major chemicals and tests in genotoxicity. To be able to explain outline, major chemicals and tests in carcinogenicity

Subject Details

- (6) Carcinogenicity

Goals

To understand the property of carcinogenicity as well as their mechanisms, and explain test methods to detect.

Objectives

- 2) To be able to explain outline, major chemicals and tests in carcinogenicity

Subject Details

- (7) Reproductive and developmental toxicity

Goals

To understand the outline of reproductive and developmental toxicology, and explain major chemicals and test methods in this toxicology.

Objectives

- 1) To be able to explain outline, major chemicals and tests in reproductive and developmental toxicity.

Subject Details

- (8) Liver toxicity

Goals

To understand the toxicological properties of chemicals to the liver and explain test methods.

Objectives

- 1) To be able to explain outline, major chemicals and tests in liver toxicity.

Subject Details

(9) Kidney toxicity

Goals

To understand the toxicological properties of chemicals to the kidney and explain test methods.

Objectives

1) To be able to explain outline, major chemicals and tests in kidney toxicity.

Subject Details

(10) Cardiovascular toxicity

Goals

To understand the toxicological properties of chemicals to the heart and circulation and explain test methods.

Objectives

1) To be able to explain outline, major chemicals and tests in cardiovascular toxicity.

Subject Details

(11) Respiratory toxicity

Goals

To understand the toxicological properties of chemicals to the respiratory system and explain test methods.

Objectives

1) To be able to explain outline, major chemicals and tests in respiratory toxicity.

Subject Details

(12) Neurotoxicity

Goals

To understand the toxicological properties of chemicals to the nervous system and explain test methods.

Objectives

1) To be able to explain outline, major chemicals and tests in neurotoxicity.

Subject Details

(13) Gastrointestinal toxicity

Goals

To understand the toxicological properties of chemicals to the gastrointestinal system.

Objectives

1) To be able to explain outline and major chemicals in gastrointestinal toxicity.

Subject Details

(14) Endocrine toxicity

Goals

To understand the toxicological properties of chemicals to the endocrine system.

Objectives

1) To be able to explain outline and major chemicals in endocrine toxicity.

Subject Details

(15) Hematotoxicity

Goals

To understand the toxicological properties of chemicals to the blood and explain test methods.

Objectives

1) To be able to explain outline, major chemicals and tests in hematotoxicity.

Subject Details

(16) Immunotoxicity

Goals

To understand the toxicological properties of chemicals to the immune system and explain test methods.

Objectives

1) To be able to explain outline, major chemicals and tests in immunotoxicity.

Subject Details

(17) Mucocutaneous toxicity

Goals

To understand the toxicological properties of chemicals to the immune system and explain test methods.

Objectives

1) To be able to explain outline, major chemicals and tests in mucocutaneous toxicity.

Subject Details

(18) Sensory organ toxicity

Goals

To understand the toxicological properties of chemicals to the sensory system and explain test methods.

Objectives

- 1) To be able to explain outline, major chemicals and tests in sensory organ toxicity.

Subject Details

(19) Musculoskeletal toxicity

Goals

To understand the toxicological properties of chemicals to the musculoskeletal system and explain test methods.

Objectives

- 1) To be able to explain outline, major chemicals and tests in musculoskeletal toxicity.

Subject Details

(20) Environmental toxicology

Goals

To understand the dynamics of chemicals in the environment and effects of chemicals to organism and the environment, and explain methods of evaluation and prevention

Objectives

- 1) To be able to explain the dynamics of chemicals in the environment
- 2) To be able to explain harmful effects by chemicals in the environment
- 3) To be able to explain legal regulations and ecotoxicity tests in environmental toxicology

Subject Details

(21) Chemicals and harmful effects

Goals

To understand the mechanism of action of harmful chemicals to animals and environment mainly by application, and explain the difference of toxicity caused by medicines from that by other chemicals

Objectives

- 1) To be able to explain outline and toxicological effects of human medicines, veterinary medicines, agricultural agents, food-related chemicals, nonessential items, cosmetics, metals, industrial chemicals, and natural toxins

Lecture 3-7. Zoonotic Diseases

Subject Aims

The aim of this subject is to understand the general characteristics and outbreak factors of zoonosis as well as the transmission cycles, epidemiology, symptoms, pathogens, diagnostic methods, and prophylaxis related to various zoonoses.

Subject Details

(1) Overview of zoonosis

Goals

To understand the definitions, classifications, and the social influence of zoonosis as well as the epidemiological characteristics and legal basis for controlling zoonosis

Objectives

- 1) To be able to explain modes of transmission and the etiology of zoonosis
- 2) To be able to explain human and animal diseases, food-born zoonosis, and the relationship between occupation and zoonosis
- 3) To be able to explain the geographical distribution of zoonosis
- 4) To be able to explain emerging and reemerging infectious diseases
- 5) To be able to explain the risk classification of pathogens
- 6) To be able to explain the legal basis for controlling zoonosis

Subject Details

(2) Disease transmission from animals to humans

Goals

To understand the transmission of disease from animals to people their health hazards

Objectives

- 1) To be able to explain disease transmission from companion animals, domestic animals, wild animals, and arthropods

Subject Details

(3) Zoonosis caused by viruses and prions

Goals

To understand the etiology, epidemiology, symptoms in humans and animals, and methods for diagnosis and control of zoonosis caused by virus and prion

Objectives

- 1) To be able to explain zoonoses caused by RNA viruses
- 2) To be able to explain zoonoses caused by DNA viruses
- 3) To be able to explain zoonoses caused by prions

Subject Details

(4) Zoonosis caused by rickettsia and chlamydia

Goals

To understand the etiology, epidemiology, symptoms in humans and animals, and methods for diagnosis and control of zoonosis caused by rickettsia and chlamydia

Objectives

- 1) To be able to explain zoonoses caused by rickettsia
- 2) To be able to explain zoonoses caused by chlamydia

Subject Details

(5) Zoonosis caused by bacteria

Goals

To understand the etiology, epidemiology, symptoms in humans and animals, and methods for diagnosis and control of zoonosis caused by bacteria

Objectives

- 1) To be able to explain zoonoses caused by gram-negative bacteria
- 2) To be able to explain zoonoses caused by gram-positive bacteria
- 3) To be able to explain zoonoses caused by acid-fast bacteria

Subject Details

(6) Zoonosis caused by fungus

Goals

To understand the etiology, epidemiology, symptoms in humans and animals, and methods for diagnosis and control of zoonosis caused by fungi

Objectives

- 1) To be able to explain zoonoses caused by fungi

Subject Details

(7) Zoonosis caused by protozoa

Goals

To understand the etiology, epidemiology, symptoms in humans and animals, and methods for diagnosis and control of zoonosis caused by protozoa

Objectives

- 1) To be able to explain zoonoses caused by protozoa

Subject Details

(8) Zoonosis caused by helminth

Goals

To understand the etiology, epidemiology, symptoms in humans and animals, and methods for diagnosis and control of zoonosis caused by helminths

Objectives

- 1) To be able to explain about zoonoses caused by helminths

Lecture 3-8. Veterinary Epidemiology

Subject Aims

The aim of this subject is to understand the basic concept of epidemiology, including the frequency, distribution, and determinants of diseases and other related health events in animal and human populations and utilize them in the preventive measures, as well as the measures, designs, and methods of epidemiologic studies and epidemiologic data analysis.

Subject Details

(1) The concept of epidemiology

Goals

To understand the purpose, scope, and concepts of health-related states or events; determinants influencing health-related events from the viewpoint of multiple causation; and basic epidemiologic study designs

Objectives

- 1) To be able to explain the definition and scope of epidemiology
- 2) To be able to explain the purpose of epidemiology and study design
- 3) To be able to explain the epidemiological triangle, risk factors, and causality

Subject Details

(2) Measures in epidemiology

Goals

To understand measures for quantifying disease frequency, the association between exposure and disease occurrence in a population, and the meaning of each measure

Objectives

- 1) To be able to explain epidemiological measures and the points to consider when using them
- 2) To be able to explain measures of disease frequency
- 3) To be able to explain measures of association between exposure and disease occurrence
- 4) To be able to explain and apply standardizations of rates and proportions

Subject Details

(3) Descriptive epidemiology

Goals

To understand the purpose and role of descriptive epidemiology and its three main characteristics

Objectives

- 1) To be able to explain the purpose and role of descriptive epidemiology
- 2) To be able to explain the three main characteristics (time, place and host variables) of descriptive epidemiology

Subject Details

(4) Analytic epidemiology

Goals

To understand the purpose, design, and characteristics of ecological, cross-sectional, case-control, and cohort studies as well as analysis results

Objectives

- 1) To be able to explain the purpose and characteristics of ecological studies
- 2) To be able to explain the purpose, characteristics, and design of cross-sectional studies, and to interpret the results
- 3) To be able to explain the purpose, characteristics, and design of case-control studies, and to interpret the results
- 4) To be able to explain the purpose, characteristics, and design of cohort studies, and to interpret the results

Subject Details

(5) Intervention studies

Goals

To understand the purpose, types, design, and characteristics of intervention studies, as well as analysis results

Objectives

- 1) To be able to explain the purpose, characteristics, and design of intervention study, and to interpret the results

Subject Details

(6) Error and its control

Goals

To understand how bias can affect analysis results and interpretation in epidemiological studies as well as the methods to control it

Objectives

- 1) To be able to explain random errors and systematic errors (bias)
- 2) To be able to explain the causes of systematic errors (bias) and the methods to control them

Subject Details

(7) Sampling

Goals

To understand the methods of sampling and sample size calculation necessary for epidemiological studies.

Objectives

- 1) To be able to explain appropriate sampling methods

- 2) To be able to explain appropriate sample size calculations

Subject Details

- (8) Screening

Goals

To understand the purpose of screening and methods for assessing the validity of screening tests

Objectives

- 1) To be able to explain the purpose of screening tests and validation procedures
- 2) To be able to interpret the results of screening tests
- 3) To be able to explain method for applying multiple screening tests

Subject Details

- (9) Surveillance

Goals

To understand the framework and methods of surveillance

Objectives

- 1) To be able to explain the frameworks and methods of surveillance, using practical examples

Subject Details

- (10) Statistical methods in epidemiology

Goals

To understand the basic statistical methods necessary for epidemiological studies

Objectives

- 1) To be able to explain types of data, statistical measures, and distributions
- 2) To be able to explain estimation and statistical tests
- 3) To be able to explain correlation and regression analysis

Subject Details

- (11) Clinical epidemiology

Goals

To understand epidemiology in the context of clinical practice

Objectives

- 1) To be able to explain the purpose and methods of clinical epidemiology
- 2) To be able to explain the methods for applying epidemiological results to clinical practice

Subject Details

- (12) Infectious disease epidemiology

Goals

To understand the characteristics of infectious disease epidemiology, including preventive measures

Objectives

- 1) To be able to explain the characteristics of epidemiology in infectious diseases
- 2) To be able to explain the factors involved in the establishment of infectious diseases
- 3) To be able to explain the various stages of infectious disease
- 4) To be able to explain the basic concept of measures against infectious diseases

Subject Details

(13) Other types of epidemiology

Goals

To understand the features and principles of epidemiology in other fields

Objectives

- 1) To be able to explain the features and principles of epidemiology used in various fields

Subject Details

(14) Risk analysis

Goals

To understand the purpose and importance of import risk analysis with respect to animals and animal products; food safety risk analysis; and the related procedures and methods

Objectives

- 1) To be able to explain the background of the introduction of risk analysis
- 2) To be able to explain the purpose, process, and basic methods of import risk analysis with respect to animal and livestock products
- 3) To be able to explain the purpose, process, and basic methods of food safety risk analysis

Subject Details

(15) Economics of disease

Goals

To understand the purpose and importance of economic evaluations of diseases in animals and public health as well as related methods

Objectives

- 1) To be able to explain the economic losses incurred from animal diseases
- 2) To be able to explain the economic losses incurred from food poisoning
- 3) To be able to explain the methods used in economic evaluations related to animals and public health

Lecture 3-9. Wildlife Biology and Medicine

Subject Aims

The aim of this subject is to understand the biological mechanisms of wildlife, from the genetic level to the ecosystem level, in order to work toward the preservation of the environment and maintain appropriate balances in ecosystems.

Subject Details

(1) Biodiversity

Goals

To understand biodiversity in the context of evolution as well as the concepts necessary for its conservation

Objectives

- 1) To be able to explain the fundamentals of ecology and biodiversity at three levels: genes, species, and ecosystems
- 2) To be able to explain the significance of biodiversity and its conservation methods

Subject Details

(2) Evolution and taxonomy of wildlife

Goals

To understand the concepts of evolution in terms of adaptations to wildlife habitats and classification based on morphology and genetics

Objectives

- 1) To be able to explain evolution in terms of adaptations to wildlife habitats
- 2) To be able to explain the concept of classification based on the morphology and genetics of wildlife

Subject Details

(3) Morphology and physiology of wildlife

Goals

To understand the morphological characteristics and physiological functions of wild animals

Objectives

- 1) To be able to explain the comparative morphological features and physiological functions of wildlife

Subject Details

(4) Wildlife ecology and population dynamics

Goals

To understand the ecological characteristics of various animal species, population structure, and the factors and mechanisms influencing population dynamics

Objectives

- 1) To be able to explain the ecological characteristics of wildlife in relation to its habitat
- 2) To be able to explain the basics of population dynamics, including life tables, environmental carrying capacity, and population density

Subject Details

- (5) Capture and immobilization of wildlife

Goals

To understand a wide variety of capture and immobilization methods, the importance of ensuring animal and handler safety, and animal welfare and environmental considerations

Objectives

- 1) To be able to explain safe and appropriate methods of capture and immobilization in consideration of the habitat and characteristics of wild animals as well as the purpose of immobilization
- 2) To be able to understand the mechanism of action of typical wildlife immobilizing drugs and appropriate clinical veterinary treatment for injuries, trauma, and so on caused by capture

Subject Details

- (6) Infectious and non-infectious disease in wildlife

Goals

To understand the risks, epidemiology, mechanism of pathogenesis, clinical condition, pathology, and countermeasures of major infectious and non-infectious diseases in wildlife

Objectives

- 1) To be able to explain the role of wildlife, disease control measures, and risk management for the diseases listed by the World Organization for Animal Health (OIE) in terms of the One Health initiative

Subject Details

- (7) Wildlife rescue and rehabilitation

Goals

To understand the purpose and importance of wildlife rescue and rehabilitation

Objectives

- 1) To be able to explain the purpose and importance of wildlife rescue as well as the related techniques and risks

Subject Details

(8) Endangered species conservation

Goals

To understand the definition of endangered species as well as conservation techniques

Objectives

- 1) To be able to explain the definition of endangered species as well as conservation efforts, including the role of zoos and aquariums as sites of *ex situ* conservation

Subject Details

(9) Wildlife management

Goals

To understand that wildlife management should be carried out scientifically and systematically, and that adaptive management based on the data of monitoring must be applied

Objectives

- 1) To be able to explain wildlife management in terms of population control systems, both for species with increasing and decreasing populations as well as the scientific and planned conservation management of specific wildlife

Subject Details

(10) Laws related to wildlife

Goals

To understand laws related to wildlife

Objectives

- 1) To be able to explain laws related to wildlife conservation, wildlife management, captivity of wildlife, and wildlife trade

Lecture subjects

Clinical Veterinary Medicine

Lecture 4-1. General Veterinary Internal Medicine

Subject Aims

The aim of this subject is to understand veterinary clinical practice and procedures, including informed consent, medical interviews, physical examinations, and medical record.

Subject Details

(1) General methods for conducting clinical practice

Goals

To understand the methods for conducting clinical practice

Objectives

1) To be able to explain methods for conducting clinical practice

Subject Details

(2) Medical interviews

Goals

To understand the concept and practice of history taking

Objectives

- 1) To be able to explain the basic manners and rules for medical interviews
- 2) To be able to explain the purpose of medical interviews and how to establish good a relationship with clients
- 3) To be able to explain the common items of history taking, including signalments, chief complaint(s), history of present and previous illnesses, and vaccination

Subject Details

(3) Physical examinations

Goals

To understand the concept and practice of physical examinations

Objectives

- 1) To be able to explain how to estimate vital signs, body weight, and body condition scores
- 2) To be able to explain how to conduct general physical examinations

Subject Details

(4) Medical records

Goals

To understand the basic knowledge about the significance of medical records and how to describe them

Objectives

- 1) To be able to explain how to describe information on history taking and the results from a physical examination
- 2) To be able to explain how to describe diagnosis, treatment, progress, and treatment evaluation

Subject Details

- (5) Informed consent

Goals

To understand the concept of informed consent in veterinary practice

Objectives

- 1) To be able to explain how to determine the clinical examination(s) required for diagnosis as well as the basis for a diagnosis
- 2) To be able to explain how to show a treatment plan and prognosis to clients
- 3) To be able to explain how diagnostic and treatment plans and agreement are determined by clients.

Subject Details

- (6) Diseases with systemic signs

Goals

To understand diseases with systemic signs and abnormalities during physical examinations

Objectives

- 1) To be able to make a differential diagnosis for major systemic signs
- 2) To be able to make a differential diagnosis for major abnormal physical examination findings
- 3)

Lecture 4-2. Veterinary Clinical Pathology

Subject Aims

The aim of this subject is to understand how to perform various examinations using biological specimens, interpret the results, make a diagnosis, select an appropriate therapy, and determine the prognosis; to understand the principle, technical methods, and significance of various clinical examinations; and to understand diagnosis algorithms, therapy selection, and prognosis determination based on a comprehensive interpretation of examination results.

Subject Details

(1) Sample collection and processing and interpretation of results

Goals

To understand sample collection, laboratory techniques, and methods for interpreting results

Objectives

- 1) To be able to explain the names and uses of instruments for clinical tests, laboratory techniques, and methods for interpreting results

Subject Details

(2) Blood cell examination and coagulation/fibrinolysis test

Goals

To understand the purpose, adaptation, and interpretation of results of blood cell and hemostasis tests

Objectives

- 1) To be able to explain the analysis of erythrocytes, abnormal signs, and causes of symptoms related to anemia, polycythemia, etc.
- 2) To be able to explain the cause of abnormalities in the leukocyte count and differential
- 3) To be able to explain the cause of abnormalities in the platelet count and the coagulation/fibrinolysis system

Subject Details

(3) Blood chemistry tests

Goals

To understand the purpose and significance of blood chemistry tests for screenings to detect liver, kidney, pancreatic, endocrinological, metabolic, muscular, and inflammatory diseases as well as electrolyte disorders

Objectives

- 1) To be able to explain the purpose and significance of individual items of blood chemistry tests, and interpret the meaning of the results comprehensively

Subject Details

(4) Immunological tests

Goals

To understand the purpose, significance, and interpretation of the results of immunological tests

Objectives

- 1) To be able to explain the purpose and significance, and interpret the results of immunological tests

Subject Details

- (5) Blood gas test and acid–base equilibrium test

Goals

To understand the purpose, significance, and interpretation of the results of blood gas tests and the acid–base equilibrium tests

Objectives

- 1) To be able to explain the abnormal findings and interpret the results of the blood gas test and the acid–base equilibrium test

Subject Details

- (6) Urinalysis

Goals

To understand the purpose, significance, and interpretation of the results of urinalysis

Objectives

- 1) To be able to explain the purpose, adaptation, abnormal signs, and evaluate the pathological state based on urinalysis

Subject Details

- (7) Abnormal fluid analysis

Goals

To understand the purpose, significance, and interpretation of the results of abnormal fluid analysis

Objectives

- 1) To be able to explain the purpose, significance, adaptation, technical methods, and abnormal findings, and to interpret the results of abnormal fluid analysis

Subject Details

- (8) Cytology

Goals

To understand the purpose, significance, and interpretation of the results of cytological tests

Objectives

- 1) To be able to explain the purpose, significance, adaptation, technical methods, and abnormal findings, and to interpret the results of cytology tests

Lecture 4-3. Veterinary Clinical Pharmacology

Subject Aims

The aim of this subject is to understand pharmacology in the context of the veterinary clinical setting, including the medicines required for drug treatment, the theory underlying drug administration methods, the effects and side effects that appear after drug administration, and the points to be considered for drug use in farm animals.

Subject Details

(1) Basic principles of veterinary medicine

Goals

To understand the basic principles and ethics of administering drugs to animals, the theories upon which medications are based, the effects and side effects that appear after administration, and drug accumulation in food animals

Objectives

- 1) To be able to explain the basic principles of administering drugs to animals, based on laws and regulations and veterinary ethics
- 2) To be able to explain the characteristics of various administration methods and various dosage forms of drugs
- 3) To be able to explain the factors that control pharmacokinetics, the factors that influence them, and therapeutic drug monitoring (TDM)
- 4) To be able to explain the transfer of drugs via milk and the factors affecting it
- 5) To be able to explain adverse drug reactions and drug–drug interactions

Subject Details

(2) Characteristics of drugs for small animals

Goals

To understand the pathophysiology of major diseases in small animals (e.g., dogs and cats), as well as the pharmacological and pharmacokinetic characteristics of major drugs, adverse reactions, and interactions with concomitant drugs

Objectives

- 1) To be able to explain the characteristics, pharmacokinetics, adverse effects, and drug–drug interactions due to concomitant use of major therapeutic agents for various diseases in small animal clinical practice. I (Nerve/motor disorders, pain, digestive/respiratory disorders)
- 2) To be able to explain the characteristics, pharmacokinetics, adverse effects, and drug–drug interactions due to concomitant use of major therapeutic agents for various diseases in small animal clinical practice. II (circulatory/urinary/reproductive organs, inflammation/allergy/immune-mediated disease, endocrine/metabolic disease)
- 3) To be able to explain how to use antibiotics according to their characteristics based on the pharmacokinetics/pharmacodynamics (PK/PD) theory.
- 4) To be able to explain the characteristics, pharmacokinetics, adverse effects, and drug–drug interactions due to concomitant use of major therapeutic agents for various diseases in small

animal clinical practice. III (malignant tumor, skin, ophthalmic disease, hemostasis, thrombus, anemia)

Subject Details

(3) Characteristics of drugs for farm animals

Goals

To understand the pathophysiology of major diseases in farm animals such as cattle, pigs, and chickens as well as the pharmacodynamic and pharmacokinetic characteristics of major drugs and their withdrawal periods

Objectives

- 1) To be able to explain the peculiarities of drug treatments in farm animals
- 2) To be able to explain the characteristics of major therapeutic drugs for various diseases in farm animals, and their pharmacokinetics, adverse drug interactions and drug–drug interactions, and withdrawal periods

Subject Details

(4) Characteristics of equine drugs

Goals

To understand the pathophysiology of major diseases in horses, as well as the pharmacodynamics and pharmacokinetic characteristics of major drugs, adverse reactions associated with treatment, and their approaches

Objectives

- 1) To be able to explain the characteristics, pharmacokinetics, adverse effects, and drug–drug interactions of the major therapeutic drugs for various diseases in racehorses
- 2) To be able to explain doping and prohibited drugs in racehorses

Lecture 4-4. Veterinary Respiratory and Cardiovascular Diseases

Subject Aims

The aim of this subject is to understand the causes, pathophysiology, clinical symptoms, diagnosis, and therapy for respiratory and cardiovascular diseases in companion animals.

Subject Details

(1) Diagnostic of respiratory diseases

Goals

To understand the laboratory procedures related to various respiratory diseases

Objectives

- 1) To be able to explain auscultation of respiratory sounds
- 2) To be able to explain chest percussion
- 3) To be able to explain X-ray imaging diagnostics in upper and lower respiratory diseases

Subject Details

(2) Upper respiratory diseases

Goals

To understand the cause, pathophysiology, clinical signs, diagnoses, and therapy in upper respiratory diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical signs, diagnoses, and therapy in infectious diseases of the upper respiratory system
- 2) To be able to explain the cause, pathophysiology, clinical signs, diagnoses, and therapy in non-infectious diseases of the upper respiratory system

Subject Details

(3) Lower respiratory diseases

Goals

To understand the cause, pathophysiology, clinical signs, diagnoses, and therapy in lower respiratory diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical signs, diagnoses, and therapy in bronchitis
- 2) To be able to explain the cause, pathophysiology, clinical signs, diagnoses, and therapy in feline asthma
- 3) To be able to explain the cause, pathophysiology, clinical signs, diagnoses, and therapy in tracheal collapse

Subject Details

(4) Lung diseases

Goals

To understand the cause, pathophysiology, clinical signs, diagnoses, and therapy in lung diseases

Objectives

- 1) To be able to explain the classification, cause, pathophysiology, clinical signs, diagnoses, and therapy in pneumonia
- 2) To be able to explain the classification, cause, pathophysiology, clinical signs, diagnoses, and therapy in pulmonary edema

Subject Details

(5) Diseases of the thoracic cavity and mediastinum

Goals

To understand the cause, pathophysiology, clinical signs, diagnoses, and therapy in thoracic cavity and mediastinum diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical signs, diagnoses, and therapy in pleural effusion, pneumothorax, pneumomediastinum, mediastinal neoplasm

Subject Details

(6) Diagnostic method of cardiovascular diseases

Goals

To understand the diagnostic and examination method of cardiovascular diseases

Objectives

- 1) To be able to explain heart sounds and murmurs
- 2) To be able to explain electrocardiographic examinations
- 3) To be able to explain thoracic radiographic and echocardiographic examinations

Subject Details

(7) Heart failure

Goals

To understand the pathophysiology, compensatory mechanism, clinical symptoms, and treatments of heart failure

Objectives

- 1) To be able to explain the definitions, pathophysiology, compensatory mechanism, and classification of heart failure
- 2) To be able to explain therapy of heart failure

Subject Details

(8) Arrhythmia

Goals

To understand the diagnosis and treatment of malignant arrhythmias

Objectives

- 1) To be able to explain disturbances of impulse formation and conduction
- 2) To be able to explain the physiological basis of treatment for cardiac arrhythmias

Subject Details

(9) Congenital heart disease

Goals

To understand the pathophysiology, clinical findings, diagnosis, and treatments of congenital heart diseases

Objectives

- 1) To be able to explain the pathophysiology, clinical findings, diagnosis, and treatments of common congenital heart diseases

Subject Details

(10) Valvular heart disease

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and treatments of valvular heart diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and treatments of canine mitral valve disease and tricuspid valve disease

Subject Details

(11) Cardiomyopathy

Goals

To understand the pathophysiology, clinical findings, diagnosis, and treatments of cardiomyopathy

Objectives

- 1) To be able to explain the classification, pathophysiology, clinical findings, diagnosis, and treatments of cardiomyopathy

Subject Details

(12) Pericardial disease

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and treatments of pericardial disease

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and treatments of cardiac tamponade

Subject Details

(13) Canine heartworm disease

Goals

To understand the pathophysiology, clinical findings, diagnosis, and treatments of canine heartworm disease

Objectives

- 1) To be able to explain the pathophysiology, clinical findings, diagnosis, treatments, and prevention of canine heartworm disease

Lecture 4-5. Veterinary Gastroenterology

Subject Aims

The aim of this subject is to understand the pathophysiology, causes, symptoms, diagnoses, and treatments of major digestive disorders.

Subject Details

(1) Clinical symptoms of digestive disorders

Goals

To understand the clinical symptoms and the physical examination findings observed in gastrointestinal disorders

Objectives

- 1) To be able to explain the causes and conditions of anorexia, polyphagia, salivation, dysphagia, regurgitation, and vomiting
- 2) To be able to explain the causes and conditions of diarrhea, melena, bloody diarrhea, constipation, difficulty of defecation
- 3) To be able to explain causes and conditions of borborygmus, abdominal distention, ascites, and jaundice

Subject Details

(2) Diagnostics of digestive disorders

Goals

To understand the general diagnostic and examination methods for gastrointestinal diseases

Objectives

- 1) To be able to explain the results of fecal and blood examinations for gastrointestinal diseases
- 2) To be able to explain the results of X-ray, ultrasound, and endoscopic examinations

Subject Details

(3) Oral diseases

Goals

To understand the pathophysiology, clinical symptoms, and diagnostic and treatment methods for typical oral diseases

Objectives

- 1) To be able to explain the causes, conditions, diagnostics, and treatments of periodontal disease, periapical lesions, and gingivostomatitis

Subject Details

(4) Diseases of the esophagus

Goals

To understand the pathophysiology, clinical symptoms, and diagnostic and treatment methods for typical esophageal diseases

Objectives

- 1) To be able to explain the causes, conditions, diagnostics, and treatments of esophagitis, esophageal stricture, and megaesophagus

Subject Details

- (5) Diseases of the stomach

Goals

To understand the pathophysiology, clinical symptoms, and diagnostic and treatment methods for typical gastric diseases

Objectives

- 1) To be able to explain the causes, conditions, diagnostics, and treatments of gastritis, gastric emptying disorder, erosion, and ulcers
- 2) To be able to explain the causes, conditions, diagnostics, and treatments of gastric foreign bodies, and tumors

Subject Details

- (6) Diseases of the intestine

Goals

To understand the pathophysiology, clinical symptoms, and diagnostic and treatment methods for typical intestinal diseases

Objectives

- 1) To be able to explain the causes, conditions, diagnostics, and treatments of viral, bacterial, and parasitic intestinal diseases
- 2) To be able to explain the causes, conditions, diagnostics, and treatments of chronic enteropathy and protein-losing enteropathy
- 3) To be able to explain the causes, conditions, diagnostics, and treatments of ileus, intussusception, and gastrointestinal tumor
- 4) To be able to explain the causes, conditions, diagnostics, and treatments of constipation and megacolon

Subject Details

- (7) Hepatobiliary diseases

Goals

To understand the pathophysiology, clinical symptoms, and diagnostic and treatment methods for typical hepatobiliary diseases

Objectives

- 1) To be able to explain the causes, conditions, diagnostics, and treatments of hepatitis and reactive hepatopathy
- 2) To be able to explain the causes, conditions, diagnostics, and treatments of cholangitis, cholecystitis, cholelithiasis, and gallbladder mucocele
- 3) To be able to explain the causes, conditions, diagnostics, and treatments of congenital and acquired portosystemic shunts
- 4) To be able to explain the causes, conditions, diagnostics, and treatments of feline hepatic lipidosis
- 5) To be able to explain the causes, conditions, diagnostics, and treatments of hepatic tumors

Subject Details

- (8) Pancreatic diseases

Goals

Learn pathophysiology, clinical symptoms, and diagnostic and treatment methods for pancreatitis and exocrine pancreatic insufficiency

Objectives

- 1) To be able to explain the causes, conditions, diagnostics, and treatments of pancreatitis
- 2) To be able to explain the causes, conditions, diagnostics, and treatments of exocrine pancreatic insufficiency

Lecture 4-6. Veterinary Nephrology and Urology

Subject Aims

The aim of this subject is to understand the causes, pathophysiology, clinical symptoms, diagnosis, and therapy for nephrological and urological diseases in companion animals.

Subject Details

(1) Clinical symptoms and diagnosis of nephrological and urological diseases

Goals

To understand the clinical symptoms and diagnosis of nephrological and urological diseases

Objectives

- 1) To be able to explain the causes and pathophysiology of urinary disorders
- 2) To be able to explain urinalysis and interpret its results
- 3) To be able to explain diagnostic imaging of the urinary tract and interpret its results
- 4) To be able to explain renal function tests and interpret their results

Subject Details

(2) Congenital anomalies in nephrological and urological diseases

Goals

To understand the congenital anomalies in nephrological and urological diseases

Objectives

- 1) To be able to explain the pathophysiology and diagnosis of congenital anomalies in the nephrological and urological diseases

Subject Details

(3) Renal failure

Goals

To understand the causes, clinical symptoms, diagnosis, and therapy of acute kidney injury and chronic kidney disease

Objectives

- 1) To be able to explain the causes, pathophysiology, diagnosis, and therapy of acute kidney injury
- 2) To be able to explain the causes, pathophysiology, diagnosis, and therapy of chronic kidney disease

Subject Details

(4) Glomerular diseases

Goals

To understand the causes, clinical symptoms, diagnosis, and therapy of glomerular diseases

Objectives

- 1) To be able to explain the causes, pathophysiology, diagnosis, and therapy of glomerular diseases

Subject Details

- (5) Urinary tract infection

Goals

To understand the causes, clinical symptoms, diagnosis, and therapy of urinary tract infections

Objectives

- 1) To be able to explain the causes, pathophysiology, diagnosis, and therapy of urinary tract infections

Subject Details

- (6) Urolithiasis

Goals

To understand the kinds, causes, clinical symptoms, diagnosis, and therapy for urolithiasis

Objectives

- 1) To be able to explain differences in the pathophysiology and therapy of urolithiasis depending on the part of the urinary tract
- 2) To be able to explain the kinds, causes, diagnoses, and therapies of urolithiasis

Subject Details

- (7) Feline idiopathic cystitis

Goals

To understand the causes, clinical symptoms, diagnosis, and therapy of feline idiopathic cystitis

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and therapy of feline idiopathic cystitis

Subject Details

- (8) Disorders of micturition

Goals

To understand the causes, clinical symptoms, diagnosis, and therapy for micturition disorders

Objectives

- 1) To be able to explain the physiological mechanisms of urination
- 2) To be able to explain the pathophysiology, diagnosis, and therapy of urinary incontinence and retention

Lecture 4-7. Veterinary Endocrine and Metabolic Diseases

Subject Aims

The aim of this subject is to understand the diagnosis and treatment of endocrine and metabolic diseases.

Subject Details

(1) Clinical diagnosis, laboratory tests, and treatment of endocrine and metabolic diseases

Goals

To understand the clinical diagnosis, laboratory tests, and treatment of endocrine and metabolic diseases

Objectives

- 1) To be able to explain the basic pathogenesis of endocrine and metabolic diseases
- 2) To be able to explain the method and clinical significance of basic laboratory tests for endocrine and metabolic diseases
- 3) To be able to explain the basic treatment of endocrine and metabolic diseases

Subject Details

(2) Hypothalamic and pituitary diseases

Goals

To understand the pathogenesis, diagnosis, and treatment of hypothalamic and pituitary diseases

Objectives

- 1) To be able to explain the pathogenesis, diagnosis, and treatment of growth hormone disorders (e.g., pituitary dwarfism and acromegaly)
- 2) To be able to explain the pathogenesis, diagnosis, and treatment of disorders related to anti-diuretic hormones (e.g., diabetes insipidus)

Subject Details

(3) Thyroid diseases

Goals

To understand the pathogenesis, diagnosis, and treatment of thyroid diseases

Objectives

- 1) To be able to explain the pathogenesis, diagnosis, and treatment of hyperthyroidism
- 2) To be able to explain the pathogenesis, diagnosis, and treatment of hypothyroidism

Subject Details

(4) Parathyroid diseases

Goals

To understand the pathogenesis, diagnosis, and treatment of parathyroid diseases

Objectives

- 1) To be able to explain the pathogenesis, diagnosis, and treatment of hyperparathyroidism
- 2) To be able to explain the pathogenesis, diagnosis, and treatment of hypoparathyroidism

Subject Details

- (5) Adrenal diseases

Goals

To understand the pathogenesis, diagnosis, and treatment of adrenal diseases

Objectives

- 1) To be able to explain pathogenesis, diagnosis, and treatment of hyperadrenocorticism
- 2) To be able to explain pathogenesis, diagnosis, and treatment of hypoadrenocorticism

Subject Details

- (6) Endocrine pancreatic diseases

Goals

To understand the pathogenesis, diagnosis, and treatment of endocrine pancreatic diseases

Objectives

- 1) To be able to explain the pathogenesis, diagnosis, and treatment of insulinoma
- 2) To be able to explain the pathogenesis, diagnosis, and treatment of diabetes mellitus

Lecture 4-8. Veterinary Clinical Nutrition

Subject Aims

The aim of this subject is to understand nutritional management methods for healthy and diseased animals, in order to prevent diseases and avoid exacerbation of diseases.

Subject Details

(1) Health issues caused by deficiency and excess

Goals

To understand the function of carbohydrates, proteins, lipids, vitamins, and minerals and the consequences of their excess and deficiency

Objectives

- 1) To be able to explain health issues caused by deficiencies and excesses of energy producing nutrients such as carbohydrates, proteins, and lipids
- 2) To be able to explain health issues caused by deficiencies and excesses of vitamins and minerals

Subject Details

(2) Life-stage nutrition

Goals

To understand requirement changes of each nutrient requirements throughout the life of companion animals

Objectives

- 1) To be able to explain nutritional management based on the life stages of each particular animal

Subject Details

(3) Nutritional management in gastrointestinal and endocrine disorders

Goals

To understand the pathophysiology and nutritional management of gastrointestinal diseases (e.g., liver disease, pancreatic disease) and endocrine disorders (e.g., diabetes, obesity)

Objectives

- 1) To be able to explain exacerbating factors that inappropriate foods bring about and the nutritional management of gastrointestinal diseases such as liver disease, pancreatitis, exocrine pancreatic insufficiency (EPI), and enteritis
- 2) To be able to explain the pathophysiology and nutritional management of endocrine disorders such as diabetes and obesity, and weight loss methods to recover/reach optimum body condition score of each animal.

Subject Details

(4) Nutritional management in nephrological / urological disorders and urolithiasis

Goals

To understand the pathophysiology and nutritional management of nephrological and urological diseases including renal disease and urolithiasis.

Objectives

- 1) To be able to explain the pathophysiology and nutritional management of chronic kidney disease (CKD).
- 2) To be able to explain the pathophysiology and nutritional management of urolithiasis and prevention of recurrence of urolithiasis

Subject Details

- (5) Nutrition management in skin disorders caused by adverse reaction to food

Goals

To understand nutritional management in adverse reaction to food, including food allergic skin diseases

Objectives

- 1) To be able to explain the pathophysiology and nutritional management, which includes feeding hypo-allergic food of patients with allergic skin diseases

Lecture 4-9. Veterinary Neurology

Subject Aims

The aim of this subject is to understand the fundamental principles of clinical neurology in veterinary medicine.

Subject Details

(1) Canine and feline neurological examination and diagnosis

Goals

To understand the principles and techniques for neurological examination and neuroanatomical localization of lesions

Objectives

- 1) To be able to explain the significance and results of neurological examinations
- 2) To be able to explain the localization and severity of transversal lesions of the spinal cord from the results of a neurological examination
- 3) To be able to explain lesion localization of the brain from the results of a neurological examination
- 4) To be able to explain abnormalities of the peripheral nerves and neuromuscular junctions
- 5) To be able to explain abnormalities of nervous system for urination
- 6) To be able to explain the abnormalities of visual and pupillary light reflex pathways

Subject Details

(2) Diseases of the brain in dogs and cats

Goals

To understand representative canine and feline diseases of the brain and their pathophysiology and diagnostic and treatment methods

Objectives

- 1) To be able to explain encephalitis, epilepsy, hydrocephalus, and intracranial tumors in dogs and cats

Subject Details

(3) Diseases of the spinal cord and spine in dogs and cats

Goals

To understand representative canine and feline diseases of the spinal cord and spine and their pathophysiology and diagnostic and treatment methods

Objectives

- 1) To be able to explain intervertebral disk disease, fibrocartilaginous embolism, degenerative myelopathy, and meningomyelitis in cats and dogs

Subject Details

(4) Diseases of the peripheral nerves, neuromuscular junctions, and muscles in dogs and cats

Goals

To understand representative canine and feline diseases of peripheral nerves, neuromuscular junctions, and muscles and their pathophysiology and diagnostic and treatment methods

Objectives

- 1) To be able to explain facial nerve paralysis, peripheral vestibular disorders, trigeminal nerve paralysis, peripheral neuropathy, myasthenia gravis, masticatory muscle myositis, and polymyositis in cats and dogs

Lecture 4-10. Veterinary Hematology

Subject Aims

The aim of this subject is to understand the general characteristics and clinical approaches of various hematological disorders.

Subject Details

(1) Anemia and polycythemia

Goals

To understand the causes, classifications, and pathogeneses of anemia and polycythemia

Objectives

- 1) To be able to explain classifications and differential diagnostic procedures of anemia
- 2) To be able to explain the causes, pathogeneses, diagnostic methods, and treatments of major disorders with anemia
- 3) To be able to explain differential diagnostic procedures and treatments of polycythemia

Subject Details

(2) Leukocytosis and leukopenia

Goals

To understand the mechanisms of leukocytosis and leukopenia and their clinical significance

Objectives

- 1) To be able to explain the pathogeneses of neutrophilia and neutropenia
- 2) To be able to explain the pathogeneses of eosinophilia and eosinopenia
- 3) To be able to explain the pathogenesis of monocytosis
- 4) To be able to explain the pathogeneses of lymphocytosis and lymphopenia

Subject Details

(3) Coagulopathies and thrombotic disorders

Goals

To understand basics of coagulopathies and thrombotic disorders

Objectives

- 1) To be able to explain the differential diagnostic procedures of hemorrhagic diathesis
- 2) To be able to explain the differential diagnostic procedures, causes, pathogeneses, diagnostic methods, and treatments of major disorders with thrombocytopenia
- 3) To be able to explain coagulation factor deficiencies
- 4) To be able to explain the causes, pathogeneses, diagnostic methods, and treatments of disseminated intravascular coagulation (DIC)
- 5) To be able to explain the causes, pathogeneses, diagnostic methods, and treatments of thrombotic disorders

Subject Details

(4) Lymphoid tumors

Goals

To understand the pathogenesis, classification, diagnosis, treatment, and prognosis of lymphoid tumors

Objectives

- 1) To be able to explain the definition, pathogeneses, classifications, diagnostic methods, treatments, and prognoses of lymphomas
- 2) To be able to explain the definition, pathogeneses, classifications, diagnostic methods and treatments, of lymphoid leukemias
- 3) To be able to explain the definition, pathogeneses, classifications, diagnostic methods and treatments, of plasma cell tumors

Subject Details

(5) Myeloid leukemias and myelodysplastic syndromes

Goals

To understand the myeloid leukemias and myelodysplastic syndromes (MDS)

Objectives

- 1) To be able to explain the general characteristics of acute myeloid leukemias
- 2) To be able to explain the general characteristics of myelodysplastic syndromes
- 3) To be able to explain the general characteristics of major disorders classified into myeloproliferative neoplasms (MPNs)

Lecture 4-11. Veterinary Dermatology

Subject Aims

The aim of this subject is to understand the cause and pathophysiology of canine and feline skin diseases as well as the clinical findings, diagnoses, and therapy of common skin diseases.

Subject Details

- (1) Structure and function of the skin

Goals

To understand the structure and function of the skin components and the products of the skin

Objectives

- 1) To be able to explain the structure and function of the integumentary organs
- 2) To be able to explain primary and secondary skin lesions and describe the pathophysiology and gross appearance of the skin lesions

Subject Details

- (2) Diagnosis of the skin diseases

Goals

To understand the diagnostic workup of skin diseases

Objectives

- 1) To be able to explain medical interviews in the context of skin diseases
- 2) To be able to explain the principles and results of microscopic hair examination, skin scraping, and cytology
- 3) To be able to explain the principles and application of skin biopsy, immunological assays, and allergy tests

Subject Details

- (3) Ectoparasitic diseases

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and therapy of common ectoparasitic diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and therapy of cheyletiellosis, canine and feline scabies, ear mite infestation, and demodicosis

Subject Details

- (4) Microbial skin diseases

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and therapy of the common microbial skin diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and therapy of pyoderma, dermatophytosis, Malassezia dermatitis, sporotrichosis, and cryptococcosis

Subject Details

- (5) Allergic skin diseases

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and therapy of the common allergic skin diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and therapy of canine flea allergic dermatitis, atopic dermatitis, and food allergy
- 2) To be able to explain the common clinical phenotypes, diagnosis, and therapy of feline allergic skin diseases

Subject Details

- (6) Immune-mediated skin diseases

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and therapy of the major immune-mediated skin diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and therapy of pemphigus, systemic or cutaneous erythematosus, erythema multiforme, toxic epidermal necrolysis, and idiopathic sterile nodular panniculitis

Subject Details

- (7) Genetic and hereditary skin diseases

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and therapy of the major genetic and hereditary skin diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and therapy of Ehler-Danlos syndrome, congenital epidermolysis bullosa, ichthyosis, sebaceous adenitis, and primary seborrhea

Subject Details

(8) Alopecic skin diseases

Goals

To understand the cause, pathophysiology, clinical findings, diagnosis, and therapy of the common alopecic skin diseases

Objectives

- 1) To be able to explain the cause, pathophysiology, clinical findings, diagnosis, and therapy of endocrine alopecia, hair cycle arrest (alopecia X), color dilution alopecia (black hair follicular dysplasia), cyclic flank alopecia, and pattern baldness

Subject Details

(9) The skin tumors

Goals

To understand the classification, clinical findings, diagnosis, therapy, and prognosis of the major skin tumors.

Objectives

- 1) To be able to explain the clinical findings, diagnosis, therapy, and prognosis of epidermal tumors, follicular and appendage tumors, and non-epithelial tumors

Lecture 4-12. Clinical Veterinary Behavior

Subject Aims

The aim of this subject is to understand the basic concepts of clinical veterinary behavior, including the definition, category, characteristics, causes, pathophysiology, risk factors, symptoms, diagnoses, and treatments of problem behaviors, and skills necessary for application.

Subject Details

(1) Problem behavior and consultation

Goals

To understand the field of clinical veterinary behavior and the process of behavioral examinations

Objectives

- 1) To be able to explain the definition of problem behaviors
- 2) To be able to explain how to conduct behavioral examinations

Subject Details

(2) Methods for behavior treatment

To understand the principles of behavioral examinations and how to make the treatment plan

Objectives

- 1) To be able to explain the categories and application of behavior modification
- 2) To be able to explain the categories and application of pharmacotherapy in behavior treatment
- 3) To be able to explain the categories and applications of surgical and other techniques in behavior treatment

Subject Details

(3) Problem behaviors in dogs

Goals

To understand the mechanisms, diagnoses, and treatments of problem behaviors in dogs

Objectives

- 1) To be able to explain problem behaviors related to aggression in dogs
- 2) To be able to explain problem behaviors caused by fear or anxiety in dogs
- 3) To be able to explain the other problem behaviors in dogs.

Subject Details

(4) Problem behaviors in cats

Goals

To understand the mechanisms, diagnoses, and treatments of problem behaviors in cats

Objectives

- 1) To be able to explain problem behaviors related to house soiling (inappropriate elimination) in cats
- 2) To be able to explain problem behaviors related to aggression in cats
- 3) To be able to explain other problem behaviors in cats

Subject Details

- (5) Problem behaviors in animals other than dogs and cats

Goals

To understand problem behaviors in companion animals other than dogs and cats, as well as in farm and zoo animals

Objectives

- 1) To be able to explain major problem behaviors in companion animals other than dogs and cats
- 2) To be able to explain problem behaviors in farm animals
- 3) To be able to explain problem behaviors in zoo animals

Subject Details

- (6) Prevention of problem behaviors

Goals

To understand the prevention of problem behaviors

Objectives

- 1) To be able to explain the criteria for selecting companion animals suitable for individual owners
- 2) To be able to explain factors related to socialization and habituation

Lecture 4-13. Veterinary Surgery

Subject Aims

The aim of this subject is to understand the basics of diagnostic methods and treatment methods for surgical diseases, as well as surgical invasion, injury, wound healing, shock, bleeding, hemostasis, and nutritional management.

Subject Details

(1) Injury and wound healing

Goals

To understand the biological reactions of damage, the mechanisms of repair, types and processes of wound healing, and factors that influence the healing process

Objectives

- 1) To be able to explain the types, causes, mechanisms, and characteristics of wounds
- 2) To be able to explain the mechanism of wound healing and influencing factors
- 3) To be able to explain basic treatment methods for wounds

Subject Details

(2) Surgical invasion

Goals

To understand the biological response to surgical invasion

Objectives

- 1) To be able to explain the effect of surgical invasion on the nervous system, endocrine system, and immune system
- 2) To be able to explain how to reduce surgical invasion

Subject Details

(3) Shock

Goals

To understand shock and its treatment

Objectives

- 1) To be able to explain the definition and pathophysiology of shock
- 2) To be able to explain the types, causes, and treatments of shock

Subject Details

(4) Bleeding, hemostasis, and transfusion

Goals

To understand the basics of treatment for bleeding during surgery

Objectives

- 1) To be able to explain the types and symptoms of bleeding
- 2) To be able to explain the mechanism and method of hemostasis
- 3) To be able to explain blood transfusion and its side effects

Subject Details

- (5) Nutrition management

Goals

To understand nutrition management during surgical invasion

Objectives

- 1) To be able to explain the basics of nutrition management

Lecture 4-14. General Veterinary Surgery

Subject Aims

The aim of this subject is to understand the theory and technical required to perform surgery.

Subject Details

- (1) Sterilization and disinfection for aseptic surgery

Goals

To understand sterilization and disinfection of instruments for aseptic surgery

Objectives

- 1) To be able to explain the equipment and drugs for sterilization and disinfection
- 2) To be able to explain the methods and indications of sterilization and disinfection and their advantages and disadvantages
- 3) To be able to explain the methodology of high pressure steam sterilization
- 4) To be able to explain the characteristics and toxicity of major disinfectants for aseptic surgery

Subject Details

- (2) Infection and management of surgical site infection

Goals

To understand surgical site infection, protective countermeasures, and methods of postoperative management of surgical site infection

Objectives

- 1) To be able to explain the etiology and protection against surgical site infection
- 2) To be able to explain protective countermeasures using antibacterial drugs
- 3) To be able to explain bandages and coverage materials for the surgical site
- 4) To be able to explain the treatment regimen for contaminated wounds

Subject Details

- (3) Preparation and use of surgical instruments, energy devices, and suture materials

Goals

To understand how to use surgical instruments, energy devices, and suture materials

Objectives

- 1) To be able to explain the types and uses of surgical instruments for general surgery
- 2) To be able to explain the types and uses of energy devices
- 3) To be able to explain the preparation and management of surgical instruments
- 4) To be able to explain suturing materials and methods of use for various tissues

Lecture 4-15. Veterinary Anesthesiology

Subject Aims

The aim of this subject is to understand the basic theories regarding anesthesia and pain management, cardiopulmonary resuscitation, and intensive care; and drugs and techniques used for them.

Subject Details

(1) A summary of anesthesia

Goals

To understand sedation, local anesthesia, and general anesthesia, and the importance of drug management

Objectives

- 1) To be able to explain the principles and classification of anesthesia, and the handling of anesthetics

Subject Details

(2) Sedation

Goals

To understand the mechanism of action and use of sedatives

Objectives

- 1) To be able to explain the classification, mechanism of action, and usage of tranquilizers and sedatives

Subject Details

(3) Local anesthesia

Goals

To understand the mechanism of action, usage, and precautions of local anesthetics

Objectives

- 1) To be able to explain the type, mechanism of action, principles of usage, contraindications, and complications of local anesthetics
- 2) To be able to explain typical methods of local anesthesia and their indications

Subject Details

(4) General anesthesia

Goals

To understand the concept of general anesthesia and the mechanism of action, pharmacokinetics, and pharmacodynamics of drugs used for general anesthesia

Objectives

- 1) To be able to explain the mechanism by which general anesthesia occurs and the concept of balance anesthesia
- 2) To be able to explain the mechanism of action, pharmacokinetics, and pharmacodynamics of inhaled anesthetics
- 3) To be able to explain the mechanism of action, pharmacokinetics, and pharmacodynamics of injectable anesthetics
- 4) To be able to explain the mechanism of action, pharmacokinetics, and pharmacodynamics of muscle relaxants
- 5) To be able to explain premedication, induction of anesthesia, maintenance of anesthesia, and intraoperative analgesia
- 6) To be able to explain the types, principles, and equipment used for tracheal intubation and inhalation anesthesia

Subject Details

- (5) Pain and analgesia

Goals

To understand the mechanism by which pain is transmitted and recognized, and the uses of analgesia

Objectives

- 1) To be able to explain the mechanism by which pain is transmitted and recognized, and the effect of pain on living organisms
- 2) To be able to explain the mechanism of action, pharmacokinetics, and pharmacodynamics of the analgesic effect of opioids
- 3) To be able to explain the mechanism of action, pharmacokinetics, and pharmacodynamics of the analgesic effect of analgesics except for opioids
- 4) To be able to explain the concept of multimodal and preemptive analgesia

Subject Details

- (6) Peri-operative management

Goals

To understand the methods of monitoring for safely and comfortably managing anesthesia, and how to deal with abnormalities during anesthesia

Objectives

- 1) To be able to explain preoperative evaluation and preparation of anesthesia cases
- 2) To be able to explain the concept of monitoring during anesthesia, how to evaluate the results, and how to deal with abnormalities
- 3) To be able to explain the methods for respiratory cardiovascular management during anesthesia
- 4) To be able to explain perioperative pain evaluation and pain management
- 5) To be able to explain the management of acid–base balance and infusion during anesthesia

Subject Details

- (7) Cardiopulmonary resuscitation

Goals

To understand the physiological changes during cardiopulmonary arrest and the theory and techniques of cardiopulmonary resuscitation

Objectives

- 1) To be able to explain the theory and basic procedures of cardiopulmonary resuscitation (basic life support / advance life support)

Subject Details

(8) Euthanasia

Goals

To understand ethics and proper techniques of euthanasia

Objectives

- 1) To be able to explain ethical and specific euthanasia methods

Lecture 4-16. Veterinary Soft Tissue Surgery

Subject Aims

The aim of this subject is to understand the causes, pathology, symptoms, diagnostic methods, and surgical treatment methods for surgical diseases of soft tissues and organs.

Subject Details

- (1) Surgical diseases of the skin and subcutaneous tissues

Goals

To understand diagnostic methods and treatment methods for skin wounds and defects, surgical diseases of the skin and subcutaneous tissues, and skin formation and reconstruction methods

Objectives

- 1) To be able to explain the precautions and procedures of reconstructive surgery, including suturing and skin flap methods for skin formation and tension relief

Subject Details

- (2) Surgical diseases of the digestive system

Goals

To understand the diagnostics and treatments for oral, esophageal, gastrointestinal, anal, liver, and pancreatic surgical disorders

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and treatment methods of cleft palate, oronasal fistulae, and periapical abscess
- 2) To be able to explain the pathophysiology, diagnosis, and treatment methods of esophageal diseases (foreign bodies, esophageal stenosis, vascular ring anomalies) requiring surgical treatment
- 3) To be able to explain the pathophysiology, diagnosis, and treatment methods of gastric surgical diseases (gastric foreign body, gastric dilatation-volvulus, pyloric stenosis)
- 4) To be able to explain the pathophysiology, diagnosis, and treatment methods of intestinal surgical diseases (intestinal foreign body, intussusception, intestinal obstruction, intestinal perforation, megacolon, rectal prolapse)
- 5) To be able to explain the pathophysiology, diagnosis, and treatment methods for surgical diseases of the anus and perianal (anal atresia or imperforate anus, perianal fistula, anal sacculitis)
- 6) To be able to explain the pathophysiology, diagnosis, and treatment methods of liver surgical diseases (portosystemic shunt, hepatic cyst, hepatic abscesses)
- 7) To be able to explain the pathophysiology, diagnosis, and treatment methods of surgical diseases of the biliary system (choleliths, biliary sludge, gallbladder mucocele, necrotizing cholecystitis, gallbladder rupture, extrahepatic bile duct obstruction)

Subject Details

- (3) Surgical diseases of the respiratory system and thorax

Goals

To understand the diagnostics and treatments for surgical disorders of the nasal cavity, larynx, trachea, lungs, thorax, and thoracic cavity

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and treatment methods of brachycephalic airway syndrome (brachycephalic airway obstruction syndrome)
- 2) To be able to explain the pathophysiology, diagnosis, and treatment methods of surgical diseases of the upper respiratory system (intranasal foreign body, intratracheal foreign body, tracheal collapse, tracheal injury, laryngeal paralysis)
- 3) To be able to explain the pathophysiology, diagnosis, and treatment of lung lobe torsion and chylothorax
- 4) To be able to explain the pathophysiology, diagnosis, and treatment of funnel chest
- 5) To be able to explain the pathophysiology, diagnosis, and treatment methods of diaphragmatic hernia and peritoneopericardial diaphragmatic hernia

Subject Details

- (4) Surgical diseases of the cardiovascular system

Goals

To understand the diagnostics and treatments for heart, pericardial, and vascular surgical disorders

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and treatment of congenital heart disease
- 2) To be able to explain the pathophysiology, diagnosis, and treatment of pericardial effusion

Subject Details

- (5) Surgical diseases of the female reproductive system

Goals

To understand the diagnostics and treatments for ovarian, uterine, and vaginal surgical disorders

Objectives

- 1) To be able to explain ovariectomy
- 2) To be able to explain the pathophysiology, diagnosis, and treatment of pyometra
- 3) To be able to explain cesarean section

Subject Details

- (6) Surgical diseases of the male reproductive system

Goals

To understand how to diagnose and treat testicular, penis, foreskin, and prostate surgical disease

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and treatment methods of castration, cryptorchidism, testicular tumors
- 2) To be able to explain the pathophysiology, diagnosis, and treatment methods of benign prostatic hypertrophy, prostatic cyst, prostatic abscess

Subject Details

- (7) Surgical diseases of urology

Goals

To understand the diagnostics and treatments for kidney, ureter, bladder, and urethral surgical disorders

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and treatment methods of nephroliths, ureteral calculi, and urolithiasis
- 2) To be able to explain the pathophysiology, diagnosis, and treatment methods of pyonephrosis and hydronephrosis
- 3) To be able to explain the pathophysiology, diagnosis, and treatment methods of ectopic ureter
- 4) To be able to explain the pathophysiology, diagnosis, and treatment methods of feline lower urinary tract disease (FLUTD)
- 5) To be able to explain the pathophysiology, diagnosis, and treatment methods of urethral stricture/obstruction

Subject Details

- (8) Surgical diseases of other soft tissues

Goals

To understand the diagnostics and treatments for other soft tissue surgical disorders

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and treatment methods of splenomegaly
- 2) To be able to explain the pathophysiology, diagnosis, and treatment methods of surgical diseases of the thyroid gland, parathyroid gland, and adrenal gland

Subject Details

- (9) Hernia

Goals

To understand the causes, diagnostics, and treatments for hernias at various sites

Objectives

- 1) To be able to explain the pathophysiology, diagnosis, and treatment methods of umbilical and abdominal hernia
- 2) To be able to explain the pathophysiology, diagnosis, and treatment methods of inguinal hernia
- 3) To be able to explain the pathophysiology, diagnosis, and treatment methods of perineal hernia

Lecture 4-17. Veterinary Musculoskeletal Diseases

Subject Aims

The aim of this subject is to understand the causes, pathophysiology, symptoms, diagnostic methods, and treatment methods for musculoskeletal diseases.

Subject Details

(1) Clinical signs

Goals

To understand the structures and functions of the musculoskeletal system and the clinical symptoms of musculoskeletal disorders

Objectives

1) To be able to explain the general clinical symptoms of musculoskeletal disorders

Subject Details

(2) Diagnostic methods

Goals

To understand the various examinations for musculoskeletal disorders and comprehensive diagnostic methods

Objectives

- 1) To be able to explain physical examinations for musculoskeletal disorders
- 2) To be able to explain synovial fluid examinations
- 3) To be able to explain the diagnostic imaging of musculoskeletal disorders

Subject Details

(3) Fractures

Goals

To understand the clinical symptoms, diagnosis, and treatment of fractures

Objectives

- 1) To be able to explain the types and symptoms of fractures and diagnostic methods
- 2) To be able to explain the closed reductions of fractures
- 3) To be able to explain the open reductions of fractures
- 4) To be able to explain the complications and treatment methods of fractures

Subject Details

(4) Bone infections

Goals

To understand the causes, diagnoses, and treatments of bone infection and osteomyelitis

Objectives

- 1) To be able to explain the disease mechanism, diagnosis, and treatments of bone infection

Subject Details

- (5) Bone and joint tumors

Goals

To understand the types, clinical symptoms, and diagnosis, and treatments of bone and joint tumors

Objectives

- 1) To be able to explain the clinical symptoms, diagnosis, and treatments of bone and joint tumors

Subject Details

- (6) Metabolic bone disorders

Goals

To understand the disease mechanism, diagnosis, and treatments of bone metabolic disorders

Objectives

- 1) To be able to explain the disease mechanism of bone metabolic disorders associated with systemic and renal metabolic disorders

Subject Details

- (7) Luxation

Goals

To understand the clinical symptoms, diagnosis, and treatments of luxation

Objectives

- 1) To be able to explain the clinical symptoms, diagnosis, and treatments of luxation
- 2) To be able to explain the causes, clinical symptoms, diagnosis, and treatments of patellar luxation

Subject Details

- (8) Developmental bone and joint disorders

Goals

To understand the causes, disease mechanism, clinical symptoms, diagnosis, and treatment and prevention of developmental bone and joint disorders

Objectives

- 1) To be able to explain the disease mechanism, clinical symptoms, diagnosis, and treatment and prevention of general bone and joint diseases

Subject Details

- (9) Arthritis

Goals

To understand the disease mechanism, clinical symptoms, diagnosis, and treatments of arthritis with articular cartilage degeneration

Objectives

- 1) To be able to explain the classification, causes, and disease mechanism of arthritis
- 2) To be able to explain the radiographic findings, diagnosis, and treatments of osteoarthritis

Subject Details

(10) Tendon and ligament disorders

Goals

To understand the disease mechanism, clinical symptoms, diagnosis, and treatments of major tendon and ligament disorders

Objectives

- 1) To be able to explain the disease mechanism, clinical symptoms, diagnosis, and treatment and prevention of general tendon and ligament disorders

Subject Details

(11) Muscle disorders

Goals

To understand about the disease mechanism, diagnosis, and treatments of the major muscle disorders

Objectives

- 1) To be able to explain the muscle tear and bruise

Lecture 4-18. Veterinary Clinical Oncology

Subject Aims

The aim of this subject is to understand tumor diseases and diagnostic and treatment methods.

Subject Details

(1) Tumor biology

Goals

To understand the mechanisms of carcinogenesis, tumor cell proliferation, and tumor progression

Objectives

- 1) To be able to explain the definition of tumor and the mechanism of carcinogenesis
- 2) To be able to explain the metastatic mechanism of malignant tumors
- 3) To be able to explain the main factors of tumor occurrence

Subject Details

(2) Tumor Diagnosis

Goals

To understand the principles, objectives, and indications for various methods of examining tumors

Objectives

- 1) To be able to explain the pathogenesis, gross findings, and related clinical signs of tumors
- 2) To be able to explain the biopsy method for pathological diagnosis and its indication, as well as the pathological grades
- 3) To be able to explain the TNM classification and staging of typical tumors

Subject Details

(3) Tumor surgery

Goals

To understand the significance and indications of tumor surgery

Objectives

- 1) To be able to explain the precautions, indications, and limitations of tumor surgery
- 2) To be able to explain the surgical margin

Subject Details

(4) Radiation therapy

Goals

To understand the significance and indications of radiation therapy for tumor

Objectives

- 1) To be able to explain the principles, indications, and limitations of radiation therapy

- 2) To be able to explain the radiosensitivity of major tumors and normal tissues

Subject Details

- (5) Chemotherapy

Goals

To understand the significance and indications of chemotherapy for tumors

Objectives

- 1) To be able to explain the principles, indications, and limitations of chemotherapy using antitumor drugs
- 2) To be able to explain the type, mechanism of action, and indication of antitumor drugs
- 3) To be able to explain the mechanism of side effects caused by antitumor drugs and how to manage them

Lecture 4-19. Veterinary Ophthalmology

Subject Aims

The aim of this subject is understand the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of ophthalmic diseases.

Subject Details

(1) The clinical symptoms of ophthalmic diseases

Goals

To understand the clinical symptoms of ophthalmic diseases

Objectives

1) To be able to explain the general clinical symptoms of ophthalmic diseases

Subject Details

(2) The diagnostic procedures of ophthalmic diseases

Goals

To understand the principles, application, and evaluation of ophthalmic diagnostic procedures

Objectives

1) To be able to explain procedures for making diagnoses and conducting treatments of ophthalmic diseases, as well as the principles, application, and diagnostic findings of these procedures

Subject Details

(3) Extraocular ophthalmic diseases

Goals

To understand the basics of the orbit, eyelids, conjunctiva, nictitating membrane (third eyelid), and nasolacrimal systems, as well as the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, and prognosis, and prevention of their diseases

Objectives

- 1) To be able to explain the basics of the orbit, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of orbital diseases
- 2) To be able to explain the basics of the eyelids, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of diseases of the eyelids
- 3) To be able to explain the basics of the conjunctiva, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of the conjunctival diseases
- 4) To be able to explain the nictitating membrane (third eyelid) and nasolacrimal systems, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, and prognosis, and prevention of their diseases

Subject Details**(4) Corneoscleral and intraocular ophthalmic diseases****Goals**

To understand the basics of the corneoscleral and intraocular systems, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of their diseases

Objectives

- 1) To be able to explain the basics of the cornea and sclera, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of corneoscleral diseases
- 2) To be able to explain the basics of the anterior chamber, posterior chamber, and iridocorneal angle, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of glaucoma
- 3) To be able to explain the basics of the uvea, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of uveal diseases
- 4) To be able to explain the basics of the lens, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of diseases of the lens
- 5) To be able to explain the basics of the vitreous humor, retina, and choroid, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of their diseases

Subject Details**(5) Other ophthalmic diseases****Goals**

To understand the basics of the neuro-ophthalmic, hereditary/congenital, and neoplastic diseases, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of their diseases

Objectives

- 1) To be able to explain the basics of vision and neuro-ophthalmology, and the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of neuro- and hereditary/congenital-ophthalmic diseases
- 2) To be able to explain the causes, pathophysiology, clinical symptoms, diagnostic procedures, treatments, prognosis, and prevention of the major ophthalmic neoplasia

Lecture 4-20. Veterinary Diagnostic Imaging

Subject Aims

The aim of this subject is to understand the specific clinical applications for each imaging modality based on the basic principles and characteristics of each imaging modality as well as the characteristics of representative images of important diseases in veterinary practice.

Subject Details

(1) Imaging modalities, basic principles, and clinical applications

Goals

To understand the imaging modalities, their basic underlying principles, and relevant clinical applications

Objectives

- 1) To be able to explain each type of imaging modality and its basic principles
- 2) To be able to explain the clinical applications of each imaging modality

Subject Details

(2) Diagnostic radiology

Goals

To understand the structure of X-ray devices, the basic concept of making a radiograph, and acquire the basics of radiographic techniques and interpretation

Objectives

- 1) To be able to explain the structure of X-ray devices and basic properties of X-rays
- 2) To be able to explain factors affecting image detail
- 3) To be able to explain X-ray imaging methods
- 4) To be able to explain normal radiographic anatomy and basic methods of describing radiographic findings
- 5) To be able to explain indications for fluoroscopy

Subject Details

(3) Ultrasonography

Goals

To understand the structure of ultrasound diagnostic devices and the basic concept of making ultrasound images, and acquire the basics of ultrasonographic techniques and interpretation

Objectives

- 1) To be able to explain basic ultrasound physics and ultrasound diagnostic devices
- 2) To be able to explain imaging modes and Doppler technology
- 3) To be able to explain ultrasound artifacts
- 4) To be able to explain basic ultrasound scanning techniques

- 5) To be able to explain normal ultrasonographic anatomy and basic method of describing ultrasonographic findings

Subject Details

- (4) Computed tomography (CT)

Goals

To understand the structure of CT devices and the basic concept of making CT images, and acquire the basics of CT techniques and interpretation

Objectives

- 1) To be able to explain indications for CT and basic CT images
- 2) To be able to explain fundamental imaging parameters

Subject Details

- (5) Magnetic resonance imaging (MRI)

Goals

To understand the structure of MRI devices and the basic concept of making MR images, and acquire the basics of MRI techniques and interpretation

Objectives

- 1) To be able to explain nuclear magnetic resonance and the basic structure of MRI devices
- 2) To be able to explain the characteristics of T1- and T2-weighted images

Subject Details

- (6) Diagnostic imaging of the thorax

Goals

To understand imaging methods for the thorax as well as representative images of typical thoracic diseases

Objectives

- 1) To be able to explain thoracic imaging
- 2) To be able to explain normal thoracic anatomy and abnormal findings

Subject Details

- (7) Diagnostic imaging of the abdomen

Goals

To understand imaging methods for the abdomen as well as representative images of typical abdominal diseases

Objectives

- 1) To be able to explain abdominal imaging
- 2) To be able to explain normal abdominal anatomy and abnormal findings

Subject Details

(8) Diagnostic imaging of the musculoskeletal system

Goals

To understand imaging methods for the musculoskeletal system as well as representative images of typical musculoskeletal diseases

Objectives

- 1) To be able to explain musculoskeletal imaging
- 2) To be able to explain normal musculoskeletal anatomy and abnormal findings

Subject Details

(9) Diagnostic imaging of the central nervous system (CNS)

Goals

To understand imaging methods for the CNS as well as representative images of typical CNS diseases

Objectives

- 1) To be able to explain CNS imaging
- 2) To be able to explain normal CNS anatomy and abnormal findings

Lecture 4-21. Farm Animal Medicine

Subject Aims

The aim of this subject is to understand basic issues and characteristics of farm animals in terms of clinical medicine, pathophysiology, causes, diagnosis, and treatment of various diseases of farm animals, as well as control methods necessary for preventing disease and increasing productivity.

Subject Details

(1) Cardiac diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of cardiac diseases in cattle

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of cardiac diseases in cattle
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of vascular diseases in cattle
- 3) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of congenital heart diseases in cattle

Subject Details

(2) Respiratory diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of respiratory diseases in farm animals

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of infectious respiratory diseases in cattle
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of non-infectious respiratory diseases in cattle
- 3) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of respiratory diseases in pigs

Subject Details

(3) Digestive tract diseases in cattle

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of digestive tract diseases in cattle

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of oral and esophageal diseases in cattle
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of forestomach diseases in cattle
- 3) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of abomasum diseases in cattle
- 4) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of infectious enteritis in adult cattle
- 5) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of non-infectious enteritis in cattle
- 6) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of calf diarrhea

Subject Details

- (4) Digestive tract diseases in pigs

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of digestive tract diseases in pigs

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of digestive tract diseases in pigs

Subject Details

- (5) Liver and biliary diseases in cattle

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of hepatic and biliary diseases in cattle

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of hepatic diseases in cattle
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of biliary diseases of cattle

Subject Details

- (6) Urological diseases in cattle

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of urological diseases in cattle

Objectives

- 1) To be able to explain the classification, pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of kidney diseases in cattle
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of diseases of the lower urinary tract in cattle

Subject Details

- (7) Metabolic and nutritional diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of metabolic and nutritional diseases in cattle and pigs

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of metabolic disorders related to minerals
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of metabolic disorders related to glucose and lipids
- 3) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of metabolic disorders related to vitamins
- 4) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of trace element deficiency

Subject Details

- (8) Mastitis and teat disorders in cattle

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and preventive measures of mastitis and teat disorders

Objectives

- 1) To be able to explain the diagnosis and treatment of mastitis
- 2) To be able to explain the pathogenic microorganisms, clinical signs, treatment, and prevention of infectious mastitis
- 3) To be able to explain the pathogenic microorganisms, clinical signs, treatment, and prevention of environmental mastitis
- 4) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of disorders of the udder and teat as well as milk abnormalities

Subject Details

- (9) Skin diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of skin diseases in cattle and pigs

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of skin diseases in cattle
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of skin diseases in pigs

Subject Details

(10) Hematological diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatments, and prevention of the major hematological diseases in cattle and pigs

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of the major hematological diseases in cattle and pigs

Subject Details

(11) Hereditary diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatments, and genetic control of the major hereditary diseases in cattle

Objectives

- 1) To be able to explain the pathophysiology, causes, diagnosis, clinical signs, treatment, and genetic control of the major hereditary diseases in cattle

Subject Details

(12) Neurological diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatments, and prevention of the major neurological diseases in cattle

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of the major neurological diseases in cattle

Subject Details

(13) Locomotive disorders

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of locomotive disorders in cattle

Objectives

- 1) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of hoof diseases
- 2) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of bone and joint diseases
- 3) To be able to explain the pathophysiology, causes, clinical signs, diagnosis, treatment, and prevention of tendon, muscle, and neurological diseases

Subject Details

(14) Ophthalmic diseases

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatments, and prevention of the major ophthalmic diseases in cattle

Objectives

- 1) To be able to explain the pathophysiology, causes, diagnosis, clinical signs, treatment, and prevention of the major ophthalmic diseases in cattle

Subject Details

(15) Neonatal diseases in animals

Goals

To understand the pathophysiology, causes, clinical signs, diagnosis, treatments, and prevention of the major diseases of neonatal animals

Objectives

- 1) To be able to explain the pathophysiology, causes, diagnosis, clinical signs, treatment, and prevention of the major neonatal diseases

Subject Details

(16) Metabolic profile test

Goals

To understand the metabolic profile test, which is conducted for improving productivity in addition to detecting diseases, and how to interpret the test results

Objectives

- 1) To be able to explain the purpose and test items of the metabolic profile test
- 2) To be able to explain how to conduct the examination and interpret the results of the metabolic profile test in dairy cows
- 3) To be able to explain how to conduct the examination and interpret the results of the metabolic profile test in beef cattle

Subject Details

(17) Pharmacotherapy principles in farm animal medicine

Goals

To understand the proper use of antibacterial and hormonal products used in farm animals

Objectives

- 1) To be able to explain the proper use of antibacterial and hormonal drugs for farm animals as well as the residue and withdrawal periods

Lecture 4-22. Equine Clinical Medicine

Subject Aims

The aim of this subject is to understand the characteristics of horses, including racehorses, riding horses, and companion horses, as well as the causes, pathophysiology, symptoms, diagnosis, treatments, and prognosis of equine diseases.

Subject Details

(1) Hippology and the management of horses

Goals

To understand the characteristics of horses, the relationship between humans and horses, and breeding management of horses

Objectives

- 1) To be able to explain the anatomical, physiological, and behavioral characteristics of horses and their relationship with humans
- 2) To be able to explain the management and nutrition of horses

Subject Details

(2) Restraint and examinations of horses

Goals

To understand the general examination, restraint, and medical treatment of horses

Objectives

- 1) To be able to explain the physical and clinical examination of horses
- 2) To be able to explain the restraint, analgesia, sedation, and anesthesia of horses
- 3) To be able to explain the treatment standards, emergency support, and euthanasia of horses

Subject Details

(3) Diagnostic imaging of horses

Goals

To understand the diagnostic imaging of horses

Objectives

- 1) To be able to explain the X-ray examination of horses
- 2) To be able to explain the ultrasonography of horses
- 3) To be able to explain the endoscopy of horses

Subject Details

(4) Equine internal medicine

Goals

To understand the causes, pathophysiology, symptoms, diagnosis, and medical treatments of equine diseases

Objectives

- 1) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine respiratory diseases (upper and lower airway diseases)
- 2) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine cardiovascular diseases
- 3) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine digestive diseases (tooth, esophagus, stomach, and intestinal diseases)
- 4) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine musculoskeletal (bones, joints, tendons, and ligaments) and hoof diseases
- 5) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine neuropathy (spinal cord and peripheral nerve)
- 6) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine urinary diseases (kidney, ureter, bladder, and urethra)
- 7) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine endocrine diseases
- 8) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine skin diseases
- 9) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and medical treatments of equine neonatal diseases

Subject Details

(5) Equine surgery

Goals

To understand the surgical treatments of equine diseases

Objectives

- 1) To be able to explain the surgical treatments of equine upper airway disease
- 2) To be able to explain the surgical treatments of equine digestive diseases
- 3) To be able to explain the surgical treatments of equine musculoskeletal and hoof diseases
- 4) To be able to explain the surgical treatments of equine urogenital diseases

Subject Details

(6) Equine ophthalmology

Goals

To understand the characteristics of equine eyes as well as the causes, pathophysiology, symptoms, diagnosis, and treatments of ophthalmic diseases

Objectives

- 1) To be able to explain the anatomy and function of equine eyes

- 2) To be able to explain the pathophysiology, causes, symptoms, diagnosis, and treatments of equine ophthalmic diseases

Subject Details

- (7) Equine reproduction and obstetrics

Goals

To understand the reproductive physiology, the reproductive procedures, the reproductive disorders, and the normal and abnormal deliveries of horses

Objectives

- 1) To be able to explain mating and breeding procedures based on male reproductive physiology, as well as genital diseases and reproductive disorders in stallions
- 2) To be able to explain the features of pregnancy based on female reproductive physiology, as well as genital diseases, reproductive disorders, and normal and abnormal deliveries in mares

Lecture 4-23. Veterinary Theriogenology

Subject Aims

The aim of this subject is to understand reproductive physiology and abnormalities, including estrous cycles, pregnancy, parturition, and the puerperal period in representative animal species; treatment and preventive measures of reproductive disorders; and basic techniques for controlling the reproductive functions of animals by artificial means.

Subject Details

- (1) Differentiation and structure of the genital organs

Goals

To understand the process of sexual differentiation, the basic structures and functions of the genital organs, and comparative interspecies differences according to structure and function

Objectives

- 1) To be able to explain the process of sexual differentiation and the basic structures of the genital organs
- 2) To be able to explain interspecies differences in the structures of female genital organs in terms of their functions
- 3) To be able to explain interspecies differences in the structures of male genital organs in terms of their functions

Subject Details

- (2) Control mechanism of reproductive functions

Goals

To understand the role of endocrine organs in controlling reproductive functions; the production and mechanisms of action of hormones; and their interactions

Objectives

- 1) To be able to explain the names, sites of production, and target organs of the major hormones involved in the control of reproductive functions
- 2) To be able to explain the actions, mechanisms, and secretory regulation of the major hormones involved in the control of reproductive functions, with a focus on the hypothalamus-pituitary-gonadal axis

Subject Details

- (3) Female reproductive cycles and sexual behavior

Goals

To understand the basic female reproductive cycles and their mechanisms of control in representative animal species; changes in genital organs and sexual behaviors that occur with estrus; and methods for diagnosing estrus

Objectives

- 1) To be able to explain the basic concept of reproductive cycles and its regulatory mechanisms
- 2) Be able to explain sexual maturation, the estrous cycle, and their regulatory in representative animal species
- 3) To be able to explain changes in the genital organs during the estrous cycle in representative animal species
- 4) To be able to explain various female sexual behaviors
- 5) To be able to explain methods for diagnosing estrus in representative animal species

Subject Details

- (4) Fertilization and implantation

Goals

To understand the mechanisms of maternal recognition of pregnancy, the process of implantation, and control systems in representative animal species

Objectives

- 1) To be able to explain the mechanisms of maternal recognition of pregnancy in representative animal species
- 2) To be able to explain the basics of implantation and characteristics of the implantation process in representative animal species

Subject Details

- (5) Pregnancy and fetal growth

Goals

To understand the basics of pregnancy and fetal growth; the mechanisms of these processes and how to control them; and the mechanisms of characteristic pregnancy maintenance in representative animal species

Objectives

- 1) To be able to explain the duration of pregnancy and changes in the dam and fetus that occur during pregnancy in representative animal species
- 2) To be able to explain the basic structures and functions of the placenta the characteristics of placentas in representative animal species
- 3) To be able to explain the actions of hormones involved in the maintenance of pregnancy and the mechanisms of pregnancy maintenance in representative animal species

Subject Details

- (6) Pregnancy diagnosis

Goals

To understand methods for diagnosing pregnancy by confirming changes in the dam and the presence of the fetus during pregnancy, as well as the procedures, advantages, and disadvantages of each diagnostic method.

Objectives

- 1) To be able to explain pregnancy diagnoses and the time to implement each diagnosis in representative animal species

Subject Details

- (7) Parturition and puerperium

Goals

To understand the process and underlying mechanisms of normal parturition and puerperium as well as the physiological characteristics of newborn animals

Objectives

- 1) To be able to explain the physiological changes before the onset of parturition and the methods for predicting its onset
- 2) To be able to explain the basic parturient and parturition processes representative animal species
- 3) To be able to explain puerperium in representative animal species as well as interspecies differences and appropriate management techniques
- 4) To be able to explain the physiological characteristics of newborns in representative animal species as well as appropriate management techniques

Subject Details

- (8) Artificial controls of the estrous cycle and pregnancy

Goals

To understand estrus, ovulation, parturition, abortion, and contraception

Objectives

- 1) To be able to explain techniques for controlling follicular growth, estrus, and timing of ovulation
- 2) To be able to explain indications and techniques for inducing abortion and parturition
- 3) To be able to explain indications and techniques for animal contraception of

Subject Details

- (9) Male reproductive physiology

Goals

To understand sexual maturation, sperm, semen, ejaculation, and their regulatory mechanisms

Objectives

- 1) To be able to explain the process of male sexual maturation and its timing in representative animal species
- 2) To be able to explain examinations of sperm and semen to judge semen quality
- 3) To be able to explain the mechanism of penile erection, which is necessary for copulation, and the regulation of the ejaculatory process in representative animal species

Subject Details

- (10) Artificial reproductive technology

Goals

To understand the basics of artificial breeding, including artificial insemination, embryo transfer, and related reproductive technologies and techniques

Objectives

- 1) To be able to explain semen collection, methods of storage, techniques for insemination, and hygiene management of semen
- 2) To be able to explain artificial breeding techniques, such as artificial insemination and embryo transfer, in representative animal species

Subject Details

(11) Female reproductive disorders

Goals

To understand classifications of infertility due to inability to be inseminated or inability to become pregnant after insemination due to anestrus or abnormal estrus, according to symptoms and causes, as well as differential diagnoses and countermeasures

Objectives

- 1) To be able to classify congenital abnormalities of the genital organs and explain causes, symptoms, diagnoses, and treatments
- 2) To be able to classify infertilities caused by structural and functional abnormalities of the genital organs in representative animal species and explain causes, symptoms, diagnoses, treatments, and preventions
- 3) To be able to explain diagnoses and countermeasures for infertilities caused by atypical infection and resultant inflammation in the genital organs
- 4) To be able to explain causes and countermeasures for decline of reproductive performance due to inadequate feeding and reproductive managements

Subject Details

(12) Abnormalities during pregnancy

Goals

To understand abnormalities in dams and fetuses during pregnancy; classifications of abortions according to cause and timing; and differential diagnoses and countermeasures, including prevention

Objectives

- 1) To be able to classify abnormalities in dams during pregnancy and explain causes, symptoms, diagnoses, and treatments
- 2) To be able to classify abnormalities and death in fetuses during pregnancy and explain causes, symptoms, diagnoses, treatments and preventive measures
- 3) To be able to classify abortions and explain causes, symptoms, diagnoses, treatments, and preventive measures

Subject Details

(13) Abnormalities during parturition

Goals

To understand the causes and countermeasures of major abnormalities of parturition from the time when premonitory symptoms appear to its end, as well as their effects on subsequent fertility

Objectives

- 1) To be able to classify abnormalities during parturition and explain causes, diagnoses, treatments, and preventive measures

Subject Details

(14) Abnormalities during puerperium

Goals

To understand the causes and countermeasures of major abnormalities during the puerperal period and their effects on subsequent fertility as well as the causes and countermeasures of abnormalities in newborn animals

Objectives

- 1) To be able to classify abnormalities during the puerperal period and explain causes, symptoms, diagnosis, treatment, and their effects on subsequent reproductive performance
- 2) To be able to explain resuscitation and abnormalities in newborn animals and explain causes, diagnoses, and treatments

Subject Details

(15) Male reproductive disorders

Goals

To understand the causes, diagnoses, and countermeasures of male reproductive disorders

Objectives

- 1) To be able to explain examinations of the genital organs and representative abnormalities of the genital organs in male animals
- 2) To be able to classify inabilities of copulation and explain causes, diagnoses, treatments, and preventions in male animals
- 3) To be able to classify sterility and explain causes, diagnoses, treatments, and preventive measures in male animals

Practical subjects

Basic Veterinary Medicine

Practice 1-1. Veterinary Anatomy Practice

Subject Aims

The aim of this subject is to understand the gross anatomical structures and related functions, as well as their clinical importance of the main organs of the skeletal, muscular, digestive, respiratory, urogenital, endocrine, cardiovascular, lymphatic and nervous systems, and common integuments and sense organs in dogs, horses, pigs, ruminants, and fowls, through dissection with scalpel and forceps and visual checking.

Subject Details

(1) Bones of the head and trunk

Goals

To deepen understanding of the main structures of the bones in the head and trunk through visual checking

Objectives

1) To be able to explain the structure, name, location, and interspecies differences of the bones of the head and trunk

Subject Details

(2) Bones of the forelimb and hindlimb

Goals

To deepen understanding of the main structures of the bones forming the forelimb and hindlimb through visual checking

Objectives

- 1) To be able to explain the structure, name, location, and interspecies differences of the bones of the forelimb and hindlimb
- 2) To be able to explain the main joints

Subject Details

(3) Muscles of the head and trunk in dogs

Goals

To deepen understanding of the main muscles of the head and trunk through visual checking

Objectives

- 1) To be able to explain the name, location, and function of the muscles of the head and trunk

Subject Details

(4) Muscles of the forelimb and hindlimb in dogs

Goals

To deepen understanding of the main muscles of the forelimb and hindlimb through visual checking

Objectives

- 1) To be able to explain the name, location, and function of the muscles of the forelimb and hindlimb

Subject Details

- (5) Organs in dogs

Goals

To deepen understanding of the main structures of organs through visual checking

Objectives

- 1) To be able to explain the structure, name, and location of the organs of the head, neck, and chest
- 2) To be able to explain the structure, name, and location of the organs of the abdomen and pelvis

Subject Details

- (6) The heart in dogs

Goals

To deepen understanding of the structure of the heart through visual checking

Objectives

- 1) To be able to explain the structure of the heart, and the name and course of the blood vessels running into and out of the heart

Subject Details

- (7) Blood vessels in dogs

Goals

To deepen understanding of the main blood vessels distributed throughout the body through visual checking

Objectives

- 1) To be able to explain the name and course of the blood vessels distributed in the head and trunk
- 2) To be able to explain the name and course of the blood vessels distributed in the forelimb and hindlimb

Subject Details

- (8) The central nervous system in dogs

Goals

To deepen understanding of the main structures of the central nervous system through visual checking

Objectives

- 1) To be able to explain the structure, name, and location of the cerebrum, brain stem, cerebellum, and spinal cord

Subject Details

(9) The visual organs and peripheral nervous system in dogs

Goals

To deepen understanding of the visual organs, autonomic nervous system, cranial nerves, and spinal nerves through visual checking

Objectives

- 1) To be able to explain the structure, name, and location of the visual organs
- 2) To be able to explain the name and course of the cranial and autonomic nerves
- 3) To be able to explain the name and course of the spinal nerves of the trunk, forelimb, and hindlimb

Subject Details

(10) Muscles in horses

Goals

To deepen understanding of the various structures of the body surface and the main muscles through visual checking

Objectives

- 1) To be able to explain the name and location of the various structures of the body surface and the muscles of the head, neck, chest, and abdomen
- 2) To be able to explain the name and location of the muscles of the forelimb and hindlimb

Subject Details

(11) Organs in horses

Goals

To deepen understanding of the main structures of the organs through visual checking

Objectives

- 1) To be able to explain the structure, name, and location of the organs of the head, neck, and chest
- 2) To be able to explain the structure, name, and location of the organs of the abdomen and pelvis

Subject Details

(12) The cardiovascular and nervous systems in horses

Goals

To deepen understanding of the structure of the heart and the main vascular and nervous systems through visual checking

Objectives

1) To be able to explain the structure of the heart and the name and course of the main vascular and nervous systems

Subject Details

(13) Muscles in ruminants

Goals

To deepen understanding of the various structures of the body surface and the main muscles through visual checking

Objectives

- 1) To be able to explain the name and location of the various structures of the body surface and the muscles of the head, neck, chest, and abdomen
- 2) To be able to explain the name and location of the muscles of the forelimb and hindlimb

Subject Details

(14) Organs in ruminants

Goals

To deepen understanding of the main structures of the organs through visual checking

Objectives

- 1) To be able to explain the structure, name, and location of the organs of the head, neck, and chest
- 2) To be able to explain the structure, name, and location of the organs of the abdomen and pelvis

Subject Details

(15) The cardiovascular and nervous systems in ruminants

Goals

To deepen understanding of the structure of the heart and the main vascular and nervous systems through visual checking

Objectives

- 1) To be able to explain the structure of the heart and the name and course of the main vascular and nervous systems

Subject Details

(16) Muscles in pigs

Goals

To deepen understanding of the various structures of the body surface and the main muscles through visual checking

Objectives

- 1) To be able to explain the name and location of the various structures of the body surface and the muscles of the head and trunk

- 2) To be able to explain the name and location of the muscles of the forelimb and hindlimb

Subject Details

(17) The organs, and cardiovascular and nervous systems in pigs

Goals

To deepen understanding of the structures of the visceral organs and heart, and the main vascular and nervous systems through visual checking

Objectives

- 1) To be able to explain the structure, name, and location of the visceral organs
- 2) To be able to explain the structure of the heart and the name and course of the main vascular and nervous systems

Subject Details

(18) The anatomy of fowls

Goals

To deepen understanding of the various structures of the body surface and organs, and the main bones, muscles, blood vessels, and nerves through visual checking

Objectives

- 1) To be able to explain the name and location of the various structures of the body surface and organs
- 2) To be able to explain the name and location of the main bones, muscles, blood vessels and nerves

Practice 1- 2. Veterinary Histology Practice

Subject Aims

The aim of this subject is to understand the morphological features of tissues and organs in cattle, horses, pigs, dogs, and laboratory animals (e.g., mice and rats) through microscopic observation and drawing sketches.

Subject Details

(1) Tissue preparation methods and proper use of optical microscopes

Goals

To understand tissue preparation methods and the proper use of optical microscopes

Objectives

- 1) To be able to explain tissue preparation methods, including tissue sectioning and hematoxylin and eosin staining
- 2) To be able to explain representative histochemical staining methods
- 3) To be able to observe histological specimens using an optical microscope with an understanding of the optimum illumination and spatial resolution

Subject Details

(2) Epithelial and connective tissue

Goals

To deepen understanding of the basic structure of epithelial and connective tissue through optical microscopic observation

Objectives

- 1) To be able to classify epithelia according to morphology and to illustrate the histological structure of the epithelium
- 2) To be able to illustrate the structure of glands
- 3) To be able to classify connective tissues and illustrate their histological structure

Subject Details

(3) Supporting tissue (bone and cartilage) and muscular tissue (smooth muscle, skeletal muscle, and cardiac muscle)

Goals

To deepen understanding of the basic structure of the supporting tissue (bone and cartilage) and muscular tissue through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of bone tissues
- 2) To be able to illustrate the histological structure of cartilage tissues
- 3) To be able to illustrate the histological structure of smooth muscle, skeletal muscle, and cardiac muscle

Subject Details

(4) Blood, bone marrow, and vascular tissues

Goals

To deepen understanding of the morphology of blood cells and the histological structure of the bone marrow and vascular tissues through optical microscopic observation

Objectives

- 1) To be able to classify blood cells and illustrate their structure
- 2) To be able to illustrate the histological structure of the bone marrow
- 3) To be able to illustrate the histological structure of arteries, veins, and capillaries, and lymphatic vessels

Subject Details

(5) Lymphatic tissue and organs

Goals

To deepen understanding of the histological structure of the lymphatic tissue and organs through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the thymus, lymph node, and spleen
- 2) To be able to illustrate the histological structure of the tonsils and aggregated lymphoid nodules (Peyer's patches)

Subject Details

(6) The digestive system I (tongue, esophagus, stomach, intestines)

Goals

To deepen understanding of the histological structure of the tongue and alimentary canal (esophagus, stomach, intestines) through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the tongue
- 2) To be able to illustrate the general histological structure of the alimentary canal
- 3) To be able to illustrate the histological structure of the esophagus, glandular stomach (in monogastric animals), rumen, reticulum, and omasum
- 4) To be able to illustrate the histological structure of the small and large intestines

Subject Details

(7) The digestive system II (salivary glands, liver, and pancreas)

Goals

To deepen understanding of the histological structure of the accessory glands of the digestive system (salivary glands, liver, and pancreas) through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the major salivary glands
- 2) To be able to illustrate the histological structure of the liver
- 3) To be able to illustrate the histological structure of the pancreas

Subject Details

(8) The respiratory system

Goals

To deepen understanding of the histological structure of the respiratory system through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the nasal mucosa and trachea
- 2) To be able to illustrate the histological structure of the lungs

Subject Details

(9) Urinary system

Goals

To deepen understanding of the histological structure of the urinary system through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the kidneys
- 2) To be able to illustrate the histological structure of the ureter, urinary bladder, and urethra

Subject Details

(10) The male genital system

Goals

To deepen understanding of the histological structure of the male genital system through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the testes
- 2) To be able to illustrate the histological structure of the epididymis, ductus deferens, accessory genital glands, and penis

Subject Details

(11) The female genital system

Goals

To deepen understanding of the histological structure of the female genital system through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the ovaries
- 2) To be able to illustrate the histological structure of the oviduct, uterus, and placenta

Subject Details

(12) The endocrine system

Goals

To deepen understanding of the histological structure of endocrine organs through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the hypophysis
- 2) To be able to illustrate the histological structure of the adrenal glands, thyroid glands, parathyroid, pancreatic islets, and pineal body as well as the structure of gastrointestinal endocrine cells

Subject Details

(13) The sense organs

Goals

To deepen understanding of the histological structure of sense organs through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the eyes
- 2) To be able to illustrate the histological structure of the vestibulocochlear organ
- 3) To be able to illustrate the histological structure of the taste buds, olfactory organ, and vomeronasal organ

Subject Details

(14) The nervous system

Goals

To deepen understanding of the histological structure of the nervous system through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the cerebrum
- 2) To be able to illustrate the histological structure of the cerebellum
- 3) To be able to illustrate the histological structure of the spinal cord
- 4) To be able to illustrate the histological structure of the peripheral nervous system

Subject Details

(15) Integument

Goals

To deepen understanding of the histological structure of the integument through optical microscopic observation

Objectives

- 1) To be able to illustrate the histological structure of the skin and cutaneous glands
- 2) To be able to illustrate the histological structure of the cutaneous appendages
- 3) To be able to illustrate the histological structure of the mammary glands

Practice 1-3. Veterinary Physiology Practice

Subject Aims

The aim of this subject is to deepen understanding of the mechanisms for maintaining homeostasis, based on practical experience performing qualitative and quantitative assessments of various physiological functions, using whole animals, isolated organs and cells, cultured cells, or humans (subjects).

Subject Details

(1) Blood

Goals

To deepen understanding of the physiological roles of blood through experiments examining the function of blood cells and plasma

Objectives

1) To be able to explain the reactions of blood coagulation and fibrinolytic system based on experimental results

Subject Details

(2) Circulation and respiration

Goals

To understand the function of the circulatory system and deepen understanding of regulatory mechanisms of respiration and blood pressure, through experiments using the isolated heart preparation, blood pressure measurement, and recording of electrocardiograms

Objectives

- 1) To be able to explain the electrical conduction system, the automaticity, and the pump function of the heart based on experimental results
- 2) To be able to explain the cardiac intrinsic and extrinsic regulatory system based on experimental results
- 3) To be able to explain the baroreflex and the regulatory mechanisms of respiratory movement and blood pressure by the autonomic nervous system based on experimental results

Subject Details

(3) Digestion and absorption

Goals

To understand the mechanism of digestion and absorption through experiments examining the functions of absorption and secretion in the digestive tract

Objectives

1) To be able to explain the mechanisms of membrane digestion and transport of nutrients by epithelial cells based on experimental results

2) To be able to explain the regulatory mechanisms of digestive juice secretion based on experimental results

Subject Details

(4) Renal function

Goals

To understand the mechanism of urine generation and solute reabsorption through experiments examining kidney function

Objectives

1) To be able to explain the mechanisms of glomerular filtration and tubular reabsorption based on experimental results

Subject Details

(5) Endocrine function

Goals

To understand the regulation of biological functions by hormones as well as the cellular mechanism of hormone secretion, through *in vivo* and *in vitro* experiments to measure plasma hormone concentrations and effects, and experiments using cells

Objectives

1) To be able to explain the secretory mechanisms and actions of hormones based on experimental results

Subject Details

(6) Muscles

Goals

To understand muscle contraction and its regulatory mechanism through experiments using skeletal muscle and nerve-muscle preparations

Objectives

- 1) To be able to explain the regulatory mechanisms of contractile movements of the skeletal muscle based on experimental results
- 2) To be able to explain the relationship between action potential generation and muscle contractile activity based on experimental results

Subject Details

(7) Nerves

Goals

To deepen understanding of the mechanisms of generation and conduction of the action potential, the properties of chemical transmission, and the general characteristics of sensation through experiments using neurons and neuromuscular preparations

Objectives

- 1) To be able to explain the mechanisms of generation and conduction of the action potential based on experimental results
- 2) To be able to explain the mechanisms of reflexes based on experimental results
- 3) To be able to explain the general characteristics of sensation based on experimental results

Practice 1-4. Veterinary Biochemistry Practice

Subject Aims

The aim of this subject is to understand the structures and functions of the molecules that compose living organisms as well as the basic skills necessary for analyzing and evaluating biological phenomena as chemical reactions at the molecular level.

Subject Details

(1) Carbohydrate analysis

Goals

To understand the structures and chemical features of carbohydrates, and the principles and techniques of analytical methods used to determine their quality and quantity

Objectives

- 1) To be able to explain the principles of methods for isolating and detecting monosaccharides and disaccharides
- 2) To be able to explain the principles of methods for isolating and detecting polysaccharides
- 3) To be able to explain the mechanisms of glucose generation in the liver based on the results of experiments

Subject Details

(2) Protein analysis

Goals

To understand the structures and chemical features of proteins as well as the principles and techniques of analytical methods used to determine their quality and quantity

Objectives

- 1) To be able to explain the principles of methods for extracting, isolating, and purifying proteins
- 2) To be able to explain the principles of methods for detecting and quantifying proteins
- 3) To be able to explain the mechanisms of urea generation in the liver based on the results of experiments

Subject Details

(3) Lipid analysis

Goals

To understand the structure and chemical characteristics of lipids, as well as the principles and techniques of qualitative/quantitative analyses of lipids

Objectives

- 1) To be able to explain the principle of lipid extraction/separation methods and perform them
- 2) To be able to explain the principle of lipid detection/quantification methods and perform them

Subject Details

(4) Enzymatic reaction

Goals

To understand the characteristics of enzymes and enzyme kinetics, as well as the techniques for measuring enzymatic reactions

Objectives

- 1) To be able to explain the kinetic properties of enzymes based on experimental results
- 2) To be able to explain the principle of enzymatic reaction assay and perform it

Subject Details

(5) Nucleic acid analysis and recombinant DNA technology

Goals

To understand the structure and chemical characteristics of nucleic acids, as well as the techniques of qualitative/quantitative analyses and handling of nucleic acids

Objectives

- 1) To be able to explain the principle of nucleic acid extraction/purification methods and perform them
- 2) To be able to explain the principle of nucleic acid quantification/separation/detection methods and perform them
- 3) To be able to explain the principle of recombinant DNA technologies and perform them

Practice 1-5. Veterinary Pharmacology Practice

Subject Aims

The aim of this subject is to understand systemic drug reactions, by understanding responses induced by typical therapeutic agents in veterinary medicine using various experimental techniques based on observations, including how the action of the drug appears, the mechanism of action, and its fate in the living body.

Subject Details

(1) Introduction to pharmacology practice

Goals

To understand the ethics and fundamental knowledge concerning animal handling and drug administration

Objectives

- 1) To be able to handle experimental animals based on an understanding of the ethics, considerations, and significance of animal experiments
- 2) To be able to implement typical drug administration methods

Subject Details

(2) Pharmacokinetics

Goals

To understand pharmacokinetics data and the factors affecting pharmacokinetics based on related research methods

Objectives

- 1) To be able to explain pharmacokinetics data based on an understanding of the related research methods
- 2) To be able to explain drug metabolism data based on an understanding of the related research methods

Subject Details

(3) Pharmacodynamics (drug target molecules and the dose–response relationship)

Goals

- 1) To be able to explain data on responses after drug binding to target molecules as well as the dose–response relationship
- 2) To be able to explain the dose–response relationship and related data
- 3) To be able to explain the intracellular signaling pathways upon ligand binding to the target receptor and the related data

Subject Details

(4) Drugs affecting the central nervous system

Goals

To understand pharmacological data on drugs affecting the central nervous system

Objectives

- 1) To be able to explain data on the pharmacology of anesthetics
- 2) To be able to explain data on the pharmacology of sedatives, tranquilizers, behavior drugs, and antiepileptic drugs

Subject Details

- (5) Drugs affecting the autonomic and motor nervous systems

Goals

To understand data on drugs affecting the peripheral nervous system and the organs it controls

Objectives

- 1) To be able to explain data on drugs affecting the motor nervous system and skeletal muscles
- 2) To be able to explain data on drugs affecting the autonomic nervous systems and the organs it controls

Subject Details

- (6) Anti-inflammatory, immunomodulatory, anti-infective, and antitumor drugs

Goals

To understand data on drugs affecting cell number and cellular function

Objectives

- 1) To be able to explain data on drugs affecting blood cells
- 2) To be able to explain data on drugs affecting tumor cells and microorganisms

Practice 1-6. Laboratory Animal Science Practice

Subject Aims

The aim of this subject is to understand the basics of carrying out animal experiments; drafting and reviewing animal experiment protocols; basic procedures used in animal experiments, including restraint, injection, drawing blood, anesthesia, pain relief, euthanasia, necropsy, and organ sampling; basic procedures for genetic and microbiological monitoring to assure the quality of laboratory animals; and basic genetic engineering technologies.

Subject Details

(1) Creation and reviewing animal experiment protocols

Goals

To understand the essentials for creation and reviewing animal experiment protocols by drafting and reviewing real or mock protocols

Objectives

- 1) To understand the points to consider in the creation of animal experimentation protocols, and to draft an animal experiment protocol in a scientific manner, giving consideration to animal welfare
- 2) To be able to understand the content of animal experimentation protocols, and determine their validity

Subject Details

(2) Basic procedures for animal experiments

Goals

To master basic animal experiment procedures, including restraint, injection, drawing blood, anesthesia, pain relief, euthanasia, necropsy, and organ sampling, for mice, rats, and/or other rodents

Objectives

- 1) To be able to perform basic animal experiment procedures, including restraint, injection, drawing blood, anesthesia, pain relief, euthanasia, necropsy, and organ sampling, mainly for mice, rats, and/or other rodents

Subject Details

(3) The genetic quality of laboratory animals

Goals

To understand the basic methods for maintaining genetic quality in laboratory animals and the relevant method validation, by performing PCR and other assays with DNA extracted from rodents

Objectives

- 1) To understand the significance and methods of genetic monitoring of laboratory animals, and to perform these methods

Subject Details

(4) The microbiological quality of laboratory animals

Goals

To understand the methods to maintain, and the tests to assure, microbiological quality of laboratory animals

Objectives

1) To understand the significance of quarantine and microbiological monitoring, and the testing involved, and perform the tests.

Subject Details

(5) Basic genetic engineering technologies

Goals

To understand the basic genetic engineering technologies used for the production of genetically modified animals and the maintenance and safekeeping of these animals

Objectives

1) To understand the procedures for collecting embryos, *in vitro* fertilization, transplantation of embryos into the oviduct and uterus, and cryopreservation of embryos and sperm

Practical subjects

Pathological Veterinary Medicine

Practice 2-1. Veterinary Pathology Practice

Subject Aims

The aim of this subject is to understand representative pathological changes in animal diseases and their significance through necropsy and histopathological observation; differential diagnosis and the inspections necessary for confirming diagnosis; and the pathogenesis of animal diseases.

Subject Details

(1) The aim and significance of pathological observation

Goals

To understand the aim, significance, and ethics of pathological observation

Objectives

- 1) To be able to explain the aim and methods of pathological inspections and the process for reaching a pathological diagnosis
- 2) To be able to explain the precautions, ethics, applicable laws and regulations, and biohazard measures for performing necropsy

Subject Details

(2) The basics of necropsy

Goals

To understand the basics of necropsy

Objectives

- 1) To be able to explain euthanasia methods for animals based on animal ethics
- 2) To be able to make plans for necropsy based on clinical histories
- 3) To be able to explain the names and applications of instruments used for necropsy, how to describe gross findings, procedures for sample collection, and how to write necropsy reports

Subject Details

(3) Necropsy techniques

Goals

To understand the techniques used for necropsy in animals

Objectives

- 1) To be able to explain necropsy techniques according to animal species

Subject Details

(4) Procedures for histopathological specimens

Goals

To understand general methods for preparing histopathological specimens, special fixations, sectioning, and staining methods according to the purpose

Objectives

- 1) To be able to explain general methods for preparing histopathological specimens
- 2) To be able to explain the methodology and purpose of special and immunohistochemical stains

Subject Details

- (5) Histological features of the infectious agents

Goals

To understand the morphological characteristics of viral inclusion bodies, bacteria, fungi, and parasites under microscopy

Objectives

- 1) To be able to explain the morphological features of viral inclusion bodies
- 2) To be able to explain the morphological features of bacteria in lesions
- 3) To be able to explain the morphological features of fungi in lesions
- 4) To be able to explain the morphological features of major parasites, including helminths and protozoa

Subject Details

- (6) Injury and death of cells, and cell/tissue adaptation

Goals

To understand the basic morphological changes that occur during the process of cellular injury, and characteristics of cell death

Objectives

- 1) To be able to explain the morphological features of the cells, tissues, and organs involved in injury
- 2) To be able to explain the morphological features of cell-death and necrosis according to classification
- 3) To be able to explain the morphological features of atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia, granulation tissues, and fibrosis

Subject Details

- (7) Pigments

Goals

To understand the morphological features of pigments found in animals

Objectives

- 1) To be able to explain the morphological features of pigments formed in animals

Subject Details

(8) Metabolic disorders

Goals

To understand the morphological features of representative protein, carbohydrate and lipid metabolic disorders

Objectives

- 1) To be able to explain the morphological features of amyloidosis
- 2) To be able to explain the major morphological features of carbohydrate and lipid metabolic disorders

Subject Details

(9) Circulatory disorders

Goals

To understand the pathophysiology and morphological features of blood and lymph circulatory disorders

Objectives

- 1) To be able to explain the morphological features of edema
- 2) To be able to explain the morphological features of hyperemia, congestion, ischemia, and hemorrhage
- 3) To be able to classify thrombi and explain the morphological features they cause
- 4) To be able to classify infarctions and explain their morphological features in individual organs

Subject Details

(10) Inflammation

Goals

To understand the morphological features of inflammation

Objectives

- 1) To be able to explain morphologically acute and chronic courses of inflammation
- 2) To be able to classify inflammation by exudate types and explain their respective morphological features
- 3) To be able to explain the morphological features of proliferative and granulomatous inflammations

Subject Details

(11) Tumors (neoplasia)

Goals

To understand the morphological features of tumors

Objectives

- 1) To be able to explain the morphological differences between benign and malignant tumors
- 2) To be able to explain the morphological features of representative tumors

Subject Details

(12) Congenital and environmental disorders

Goals

To understand the morphological features of congenital disorders

Objectives

- 1) To be able to explain the types of congenital disorders and their morphological features

Subject Details

(13) Lesions in the cardiovascular and hematopoietic systems

Goals

To understand the morphological features of lesions in the cardiovascular and hematopoietic systems

Objectives

- 1) To be able to explain the morphological features of lesions in the cardiovascular system
- 2) To be able to explain the morphological features of lesions in the hematopoietic system

Subject Details

(14) Lesions in the thoracic/abdominal cavities and the respiratory system

Goals

To understand the morphological features of lesions in the thoracic/abdominal cavities and the respiratory system

Objectives

- 1) To be able to explain the morphological features of lesions in the thoracic and abdominal cavities
- 2) To be able to explain the morphological features of lesions in the respiratory system

Subject Details

(15) Lesions in the digestive system

Goals

To understand the morphological features of lesions in the digestive tract, liver, and pancreas

Objectives

- 1) To be able to explain the morphological features of lesions in the oral cavity and esophagus
- 2) To be able to explain the morphological features of lesions in the stomach and digestive tract
- 3) To be able to explain the morphological features of lesions in the liver
- 4) To be able to explain the morphological features of lesions in the pancreas

Subject Details

(16) Lesions in the urinary and reproductive systems

Goals

To understand the morphological features of lesions in the urinary and reproductive systems

Objectives

- 1) To be able to explain the morphological features of lesions in the urinary system
- 2) To be able to explain the morphological features of lesions in the reproductive system

Subject Details

(17) Lesions in the nervous system

Goals

To understand the morphological features of lesions in the nervous system

Objectives

- 1) To be able to explain the morphological features of lesions in the central nervous system
- 2) To be able to explain the morphological features of lesions in the peripheral nervous system

Subject Details

(18) Lesions in the endocrine and sensory systems

Goals

To understand the morphological features of the endocrine and sensory systems

Objectives

- 1) To be able to explain the morphological features of lesions in the endocrine system
- 2) To be able to explain the morphological features of lesions in the eyes and ears

Subject Details

(19) Lesions in bones, skeletal muscles, and skin

Goals

To understand the morphological features of lesions in bones, skeletal muscles, and skin

Objectives

- 1) To be able to explain the morphological features of lesions in bones
- 2) To be able to explain the morphological features of lesions in skeletal muscles
- 3) To be able to explain the morphological features of lesions in skin

Subject Details

(20) Surgical pathology

Goals

To understand the various biopsy methods, adequate treatments for biopsy, and methodology for observation

Objectives

- 1) To be able to explain the basics of tissue biopsy and cytological diagnosis

Practice 2-2. Veterinary Microbiology Practice

Subject Aims

The aim of this subject is to understand basic microbiology concepts in the context of veterinary medicine, including aseptic operation; the characteristics and handling of pathogens; the characteristics and handling of bacteria and viruses; and basic microbiological diagnostic methods.

Subject Details

(1) Aseptic operation and disinfection/sterilization

Goals

To understand the concepts of aseptic operation, disinfection and sterilization, and biosafety

Objectives

- 1) To be able to perform aseptic operation
- 2) To be able to explain the differences between clean benches and safety cabinets and use safety cabinets properly
- 3) To be able to explain disinfection and sterilization methods and their differences, and to select and implement the appropriate method according to the target microorganism, target object, and intended use

Subject Details

(2) Preparation of bacterial culture media

Goals

To understand the properties of culture media (including selective and differential media), and how to prepare them

Objectives

- 1) To be able to explain the methods for preparing liquid and solid media and their uses

Subject Details

(3) Cultivation of bacteria

Goals

To understand the procedure for inoculating bacteria onto culture media, colony color and morphology, and staining and observing bacteria

Objectives

- 1) To be able to inoculate bacteria onto culture media in an appropriate manner
- 2) To be able to ascertain the biological and biochemical properties of bacteria based on the modulation of the culture medium after culture
- 3) To be able to explain the principles of various staining methods for bacteria, to stain and observe bacteria by one or more methods including Gram staining, and to ascertain their properties

Subject Details

(4) Bacterial quantification

Goals

To understand how to determine the number of bacteria in culture

Objectives

1) To be able to explain the principles of various quantification methods for measuring total and viable cell counts and perform one or more methods

Subject Details

(5) Isolation and identification of bacteria

Goals

To understand how to identify various species of bacteria

Objectives

- 1) To be able to explain the isolation culture method for bacteria (such as selection and transportation of test samples, selection of culture medium, and culture method)
- 2) To be able to inoculate bacteria on media for analysis of biochemical properties and ascertain the biochemical properties of bacteria based on the results
- 3) To be able to perform bacterial identification using serotyping or molecular biological tests by immunological tests, and interpret the results

Subject Details

(6) Antimicrobial susceptibility

Goals

To understand how to conduct antimicrobial susceptibility tests

Objectives

- 1) To be able to explain and perform antimicrobial susceptibility tests
- 2) To be able to explain the acquisition of drug resistance traits via plasmid transfer

Subject Details

(7) Cell culture

Goals

To understand the cell culture method that can be used for virus propagation

Objectives

- 1) To be able to explain the medium necessary for a given cell culture and the method for cryopreservation of cells
- 2) To be able to implement methods for establishing primary culture cells from developing chicken embryos or animal organs
- 3) To be able to explain cell lines and subcultures

Subject Details

(8) Cultivation of viruses

Goals

To understand the virus culture method using cultured cells and embryonated chicken eggs, and the cytopathic effects

Objectives

- 1) To be able to inoculate a virus into cultured cells, propagate the virus, and observe its cytopathic effects
- 2) To be able to inoculate a virus in embryonated chicken eggs, and detect the growth of the virus after its propagation
- 3) To be able to explain how to harvest and store the virus

Subject Details

(9) Virus quantification

Goals

To understand the virus titration method

Objectives

- 1) To be able to use various methods for quantifying viruses and to perform one or more methods to calculate the virus titer

Subject Details

(10) Isolation and identification of viruses

Goals

To understand the procedure for identifying various viruses

Objectives

- 1) To be able to explain the isolation culture method for viruses (such as selection and transportation of test samples, selection of propagation matrix, and culture method)
- 2) To be able to explain how to identify viruses using various tests and perform one or more methods

Subject Details

(11) Serological diagnosis

Goals

To understand the serodiagnosis of bacterial and viral infections

Objectives

- 1) To be able to detect bacterial antibodies using various serological tests and perform one or more methods

2) To be able to detect viral antibodies using various serological tests and perform one or more methods

Practice 2-3. Veterinary Parasitology and Clinical Parasitology Practice

Subject Aims

The aim of this subject is to understand the development (life cycle) of parasites; the diseases and injuries parasites cause; and the techniques for diagnosing and managing parasitic disease based on observation of the mode of infection, mode of parasitism, and morphological changes.

Subject Details

(1) Morphological observation of protozoa

Goals

To understand the procedure for the identification of protozoan species

Objectives

- 1) To be able to explain the morphological characteristics of important species in Amoebozoa and Excavata (Mastigophora)
- 2) To be able to explain the morphological characteristics of important species in SAR (Apicomplexa)

Subject Details

(2) Morphological observation of helminths

Goals

To understand the procedure for the identification of arthropod species

Objectives

- 1) To be able to explain the morphological characteristics of important Nematoda species
- 2) To be able to explain the morphological characteristics of important Trematoda species
- 3) To be able to explain the morphological characteristics of important Cestoda species

Subject Details

(3) Morphological observation of arthropods

Goals

To understand the procedure for the identification of arthropod species

Objectives

- 1) To be able to explain the morphological characteristics of important tick and mite species
- 2) To be able to explain the morphological characteristics of important insect species

Subject Details

(4) Parasitological examination

Goals

To understand the procedure for typical parasitological examinations

Objectives

- 1) To be able to explain the method for collecting parasites from animals as well as parasitic specimen preparation methods
- 2) To be able to explain the principles of parasitological examinations, and perform them with the appropriate materials and techniques
- 3) To be able to perform microscopy and measurements for the observation and examination of parasites

Practical subjects

Applied Veterinary Medicine

Practice 3-1. Animal Hygiene Practice

Subject Aims

The aim of this subject is to understand animal hygiene in the context of veterinary medicine, including rearing environment, hygiene management practices, disease prevention practices/diagnosis methods, and evaluation methods for livestock product safety, as well as the applicable laws and regulations.

Subject Details

(1) Basic knowledge and techniques about livestock management

Goals

To understand the basic techniques for livestock handling and rearing management at farms

Objectives

- 1) To be able to use rope work to capture livestock
- 2) To be able to explain the importance of hoof management (trimming, shoeing) and cutting the tooth.
- 3) To be able to explain the various types of rations for livestock

Subject Details

(2) Vital observation and measurement of livestock

Goals

To understand the basic techniques for vital observation and measurement of livestock

Objectives

- 1) To be able to measure body weight, withers height, chest depth, thurl width, cross height, and buttocks of cows; calculate the body condition scores (BCS) of milk cows; and manage herd health
- 2) To be able to explain the milking process and milking hygiene

Subject Details

(3) Scientific assessment of the livestock rearing environment

Goals

To understand the basic techniques related to the rearing environment and amenity of livestock

Objectives

- 1) To be able to perform physical, chemical, and microbiological assessments of rearing environments using model environments
- 2) To be able to explain the amenity of livestock and the relationship between environment and productivity using environment simulations

Subject Details

(4) Hygiene management practices for livestock

Goals

To understand the proper usage and evaluate the effectiveness of various disinfectants

Objectives

- 1) To be able to explain the proper usage of disinfectants for the prevention of invasion and proliferation of pathogens
- 2) To be able to explain the effective usage of disinfectants under simulated production site environments

Subject Details

- (5) Disease prevention practices for livestock

Goals

To understand livestock vaccination, disease control, and molecular epidemiology

Objectives

- 1) To be able to explain livestock vaccination techniques and their evaluation methods (herd immunity, assessment)

Subject Details

- (6) Preventive measures used at livestock farms (biosecurity and Livestock Farm HACCP)

Goals

To understand preventive measures at livestock farms

Objectives

- 1) To be able to explain the preventive measures against infectious diseases at livestock farms

Subject Details

- (7) Preventive measures related to monitored infectious diseases

Goals

To understand domestic preventive measures related to monitored infectious diseases

Objectives

- 1) To be able to explain the preventive measures related to livestock infectious diseases
- 2) To be able to explain the equipment and materials used for preventive measures

Subject Details

- (8) Hygiene management techniques for beef and dairy cattle

Goals

To understand the basics of hygiene management for beef and dairy cattle

Objectives

- 1) To be able to explain the techniques used in the rearing management of beef and dairy cattle

2) To be able to identify poisonous plants to livestock common to meadows and farms

Subject Details

(9) Hygiene management practices for pigs and poultry

Goals

To understand the basics of hygiene management for pigs and poultry

Objectives

- 1) To be able to explain the hygiene management of pigs
- 2) To be able to explain the hygiene management of layer and broiler chickens

Subject Details

(10) Livestock product safety and its evaluation methods

Goals

To understand the basics of livestock product safety and its evaluation methods

Objectives

- 1) To be able to explain the Act on safety assurance and quality improvement of feeds and its importance

Subject Details

(11) Hygiene management for livestock waste

Goals

To understand the basics of hygiene management for livestock waste

Objectives

- 1) To be able to explain the methods (aerobic, anaerobic, and soil reductions), structure, and function of facilities for livestock waste treatment

Subject Details

(12) Animal welfare

Goals

To understand the basics of livestock rearing methods in the context of animal welfare

Objectives

- 1) To be able to explain livestock rearing and management methods in the context of animal welfare

Subject Details

(13) Facilities related livestock hygiene

Goals

To understand the institutions and facilities related to livestock hygiene

Objectives

- 1) To be able to explain the duties and missions of livestock hygiene service centers
- 2) To be able to explain the duties and missions of livestock experimental stations
- 3) To be able to explain the duties and missions of rendering plants

Practice 3-2. Veterinary Public Health Practice

Subject Aims

The aim of this subject is to understand methods for preventing, managing, and treating zoonosis; the characteristics and epidemiology of zoonosis; and diagnostic, sanitary survey, and environmental analysis techniques.

Subject Details

(1) Diagnosis of zoonosis

Goals

To understand the basics of diagnosing zoonosis

Objectives

1) To be able to explain the characteristics of zoonosis and the significance of the diagnosis

Subject Details

(2) Viral zoonosis

Goals

To understand the principle and laboratory procedures for diagnosing viral zoonosis

Objectives

- 1) To be able to explain veterinarian's responsibility in rabies outbreaks and the principle of the diagnostic method
- 2) To be able to explain the principle of the diagnostic method of Japanese encephalitis
- 3) To be able to explain the principle of the diagnostic method of influenza

Subject Details

(3) Bacterial zoonosis

Goals

To understand the principle and laboratory procedures for diagnosing bacterial zoonosis

Objectives

- 1) To be able to explain the principle of the diagnostic method of anthrax
- 2) To be able to explain the principle of the diagnostic method of brucellosis
- 3) To be able to explain the difference between cat scratch diseases and pasteurellosis and the principles of their diagnostic methods
- 4) To be able to explain the principle of the diagnostic method of
- 5) To be able to explain the principle of the diagnostic method of psittacosis

Subject Details

(4) Parasitic zoonosis

Goals

Veterinary Education

Model Core Curriculum

To understand the principle and laboratory procedures for diagnosing parasitic zoonosis,

Objectives

- 1) To be able to explain the properties and mode of transmission of the anisakis larva and to detect the larva in commercial fish
- 2) To be able to explain the principle of the diagnostic method of the echinococcosis
- 3) To be able to explain the principle of the diagnostic method of the toxoplasmosis
- 4) To be able to explain the principles of the diagnostic methods of the cryptosporidiosis, ascariasis, and taeniasis by *Taenia solium* and *Taenia saginata*

Subject Details

- (5) Evaluation of the thermal environment

Goals

To understand the principle of the method for measuring the thermal environment

Objectives

- 1) To be able to measure the thermal environment using the appropriate measurement devices
- 2) To be able to evaluate the effect of thermal environment on people using the measured data

Subject Details

- (6) Measurement of atmospheric components

Goals

To understand the principle of the method for measuring components of the atmospheric environment

Objectives

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- 1) To be able to explain the method for collecting air samples
- 2) To be able to explain the principles of the official methods for measuring atmospheric contaminants
- 3) To be able to measure atmospheric components using the detector tubes
- 4) To be able to collect microbes in the air and evaluate the microbial contamination

Subject Details

- (7) Water quality standards and water quality test methods

Goals

To understand the methods for measuring water quality for tap water

Objectives

- 1) To be able to explain the water quality standard for tap water and to select the appropriate test method
- 2) To be able to explain the principle of instrument analyses adopted in the official methods

Subject Details

(8) Environmental standards and water quality tests of sewage

Goals

To understand the various standards for sewage water and natural water and major examination methods.

Objectives

- 1) To be able to explain the regulation of sewage and to evaluate the related data
- 2) To be able to collect water samples from public water areas and to conduct major examinations
- 3) To be able to explain the principle of instrument analyses adopted in the official methods

Practice 3-3. Food Hygiene Practice

Subject Aims

The aim of this subject is to understand the official methods for evaluating food sanitation, a competency that is required for all veterinarians, as well as related administrative activities based on scientific evidence.

Subject Details

(1) Food hygiene management

Goals

To understand the principle of examination methods for disease agents of food poisoning based on the Food Hygiene Law, to monitor the sanitation condition of foods, and to learn the relevant technical skills

Objectives

- 1) To be able to conduct examinations to detect indicator bacteria for general and fecal contaminations among indicator microorganisms
- 2) To be able to conduct representative tests for assessing degeneration, decomposition, and deterioration of foods
- 3) To be able to conduct representative tests for detecting food additives
- 4) To be able to judge the proper labeling of retail food products in accordance with the Food Labeling Act
- 5) To be able to explain the detection methods of harmful substances such as trihalomethane, mycotoxin, and allergic agents

Subject Details

(2) Disease agents of food poisoning

Goals

To be able to understand the principle of examination methods for disease agents of food poisoning

Objectives

- 1) To be able to safely handle bacteria classified as Biosafety Level 2
- 2) To be able to explain and prepare representative selective media for the isolation of bacteria that causes food poisoning
- 3) To be able to isolate and identify *Vibrio parahaemolyticus*
- 4) To be able to isolate and identify bacteria classified in the family Enterobacteriaceae, such as *Escherichia coli*, that cause food poisoning
- 5) To be able to isolate and identify representative bacteria, such as *Staphylococcus aureus*, that cause food poisoning by food intoxication
- 6) To be able to isolate and identify representative anaerobic bacteria, such as *Clostridium perfringens*, causing food poisoning
- 7) To be able to isolate and identify *Campylobacter jejuni/coli*
- 8) To be able to explain laboratory tests for representative viral and parasitic food poisonings

9) To be able to summarize epidemiological surveys of food poisoning occurrence, and to conduct the necessary statistical analyses

Subject Details

(3) Hygiene for animal food products

Goals

To be able to understand the legal foundation and examination methods for ensuring the food safety of animal food products such as milk, meat, eggs, and fishery foods

Objectives

- 1) To be able to conduct physical and chemical tests for milk components, and their characteristics
- 2) To be able to conduct bacteriological tests for milk
- 3) To be able to perform a screening test (bacteriological test) to detect residual antimicrobial agents in meat and milk
- 4) To be able to explain testing methods for the detection of toxins produced by fish and shellfish, such as pufferfish and shellfish toxins
- 5) To be able to explain meat processing steps, including the slaughtering and evisceration of carcasses in slaughterhouses, as well as the procedures of meat inspections
- 6) To be able to explain poultry processing steps, including slaughtering and evisceration of carcasses in processing plants, as well as the procedures of poultry meat inspections

Practice 3-4. Veterinary Toxicology Practice

Subject Aims

The aim of this subject is to understand the mechanism of action and toxicokinetics of chemicals that cause harm to people and animals.

Subject Details

(1) Introduction to laboratory toxicology

Goals

To understand the significance of toxicology and explain toxicological tests and evaluation methods

Objectives

- 1) To be able to explain toxicological tests
- 2) To be able to explain animal experiments and alternative methods for toxicological testing, as well as safe handling of test chemicals
- 3) To be able to explain dose-dependent response, selection of adequate dosing for toxicological testing, and safety evaluation

Subject Details

(2) Genotoxicity and carcinogenicity

Goals

To understand the mechanism of genotoxicity and carcinogenicity and evaluation methods

Objectives

- 1) To be able to explain genotoxicity and carcinogenicity
- 2) To be able to explain tests for detecting genotoxicity and carcinogenicity

Subject Details

(3) Organ toxicology

Goals

To understand the characteristic toxicological properties of chemicals and their effects on organs and biological function

Objectives

- 1) To be able to explain the characteristic properties and mechanisms of organ toxicology
- 2) To be able to explain the properties and mechanisms of behavioral toxicology

Subject Details

(4) Environmental toxicology

Goals

To understand toxicological effects of chemicals in the environment

Objectives

- 1) To be able to explain toxicological tests in environmental toxicology

Practical subjects

Clinical Veterinary Medicine

Practice 4-1. Small Animal Internal Medicine Practice

Subject Aims

The aim of this subject is to acquire the basic diagnostic procedures and treatments of internal medicine in small animals

Subject Details

(1) General clinical procedures

Goals

To acquire basic clinical procedures, including verifying patient information and recording charts, diagnostic procedures, medical interviews, obtaining informed consent, restraining and treating animals, performing physical examinations, and prescribing/administering medications

Objectives

- 1) To be able to explain general clinical procedures
- 2) To be able to perform medical interviews
- 3) To be able to explain how to record medical charts
- 4) To be able to explain how to obtain informed consent, and its importance
- 5) To be able to restrain and treat animals
- 6) To be able to perform basic physical examinations
- 7) To be able to administer oral, subcutaneous, intramuscular, and intravenous medications

Subject Details

(2) Hematology

Goals

To acquire blood sampling methods and clinical sample preparation, including principles of general blood tests, blood biochemistry tests, blood coagulation and fibrinolysis tests, and how to evaluate their results

Objectives

- 1) To be able to perform blood sampling
- 2) To be able to measure blood count, hematocrit and erythrocyte indices, and to evaluate their results
- 3) To be able to perform blood smear preparation and observation, and to evaluate their results
- 4) To be able to evaluate blood biochemistry results of representative diseases (e.g., evaluate clinical data from past cases)
- 5) To be able to evaluate results of blood coagulation and fibrinolysis tests

Subject Details

(3) Bone marrow

Goals

To understand methods for bone marrow collection and sample preparation, and to be able to explain the evaluation method

Objectives

- 1) To be able to explain methods for the bone marrow aspiration and the core biopsy, and preparation of bone marrow smear
- 2) To be able to explain the method for evaluating a bone marrow smear

Subject Details

- (4) Blood transfusion and fluid therapy

Goals

To understand methods for blood transfusions and fluid therapy

Objectives

- 1) To be able to perform crossmatching
- 2) To be able to perform subcutaneous and intravenous infusions

Subject Details

- (5) Cardiorespiratory diagnosis

Goals

To be able to perform basic diagnostic procedures for cardiorespiratory patients

Objectives

- 1) To be able to perform auscultation of heart sound, heart murmur, and respiratory sounds
- 2) To be able to take standard limb lead electrocardiograms and to evaluate the results
- 3) To be able to take chest X-rays and interpret the results
- 4) To be able to visualize basic sections of an echocardiogram

Subject Details

- (6) Gastroenterology

Goals

To be able to perform basic diagnostic procedures for patients with digestive disorders

Objectives

- 1) To be able to perform fecal sampling and to perform fecal observation and examination
- 2) To be able to visualize abdominal organs by ultrasound examination
- 3) To be able to take abdominal X-rays and interpret the results of simple and contrast images

Subject Details

- (7) Urology

Goals

To be able to perform basic diagnostic procedures for urological patients

Objectives

- 1) To be able to perform urine sampling
- 2) To be able to perform urine examination
- 3) To be able to interpret the results of urinary X-ray images

Subject Details

(8) Dermatology

Goals

To be able to perform basic diagnostic procedures for dermatological patients

Objectives

- 1) To be able to perform proper observation and recording of dermatological cases
- 2) To be able to explain principles and applications of various dermatological examinations

Subject Details

(9) Neurology

Goals

To understand the principles and methods for diagnosis and identification of lesion localization in neurological diseases

Objectives

- 1) To be able to explain the principles of examinations for postural reactions and spinal reflexes, to perform these examinations, and to evaluate their normal results
- 2) To be able to explain the principles of examinations for cranial nerves, to perform these examinations, and to evaluate their normal results
- 3) To be able to explain the characteristic clinical symptoms of brain lesions, and to estimate the location of the lesion
- 4) To be able to explain spinal innervation areas and to speculate the location of the lesion
- 5) To be able to explain cerebrospinal fluid sampling methods, and to evaluate its properties
- 6) To be able to explain applications of diagnostic imaging for neurological disorders

Subject Details

(10) Cytology

Goals

To understand the usage and limitations of cytology and the examination of effusions

Objectives

- 1) To be able to explain sampling methods and specimen preparations
- 2) To be able to explain the characteristics of inflammatory, neoplastic, and mixed lesions
- 3) To be able to explain examinations for effusions, and to evaluate their properties

4) To be able to explain the cytological findings of discrete round cell tumors (lymphomas, mast cell tumors, histiocytic tumors, malignant melanomas, and so on)

Practice 4-2. Small Animal Surgery Practice

Subject Aims

The aim of this subject is to understand the basic techniques necessary to perform surgical treatment on small animals.

Subject Details

(1) Basic surgical procedures

Goals

To understand the basic procedures, applications, contraindications, and complications of surgery

Objectives

- 1) To be able to use general surgical instruments
- 2) To be able to use basic sterilization and disinfection methods for equipment and facilities
- 3) To be able to perform surgical hand washing and put on surgical gloves
- 4) To be able to perform basic surgical techniques such as incisions, hemostasis, ligation, and suturing

Subject Details

(2) Perioperative management

Goals

To understand monitoring during surgery and basic management methods

Objectives

- 1) To be able to read and monitor basic vital signs
- 2) To be able to perform infusions and blood transfusions in perioperative management

Subject Details

(3) Body surface surgery

Goals

To understand the structure and function of the skin and how to treat it

Objectives

- 1) To be able to perform skin incisions and sutures

Subject Details

(4) Digestive surgery

Goals

To understand digestive diseases and the related basic surgical techniques

Objectives

- 1) To be able to perform laparotomy
- 2) To be able to perform basic gastrointestinal dissection, suturing, and anastomosis procedures

Subject Details

(5) Respiratory and thoracic surgery

Goals

To understand respiratory and thoracic diseases and the related basic surgical techniques

Objectives

1) To be able to perform thoracotomy for respiratory surgery

Subject Details

(6) Nervous system surgery

Goals

To understand neurological examinations and surgical techniques for spinal cord disease and treatment of the peripheral nervous system

Objectives

1) To be able to perform basic surgical procedures for spinal cord disease

Subject Details

(7) Urological and genital surgery

Goals

To understand urological diseases and the related basic surgical techniques as well as ovarian hysterectomy and castration

Objectives

- 1) To be able to perform basic surgical procedures for urological diseases
- 2) To be able to perform ovarian hysterectomy and castration

Subject Details

(8) Orthopedic surgery

Goals

To understand bone, joint, muscle, and tendon diseases and their basic surgical techniques

Objectives

- 1) To be able to perform basic surgical procedures for bone disease and fractures
- 2) To be able to perform basic surgical procedures for joint diseases

Practice 4-3. Veterinary Radiology and Veterinary Diagnostic Imaging Practice

Subject Aims

The aim of this subject is to understand the generation, measurement, and effects of radiation on living organisms; the safe and effective use of radiation; the basic principles of various diagnostic imaging methods used in veterinary medicine; the characteristics of each diagnostic imaging method, and acquire the clinical applications for various diseases.

Subject Details

(1) Basic uses of radiation

Goals

To understand the basic uses of radiation, including types and isotopes of radiation, units, measurement methods, biological effects of radiation, and how to protect against them

Objectives

- 1) To be able to safely handle radioisotopes
- 2) To be able to explain the mechanisms of X-ray and electron-beam generation and how to protect against them
- 3) To be able to explain radiation, the units of radioactivity, and the related measurement methods according to the type of radiation

Subject Details

(2) Diagnostic imaging equipment

Goals

To understand the basics of X-ray examination, ultrasound examination, computed tomography examination (CT)

Objectives

- 1) To be able to explain the equipment used in X-ray examinations and X-ray fluoroscopy, peripheral equipment, imaging methods, and display methods
- 2) To be able to explain the equipment used for ultrasonographic examination, its peripheral devices, imaging methods, and display methods
- 3) To be able to explain the composition and type of each device used for CT examination
- 4) To be able to explain the composition and type of each device used for MRI

Subject Details

(3) Diagnostic imaging

Goals

To acquire diagnostic imaging methods for each part of the body

Objectives

- 1) To be able to explain normal findings in various diagnostic imaging methods for the respiratory and cardiovascular systems

- 2) To be able to explain normal findings in various diagnostic imaging methods for the digestive, urinary, and reproductive systems
- 3) To be able to explain normal findings in various diagnostic imaging methods for the musculoskeletal and central nervous systems

Practice 4-4. Farm Animal Clinical Practice

Subject Aims

The aim of this subject is to understand the basic veterinary practices for diagnosing the causes of suffering in farm animals.

Subject Details

(1) Basics of veterinary care I (history taking)

Goals

To understand the purpose of animal identification and the basics of medical procedures in cattle and horses

Objectives

- 1) To be able to explain the purpose of animal identification
- 2) To be able to perform medical inquiries depending on the use of each livestock animal

Subject Details

(2) Basics of veterinary care II (practice)

Goals

To understand the characteristics of livestock animals and the basics of the medical examinations in cattle, horses, and pigs

Objectives

- 1) To be able to handle and restrain livestock animals
- 2) To be able to evaluate nutritional condition
- 3) To be able to palpate lymph nodes
- 4) To be able to measure body temperature, heart rate, and respiratory rate
- 5) To be able to collect blood properly
- 6) To be able to administer medication
- 7) To be able to prepare surgeries
- 8) To be able to perform basic surgical procedures
- 9) To be able to perform basic anesthetic procedures

Subject Details

(3) The eyes

Goals

To understand the basics of medical examinations for eye diseases

Objectives

- 1) To be able to perform basic examinations for eye diseases

Subject Details

(4) The circulatory system

Goals

To understand the basics of medical examinations for circulatory diseases

Objectives

- 1) To be able to conduct an inspection of the visible mucous membrane
- 2) To be able to evaluate pulse pressure and jugular vein pulse
- 3) To be able to identify cardiac murmurs
- 4) To be able to perform a basic evaluation of imaging examinations for circulatory diseases

Subject Details

- (5) The respiratory system

Goals

To understand the basics of medical examinations for respiratory diseases

Objectives

- 1) To be able to conduct an inspection of respiration style
- 2) To be able to identify abnormal respiratory sounds
- 3) To be able to perform a basic evaluation of imaging examinations for respiratory diseases

Subject Details

- (6) The digestive system

Goals

To understand the basics of medical examinations for digestive diseases

Objectives

- 1) To be able to perform basic examinations of the intraoral cavity
- 2) To be able to perform auscultation, sounding, and palpation in the gastrointestinal tract
- 3) To be able to collect rumen fluid and perform the related basic examinations

Subject Details

- (7) The urinary system

Goals

To understand the basics of medical examinations for urinary diseases

Objectives

- 1) To be able to collect urine from female animals
- 2) To be able to palpate the kidneys

Subject Details

- (8) The locomotor system

Goals

To understand the basics of medical examinations for locomotor diseases

Objectives

- 1) To be able to perform basic examinations for limping
- 2) To be able to perform the examinations for diagnosing problems with tendons, ligaments, bones, joints, and hooves
- 3) To be able to perform a basic evaluation of imaging examinations for locomotor diseases

Subject Details

(9) Mastitis

Goals

To understand the basics of medical examinations for mastitis

Objectives

- 1) To be able to collect milk from a cow's udder and perform basic examinations for mastitis

Practice 4-5. Theriogenology Practice

Subject Aims

The aim of this subject is to understand the necessary diagnosis techniques in the field of theriogenology, including artificial insemination and embryo transfer, as well as techniques for the treatment and prevention of reproductive disorders.

Subject Details

(1) Examination of female reproductive functions

Goals

To understand how to diagnose the stage of the estrous cycle and the state of the genital organs

Objectives

- 1) To be able to explain examinations of the vulva and vagina in representative animal species
- 2) To be able to explain the structures of normal reproductive organs in cows and perform rectal palpation, as well as explain the estrous cycle and abnormalities of the uterus and ovaries based on the findings
- 3) To be able to explain the change in vaginal smear findings that occur with the estrous cycle, and judge the state of the estrous cycle in representative animal species
- 4) To be able to explain the findings of image views related to the reproductive functions and special inspections in the representative animal

Subject Details

(2) Estrous diagnosis and estrous synchronization

Goals

To understand the procedure for diagnosing the state of estrus from the behavior of the animal, external signs, and the findings of clinical examination; techniques for adjusting estrus; and the timing of ovulation necessary for carrying out protocols on timed artificial insemination and embryo transfer in cattle

Objectives

- 1) To be able to point out characteristics of estrous behavior in representative animal species
- 2) To be able to explain the genital and clinical examinations for estrous diagnoses in representative animal species
- 3) To be able to explain the instructions for device used in estrous diagnosis in representative animal species
- 4) To be able to devise an artificial adjustment program of estrous and ovulation timing in order to perform artificial insemination at the optimum time of mating in the cow

Subject Details

(3) Examination of male reproductive functions and reproductive disorders

Goals

To understand the techniques for performing semen examinations and evaluating the characteristics of semen as well as for diagnosing the cause of male reproductive disorders based on the findings of clinical examination, medical history, and breeding history

Objectives

- 1) To be able to explain the methods of semen collection and semen examination in representative animal species
- 2) To be able to explain the methods of diagnosis and treatment of male reproductive disorders and genital diseases in representative animal species

Subject Details

- (4) Storage of semen and artificial insemination technology

Goals

To understand the storage methods for semen as well as insemination techniques

Objectives

- 1) To be able to explain the preparation method for liquid and frozen semen in representative animal species
- 2) To be able to explain techniques of artificial insemination in representative animal species

Subject Details

- (5) Collection of embryos and embryo transfer

Goals

To understand the methods of superovulation, embryo collection, and embryo transfer in cows

Objectives

- 1) To be able to formulate appropriate programs to control the timing of estrous and ovulation that are necessary to perform embryo collection and embryo transfer in cows
- 2) To be able to formulate a program of superovulation
- 3) To be able to explain the methods of embryo collection and freezing
- 4) To be able to explain the methods of transferring fresh and frozen embryos

Subject Details

- (6) Pregnancy diagnosis

Goals

To understand how to diagnosis pregnancy according to animal species and stage of pregnancy

Objectives

- 1) To be able to explain pregnancy diagnostic methods according to the stages of pregnancy in representative animal species

Subject Details

(7) Female reproductive disorders and diseases of the genital organs

Goals

To understand how to diagnosis and choose the appropriate method of treatment for reproductive disorders and genital diseases based on medical history, reproductive history, findings of clinical examination, and reproductive examination

Objectives

- 1) To be able to explain the notifications such as medical history and reproductive history that are necessary for the diagnosis of the reproductive disorders in the representative animal species
- 2) To be able to point out problems about animal management that lead to reproductive disorders in the representative animal species
- 3) To be able to choose the necessary examinations for the diagnosis of the major ovarian and uterine diseases, and to make a treatment plan in representative animal species

Subject Details

(8) Abnormalities in pregnancy and the periparturient period

Goals

To understand abnormalities that occur during pregnancy and the periparturient period and how to treat them

Objectives

- 1) To be able to explain the necessary examinations for clarifying the cause of abortion in representative animal species
- 2) To be able to diagnose abnormalities of delivery (dystocia), and explain appropriate treatment approaches in representative animal species

Practice 4-6. Participatory Veterinary Clinical Trainings

Subject Aims

The aim of this subject is to understand the appropriate attitude and clinical skills necessary for communicating with clients, obtaining informed consent, and ensuring medical safety.

Subject Details

(1) Obtaining medical information about the clinical case

Goals

To understand how to communicate with clients in an appropriate manner and obtain information through medical interviews

Objectives

- 1) To be able to perform appropriate veterinary medical interviews
- 2) To be able to obtain informed consent properly
- 3) To be able to ensure medical safety
- 4) To be able to perform medical interviews necessary for problem-oriented diagnosis and treatment in an appropriate manner
- 5) To be able to collect and analyze information about disease occurrence, reproductive management, and the feeding system of the livestock herd

Subject Details

(2) Performing veterinary care for clinical cases

Goals

To gain clinical experience through making a diagnosis through problem-oriented system based on medical information about the patient. Perform the level 1 and level 2 veterinary care for veterinary students in clinical practice determined by MEXT (June 30, 2010). For farm animals, also carry out a solution for the issues of disease occurrence and feeding system in the livestock herd.

Objectives

- 1) To be able to record a medical chart based on the problem-oriented system
- 2) To be able to perform a problem-oriented examination and choose and administer an appropriate treatment plan
- 3) To be able to evaluate the treatment process and modify the treatment plan as necessary
- 4) To be able to perform level 1 veterinary care as determined by MEXT
- 5) To be able to perform level 2 veterinary care as determined by MEXT under the supervision of a supervisor
- 6) To be able to point out issues concerning the livestock herd from the results of various examinations and propose appropriate countermeasures