Freie Universität Berlin

ECTS-Brochure
Veterinary Medicine 2017

Contents

Introduction to the faculty of veterinary medicine

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Grading Scale

At the faculty of veterinary medicine grading scales comply with § 14 TAppV and consist of a scale of five levels with verbal definitions. For the evaluation of achievements in oral and written examinations, the following examination scores are used:

Mark	Definition	Description
1	„very good“	an outstanding performance
2	„good“	the performance is significantly above average requirements
3	„satisfactory“	the performance meets average requirements in every respect
4	„sufficient“	the performance meets the requirements despite its shortcomings
5	„fail“	the performance no longer meets the requirements due to significant shortcomings

For students within the ECTH this local rating system is converted into the ECTH grading scale, which consists of 6 levels with the following criteria:

Level	Range of Marks	Definition	Description
A	1.0 – 1.5	excellent	an exceptional performance
B	1.6 – 2.0	very good	the performance is above average with some slight errors
C	2.1 - 3.0	good	a generally solid performance with some significant errors
D	3.1 – 3.5	satisfactory	moderate performance with eye-catching errors
E	3.6 – 4.0	sufficient	the performance meets the minimum requirements
F	4.1 – 5,0	fail	performance below the minimum requirements

Course of Study

Veterinary training includes a total of 5,020 hours and consists of a scientific-theoretical (3850 hours) and a practical study part (1,170 hours). The study is divided into the basic study period ("pre-clinic", 2 years) and the main section ("Clinic", 3.5 years). 5.5 years are needed to finish veterinary training.

The practical part of the study consists of the following mandatory work-placements:

• 70 hours within a minimum of 2 weeks in agriculture, livestock farming and animal husbandry,.

• 150 hours within a minimum of 4 weeks in the practice of a veterinarian or in a veterinary clinic ("small curative internship"),

• 75 hours within a minimum of 2 weeks in the control of food hygiene;

• 100 hours within a minimum of 3 weeks in the ante-mortem and post-mortem inspection of slaughter animals,

• 75 hours within a minimum of 2 weeks in the public veterinary system and,

• 700 hours within a minimum of 16 weeks in the practice of a veterinarian or in a veterinary clinic ("great curative internship").

The 5th year is performed as "Practical Year" in which Students rotate through the faculty's clinics, meat hygiene and veterinary pathology in addition to their mandatory work-placements. The 11th semester is the examination semester.

For each semester timetables are published in good time before the start of the term, which show the weekly lectures, exercises and seminars as well as the locations. These are available at www.vetmed.fu-berlin.de in the internet. More optional events may be found in the online course catalogue of the Freie Universität Berlin under http://www.vetmed.fu-berlin.de/studium/plaene/index.html

A. Pre-clinical Veterinary Examination	
Natural scientific phase after the 2nd semester	
Botany of forage, poisonous and medicinal plants	oral
Chemistry	oral
Physics including basics of physical radiation protection	oral
Zoology	oral
Anatomic physiological phase after the 4th semester	
after the 3rd semester	
Biochemistry	oral
Animal husbandry and genetics including animal assessment	written
after the 4th semester	
Anatomy	practical / oral
Histology and embryology	written
Physiology	practical / oral
B. Veterinary Examination	
during or after the 5th semester	
Clinical propaedeutics	practical / oral
Animal nutrition	practical / oral
Animal and environmental hygiene	oral
Animal welfare and behaviour	written
Virology	oral
after the 6th semester	
Parasitology	practical / oral
Pharmacology and Toxicology	oral
after the 8th semester	
Pharmaceutical and narcotics law	practical / oral
Bacteriology and mycology – (additional tests during the 5th and 6th semester)	oral
Radiology	oral
after the 8th semester	
Animal disease control and infection epidemiology	oral
during the 5th or 6th semester	
General and special pathological anatomy and histology	practical / oral / written
Surgery and anesthesiology	practical / oral
Meat hygiene (additional test during the 8th semester)	practical / oral
Poultry diseases	practical / oral
Forensic veterinary medicine, law and ethics of the profession	oral
Internal medicine	practical / oral
Food science incl. food hygiene	practical / oral
Milk hygiene	practical / oral
Reproductive medicine	practical / oral

Pre-Clinical Studies

Courses in the 1. semester	Form of the Course	SWH	ECTS
Basic lecture biology – zoology	Lecture	4	4
Basic lecture biology – botany	Lecture	2	2
Organic and inorganic chemistry	Lecture	4	4
Experimental physics and radiation	Lecture	2	2
Physik-Praktikum	Practical course	2	4
Medical terminology	Lecture	1	1
Anatomy I	Lecture	2	2
Anatomical preparation exercises I	Practical course	4	6
Histology I	Lecture	1	1
Histological exercises I	Practical course	2	4
History of veterinary medicine	Lecture	1	1
Professional organisation and ethics	Lecture	1	1
Interdisciplinary lecture - Professional Skills	Lecture	1	1
Sum		**27**	**33**

Courses in the 2. semester	Form of the Course	SWH	ECTS
Botany of forage, poisonous and medicinal plants	Lecture	2	2
Chemistry - practical course	Practical course	3,5	5
Anatomical seminar/ Situs demonstrations I	Practical course	1,5	3
Introduction to animal welfare ethics and law	Lecture	2	2
Introduction to ethology	Lecture	2	2
General agricultural economics	Lecture	2	2
Biometrics	Lecture / Practical course	2	3
Biochemistry I	Lecture	4	4
Biochemistry seminar	Seminar	0,5	2
Physiology I	Lecture	2	2
Introduction in animal husbandry and assessment	Lecture	2	2
Special animal husbandry and assessment	Lecture	2	3
Exercises to the special animal husbandry and animal assessment	Practical course	1	1
Interdisciplinary lecture - Professional Skills	Lecture	1	1
Sum		**27,5**	**34**

Courses in the 3. semester	Form of the Course	SWH	ECTS
Anatomy II	Lecture	2	2
Anatomical preparation exercises II	Practical course	4	8
Physiology II	Lecture	4	4
Proseminar to the practical course in physiology	Seminar	0,5	2
Biochemistry II	Lecture	3	3
Biochemical practical course	Practical course	1,5	4
Interdisciplinary lecture - Professional Skills	Lecture	1	1
Sum		**16**	**24**

Courses in the 4. semester	Form of the Course	SWH	ECTS

Anatomical seminar / Situs demonstrations II	Practical course	2	4
Embryology	Lecture	1	1
Histology II	Lecture	1	1
Histological exercises II	Practical course	2	4
Clinical Biochemistry	Lecture	1	1
Physiology III	Lecture	1	1
Physiology practical course	Practical course	2,5	5
Animal feed exercises	Practical course	2	4
Animal protection seminar	Practical course	2	4
Interdisciplinary lecture - Professional Skills	Lecture	1	1
Sum		**15,5**	**26**

Clinical Studies

Courses in the 5. semester	Form of the Course	SWH	ECTS
Animal nutrition	Lecture	3	3
Animal nutrition	Practical course	2	2
General and special virology I	Lecture	2	2
General lecture on infections and epizootics	Lecture	2	2
Animal and environmental hygiene	Lecture	2	2
Keeping of animals	Lecture	2	2
General pathology	Lecture	3,5	3,5
General pathology	Practical course	0,5	0,5
Parasitology	Lecture	3	3
Pharmacology and toxicology	Lecture	4	4
General and clinical radiology I	Lecture	1	1
General surgery	Lecture	2	2
General and special immunology	Lecture	2	2
Clinical propaedeutics - small animal	Practical course	2	2
Clinical propaedeutics - reproduction	Practical course	2	2
Clinical propaedeutics - cloven-hoofed animals	Practical course	2	2
Clinical propaedeutics - horse	Practical course	2	2
Sum		**37**	**37**

Courses in the 6. semester	Form of the Course	SWH	ECTS
Pharmacology and toxicology	Lecture	2	2
Virology - practical course	Practical course	1	1
General and special virology II	Lecture	1	1
Mikrobiology – practical course	Practical course	2	2
Bacteriology and mycology	Lecture	1	1
Meat Hygiene I	Lecture	1	1
Milkhygiene	Lecture	2	2
Hygiene of foodstuffs I	Lecture	1	1
Parasitological exercises	Practical course	2	2
Clinical demonstrations I - small animal	Practical course	2	2
Clinical demonstrations I - reproduction	Practical course	1	1

Clinical demonstrations I - cloven-hoofed animals	Practical course	1	1
Clinical demonstrations I - horse	Practical course	2	2
Labororatory course	Practical course	2	2
organ-centred teaching 1: Introduction, medical teaching	Lecture	1	1
organ-centred teaching 2: Reproduction I	Lecture	3	3
organ-centred teaching 3: Gastroenterology	Lecture	4	4
organ-centred teaching 4: Liver, pancreas	Lecture	1	1
organ-centred teaching 5: Kidney und efferent urinary tract	Lecture	0,5	0,5
Pathological demonstrations in organ-centred teaching I	Practical course	0,5	0,5
Interdisciplinary lectures	Lecture	4	4
Sum		35	35

Courses in the 7. semester	Form of the Course	SWH	ECTS
Animal disease control I	Lecture	1	1
Meat Hygiene II	Lecture	1	1
Food science	Lecture	2	2
Food science – practical course I	Practical course	2	2
Milkanalysis – practical course	Practical course	2	2
Pathologic-anatomical demonstrations I	Practical course	1	1
Pharmaceutical and narcotics law / drug regulation and application	Lecture / Practical course	2	2
Galenics - practical course	Practical course	1	1
General and clinical radiology II	Lecture	2	2
Clinical demonstrations II - small animal	Practical course	2	2
Clinical demonstrations II - reproduction	Practical course	1	1
Clinical demonstrations II - cloven-hoofed animals	Practical course	1	1
Clinical demonstrations II - horse	Practical course	2	2
Surgery and anesthesia	Lecture	1	1
organ-centred teaching 6: Reproduction II	Lecture	3	3
organ-centred teaching 7: Respiratory system	Lecture	1,5	1,5
organ-centred teaching 8: Cardio-vascular system	Lecture	1	1
organ-centred teaching 9: Blood, haemopoietic organs, lymphatic system	Lecture	2,5	2,5
Pathological demonstrations in organ-centred teaching II	Practical course	0,5	0,5
Interdisciplinary lectures	Lecture	4	4
Sum		33,5	33,5

Courses in the 8. semester	Form of the Course	SWH	ECTS
Animal disease control and infection epidemiology II	Lecture	2	2
Food science – practical course II	Practical course	2	2
Meat Hygiene III	Lecture	2	2
Pathologic-anatomical demonstrations II	Practical course	1	1
Poultry diseases	Lecture	2	2
Clinical demonstrations - Poultry	Practical course	2	2
General ophthalmology	Practical course	2	2
Law and ethics of the profession	Lecture	2	2

Krankheiten der Bienen	Lecture	1	1
Diseases of reptiles, amphibians and fishes	Lecture	1	1
laboratory animal science	Lecture	1	1
organ-centred teaching 10: Musculoskeletal systemt	Lecture	3	3
organ-centred teaching 11: Nervous system	Lecture	2	2
organ-centred teaching 12: Metabolism and endocrine organs	Lecture	2	2
organ-centred teaching 13: Udder and teats	Lecture	2	2
organ-centred teaching 14: Skin, mucous membrane, skin appendages	Lecture	1	1
organ-centred teaching 15: Systemic diseases	Lecture	1	1
Pathological demonstrations in organ-centred teaching III	Practical course	0,5	0,5
Interdisciplinary lectures	Lecture	4	4
Sum		**33,5**	**33,5**

Courses in the 9. and 10. semester	Form of the Course	SWH	ECTS
Clinical rotation – Small animal clinic	Practical course	5,5	5,5
Clinical rotation – Equine clinic	Practical course	5,9	5,9
Clinical rotation – Ruminant and swine clinic	Practical course	5,4	5,4
Clinical rotation – Animal reproduction	Practical course	5,4	5,4
Clinical rotation – Poultry diseases	Practical course	0,8	0,8
Clinical rotation – Pathology	Practical course	4,6	4,6
Clinical rotation – Meat hygiene	Practical course	2,4	2,4
Sum		**30**	**30**

Compulsory elective	Form of the Course	SWH	ECTS
In the pre-clinical section	Practical course / Seminar / Lecture	6	6
In the clinical section	Practical course / Seminar / Lecture	16	16
Sum		**22**	**22**

external internships	Form of the Course	Stunden	ECTS
Übungen in Landwirtschaft, Tierzucht und Tierhaltung (70h)	Internship	70	5
Schlachthof-Praktikum (100h)	Internship	100	7
Praktikum Öffentliches Veterinärwesen (75h)	Internship	75	5
Hygienekontrolle (75h)	Internship	75	5
Kleines kuratives Praktikum (extramural 150 h)	Internship	150	10
Großes kuratives Praktikum (extramural 700 h)	Internship	700	50
Sum in Stunden		**1170**	**82**

Course Offer and Syllabus of Pre-clinical Studies

Obligatory courses during the 1st term

Basic lecture biology – Zoology	
Form of the course	Lecture (4 SWH)
ECTH	4
Responsibility	Faculty of biology
Entry requirements	None
Course contents	Construction of the animal cell; function relationships (excretion, contractile and motile elements; cytoskeleton, extracellular matrix); reproduction, alternation of generations and development; basic phenomena of genetics (molecular genetics, developmental genetics); introduction to the phylogenetic systematics; presentation of the main taxa of the Animal Kingdom; comparative animal physiology including neurobiology and behavioural biology.
Performance assessment	None

Basic lecture biology – Botany	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Faculty of biology
Entry requirements	None
Course contents	Overview of organization, function, development, and movement in plants. Anatomy and morphology of seed plants. The plant cell (membranes, cell types, cell function, cell wall), metabolic physiology (photosynthesis, energy-, fat-, nitrogen-metabolism, nutrition and special feeding strategies), alternation of generations and reproduction, developmental physiology (pattern formation, exogenous and endogenous signals, polarity, model plant of Arabidopsis), stimulus physiology and physiology of movement.
Performance assessment	None

Organic and inorganic chemistry	
Form oft he course	Lecture (4 SWH)
ECTH	4
Responsibility	Faculty of chemistry
Entry requirements	None
Course contents	Chemical reactions, stoichiometry, amount of substance: mole, construction of atoms, light/matter interaction, periodic table, material properties, inert gases, aggregate state, ideal gas law, isotope, covalent bonding H_2 molecule, oxidation and reduction, halogens, electronegativities, hydrogen halide, polar covalent bond, hydrogen bond, chemical equilibrium, law of mass action, reaction rate, half-life, monomolecular reaction, energetics of chemical reactions, Gibbs-Helmholtz-equation, energy profile, activation energy, completed, closed & open systems, alkaline metals, metallic bonding, ionic bonding, net ionic, alkali halogenide, chalcogens, O_2-molecule, ozone, orbital hybridization, geometry of polyatomic molecules, *.- and. *.-bindings, mesomerism, properties and structure of water, selfdissoziation, pH, acids & bases (Brønstedt), neutralization, indicators, weak acids and bases, pkA, pkB, degree of dissociation, buffer, buffer capacity, hydrogen peroxide, HOCl, chlorinated lime, perchloric acid, strong & weak oxidizing and reducing agents, redox potential, Nernst equation, pH-dependent potentials, pH measurement with the glass electrode, diffusion and membrane potentials, sulphur and sulphuric compounds, coupled equilibria, solubility product, heterogeneous phase equilibria, essential trace elements, toxicity and concentration, alkaline earth metals, formation & decay constants of complexes, chelations, denticity, coordination number (boron and aluminium), pnictogens, ammoniac, hydrazine, hydroxylamine, nitrogen oxides, nitrous and nitric acid, phosphoric acid, apatite, multi-stage dissociation, condensation of phosphoric acid, phosphate buffer; carbon group, carbon dioxide, hydrogen carbonate and carbonate, urea, phosgene, hydrogen cyanide and salts; overview of silicium compounds, important subgroup elements (Fe, Cu, Co, Mo, etc.).
Performance assessment	None

Atomic and nuclear physics with regard to radiology	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Faculty of physics
Entry requirements	None
Course contents	1. Mechanics: Motion of point-shaped bodies, conservation laws, equations of motion, gravity, forces and equilibrium of forces, motion of rigid bodies, rotation, accelerated reference systems, elastic properties of solid bodies, static and moving liquids, harmonic oscillator, waves, interference, acoustics 2. Thermodynamics: Equations of state, kinetic theory of gases, specific heat, phase transformation, entropy, cycles, thermal engines 3. Electricity: Electric fields, magnetic fields, induction, circuits, AC, oscillating circuit 4. Optics: Wave, interference, diffraction, reflection, refraction, lenses, optical instruments, resolution 5. Atomic and nuclear physics: Atoms, nuclei, radioactivity
Educational objective	
Performance assessment	None

Physics - Practical course	
Form of the course	Practical course (2 SWH)
ECTH	4
Responsibility	Faculty of physics
Entry requirements	None
Advice	The event will be held in blocks in the 1st and 2nd semester
Course contents	Practical exercises on selected topics of the lecture „Atomic and nuclear physics“
Performance assessment	None

Medical terminology	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None; A Latinum or Graecum can replace participation in this seminar
Course contents	Latin and Greek phonology and morpheme, application in the scientific and medical language, structure of the nomina anatomica, including related nomenclatures
Performance assessment	Written test at the end of term

Anatomy I - Topographical and applied anatomy of dogs and cats	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None
Course contents	General myology, osteology, angiology, neurology, lymphology. Skeleton: Structure, organization, and joints. Muscles: location, function, innervation, and auxiliaries. Intestines: location, relationship of organs, classification, meso, vascular and nerve supply and lymph nodes. Neck: cervical spine, neck muscles, neck viscera, conduction systems. Chest: bones of the chest, muscles, pleural relations, organs, conduction systems. Abdomen: chest and lumbar spine, muscles, teats. Abdominal cavity: organs, peritoneal relations, conduction systems Pelvis: pelvic girdle, muscles. Pelvic cavity: organs, peritoneal relations, conduction systems. Shoulder limb: bones, limb muscles, conduction systems, lymph nodes, end of the toes Pelvic limb: bones, limb muscles, conduction systems, lymph nodes.

	Head: ones, organs: oral cavity, throat, nasal cavity and paranasal sinuses, larynx. Central nervous system: spinal cord: lining, organization and structure, brain: meninges, organization and structure, nerves.
Educational objective	Establishing anatomical base knowledge in form of general osteology, myology, arthrology, angiology, lymphology, neurology and general composition of skin, mucous and serous membranes. Knowledge of the basic concept of structures and organ systems (e.g., musculoskeletal, respiratory, digestive, and urogenital system) in the carnivores (dog, cat) in close relation to the circulatory and nervous system, as well as the lymphoid and endocrine system. Ability to link topographical and systematic anatomy; interdisciplinary links (histology, zoology). Practical relevance through constant link of applied anatomical aspects with clinically relevant topics in terms of the clinical section of the study (surgery, imaging: X-ray, ultrasound, MRI, CT). Understanding of comparative anatomy using the example of variations of basic appearances in the body of dogs and cats. Preparation for the following thematically linked practical lessons.
Performance assessment	None

Anatomical preparation exercises I (dog and cat)	
Form of the course	Exercise (4 SWH)
ECTH	6
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None
Course contents	Introduction to the preparation exercises of the dog. General osteology and thorax with spine and joints. Skin, skin muscles and skin nerves. Dorsal trunk limb muscles. Ventral trunk limb muscles. Conduction systems and neck viscera. Bones and joints of the shoulder limb. Conduction systems and muscles on the upper arm. Conduction systems and muscles in the forearm. Spinal muscles, lumbar skin nerves. Muscles of respiration. Ventrolateral body wall with teats and prepuce, abdominal muscles, groin. Thoracic cavity with pleural caves and lungs. Heart and pericardium. Conduction systems of the thoracic cavity with sympathetic chain. Topography of the abdominal organs and peritoneum. Stomach and intestines with blood vessels and nerves. Intestinal accessory glands, autonomous nervous system. Pelvic cavity with peritoneum, meso and tendons of the urinary and reproductive organs, Fossa ischiorectalis. Comparing sexual organs. Pelvic girdle, bones, and joints of the pelvic limb. Conduction systems and hip joint muscles. Conduction systems and muscles in the lower leg. Skull, nose, nasal cavity, larynx, oral cavity, pharynx, crainial nerves, tongue, salivary glands, teeth. Spinal cord, brain and meninges.
Educational objectives	Systematically-derived topographic preparation of the structures and organ systems listed above at preserved and fresh carcasses (comparing cat and dog). Consolidation of expertise, expanding the rhetorical skills and intensification of professional communication between students with the aid of the new educational method "peer instructing". "Peer instructing" is based on teachings by students and accompanied by instructors. Learning the topographical preparation method as preparation for the future clinical surgical activity. Combination of topographical and systematic anatomy; interdisciplinary links (histology, zoology). Independent preparation of body cavities of fresh carcasses (dog and cat). Comparison of the different anatomical structures of fresh Carnivore carcasses, as well as fixed organ and skeletal preparations or plastinates and polyethylene glycol (PEG)-preparations. Mesoscopic demonstrations (magnifying glass). Learn anatomical terms.

	Clinical reference by learning to interprete imaging techniques by comparing self-made or provided anatomical preparations with X-rays presented on specific topics, as well as CT and ultrasound recordings. Guidance for evaluation of clinically applied questions.
Performance assessment	4 oral and practical tests during the semester

General histology (cytology und histology of vertebrates) and special histology I	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None
Course contents	Cytology: general, cell definititon. Cytoplasm: plasmalemm, hyaloplasm, microtubules, cell organelles, metaplasm, paraplasm, nucleus. Manifestation of life of the cell: cell growth, cell proliferation (mitosis, meiosis), functional morphology. Histology: general, tissue definition. Epithelial tissue: integumentary epithelia, secretory epithelia, sensory epithelia. Connective and supporting tissue: mesenchymal tissue, reticular tissue, adipose tissue, fibrous connective tissue, cartilage and bone tissue. Muscle tissue: smooth muscle, skeletal muscle, myocardal muscle. Nervous tissue: neuron, neuroglia, nerve fiber, synapses. Cardiovascular system: blood, blood vessels, lymph vessels, heart, haematopoiesis and bone marrow. Immune system: thymus, lymph nodes, spleen, tonsils. Skin and appendages: skin, hair, cutaneous glands (perspiratory glands, sebaceous gland, mammary gland) Sensory equipment of the skin, claw, hoof.
Educational objectives	Ultrastructure of the animal cell, structure of tissues, and microscopic anatomy of the skin and of the immune system of companion animals and birds in terms of functionality. Establishing references to clinical situations or cases and integration of various fields of knowledge.
Performance assessment	None

General histology (cytology and histology of vertebrates) and special histology I	
Form of the course	Exercise (2 SWH)
ECTH	4
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None
Course contents	Introduction to histology and cytology of companion animals. Microscope and making of histological sections in electron microscopy and immunohistochemistry. Guided microscopy of cells and tissues: cytology, connective and supporting tissue, osteogenesis, muscle tissue, nerve tissue, epithelial tissue, skin and mamma, blood and lymph vessels, blood, bone marrow, lymphatic organs.
Educational objectives	Basic knowledge of the making of preparations for light and electron microscopy, basic knowledge of light microscopy, routinely used histological stains, immunohistochemistry and electron microscopy. Basic knowledge of the distinction between physiologically and pathologically modified tissue. Maximizing the expertise through peer instructing ("Peer instructing" is based on teachings by students and accompanied by instructors.).
Performance assessment	Written or practical test at the end of the term

History of veterinary medicine

Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Equine clinic
Entry requirements	None
Course contents	At the beginning of veterinary studies, Students shall be given an insight into the development of veterinary medicine and the history of the professional. Among other things the relationship between humans and animals is demonstrated from the prehistoric to the present.
Performance assessment	None

Professional organisation and ethics	
Art und Umfang	Lecture (1 SWH)
ECTS	1
Verantwortliche WE	Klinik für Klauentiere (WE18)
Eingangsvoraussetzung	Keine
Lehrinhalte	Einführung in die Aufgaben des tierärztlichen Berufs, Übersicht über die Vielfalt der tierärztlichen Aufgaben und Tätigkeitsbereiche, Einsicht in die gegebenen Ausbildungs- und Weiterbildungsmöglichkeiten; Rolle der Veterinärmedizin im öffentlichen Gesundheitswesen, im gesundheitlichen Verbraucherschutz, in der Ernährungswissenschaft, in der medizinischen Forschung, in der Betreuung der Tierbestände und in der Landwirtschaft
Lernziele	Umfassende Darstellung der Möglichkeiten tierärztlicher Tätigkeiten.
Art der Leistungskontrolle	Keine

Obilgatory courses during the 2nd term

Botany of forage, poisonous, and medicinal plants	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of animal nutrition
Entry requirements	None
Course contents	Fundamentals of botany of forage plants, nutritive value, cultivation, conservation and uses.
Educational objectives	Students know the most important forage plants and their main ingredients, as well as the possibile fields of application.
Performance assessment	None

Chemistry - Practical course for veterinarians	
Form of the course	Practical course (3,5 SWH)
ECTH	5
Responsibility	Faculty of chemistry
Entry requirements	None
Advice	The event will be held in blocks in the 1st and 2nd semester
Course contents	Practical exercises on selected topics of the lecture
Performance assessment	Written test (in the 2nd semester)

Anatomical seminar/ Situs demonstrations I	
Form of the course	Seminar (1,5 SWH)
ECTH	3
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	Successful participation: Anatomical preparation exercises I (dog and cat)
Course contents	Unfixed dogs and cats:

	Demonstration of the organs, structures and relationships of mesentery in abdominal and pelvic cavities, as well as in the thoracic cavity. Abdominal situs: organs that are supplied by the A. coeliaca and A. mesenterica cran. , including their mesenteries and supply structures; abdominal wall with rectus sheath. Female pelvic situs: inner and outer genitals, urinary organs, rectum including the mesenteries and supply structures; skin and skin modifications, excavations. Male pelvic situs: inner and outer genitals, urinary organs, rectum including the Mesenteries and supply structures; pelvis, inguinal rings, lymph nodes. Thorax situs: organs of the throracic cavity including their mesenteries and supply structures; autonomous nervous system. Situs cat: all body cavities. Sonography situs: sonographic appearance of the main organ systems in the abdominal and pelvic cavities. X-ray situs: radiographic anatomy, image interpretation and reporting.
Educational objectives	Consolidation and extension of anatomical knowledge of body cavities of carnivores from unfixed carcasses (dog, cat) and representation of clinically significant structures of the body cavities and the internal organs using the examples of clinical questions. Projection of the organs to the body wall. Independent preparation of the body cavities, orientation within the carcass and identification of anatomical structures. Presentation of operating conditions and detection of pathological changes. Basic knowledge of anatomically relevant structures for the soft tissue surgery and simulation of standard surgery such as the castration of male and female animals. Consolidation of expertise, expanding the rhetorical skills and intensification of technical communication between students or between students and the scientific staff through so-called "competence teams". A competence team consists of 2 students, which independently prepare for specific organs and organ systems and answer the teacher's questions during the seminar. Basic knowledge of sonographic examination and the section diagram anatomy. Anatomical knowledge to interpret the structures on X-ray and CT images.
Performance assessment	oral and practical, each student each day

Introduction to ethology	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of Animal Welfare and Behavior (WE11)
Entry requirements	None
Course contents	A. History and functioning of ethology: ethograms and functional circuits, including territorial behavior, sexual behavior, socialization, aggression, order of precedence; Influence of domestication on behavior; ontogeny of behaviour; coping strategies; learning theories; classical and instrumental conditioning. B. Specific behavioral patterns of dogs, cats, horses, cattle, pigs, sheep, goats, llamas, small pet animals, birds, reptiles and fish: normal behavior, behavioral disorders and problem behaviour; signals of veterinary importance (including pain / suffering indicators); behavioral therapy (including applied learning theory, desensitization, counter conditioning, habituation).
Performance assessment	None

General agricultural economics	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	HU Berlin, faculty of agriculture and horticulture
Entry requirements	None
Course contents	Influencing factors and specific function in the livestock sector; animal husbandry, animal performance, animal health; animal-environment interaction; agricultural farm structures with livestock; intensive and extensive livestock husbandry; standards regarding livestock systems; animal husbandry and welfare; animal husbandry and environmental protection;

	animals in the agricultural ecosystem; evaluation of livestock systems; evaluation criteria for an livestock-friendly and ecological animal husbandry; fundamentals of stable construction; housing for dairy cows; combinations of livestock husbandry, feeding, milking, manure removal techniques; variants of housing for growing cattle; procedures of pasture management; housing forms for pigs in different age groups; influences of animal husbandry and feeding practices on the health and growth of pigs, as well as on the quality of the meat; possibilities and conditions for keeping sheep; poultry farming; animal husbandry in organic farming.
Performance assessment	None

Introduction to animal welfare ethics and law	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of Animal Welfare and Behavior (WE11)
Entry requirements	None
Course contents	Animal ethics: deontological and utilitarian ethics of animals, animal law concepts, reference systems of ethical reasoning (contractualism, empathy, socio-biology, sense of justice), cruelty to animals and animal killing, veterinary ethics, animal ethics and politics. - Animal protection law: historical and current concepts of animal welfare legislation, crimes and offences, proportionality (reasonable reason), collective right to file an action, animal advocate, animal protection ombudsman, animal welfare officer, guarantor position, right to life, emergency killing indication, euthanasia, animal experimentation law, alternative methods (3R).)
Performance assessment	None

Special animal husbandry and assessment	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	HU Berlin, faculty of agriculture and horticulture
Entry requirements	None
Course contents	Cattle: current state of cattle breeding, organization and performance testing in cattle breeding, milk and beef production, estimation of breeding values in dairy cattle farming. Horses: horse breeds, performance and perspective use, estimation of breeding values in the riding horse and racehorse, special genetics and marker assisted breeding. Pigs: regionalisation, importance of piglet production and pig fattening, performance testing and estimation of breeding values, piglet and porker production. Sheep and goats: state of sheep breeding in Germany, modes of operation, performance, performance testing and breeding programs. Poultry: regionalisation, importance, breeds, breeding, rearing, laying hens, young broilers.
Performance assessment	None

Exercises to the special animal husbandry and animal assessment	
Form of the course	Exercise (2 SWH)
ECTH	3
Responsibility	HU Berlin, faculty of agriculture and horticulture
Entry requirements	None
Course contents	Cattle: breeds; performance direction and perspective use, assessment of breeding animals, assessment of carcasses and quality production, practicale breeding work. Horses: organization of performance tests. Swine: estimation of breeding values, breeding procedures, assessment of breeds and breeding animals, evaluation of carcass quality. Sheep and goats: breeds of sheep andgoats, breeding programs for adverse population structures. Poultry: breeding processes, performance testing and assessment of egg quality.
Performance assessment	Written examination

Biometrics	
Form of the course	Exercise (2 SWH)
ECTH	3
Responsibility	Institute of Biometrics and Data Processing (WE16)
Entry requirements	None
Course contents	Basic concepts of biostatistics, data collection, data processing, measures of dispersion and variation, probability, probability distributions I (including binomial distribution), probability distributions II (including normal distribution), point and interval estimation, principle and application of biostatistic test procedures, mass of dependency, correlation analysis, regression analysis
Educational objectives	Students will be able to question scientific work with regard to its quality and plausibility. To do this, they learn to use different statistical methods. Beginning with the basics of the descriptive statistics for presenting collected information they proceed to the concept of probability and its application to veterinary issues, and continue with principles and simple methods of inductive statistics and concepts for the determination of relationships and dependencies. The event will teach biometric concepts and put students in a position to understand statistical calculation formulas, and to compile statistical methods independently with the help of a textbook.
Performance assessment	2 multiple choice exams

Biochemistry I	
Form of the course	Lecture (4 SWH)
ECTH	4
Responsibility	Institute of veterinary biochemistry (WE03)
Entry requirements	None
Course contents	Amino acids, peptides and proteins: structures and functions Protein-N-metabolism: Transamination, deamination, decarboxylation, urea cycle, proteolysis Enzymes: classification, structure and function, examples of mechanisms of catalysis, Michaelis-Menten kinetics, inhibitors, activators, allosteric enzymes, inter conversion. Carbohydrates and their metabolism: occurrence, structure and function of monosaccharides, oligo-and polysaccharides, proteoglycans, metabolism of glucose (glucose intake, glycolysis, gluconeogenesis), glycogen metabolism, metabolism of fructose and galactose, pentose phosphate pathway, carbohydrate digestion. Lipids and their metabolism: structure, occurrence and function of lipids and eicosanoids, biological membranes, asymmetry, metabolism of fatty acids (ß-oxidation, de novo synthesis, ketogenesis, ketolysis, propionate metabolism, lipolysis, lipogenesis), digestion, lipid transport, lipid analysis. Biochemistry of nutrition: digestion and absorption of nutrients in omnivores and ruminants. Biological oxidation: thermodynamics, citric acid cycle, respiratory chain (electron transport, proton translocation, ATP synthesis, decoupling, energy balance).
Performance assessment	None

Biochemistry seminar	
Form of the course	Exercise / Seminar (0,5 SWH)
ECTH	2
Responsibility	Institute of veterinary biochemistry (WE03)
Entry requirements	None
Course contents	Consolidation of the course contents of the lecture "Biochemistry I"
Performance assessment	oral examinations

Physiology I	
Form of the course	Lecture (4 SWH)
ECTH	4
Responsibility	Institute of veterinary physiology (WE02)
Entry requirements	None

Course contents	General cell physiology (functions of cellular compartments and cell membrane, diffusion, osmosis, protein-mediated transport, potential formation) General neurophysiology (emergence, conduction and integration of stimulating and inhibiting signals to neurons, reflexes) Muscle Physiology (structure, saltatory conduction and functional processes of skeletal, smooth and cardiac muscles, contraction forms, contractile force and its regulation) Physiology of the central nervous system (structure and hierarchy of the nervous system, learning, motor centres and motor processes, behavioural physiology) Physiology of vegetative nervous system (sympathetic, parasympathetic and enteric nervous system) Sensory physiology (general sensory physiology, sense of pain, touch or smell, taste buds, sense of sight, hearing, or balance) Physiology of blood and lymph (functions of blood plasma and blood cells, haematopoiesis, rheology, immune system, blood groups and blood transfusion, haemostasis and wound healing, haematologic diagnosis, anemia, lymph) Cardiovascular physiology (electrical and mechanical processes of the heart, regulation of cardiac activity, basics of heart diagnostics, organisation and physical laws of the circulation, blood pressure, pulse, blood pressure regulation, substance transfer in the terminal vessels, characteristics of the pulmonary circulation) Renal physiology (processes of urine formation, regulation of renal function, tasks and structure of the kidney, diagnostic parameters of renal function, urinary incontinence) Respiration physiology (structure and function of the lung, sub-functions of external respiration, spirometric parameters, mechanics of respiration, exchange and transport of respiratory gases, regulation of respiration, pulmonary clearance, pulmonary thermoregulation)
Educational objectives	Ready-to-apply knowledge of basic physiological in species important in veterinary medicine In-depth understanding of the function of excitable structures and their integrative performance In-depth understanding of the functions of blood and the cardio vascular system, as well as the importance of lung and kidney for the constant blood composition Ready-to-apply knowledge of important regulating and control mechanisms Detection and understanding of pathophysiological mechanisms and pharmacological intervention points
Performance assessment	None

Obligatory courses during the 3rd term

Anatomy II (hoofed and cloven-hoofed animals)	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None
Course contents	Similar course contents as in anatomy I, but with special regard to farm animals, e.g. ruminants, swine and horses. Skin, skin muscles and skin nerves. Dorsal trunk limb muscles. Ventral trunk limb muscles. Conduction systems and neck viscera. Bones and joints of the shoulder limb. Conduction systems and muscles on the upper arm. Conduction systems and muscles in the forearm. Spinal muscles, lumbar skin nerves. Muscles of respiration. Ventrolateral body wall with teats and prepuce, abdominal muscles, groin. Thoracic cavity with pleural caves and lungs. Heart and pericardium. Conduction systems of the thoracic cavity with sympathetic chain. Topography of the abdominal organs and peritoneum. Stomach and intestines with blood vessels and nerves. Intestinal accessory glands, autonomous nervous system. Pelvic cavity with peritoneum, meso and tendons of the urinary and reproductive organs, Fossa ischiorectalis. Comparing sexual organs.

	Pelvic girdle, bones, and joints of the pelvic limb. Conduction systems and hip joint muscles. Conduction systems and muscles in the lower leg. Skull and joints of the head, superficial blood vessels of the head, facial muscles, lacrimal apparatus, eye nerves and muscles, nose, nasal cavity, larynx, oral cavity, pharynx, all cranial nerves, arteries of the head, Diverticulum tubae auditivae, tongue, salivary glands, teeth. Spinal cord, brain and meninges. Parallel to the individual preparation topics demonstrations will take place on X-rays and on living animals (cattle, horses).
Educational objectives	Knowledge of the basic concept of structures and organ systems (such as musculoskeletal, respiratory, digestive and urogenital system) in large and small ruminants, horse and pig in close relation to the circulatory and nervous system, as well as the lymphoid and endocrine system.. Ability to link topographical and systematic anatomy; interdisciplinary links (microscopic anatomy, propaedeutics, physiology). Theoretical corroboration of rectal examination; Practical relevance through constant link of applied anatomical aspects with clinically relevant topics in terms of the clinical section of the study (surgery, clinic, pathology, imaging). Understanding of comparative anatomy using the example of variations of basic appearances in the body of herbi- and omnivores.
Performance assessment	None

Anatomical preparation exercises II (hoofed and cloven-hoofed animals)	
Form of the course	Exercise (4 SWH)
ECTH	8
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	Successful participation: Anatomical preparation exercises I (dog and cat)
Course contents	Skin muscles, shoulder girdle muscles. Neck: suprasternal notch with V. jugularis externa. A. carotis communis, Truncus vagosympathicus, Spatium colli with conduction systems, trachea and esophagus. Respiratory muscles, thoracic cavity, lungs, conduction systems in the mediastinum. Pericardium and heart. Abdominal wall muscle and rectus sheath, study of peritoneum and the location of the abdominal viscera, study of abdominal organs, liver, stomach, pancreas and spleen. Pelvis, inguinal rings, urinary organs, female and male sexual organs. Head: facial muscles, N. facialis, astication muscles, Nn. mandibularis, maxillaris and ophthalmicus, eye muscles and nerves. Nose and nasal cavity, paranasal sinus. Muscles of soft palate and pharynx. Diverticulum tubae auditivae, larynx: Skeleton, muscles, nerves. Brain and spinal cord. Preparation of the limbs: muscles, nerves, blood vessels and their terminal branches. Fascia reinforcements. Preparation of the unfixed toes. Study of the naked and unfixed hoof or claws. Parallel to the course will be demonstrations on living animals.
Educational objectives	Systematically-derived topographic preparation of the structures and organ systems listed above at preserved and fresh carcasses (horse, cattle, sheep, goat, pig). Consolidation of expertise, expanding the rhetorical skills and intensification of professional communication between students with the aid of the new educational method "peer instructing". "Peer instructing" is based on teachings by students and accompanied by instructors. Learning the topographical preparation method as preparation for the future clinical surgical activity focusing on stratigraphy. Learn orientation, based on tactile points of bone and muscle furrows, location relations and organ projection on the carcasses. Learn to protect sensitive conduction systems. Ability to independently perform the preparation carried out on the demonstration species on the other species and work out differences. Combination of topographical and systematic Anatomy; interdisciplinary links (propaedeutics, microscopic anatomy, physiology). Independent preparation of body cavities of preserved carcasses (horse, cattle, small ruminants) and comparison of the different anatomical structures to fresh carcasses (cattle, small ruminants, pig), as well as fixed organ and skeletal preparations or plastinates and polyethylene glycol (PEG)-preparations. Mesoscopic demonstrations (magnifying glass).

	Learn medical terminology and anatomical terms. Clinically applied anatomy through orienting palpation on live animals. Guidance for evaluation of clinically applied questions
Performance assessment	4 oral, written or practical tests during the semester

Physiology II	
Form of the course	Lecture (4 SWH)
ECTH	4
Responsibility	Institute of veterinary physiology (WE02)
Entry requirements	None
Course contents	Physiology of the gastrointestinal tract (function of GIT, food intake and regulation, saliva formation, swallowing act, secretion and activity of single stomach, intestinal digestion, intestinal absorption and secretion, exocrine pancreas and liver, bowel movements, defecation, fermentative digestion, absorption and acids/bases household in the rumen, flow rate of nutrients, rumen activity, characteristics of digestion in the large intestine, postresorptive use of nutrients, diarrhea) Energy balance (principles of thermodynamics, calorific values, direct and indirect calorimetry, energy-dependent processes, conversion rate, degrees of energy conversion) Thermophysiology (temperature of core and shell, homeothermia, poikilothermia, thermoregulation, fever) Water and electrolyte balance (water balance and compartmentalisation, regulation of water balance of the cell and whole organism, homeostasis of clinically important electrolytes, disorders of water and electrolyte balance) Acid-base balance (pH, pH-regulation of the cell and of the total organism, biological buffer systems, Henderson-Hasselbalch equilibrium, diagnosis of disorders) Stress physiology (sympatho-excitatory adrenomedullary system, stress, stress management strategies, hypothalamic pituitary adrenal axis) Performance physiology (especially horses and cattle) Reproduction (female sexual cycle, spermatogenesis and spermiogenesis, capacitation, fertilization, implantation and pregnancy, childbirth, lactation, egg fomation and oviposition
Educational objectives	In-depth understanding of strategies and processes of gastro-intestinal absorption of substrate and subsequent utilisation including its regulation Ready-to-apply knowledge of important homeostatic control circles in different species Identification of performance potential of sport and production animals, as well as understanding of mechanisms and limits of performance adaptation Acquire basic knowledge on reproduction and lactation physiology Recognize and understand pathophysiologically important mechanisms and pharmacological intervention points
Performance assessment	None

Proseminar to the practical course in physiology	
Form of the course	Seminar (0,5 SWH)
ECTH	2
Responsibility	Institute of veterinary physiology (WE02)
Entry requirements	According to the practical course regulations
Course contents	General cell- and neurophysiology and physiology of muscles, CNS, vegetative nervous system, cardio vascular system, kidney and gastrointestinal tract
Educational objectives	In-depth knowledge on selected physiological topics preparing for or in addition to the physiological practical course Cognition and understanding of relationships between individual physiological or pathophysiological processes; improving the combinatorial skills Knowledge of technical terms needed to describe life processes
Performance assessment	Tests

Biochemistry II

Form of the course	Lecture (3 SWH)
ECTH	3
Responsibility	Institute of veterinary biochemistry (WE03)
Entry requirements	None
Course contents	• Nucleic acids, gene regulation, genetic engineering: A. Structures of nucleic acids: general structure (bases, nucleosides, nucleotides), functions of nucleosides + nucleotides (energy source, group vectors, energy, signal substances), NA spatial structure, base pairing, melting curve + hybridization, running direction, polymerization, double helix, triplet code, chromosome structure, mutations (point mutation – chromosomal aberration), sex chromosomes, genetic diseases, recombination, genome structure, plasmids, RNA structure (types of RNA: mRNA, rRNA, tRNA, snRNA, miRNA), functions, nucleic acid analysis (cleaning, sequence determination) B. Gene regulation: replication: DNA polymerases (initiation, elongation, termination), overview of gene expression, gene, genome organization, antibiotics (inhibition of replication, transcription or translation) C. Transcription: prokaryotes: promoters, RNA polymerases, initiation, elongation, termination, regulation (Operon model: lac + trp), DNA-protein interaction (zinc finger, HRE), Eukaryotes: Intro/exon, post-transcriptional RNA processing, translation (only in prokaryotes): components mRNA, tRNA, ribosome, initiation, elongation, termination, polysomes, wobble hypothesis, specific detection methods for mRNA (RT-PCR, Northern blot) D. Genetic engineering: cloning techniques in bacteria + animals, problems in assisted reproduction, genetically modified organisms (GMOs), transgenic animals, detection methods for GM, PCR, benefits of genetic engineering • Hormones + vitamines A. Hormones: introduction, general infomation & history of endocrinology, transmission paths & hierarchy of hormone control (feedback), hormone receptor types + signal transduction, type I-IV receptors, adenylate cyclase system, inositol-tris-phosphate system, tyrosine kinases, jak/stat-system, RAS-system, intracellular receptors, second messenger, hormone classes, organs of the endocrine system (brain, adrenal glands, gonads, pancreas), detection methods for hormones, hypothalamus-pituitary axis, releasing hormone: GnRH, TRH, GHRH, proteo/peptide hormones: glucagon, insulin (carbohydrate-/ fat metabolism, diabetes mellitus), gonadotropins FSH + LH, TSH receptor, growth hormone, prolactin, oxytocin (ACTH), Parathyroid hormone, calcitonin is only mentioned), steroid hormones (gonadal hormones: androgens, estrogens, progestins), glucocorticoids, amino acid derivatives: catecholamine (without cardiovascular physiology), thyroid hormones, melatonin, other messengers (mediators): nitrous oxide system, histamine, eicosanoids, cytokines, growth factors, summary, application and benefits, abuse (doping) B. Vitamins: vitamin A (other effects besides vision), water soluble vitamins C + B, vitamin D, vitamin E, vitamin K
Performance assessment	None

Biochemistry practical course

Form of the course	Exercise / Seminar (1,5 SWH)
ECTH	4
Responsibility	Institute of veterinary biochemistry (WE03)
Entry requirements	Successful participation: Chemistry - practical course for veterinarians
Course contents	Practical performance of seven experiments: 1. Proteins (determination of free amino acids with Ninhydrin, determination of the activity of arginase in the liver) 2. Enzymes (electrophoretic separation of LDH-isoenzymes in agarose gel, determination of the enrichment of the enzyme lactat dehydrogenase) 3. Carbohydrates (isolation of glycogen from liver acid hydrolysate and evidence of glucose, determination of glucose 6-phospatase activity in liver extract) 4. Lipids (enzymatic determination of D-3-hydroxybutyrate in blood, enzymatic cleavage of triacylglycerides by pancreatic lipase, determination of the peroxide value)

	5. Biological oxidation (extraction of mitochondria from heart muscle, measurement of the succinate dehydrogenase reaction, recording the absorption spectra of cytochrome C, examination of cytochrome-C oxidase) 6. Nucleic acids (cleaning of DNA from horse blood, enzymatic cleavage of DNA and viscosity measurements, gel electrophoresis of DNA, photometric determination of DNA concentration and purity) 7. Vitamins / hormones (characterization and separation of vitamins, evidence of hormonal regulation of blood glucose level)
Performance assessment	Practical / oral examinations

Obligatory courses during the 4th term

Anatomical seminar / Situs demonstrations II	
Form of the course	Seminar (2 SWH)
ECTH	4
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	Successful participation: Anatomical preparation exercises II (hoofed and cloven-hoofed animals)
Course contents	Unfixed pigs, ruminants, horses, small pet animals, and poultry: Demonstration of organs, conduction systems and relationships of mesenteries in abdominal and pelvic cavities, as well as in the thoracic cavity. Bird I Anatomy of the bird Bird II (situs of the body cavity, respiratory and digestive tract including conduction systems) Bird III (urogenital organs) Horse I (abdominal and pelvic cavities, clinically applied focus: colic) Horse II (thoracic cavity) Pet situs (all body cavities: rodents, rabbits, ornamental birds, exotics) Pig situs (all body cavities) Situs small ruminants (all body cavities)
Educational objectives	Consolidation and extension of practical capabilities and of anatomical knowledge of the body cavities of large farm animals (cattle, horse, pig, small ruminants) and introduction to the anatomy of pets (rabbits, rodents, exotics, ornamental birds) from unfixed carcasses. Introduction to the anatomy of poultry. Representation of clinically significant structures of the body cavities and the internal organs using the examples of clinical questions. Projection of organs to the body wall. Consolidation of knowledge of comparative anatomy. Identification of functional adaptation of certain organ systems to certain living conditions of different species. Comparison of basic anatomy of mammals and birds. Acquisition of knowledge of anatomically relevant basics for the soft part surgery and simulation of standard operations. Consolidation of expertise and intensification of technical communication between students or between students and the scientific staff through so-called "competence teams".
Performance assessment	oral and practical, each student each day

Embryology	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None
Course contents	Organogenesis, cleavage, gastrulation, neurulation, cotyledons. Gametogenesis, capacitation, acrosome reaction. Sexual cycle comparative and including man. Regulation of expression of parental genes. Development of the placenta, implantation, placentation. Development of the heart and the blood vessels, vasculogenesis and angiogenesis.

	Development of the musculoskeletal system, the digestive and respiratory systems, of the urinary system, the reproductive system, skin, appendages of the skin and mamma. Development of the nervous system. Teratogenesis. Experimental embryology, in vitro fertilization, in vitro culture of embryos, embryo transfer, cloning, stem cells, transgenic animals.
Educational objectives	Development of essential principles of developmental biology and embryology, including medical and experimental embryology, e.g. differentiation and determination, epithelial and mesenchymal interactions, role of growth factors, signal molecules and cell adhesion molecules, proliferation and apoptosis, embryonic inductionand cell migration. Basic aspects of morphogenesis and teratology.
Performance assessment	None

Histology II (microscopic anatomy II)	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	None
Course contents	Digestive system: foregut: oral cavity, tongue, teeth, salivary glands, pharynx, Mid- and hindgut: esophagus, stomach, duodenum, jejunum, caecum, colon, rectum, anus, anal bag. Intestinal appendage glands: liver and gallbladder, pancreas and islet system. Respiratory system: nasal cavity, larynx, trachea, lungs. Urinary system: kidney, efferent urinary tract. Male sexual organs: testis and epididymis, sperm, spermatic cord, prostate. Female reproductive organs: ovary, fallopian tube, uterus at various stages of the cycle. Endocrine organs. CNS Sensory organs.
Educational objectives	Microscopic anatomy of digestive, respiratory, urogenital and nervous system and the organs of perception, each functionally related. Producing connections to clinical situations or cases and integration of various fields of knowledge.
Performance assessment	None

Histology II (microscopic anatomy II) and embryology	
Form of the course	Exercise (2 SWH)
ECTH	4
Responsibility	Institute of veterinary anatomy (WE01)
Entry requirements	Successful participation: General and special histology I
Course contents	Digestive system: Lip, tongue, teeth, salivary glands, esophagus, rumen, stomach, small intestine, large intestine, anus, anal bag, liver, pancreas. Respiratory system: trachea, lung. Urinary system: kidney, ureter. Male sexual organs: testis and epididymis, sperm, spermatic cord, prostate. Female reproductive organs: ovary, fallopian tube, uterus at various stages of the cycle. Histology of the embryo: gastrulation, gill intestine, kidney development, placentation, umbilical cord, age estimation of fetuses. Endocrine organs. CNS Sensory organs.
Educational objectives	Independent microscopic diagnostics of all organs of farm animals and poultry as listed under “course contents”, and the most important structures during embryonic development and the placenta. Consolidation of knowledge regarding the histological and microscopic diagnosis of the respective course preparations. Basic knowledge of the distinction between physiologically and pathologically modified tissue. Maximizing the expertise through peer instructing (= of the instructors accompanied and supported teaching through students).

	Intensification of technical communication between students or between students and instructor.
Performance assessment	Written or practical test at the end of the term

Clinical Biochemistry	
Art und Umfang	Vorlesung (1 SWS)
ECTS	1
Verantwortliche WE	Institut für Veterinär-Biochemie (WE03)
Eingangsvoraussetzung	Keine
Lehrinhalte	Ausgewählte, klinisch besonders relevante Themen der Biochemie und Physiologie werden in enger Koordination von Fachkolleginnen und -kollegen der beiden Fächer vermittelt. Aus der Erläuterung pathobiochemischer und pathophysiologischer Zusammenhänge werden Bezüge zur Labordiagnostik abgeleitet.
Art der Leistungskontrolle	Keine

Physiology III	
Art und Umfang	Vorlesung (1 SWS)
ECTS	1
Verantwortliche WE	Institut für Veterinär-Physiologie (WE02)
Eingangsvoraussetzung	Keine
Lehrinhalte	In diesem dritten Teil des Physiologie-Vorlesungsangebotes werden ausgewählte, klinisch besonders relevante Themen der Physiologie vermittelt. In enger Koordination werden Fachkollegen der Biochemie und Kliniken pathobiochemische und labordiagnostische Inhalten präsentieren.
Art der Leistungskontrolle	Keine

Physiology practical course	
Form of the course	Exercise (2,5 SWH)
ECTH	5
Responsibility	Institute of verterinary physiology (WE02)
Entry requirements	According to the practical course regulations
Course contents	• Impulse formation andconduction • Function of skeletal and smooth muscle • Epithelial transport processes • Function of the sensory organs, objective and subjective sensory physiology • Red and white blood cell count, blood coagulation and blood group diagnosis • Electrocardiography and blood pressure measurement • Respiratory gas and blood gas analysis, spirometry • Metabolic rate • Forestomach function of the ruminants
Educational objectives	Consolidation of course contents mediated in the lectures and previous seminars. Acquire ready-to-use knowledge about important experimental methods of physiology and selected methods of laboratory and clinical diagnostics Ready-to-use knowledge of the magnitude of clinically relevant physiological dimensions Practise of skill in dealing with laboratory animals, laboratory equipment and computer-based evaluation procedures
Performance assessment	Tests at the beginning and the end of each day

Animal feed exercises	
Form of the course	Lecture / Exercise (2 SWH)
ECTH	4
Responsibility	Institute of animal nutrition (WE04)
Entry requirements	None

Course contents	General principles of animal nutrition: main nutrients: occurrence, properties, function; nutrient digestibility, energy evaluation; evaluation of protein, minerals and vitamins: occurrence and function. Presentation of main feed groups (grains and seeds, feeds of animal origin, green fodder and cereals, by-products of the fermentation and sugar industry and the fruit processing, feed supplements and feed additives) relating to value-determining ingredients, properties and anti-nutritive substances and their suitability for monogastric animals and ruminants. Feed preservation, feed spoilage, feed technology, feed law and safety, feed microscopy.
Educational objectives	Knowledge about the suitability of feed groups, including their processing, preservation and storage for performance and health-oriented feeding; knowledge of the legal framework and common laboratory procedures for the evaluation of feeds
Performance assessment	2 tests (basics of animal nutrition, animal feeds)

Animal protection seminar	
Form of the course	Exercise (2 SWH)
ECTH	4
Responsibility	Institute of animal welfare and behavior (WE11)
Entry requirements	None
Course contents	10 to 12 anonymised animal welfare cases from veterinary offices. In group work, students develop strategies to deal with a series of frequently encountered offences against the law of animal welfare. The results will be presented by Students during the seminar and discussed with official veterinarians.
Educational objectives	Students increase their knowledge of the animal protection law and gain first skills in the official veterinarian animal welfare enforcement.
Performance assessment	Short presentation (random sample)

Course offer and syllabus of clinical training

Obligatory courses during the 5th term

Animal nutrition	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of animal nutrition (WE 04)
Entry requirements	None
Course contents	General principles of animal nutrition: main nutrients: occurrence, properties, function; feed intake and regulation; nutrient digestibility and determination methods; energy conversion and evaluation systems; evaluation of protein and fulfillment of amino acid demand, protein deficiency and surplus; minerals and vitamins: occurrence and function, availability, deficiency diseases, toxicity. Effect of feed additives; Basics of nutrition of ruminants, pigs, horses, poultry, cats, dogs, ornamental birds and small pets. Mycotoxins in feeds, feed spoilage, influence of feeding on the food quality and safety.
Educational objectives	Knowledge of the metabolism of the feed ingredients, taking into account biochemical, pathobiochemical and nutritious characteristics; knowledge of nutrition- and health-related correlations; competence in the deduction of feeding strategies for farm animals and pets, as well as basic knowledge in terms of influences of feeds and feeding on food safety.
Performance assessment	None

Animal nutrition – practical course	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Institute of animal nutrition (WE 04)
Entry requirements	None
Course contents	Aspects of practical feeding of sows, piglets, porker, laying hens and fattened poultry, calves, heifers, cows and fattening bulls as well as dogs, cats, ornamental birds and small pet

	animals; determination of requirements, selection of appropriate feeds, calculation and evaluation of rations, dietetic measures in metabolic disorders and convalescent animals
Educational objectives	Knowledge to the ration for farm animals and pets, particularly with regard to high-performance and environmentally friendly aspects of livestock; fundamentals of dietetics for the treatment of food-associated diseases.
Performance assessment	5 tests (livestock-friendly feeding of ruminant, horse, pig, dog, cat and pet animal)

General and special virology I	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of virology (WE05)
Entry requirements	None
Course contents	Structure, properties, taxonomy, replication strategies, virus genetics, virus-cell interaction, transmission routes, immune response to viral infections, vaccination, laboratory diagnostics, introduction to the virus families and their most important representatives and virus diseases of animals.
Educational objectives	Teaching of basic knowledge of virology
Performance assessment	None

General lecture on infections and epizootics	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of microbiology and epizootics (WE07)
Entry requirements	None
Course contents	Basics of infectious diseases and epidemics, definitions, ecosystem, cause-effect relationships, evolution of pathogen-host relationships Positive guest-host relations, model diseases Pathogenesis, clinically inapparent infections, Infectious diseases Structure of bacteria, genetics Metabolism, cultivation, microscopy, isolation, detection, identification, classification, taxonomy Virulence mechanisms including pathogenicity islands Chemotherapy and resistance General mycology (structure, taxonomy, propagation, virulence mechanisms, isolation, identification) Etiology, pathogenesis, clinic, therapy of veterinary-relevant infectious diseases caused by fungi
Educational objectives	Explain different pathogen-host relationships Explain the pathogenesis of infectious diseases Explain the structure of bacteria and fungi Explain mechanisms of virulence of microorganisms Explain how to use anti-infectives wisely and how resistances develop
Performance assessment	MC-test / oral examination

Animal and environmental hygiene	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of animal and environmental hygiene (WE10)
Entry requirements	None
Course contents	Basics of animal hygiene, definitions, ecosystem, animal-environment interactions, legal basics Stable construction, ventilation, stable climate, manure removal procedure Emissions (contaminated air, faeces), emission reduction Drinking water for humans and animals, waste water treatment Infection prophylaxis (cleaning, pest control, disinfection, sterilization) Disposal of animal by-products
Educational objectives	• Explain animal-environment interactions

	• Assess stable climate and emissions from animal farming • Carry out measures for the prevention of infections and evaluate
Performance assessment	None

Keeping of animals	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of animal and environmental hygiene (WE10)
Entry requirements	None
Course contents	Basics of animal husbandry, physiological basics, ethological basics, legal basics Farming of pigs, cattle (including calves), poultry (laying hens, fattened poultry, water fowl), small ruminants; horses, keeping of small animal and pets, ecological animal husbandry
Educational objectives	Assess keeping of animals Identify animal welfare problems Know alternative farming systems
Performance assessment	None

General pathology	
Form of the course	Lecture / Practice / Seminar (4 SWH)
ECTH	4
Responsibility	Institute of animal pathology (WE12)
Entry requirements	None
Course contents	Overview of pathological conditions and processes in the entire organism including their definition and specific nomenclature.
Educational objectives	General principles of disease principles and mechanisms and classification of pathological processes in the whole organism.
Performance assessment	Written tests during the term, practical and oral examination

Parasitology	
Form of the course	Lecture (3 SWH)
ECTH	3
Responsibility	Institute of parasitology and tropical veterinary medicine (WE13)
Entry requirements	None
Course contents	• General parasitology: parasites, parasitism, harmful effect, immune reaction. • Special parasitology: helminthology, protozoology, entomology; morphology, biology and therapy of trematodes, cestodes and nematodes, as well as flagellates, Sporozoa, Piroplasmida and parasitic arthropods
Educational objectives	Knowledge on general aspects of parasitology and endo- and ectoparasites of veterinary importance and the diseases caused by them, taking into account the zoonoses, including their epidemiology and control
Performance assessment	None

General pharmacology and toxicology	
Form of the course	Lecture (4 SWH)
ECTH	4
Responsibility	Institute of pharmacology and toxicology (WE14)
Entry requirements	None
Course contents	Drug and medicinal properties: pKa value, molecular weight, forms of isomerism, binding properties, receptor effects and inner pathways, methods and modes of application, dose and dose-effect relationships, side effect and toxicity, drug kinetics, absorption types and sites of drugs and influencing factors, protein binding and drug distribution, compartments, elimination of active substances: excretion, bio transformation forms and influencing factors, possible consequences of repeated drug administration (tolerance, resistance and dependency, allergy development, cumulation etc), pharmacogenetics (species differences in drug reaction).

Performance assessment	None

General and clinical radiology I	
Art und Umfang	Vorlesung (1 SWS)
ECTS	1
Verantwortliche WE	Klinik für Pferde, allgemeine Chirurgie und Radiologie (WE17)
Eingangsvoraussetzung	Keine
Lehrinhalte	Allgemeine Radiologie und Strahlenschutz Rechtlicher Strahlenschutz (RöV, StrSchV) Röntgentechnik, Röntgenartefakte Digitales versus analogen Röntgen Grundlagen Sonographie, CT, MRT, Szintigraphie, Arthroskopie, Laparaskopie Bildgebende Diagnostik beim Kleintier: Thorax, Abdomen, Knochen, Gelenke,... Bildgebende Diagnostik beim Pferd: Huf, Gelenke, Kopf, Sehnen, ...
Lernziele	Theoretisches Wissen als Voraussetzung für den Erwerb der Fachkunde nach erfolgreicher Approbation.
Art der Leistungskontrolle	Keine

General surgery	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	Wounds (wound healing, wound care, wound management in small animals and horses) Muscle and tendon diseases / injuries Bone and cartilage diseases: stunted growth (dysplasia, e.g. of hip and elbow, patella luxation, Legg-Calvé-Perthes disease) Bone inflammation (not infectious / infectious): hypertrophic osteodystrophy, periostitis, panostitis; osteomyelitis Arthritis / osteoarthritis Joint injury in the horse Fractures (origin, classification, healing; fracture treatment in small animals and horses, fracture healing disorders) Epiphyseal damage (small animals, horses)
Educational objectives	Students will learn the theoretical basics of general surgery.
Performance assessment	None

Clinical propaedeutics – Horse	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Equine clinic: surgery and radiology (WE17)
Entry requirements	None
Course contents	Dealing with horses, coercive measures, description, general examination, special examinations of the organ systems: orthopaedic examination, examination of the upper and lower respiratory tract, the digestive system and heart and circulation, neurological examination, examination of the urinary tract, gynecological and andrological examination. Practical exercises in small groups.
Educational objectives	Students learn the theoretical basics of tropaedeutic. They should be able to carry out a general clinical examination and simple special examinations of organ systems and interpret the findings.
Performance assessment	Oral / practical examination

Clinical propaedeutics – Cloven-hoofed animal	
Form of the course	Exercise (2 SWH)
ECTH	2

Responsibility	Ruminant and swine clinic (WE 18)
Entry requirements	None
Course contents	Theory and practice of clinical examination for ruminants and pigs, practice-relevant treatment methods, handling including coercive measures.
Educational objectives	Students are able to correctly execute the complete clinical examination of ruminants and pigs. They know the most important normal and deviant examination findings and master the terminology as part of the clinical diagnostic report.
Performance assessment	Practical examination on animal

Clinical propaedeutics – Reproduction	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Animal reproduction clinic (WE19)
Entry requirements	None
Course contents	Special investigation techniques in gynecology, obstetrics, herd health care, andrology and neonatology and on the teats of different species.
Educational objectives	Students know the special reproductive medical examination techniques and procedures in theory and practice. Students can perform the examinations and interpret the findings.
Performance assessment	Oral / practical examination

Clinical propaedeutics – Small animals and pets	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	Application of previously discussed theoretical knowledge under guidance in small groups. Topics: handling the animal, general examination, coercive measures, palpation of lymph nodes, heart/cardiovascular examination, taking of a blood sample/injection techniques, examination of the eyes, skin, ears, oral cavity, respiratory, urinary and gastrointestinal tract; neurological examination, diagnosis of lameness, dressings and bandages; examination of small pets
Educational objectives	Students learn the theoretical basics of propaedeutic. They should be able to carry out a full clinical general examination including special examinations of small animals and pets and interpret the findings.
Performance assessment	Medical report

General immunology	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of immunology and molecular biology (WE06)
Entry requirements	None
Course contents	Cells of the immune system; innate immune responses; complement; adaptive immune responses; B cells; antibodies; T cells, their maturation, activation, receptors, and subpopulations; cytokines; MHC molecules; immune tolerance, autoimmunity; immunopathology; infection defense; evolution
Educational objectives	Basic understanding of innate and adaptive immune responses
Performance assessment	MC-test

Obligatory courses during the 6th term

Special pharmacology and toxicology	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of pharmacology and toxicology (WE14)
Entry requirements	None
Course contents	
Educational objectives	
Performance assessment	None

General and special virology II	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of virology (WE05)
Entry requirements	None
Course contents	Structure, properties, taxonomy, replication strategies, virus genetics, virus-cell interaction, transmission routes, immune response to viral infections, vaccination, laboratory diagnostics, introduction to the virus families and their most important representatives and virus diseases of animals.
Educational objectives	Teaching of basic knowledge of virology
Performance assessment	None

Virology - Practical course	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Institute of virology (WE05)
Entry requirements	None
Course contents	
Educational objectives	
Performance assessment	Admission test

Microbiology – Practical course	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Institute of microbiology and epizootics (WE07)
Entry requirements	None
Course contents	Learn how to deal with infectious samples Learn simple conventional and molecular methods of bacteriological and mycological infection diagnostic Learn techniques necessary when working with infectious agents Infectiological case descriptions, different strategies for the diagnosis of various pathogens of veterinary importance
Educational objectives	Students can: competently assess the sampling and transport of infectious material deal safely with pathogenic micro-organisms diagnose infectious agents (bacteria, fungi) of veterinary importance
Performance assessment	Practical Examination

Bacteriology and mycology	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of microbiology and epizootics (WE 07)
Entry requirements	None
Course contents	**Module 3:** E. coli-enteropathies, Campylobacter spp., Salmonella enterica, Brachyspira spp., Lawsonia intracellularis, Clostridium perfringens - **Module 5:** Uropathogene E. coli,

	Corynebacterium renale - **Module 7:** Pasteurella spp., Bordetella spp., Streptococcus equi; Chlamydophila spp., Mycoplasma spp., Actinobacillus spp. - **Module 11:** C. botulinum, C. tetani, S. suis - **Module 14:** relevant mastitis pathogens: i. a. Streptococcus spp., Arcanobacterium (Trueperella) pyogenes; - **Module 15:** Staphylococcus spp. (incl. MRS, ESBL nosocomial infections), Erysipelothrix rhusiopathiae; - **Module 16:** Borrelia spp., Leptospira spp.
Educational objectives	Students can... • classify pathogens taxonomically, explain pathogen characteristics • explain the pathogenesis of infectious diseases • explain the pathology of infectious diseases • define the habitats of the pathogen • explain relevant diagnostic methods • recommend specific therapy and prophylaxis • explain infection-epidemiological aspects of the infectious disease (reservoirs, prevalences, transmission routes etc.)
Performance assessment	None

General food science	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of food hygiene (WE 08)
Entry requirements	None
Course contents	・Introduction of the topic of food hygiene, ・Continuation of the subject of "bacteriology, mycology and virology", ・Preparation for the exercises in "food analysis and technology" ・Residues/contaminants in food ・Chemical analysis of foods
Educational objectives	Students can... explain the principles of food safety explain the basics of food microbiology (influences on survival, death and proliferation of micro-organisms) provide an overview to the damage to health caused by foods explain the basics of spoilage of foods
Performance assessment	None

Milkhygiene	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE 08)
Entry requirements	None
Course contents	Hygiene of milk production, in particular dairy equipment and milking hygiene, industrial hygiene, Transport of milk to be delivered, production of drinking milk and milk products (curdled milk products, milk powder, cheese, butter, mixed milk products Microbiology of milk and milk products, in particular starter cultures, Probiotics, spoilage agents and pathogens, dairy legislation
Educational objectives	Students can... explain the national and international relevance of milk and milk products for human consumption and the economic significance of the dairy industry explain the creation of the ingredients of milk of the main species and define standard values explain heat treatment explain the main milk ingredients and evaluate in terms of the physico-chemical, technological and nutritional characteristics of milk discuss the production of high quality and hygienic raw milk and explain the relevant laws
Performance assessment	None

Meat Hygiene I

Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of meat technology and hygiene (WE 09)
Entry requirements	None
Course contents	Overview of the vertical and horizontal processes in the food chain
Educational objectives	To recognize the cross linking far above the animal and the herd
Performance assessment	None

Parasitological exercises	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Institute of parasitology and tropical veterinary medicine (WE13)
Entry requirements	None
Course contents	Analytical methods for the detection of parasitic stages in farm animals and pets; differentiation of larvae of pathogenic nematodes; staining techniques for the detection of blood and tissue parasites; microscopic and macroscopic differentiation of parasitic forms of arthropods
Educational objectives	Practical experience in the detection and identification of parasites and their developmental stages of high veterinary importance
Performance assessment	Practical examination on the last day of the exercises

Clinical demonstrations I – Horses	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Equine clinic: surgery and radiology (WE17)
Entry requirements	None
Course contents	Interactive case presentations from the area of orthopaedics/surgery, internal medicine, and reproductive medicine with subsequent discussion
Educational objectives	Application and consolidation of the knowledge gained in the modular and cross-section lectures regarding diseases in the horse and presentation of defined clinical pictures with demonstration of special examination and treatment Problem-oriented case analysis (anamnesis and clinical examination, list of medical conditions, differential diagnosis, diagnostic plan, evaluation of findings, creation of a therapy plan, prognostic assessment, efficiency)
Performance assessment	Medical report on a patient, powerpoint presentation

Clinical demonstrations I – Cloven-hoofed animals	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Ruminant and swine clinic (WE18)
Entry requirements	None
Course contents	Demonstration of clinic patients (ruminants, pigs) with internal and surgical diseases, reproductive disorders (pig), and case studies of diseases affecting whole herds
Educational objectives	Students are able to create a list of differential diagnoses for a sick animal (ruminant or swine) based on the results of the clinical examination. They can name further examination methods for diagnostics, they can give a prognosis taking into account economic aspects and they can formulate a therapy plan or supply prevention measures for food-producing animals.
Performance assessment	Practical examination on animal

Clinical demonstrations I – Reproduction	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Animal reproduction clinic (WE19)
Entry requirements	None

Course contents	Presentation, examination and review of patient and demonstration animals (ruminants, horses, dogs, cats, pets) regarding: -gynaecological, obstetric, andrological and neonatal issues, -introduction and execution of special examination techniques and methods of treatment including surgery (i.a. performing of caesareans, teat operations, castration), as well as biotechnological methods. Presentation, examination and review of animals regarding breed fitness and udder health.
Educational objectives	Students can apply special examination techniques and methods of treatment regarding reproduction of male and female animals of different species.
Performance assessment	Medical report on a patient, a clinical problem or a herd situation

Clinical demonstrations I – Small animals and pets	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	Presentation and interactive review of clinic patients (dogs, cats, pets, birds, reptiles) with internal medical, dermatological, oncological, neurological, surgical and ophthalmological diseases; problem-oriented case analysis; compiling of problem-oriented medical reports
Educational objectives	Students will learn from a variety of clinical cases problem-oriented case analysis including medical history and clinical examination (anamnesis and clinical examination, list of medical conditions, differential diagnoses, diagnostic plan, evaluation of the findings, creation of therapy plan, prognostic assessment)
Performance assessment	Medical report

Laboratory course	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Small animal clinic (WE20), Ruminant an swine clinic (WE 18), Equine clinic: surgery and radiology (WE 17)
Entry requirements	None
Course contents	During this course, theoretical and practical basics of the most important laboratory examinations of small and pet animals, birds, reptiles and horses and farm animals are being taught. Special contents: Preanalytics, accuracy control, precision, sensitivity, specificity; Diagnosis of disorders of the primary and secondary haemostasis; Haematology (micro haematocrit, blood smears - preparation and interpretation, reticulocytes; leucocytes); Serum proteins (incl. electrophoresis); lipids; Analysis of cerebrospinal fluid and synovia; Analysis of the effusions into body cavities; Diagnosis of kidney or liver disease; urine examination in small animals and horses; Endocrine pancreas (hypo- and hyperglycemia;) determination of Glc); Cytology; acid-base homeostasis; Laboratory diagnostical particularities in pets; Laboratory diagnostics in livestock medicine; diagnosis of rumen fluid; Trachealwash in a horse; quick tests in the veterinary medicine
Educational objectives	Students should: know the possible sources of error in the identification and interpretation of laboratory parameters; know the most important laboratory methods and parameters of small and pet animals, birds, reptiles and horses and farm animals and be able to interpret the results and carry out simple laboratory methods independently
Performance assessment	None

Obligatory courses during the 7th term

Animal disease control I	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of microbiology and epizootics (WE07)
Entry requirements	None
Course contents	• Objectives, strategies and methods of epizootic control in Germany • Introduction, structure, and function of the Veterinary Administration (Germany) • Law on epizootic diseases (objective, definitions) • Law on epizootic diseases (notifiable and compulsorily notifiable diseases, measures against the general risk of animal diseases) • Suspected outbreak of an epizootic disease, confirmation of an outbreak, detecting animal disease outbreaks • Protected areas, closed areas, control zones in case of an outbreak of epizootic diseases • Jurisdiction of animal disease control in Germany / role of the federal authorities in the epizootics control and prevention • Law on epizootic diseases (provisions against the exceptional danger of epizootics, empowerment paragraphs) • Compensation / animal disease funds • Protection against animal diseases in import, export, transit • Data collection in connection with animal disease control (TRACES / TSN) • Animal identification / HIT database • Animal vaccines • European legislation (institutions, legislative procedures, legal norms, animal health strategy) • Basics of infection epidemiology
Educational objectives	• Students can: • explain objectives, strategies, and methods of animal disease control • reflect and explain the terms of the relevant veterinary directives (law on epizootic diseases, livestock movement order, animal vaccine order, pig husbandry hygiene order) • identify national and supra-national databases and data collections in line with animal disease control and explain their functions • identify national and supranational institutions and bodies in line with animal disease control and explain their functions • evaluate research and control of epizootics in animal populations on the basis of infection-epidemiological key figures
Performance assessment	None

Meat Hygiene II	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of meat technology and hygiene (WE09)
Entry requirements	None
Course contents	Installations and technical options to control and secure the food chain
Educational objectives	Understand the significance of health implications
Performance assessment	None

Food science I	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE08)
Entry requirements	None
Course contents	

Educational objectives	• Consolidation of the subject of food hygiene at the level of food production (products of animal origin) and the placing on the market • Mediation of the tasks of the official veterinarian in the area of food hygiene • Mediation of legal regulations regarding the official examinations and the placing of food of animal origin on the market Students can... • provide an overview to the horizontal and vertical meat and food hygiene regulations (EU regulations and national legal requirements) • explain ways of preservation (production and storage) of foodstuffs of animal origin • provide an overview to the food science (definitions, classification and systematics) of food of animal origin • explain the classical and modern procedures in product manufacturing (including novel/functional food and GMOs), and explain the legal requirements • provide durability criteria of foodstuffs of animal origin • present possible adverse influences (including microbiology, residues and storage pests) and the legal requirements • provide principles and legal requirements concerning the official control of foodstuffs • explain the principles and legal requirements regarding the placing of products on the market
Performance assessment	None

Food science – Practical course I	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE 08)
Entry requirements	None
Course contents	General and special investigations on the subject • Fish and fish products • Residues in food • Microbiology I, II and III • Histology • Sensory properties I and II • Sensory examination of dairy products
Educational objectives	Under guidance, students can perform the official foodstuff examination (incl. sensory, chemical, physical, bacteriological and histological examinations) independently
Performance assessment	Case study during the semester

Milkanalysis – Practical course	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE 08)
Entry requirements	None
Course contents	Discussing specific aspects of milk hygiene and demonstration or performance of practical exercises. Milk sampling, cell number determination, bacteriological examination of quarter milk samples, inhibitor testing, physical quality parameters, detection of heat treatment, casein precipitating, starter cultures, colony counting methods in milk, detection of pathogens from milk and milk products
Educational objectives	Students can... • describe the principle of examining raw milk as specified in the milk quality testing and explain reasons for deviations from standard values • explain influencing factors at sampling, as well as cytological and bacteriological findings relating to subclinical mastitis and explain the characteristics of important pathogens with regard to industrial hygiene • describe methods for the determination of physic-chemical quality parameters of milk and milk products and interpret the findings in terms of the reference values • describe method principles for the production of milk products and identify causes for problems in milk processing

	• recognize important tools for the microbiological examination of milk products and interpret typical findings, including sensory properties
Performance assessment	Examination of a milk sample and writing of a report

Pathologic-anatomical demonstrations I	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Institute of animal pathology (WE12)
Entry requirements	None
Course contents	Guided group discussion of organ changes with the help of material from routine operation of the Institute and archive material.
Educational objectives	Establishing pathologic-anatomical diagnoses and differential diagnoses and epi-critical evaluation of the etiology and relevance with regard to the clinic.
Performance assessment	Oral tests during the term

Pharmaceutical and narcotics law / drug regulation and application	
Form of the course	Lecture / Exercise (2 SWH)
ECTH	2
Responsibility	Institute of pharmacology and toxicology (WE14)
Entry requirements	None
Course contents	Dispense law and framework provisions, as well as narcotics, food and animal health regulations; national and EU law; provisions on consumer protection
Educational objectives	Comment the relevant legal provisions to the application, prescription, discharge and production of various categories of medicinal products, summarize and explain with the help of examples
Performance assessment	Oral examination

Galenics - Practical course	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Institute of pharmacology and toxicology (WE14)
Entry requirements	None
Course contents	Importance of pharmaceutical technology; legal basics; drug quality; labelling; price calculation; various pharmaceutical forms
Educational objectives	Manufacture of various pharmaceutical forms
Performance assessment	Practical and oral examination

General and clinical radiology II	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Equine clinic: surgery and radiology (WE17)
Entry requirements	None
Course contents	General Radiology and radiation protection Radiation protection ordinance (RöV, StrSchV) Radiotechnology, X-ray artifacts Digital versus analog X-ray Basics of sonography, CT, MRI, scintigraphy, arthroscopy, laparaskopy Imaging diagnostics of the small animal: thorax, abdomen, bones, joints, ... Imaging diagnostics of the horse: hoof, head, joints, tendons, ...
Educational objectives	Theoretical knowledge as a prerequisite for the acquisition of the technical qualification after successful approbation.
Performance assessment	None

Clinical demonstrations II – Horses	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Equine clinic: surgery and radiology (WE17)
Entry requirements	None
Course contents	Interactive case presentations from the area of orthopaedics/surgery, internal medicine, and reproductive medicine with subsequent discussion
Educational objectives	Application and consolidation of the knowledge gained in the modular and cross-section lectures regarding diseases in the horse and presentation of defined clinical pictures with demonstration of special examination and treatment Problem-oriented case analysis (anamnesis and clinical examination, list of medical conditions, differential diagnosis, diagnostic plan, evaluation of findings, creation of a therapy plan, prognostic assessment, efficiency)
Performance assessment	Medical report of a patient, powerpoint presentation

Clinical demonstrations II – Cloven-hoofed animals	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Ruminant and swine clinic (WE18)
Entry requirements	None
Course contents	Demonstration of clinic patients (ruminants, pigs) with internal and surgical diseases, reproductive disorders (pig), and case studies of diseases affecting whole herds
Educational objectives	Students are able to create a list of differential diagnoses for a sick animal (ruminant or swine) based on the results of the clinical examination. They can name further examination methods for diagnostics, they can give a prognosis taking into account economic aspects and they can formulate a therapy plan or supply prevention measures for food-producing animals.
Performance assessment	Practical examination on animal

Clinical demonstrations II – Reproduction	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Animal reproduction clinic (WE19)
Entry requirements	None
Course contents	Presentation, examination and review of patient and demonstration animals (ruminants, horses, dogs, cats, pets) regarding: -gynaecological, obstetric, andrological and neonatal issues, -introduction and execution of special examination techniques and methods of treatment including surgery (e.g. performing of caesareans, teat operations, castration), as well as biotechnological methods. Presentation, examination and review of animals regarding breed fitness and udder health.
Educational objectives	Students can apply special examination techniques and methods of treatment regarding reproduction of male and female animals of different species.
Performance assessment	Medical report on a patient, a clinical problem or a herd situation

Clinical demonstrations II – Small animals and pets	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	Presentation and interactive review of clinic patients (dogs, cats, pets, birds, reptiles) with internal medical, dermatological, oncological, neurological, surgical and ophthalmological diseases; problem-oriented case analysis; compiling of problem-oriented medical reports
Educational objectives	Students will learn from a variety of clinical cases problem-oriented case analysis including medical history and clinical examination (anamnesis and clinical examination, list of medical conditions, differential diagnoses, diagnostic plan, evaluation of the findings, creation of therapy plan, prognostic assessment)

Performance assessment	Medical report

Surgery and anesthesia	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	Asepsis and antiseptics in the operating theatre; injections and punctures in small animals and horses; sedation; equine anesthetic; injection and inhalation anesthetic in the small animal; surgical instruments; wound dressing; suture materials and suturing techniques; joint surgery in small animals and horses
Educational objectives	Basic knowledge of sterility, instruments, suture materials and suturing techniques; knowledge of anesthesia in small animals and horses; special procedures (punctures, joint surgery)
Performance assessment	Oral examination (surgery)

Obligatory courses during the 8th term

Animal disease control and infection epidemiology II	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of microbiology and epizootics (WE07)
Entry requirements	None
Course contents	• Legal basics, strategies and preventive measures in the control of relevant notifiable and obligatory notifiable animal diseases in Germany (taking EU directives / international regulations into consideration, if applicable) • Etiology, pathogenesis, infection epidemiology (risk of exposure), diagnostics of relevant notifiable and obligatory notifiable epizootics
Educational objectives	Students can... • name notifiable and obligatory notifiable animal diseases • explain content and objective of regulations which have been passed to combat these diseases • describe characteristics (infection epidemiology, etiologie, pathogenesis and diagnosis) of epizootics relevant for their control • discuss advantages and disadvantages of control programmes
Performance assessment	Oral examination

Food science – practical course II	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE 08)
Entry requirements	None
Course contents	• Demonstration of the production of meat products • Demonstration of the official foodstuff examination with food hygiene legal assessment • Chemical foodstuff investigation • Properties and technology of meat, sausage and other meat products, eggs and egg products, delicatessen, salted meat products • Law I, II, III • Preparative gravimetry • Compilation of an opinion on foodstuff examination
Educational objectives	Students can... • explain the principles and legal requirements of official foodstuff examination • compile an opinion in the context of the official foodstuff examination • gain insight into the product manufacturing of raw, boiled and cooked sausage
Performance assessment	Case study during the semester

Meat Hygiene III	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE08) and Institute of meat technology and hygiene (WE09)
Entry requirements	None
Course contents	Monitoring systems for livestock species
Educational objectives	Students understand the supervision of farm animals.
Performance assessment	None

Pathologic-anatomical demonstrations II	
Form of the course	Exercise (1 SWH)
ECTH	1
Responsibility	Institute of animal pathology (WE12)
Entry requirements	None
Course contents	Guided group discussion of organ changes with the help of material from routine operation of the institute and archive material.
Educational objectives	Establishing pathologic-anatomical diagnoses and differential diagnoses and epi-critical evaluation of the etiology and relevance with regard to the clinic.
Performance assessment	Oral tests during the term

Poultry diseases	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of poultry diseases (WE15)
Entry requirements	None
Course contents	Etiology, pathogenesis, diagnosis, therapy and prophylaxis of diseases of commercial poultry
Educational objectives	• Viral diseases: avian encephalomyelitis, infectious bronchitis, infectious bursitis (Gumboro-), classical fowlpest, Newcastle disease (atypical fowlpest), infectious laryngotracheitis, rhinotracheitis of turkeys, Marek´s disease, leucosis, smallpox, adenovirus infections, reovirus infections. • Bacterial diseases: salmonellosis, coli-infections, pasteurellosis (poultry cholera), ornithosis, mycoplasmosis, coryza contagiosa, erysipelas, clostridia, Ornithobacterium rhinotracheale • Parasitic diseases: coccidiosis, typhlohepatitis, roundworms, tapeworms, ectoparasites • Deficiency diseases, metabolic disorders: vitamin A - deficiency, vitamin B-deficiency, vitamin E - deficiency (encephalomalacia), vitamin K - deficiency (haemorrhagic syndrome), perosis, gout, fat liver syndrome and other diseases
Performance assessment	None

Clinical demonstrations – Poultry	
Form of the course	Exercise (2 SWH)
ECTH	2
Responsibility	Institute of poultry diseases (WE15)
Entry requirements	None
Course contents	Keeping of commercial poultry and ornamental, zoo and wild birds; propaedeutics in terms of commercial poultry and ornamental, zoo and wild birds; etiology, pathogenesis, diagnosis, therapy and prophylaxis of diseases of ornamental, zoo and wild birds.
Educational objectives	Assessment of keeping of poultry, anamnesis, fixation, clinical examination, sampling, application of medications, evaluation of X-rays, performing sections, theory of surgery (endoscopy, trauma, bumblefoot, sex determination), undernourishment and malnutrition, psittacine beak and feather disease, polyomavirus infection, dilatation of the glandular stomach of psittacids, psittacosis, paramyxovirus infections, trichomonosis and salmonellosis of pigeons.
Performance assessment	None

General ophthalmology	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	General ophthalmology in different species
Educational objectives	Knowledge relating to general ophthalmology in different species, including ophthalmologic diagnostics, problem-oriented case processing and diagnosis, therapy and surgery of eye diseases. Disorders of orbita, lids, conjunctiva, nictitating membrane, cornea, anterior chamber of the eye, lens, vitreous body and retina, of the olfactory bulb, uveitis and glaucoma, neurophthalmology.
Performance assessment	None

Law and ethics of the profession	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Ruminant and swine clinic (WE18)
Entry requirements	None
Course contents	Introduction to the duties and responsibilities of the veterinary profession, overview of the variety of veterinary tasks and fields of action, insight into opportunities of training and continuing education; role of veterinary medicine in public health, consumer protection, nutritional science, medical research, the care of the herds and agriculture
Educational objectives	Comprehensive presentation of the possibilities of veterinary activities.
Performance assessment	None

Diseases of bees	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of microbiology and epizootics (WE07)
Entry requirements	None
Course contents	1. Introduction to bee biology, immunity to and the spread of diseases in bees 2. Selected diseases (practice-relevant selection) Parasitic diseases; (varroosis or varroatosis, malpighamoebosis) Fungal diseases; (chalk brood, Nosema, stone brood) Bacterial infections; EFB (European foulbrood), AFB (American foulbrood) Viral infections; chronic bee paralysis virus (CBPV), acute bee paralysis virus (ABPV), deformed wing virus (DWV), sacbrood virus (SBV), other and rare infections (KBV, IAPV) 3. Intoxication 4 Obligatory notifiable bee diseases and disease control; bee products/consumer protection
Educational objectives	Veterinary students get an insight into selected areas of bee biology based on knowledge of general zoology. With additional knowledge of general parasitology and microbiology as well as epizootics an overview of diseases of honey bees will be provided. The emphasis is placed on practice-related diseases. Official veterinary-related legal requirements regarding detection and control of notifiable bee diseases are mentioned.
Performance assessment	None

Diseases of reptiles, amphibians and fishes	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	Infectious and non-infectious diseases of reptiles, amphibians and fish
Educational objectives	In the context of modular teaching students learn the most important diseases of reptiles, amphibians and fish.
Performance assessment	None

Laboratory animal science	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of animal welfare and behavior (WE11)
Entry requirements	None
Course contents	Laboratory animal science, freedom of research, ethical justification of animal tests; legal aspects, pproval and monitoring of animal experiments; animal testing; influential factors in animal experiments, factors, animals, environment, experiment; gnotobiot, gnotobiotop, gnotobiostasis, genetic standardisation, genetic control; transgenic animals; basics of molecular biology, constructing transgenic animals, abiotic environment of laboratory animals; climate, temperature, humidity, ventilation, light, acoustics, nutrition and diet components; optimising of animal experiments; alternatives to animal experiments.
Performance assessment	None

Courses of 6th to 8th semesters within the framework of "organ-centred teaching"

The courses of the 6th to 8th semester will be partly read in organblocks, where clinical and para-clinical subjects are integrated into the respective topic. Please find the appropriate contents as well as their assignment to the respective semester in the table.

The following courses are incorporated in the context of module-centered learning. See the exact course assignements in the "plans of the week" for each semester: *http://www.vetmed.fu-berlin.de/studium/plaene/index.html*

Semester	Block Nr.	Block Name	Hours
6th term	1	Introduction, medical teaching	3
	2	Reproduction I	42
	3	Gastroenterology	63
	4	Liver, pancreas	15
	5	Kidney und efferent urinary tract	9
7th term	6	Reproduction II	45
	7	Respiratory system	20
	8	Cardio-vascular system	15
	9	Blood, haemopoietic organs, lymphatic system	32
	10	Musculoskeletal system	44
8th term	11	Nervous system	23
	12	Metabolism and endocrine organs	31
	13	Udder and teats	25
	14	Skin, mucous membrane, skin appendages	17
	15	Systemic diseases	17

Organzentrierte Lehre, Organblock 2: Reproduction I	
Art und Umfang	Vorlesung (42 Stunden)
ECTS	3
Verantwortliche WE	Animal Reproduction Clinic (WE 19)
Eingangsvoraussetzung	Keine
Lehrinhalte	• Die Studierenden kennen die physiologischen und pathologischen Aspekte der Wirkung der Sexualhormone/ des Sexualzyklus bei männlichen und weiblichen Tieren verschiedener Tierarten. • Die Studierenden sind in der Lage, weibliche und männliche Tiere hinsichtlich ihrer Geschlechtsgesundheit, Zuchttauglichkeit und Eutergesundheit zu untersuchen und zu beurteilen. Hierbei spielen auch Aspekte bezüglich des Tierschutzes, der Lebensmittelhygiene und der Wirtschaftlichkeit eine Rolle.

	• Die Studierenden sind in der Lage, reproduktionsmedizinische Erkrankungen und Störungen zu erkennen, zu beurteilen und die richtigen therapeutischen Maßnahmen durchzuführen. Dies umfasst unter anderem Aspekte der Unfruchtbarkeit, der Trächtigkeit, geburtshilfliche Fragestellungen und die Neonatologie. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Keine

Organzentrierte Lehre, Organblock 3: Gastroenterology	
Art und Umfang	Vorlesung (63 Stunden)
ECTS	4
Verantwortliche WE	Ruminant and Swine Clinic (WE 18)
Eingangsvoraussetzung	Keine
Lehrinhalte	Der Block umfasst eine Vernetzung der Fachgebiete Innere Medizin, Chirurgie (Pferd, Wiederkäuer, Schwein, Kleintiere) und Pathologie. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 4: Liver, pancreas	
Art und Umfang	Vorlesung (15 Stunden)
ECTS	1
Verantwortliche WE	Institute of Veterinary Pathology (WE 12)
Eingangsvoraussetzung	Keine
Lehrinhalte	• Die Studierenden sollen die Ursachen und Pathomechanismen von Erkrankungen der Leber und des Pankreas bei verschiedenen Tierarten kennen und verstehen. • Die Studierenden sollen die diagnostischen Möglichkeiten zur Unterscheidung von Erkrankungen der Leber und des Pankreas bei verschiedenen Tierarten kennen, anwenden und auswerten können. • Die Studierenden sollen Erreger infektiöser Leber- und Pankreaserkrankungen und Möglichkeiten zur Diagnose / zum Nachweis kennen und verstehen. • Die Studierenden sollen mit Kenntnis der Ursachen und deren möglicher Diagnostik Therapiepläne und ggfs. Strategien zur Prophylaxe entwickeln können. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 5: Kidney und efferent urinary tract	
Art und Umfang	Vorlesung (9 Stunden)
ECTS	1
Verantwortliche WE	Institute of Veterinary Physiology (WE 02)
Eingangsvoraussetzung	Keine
Lehrinhalte	• Die Studierenden sollen den Bau und die Funktion der Niere und der ableitenden Harnwege verstehen • Die Studierenden sollen die Steuerung der Nierenfunktion erläutern • Die Studierenden sollen die Untersuchung der Nieren und ableitender Harnwege beschreiben • Die Studierenden sollen die morphologischen Veränderungen und Funktionsstörungen der Niere und der ableitenden Harnwege erläutern • Die Studierenden sollen die wichtigsten klinischen Erscheinungsbilder von Erkrankungen der Niere und der ableitenden Harnwege erkennen und beurteilen können • Die Studierenden sollen notwendige Behandlungen anwenden können

	Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 6: Reproduction II	
Art und Umfang	Vorlesung (45 Stunden)
ECTS	3
Verantwortliche WE	Animal Reproduction Clinic (WE 19)
Eingangsvoraussetzung	Keine
Lehrinhalte	• Die Studierenden kennen die physiologischen und pathologischen Aspekte der Wirkung der Sexualhormone/ des Sexualzyklus bei männlichen und weiblichen Tieren verschiedener Tierarten. • Die Studierenden sind in der Lage, weibliche und männliche Tiere hinsichtlich ihrer Geschlechtsgesundheit, Zuchttauglichkeit und Eutergesundheit zu untersuchen und zu beurteilen. Hierbei spielen auch Aspekte bezüglich des Tierschutzes, der Lebensmittelhygiene und der Wirtschaftlichkeit eine Rolle. • Die Studierenden sind in der Lage, reproduktionsmedizinische Erkrankungen und Störungen zu erkennen, zu beurteilen und die richtigen therapeutischen Maßnahmen durchzuführen. Dies umfasst unter anderem Aspekte der Unfruchtbarkeit, der Trächtigkeit, geburtshilfliche Fragestellungen und die Neonatologie. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 7: Respiratory system	
Art und Umfang	Vorlesung (20 Stunden)
ECTS	1
Verantwortliche WE	Equine Clinic (WE 15)
Eingangsvoraussetzung	Keine
Lehrinhalte	• Die Studierenden sollen die Ursachen und Pathomechanismen von Atemwegserkrankungen der verschiedenen Tierarten kennen und verstehen. • Die Studierenden sollen die diagnostischen Möglichkeiten der Unterscheidung von Atemwegserkrankungen der verschiedenen Tierarten kennen, anwenden und auswerten können. • Die Studierenden sollen Infektionserreger im Atmungstrakt und Wege zur Diagnose kennen und verstehen. • Die Studierenden sollen mit dem Wissen über Ursachen und diagnostischen Möglichkeiten Therapie-/Prophylaxepläne und -strategien entwickeln können. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 8: Cardio-vascular system	
Art und Umfang	Vorlesung (15 Stunden)
ECTS	1
Verantwortliche WE	Equine Clinic (WE 15)
Eingangsvoraussetzung	Keine
Lehrinhalte	• Die Studierenden sollen die Ursachen und Pathomechanismen von Herz-/ Kreislauferkrankungen der verschiedenen Tierarten kennen und verstehen. • Die Studierenden sollen die diagnostischen Möglichkeiten der Unterscheidung von Herz-/ Kreislauferkrankungen der verschiedenen Tierarten kennen, anwenden und auswerten können.

	• Die Studierenden sollen kardiale Infektionserreger und Wege zur Diagnose kennen und verstehen. • Die Studierenden sollen mit dem Wissen über Ursachen und diagnostischen Möglichkeiten Therapie-/Prophylaxepläne und -strategien entwickeln können. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 9: Blood, haemopoietic organs, lymphatic system	
Art und Umfang	Vorlesung (32 Stunden)
ECTS	2
Verantwortliche WE	Institut für Tierpathologie (WE 12)
Eingangsvoraussetzung	Keine
Lehrinhalte	• Die Studierenden sollen die Ursachen und Pathomechanismen von Anämien, Gefäßerkrankungen und Neoplasien der blutbildenden Organe kennen und verstehen. • Die Studierenden sollen die diagnostischen Möglichkeiten der Unterscheidung von Anämien und hämatopoetischen Neoplasien kennen, anwenden und auswerten können. • Die Studierenden sollen Infektionserreger in Blut und im hämatopoetischen System und Wege zur Diagnose kennen und verstehen. • Die Studierenden sollen mit dem Wissen über Ursachen und diagnostischen Möglichkeiten Therapie-/Prophylaxepläne und -strategien entwickeln können. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 10: Musculoskeletal system	
Art und Umfang	Vorlesung (44 Stunden)
ECTS	3
Verantwortliche WE	Equine Clinic (WE 15)
Eingangsvoraussetzung	Keine
Lehrinhalte	Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 11: Nervous system	
Art und Umfang	Vorlesung (23 Stunden)
ECTS	2
Verantwortliche WE	Small Animal Clinic (WE 20)
Eingangsvoraussetzung	Keine
Lehrinhalte	Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 12: Metabolism and endocrine organs	
Art und Umfang	Vorlesung (31 Stunden)
ECTS	2
Verantwortliche WE	Ruminant and Swine Clinic (WE 18)
Eingangsvoraussetzung	Keine
Lehrinhalte	Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard

Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 13: Udder and teats	
Art und Umfang	Vorlesung (25 Stunden)
ECTS	1
Verantwortliche WE	Animal Reproduction Clinic (WE 19)
Eingangsvoraussetzung	Keine
Lehrinhalte	Die Studierenden kennen die physiologischen und pathologischen Aspekte der Wirkung der Sexualhormone/ des Sexualzyklus bei männlichen und weiblichen Tieren verschiedener Tierarten. • Die Studierenden sind in der Lage, weibliche und männliche Tiere hinsichtlich ihrer Geschlechtsgesundheit, Zuchttauglichkeit und Eutergesundheit zu untersuchen und zu beurteilen. Hierbei spielen auch Aspekte bezüglich des Tierschutzes, der Lebensmittelhygiene und der Wirtschaftlichkeit eine Rolle. • Die Studierenden sind in der Lage, reproduktionsmedizinische Erkrankungen und Störungen zu erkennen, zu beurteilen und die richtigen therapeutischen Maßnahmen durchzuführen. Dies umfasst unter anderem Aspekte der Unfruchtbarkeit, der Trächtigkeit, geburtshilfliche Fragestellungen und die Neonatologie. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 14: Skin, mucous membrane, skin appendages	
Art und Umfang	Vorlesung (17 Stunden)
ECTS	1
Verantwortliche WE	Institut für Tierpathologie (WE 12)
Eingangsvoraussetzung	Keine
Lehrinhalte	Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Organzentrierte Lehre, Organblock 15: Systemic diseases	
Art und Umfang	Vorlesung (17 Stunden)
ECTS	1
Verantwortliche WE	Ruminant and Swine Clinic (WE 18)
Eingangsvoraussetzung	Keine
Lehrinhalte	Die Studierenden sind in der Lage, die unter den Systemkrankheiten gefassten Themeninhalte auf dem Niveau von Stufe 2 und 3 zu beherrschen. Sie können das Krankheitsgeschehen beurteilen und therapeutisch oder präventiv darauf reagieren. Eine differenzierte Beschreibung der Lerninhalte findet sich im Lernzielkatalog.
Lernziele	s. Lernzielkatalog in Blackboard
Art der Leistungskontrolle	Semesterbegleitende, schriftliche Lernzielkontrollen

Courses of 1th to 8th semesters within the framework of "Interdisciplinary lecture"

Interdisciplinary lecture - Foods	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE08) and Institute of meat technology and hygiene (WE09)
Entry requirements	None
Course contents	• Case studies to module 1 of the lecture "food chain" • Drug residues in foods of animal origin • Epidemiology I-III • Fresh fish I-II • Official foodstuff control • Animal and vegetable fats • Master regulation • Crustacea – molluscs
Educational objectives	Students understand and learn the interaction between technical processes in a food chain and the hygienic consequences and necessary prevention measures. Students will learn... • Product knowledge of fresh fish including seafood • Product knowledge of oils and fats • Interactions, product - hygienic status • Adaptation of the EU hygiene council to national characteristics
Performance assessment	None

Interdisciplinary lecture - Foods	
Form of the course	Lecture / Exercise (3 SWH)
ECTH	2
Responsibility	Institute of food hygiene (WE08) and Institute of meat technology and hygiene (WE09)
Entry requirements	None
Course contents	Case studies to the modules II and III of the lecture "food chain" • DACH-values • The institute of meat technology and ygiene (WE09) • Food allergies - food intolerance I-III • Genetically modified foods and feeds • Cannibalism • Pest control • Installation / organization of foodstuff examination in Berlin - practice of the official foodstuff inspection/monitoring • KIN Neumünster: duties and responsibilities of private food examination laboratories • BMELV – duties and responsibilities of veterinarians in the German federationl • BVL - rapid alert system of the EU • Development of reference laboratories - BfR
Educational objectives	Students understand the need for monitoring of livestock and – as a consequence - derive the elements for this and the systems to be installed.. Students... • can explain the structure of food monitoring (examination/enforcement) • can explain the relationship between federal government and land • become acquainted with main features of administrative action • get to know the modus operandi in pest control in the food industry • can explain influence on health by allergens and explain their labelling. Students get basic knowledge in food hygiene, i.e. ratio: intake foods – influence on health.
Performance assessment	None

Interdisciplinary lecture - Poultry	
Form of the course	Lecture (1 SWH)
ECTH	1
Responsibility	Institute of poultry diseases (WE15)
Entry requirements	None
Course contents	Interdisciplinary link of poultry-specific topics with related topics.
Educational objectives	Keeping and feeding of poultry; further information on viral, bacterial and parasitic diseases; anatomy and immunology of birds.
Performance assessment	None

Interdisciplinary lecture - Horse	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Equine clinic: surgery and radiology (WE17)
Entry requirements	None
Course contents	Presentation on disease complexes from surgery/orthopaedics and internal medicine in the horse with representatives of other institutes (physiology, pathology, parasitology, anatomy).
Educational objectives	Interdisciplinary transfer of knowledge with highlighting the intersection points with other course contents.
Performance assessment	None

Interdisciplinary lecture - Cloven-hoofed animals	
Form of the course	Lecture (2 SWH)
ECTH	1
Responsibility	Ruminant and swine clinic (WE18)
Entry requirements	None
Course contents	The internal and surgical diseases in ruminants and pigs are discussed within the context of modular teaching.
Educational objectives	The interdisciplinary lectures connect internal medicine, herd management and surgery to interdisciplinary topics of pathological anatomy, pharmacology, animal nutrition, animal husbandry and animal housing, infection medicine, animal welfare, the epidemiology and animal disease control and food hygiene. Special consideration is given to problems with residues, quality assurance (QA) and marketability of foods obtained from animals. The possible impacts of diseases of animals and the long-term consequences of their therapies on human health and the environment are discussed.
Performance assessment	None

Interdisciplinary lecture – Reproduction	
Form of the course	Lecture (2 SWH)
ECTH	1
Responsibility	Animal reproduction clinic (WE19)
Entry requirements	None
Course contents	Joint events with representatives (surgery and internal medicine) of animal clinics, physiology, biochemistry, bacteriology and virology, food and milk hygiene, pharmacology and pathology.
Educational objectives	Regarding important fields of reproductive medicine, students know the intersection points with other course contents.
Performance assessment	None

Interdisciplinary lecture - Small animals and pets	
Form of the course	Lecture (2 SWH)
ECTH	2
Responsibility	Small animal clinic (WE20)
Entry requirements	None

Course contents	Interdisciplinary events regarding disease complexes from surgery/orthopaedics and internal medicine in small animals and pets; inclusion of representatives of other institutions.
Educational objectives	Students will consolidate theoretical fundamentals of the various diseases of small animals and pets, as well as cardinal symptoms, and their differential diagnoses in the context of interdisciplinary teaching. Presentation of intersections / interactiions between different disciplines.
Performance assessment	None

Courses of 9th to 10th semester within the framework of the "clinical rotation"

During the 9th and 10th semester, students participate in clinical rotations, in which they work in the clinics and pathology and participate in courses. The courses listed in the tabular overview are integrated into the framework of the rotation.

Clinical rotation – Small animal clinic	
Form of the course	Exercise (5,5 SWH)
ECTH	5,5
Responsibility	Small animal clinic (WE20)
Entry requirements	None
Course contents	Review of clinic patients (dogs, cats, pets, reptiles) with internal medical, dermatological, oncological, neurological, ophthalmological and surgical disorders in the context of the clinical rotation; problem-oriented case processing; problem-oriented case analysis; compiling of medical reports; participation in journal clubs; interactive review of cases in small groups; X-ray interpretation; introduction to anaesthesia; basics of sterility and OP assistance; care for stationary patients; participation in emergency services (first aid, taking X-rays, emergency laboratory examinations); surgical exercises
Educational objectives	Within the framework of the rotation, students will practice problem-oriented case analysis from clinical cases (anamnesis and clinical examination, list of medical conditions, differential diagnoses, diagnostic plan, evaluation of the findings, creation of therapy plan, prognostic assessment); dealing with customers and patients; emergency management; practicing simple operations
Performance assessment	Medical report

Clinical rotation – Equine clinic	
Form of the course	Exercise (5,9 SWH)
ECTH	5,9
Responsibility	Equine Clinic: Surgery and Radiology (WE17)
Entry requirements	None
Course contents	Review and care of clinic patients with internal medical, reproductive and surgical diseases. Compiling of a medical report. Internships: rectal examination, sonography tendons, X-ray / imaging techniques, forge, diagnostic anesthesia, applied anatomy, internal medicine, reproduction medicine.
Educational objectives	Skills in dealing with patients and their daily care Practical application and implementation of theoretical knowledge Practice of problem-oriented case analysis: anamnesis, clinical examination, assessment of the status praesens, differential diagnoses, creation of therapy plans, prognostic assessment
Performance assessment	Medical report

Clinical rotation – Ruminant and swine clinic	
Form of the course	Exercise (5,4 SWH)
ECTH	5,4
Responsibility	Ruminant and swine clinic (WE18)
Entry requirements	Successful participation: Clinical propaedeutics
Course contents	Participation in routine operations in the ruminant and swine clinic, demonstration of clinic patients (ruminants, pigs) with internal and surgical diseases, reproductive disorders (pig) and case studies of livestock diseases. Ambulance trips to farms, evaluation and treatment of individuals and diagnosis and vaccination of the herd. Excursions to agricultural holdings: identification of problems and approaches to solving the problem of stock diseases, diagnostic investigation, taking of samples for further examination, evaluation of findings, knowledge of farm organisation, course of operations and economic matters, contact to the operations manager and stable staff during the survey of the farm statistics, anamnesis and detailed consultation, creation of a consultation protocol with appropriate recommendations to solve the problem. Surgical exercises: suturing techniques, anesthesia, laparotomies, wound treatment, installing blocks and dressings, castration, operation of hernia, and orthopaedic surgery.
Educational objectives	Students are able to create a list of differential diagnoses for a sick animal (ruminant or swine) based on the results of the clinical examination. They can name further examination

	methods for concrete diagnostics, they can give a prognosis taking into account economic aspects and they can formulate a therapy plan or supply prevention measures for food-producing animals. Students can explain the surgery on ruminants and pigs including perioperative measures and perform these operations under guidance. In addition, they learn how to handle and communicate with pet owners and stable staff.
Performance assessment	Compiling a medical report, practical examination on animal and oral test.

Clinical rotation – Animal reproduction	
Form of the course	Exercise (5,4 SWH)
ECTH	5,4
Responsibility	Animal reproduction clinic (WE19)
Entry requirements	None
Course contents	Examination, review and treatment of patients and demonstration animals (ruminants, horses, dogs, cats, pets) in regard to gynaecological, obstetrical, andrological and neonatal questions, including diseases and dysfunctions of the mammary gland. Implementation of special examination techniques and methods of treatment including surgery and biotechnological methods. Presentation, examination and review of animals regarding breed fitness and udder health. Practical examinations: rectal and vaginal examination in cattle and horse, gynaecological examination of dog, cat, pet, ultrasound examinations in the medical context of reproduction (including pregnancy tests). Identification of the insemination date in a dog, andrological and spermatological examinations, examination and surgical procedures on the mamma, obstetrical examinations, obstetric measures including correction of position, posture, presentation, instrumental obstetrics, embryotomy, caesarean. Care of neonatals. Excursions to dairy farms, sheep and horse farmers in the hinterland. Visit to the stables, the milking parlour and other facilities on the farms, examination and treatment of animals in the context of livestock managemengt. Introduction and application of working techniques of the evidence-based veterinary medicine.
Educational objectives	Students acquire in-depth knowledge and skills in the implementation of specific examination techniques and methods of treatment which they learn to apply in the reproduction medical context on male and female animals of different species. Students get to know dairy farms and their facilities near Berlin. They learn practical work within the framework of stock supervision of dairy farms. Students know the basic features of the evidence-based veterinary medicine and are able to evaluate information critically.
Performance assessment	Medical report

Clinical rotation – Poultry diseases	
Form of the course	Exercise (0,8 SWH)
ECTH	0,8
Responsibility	Institute of poultry diseases (WE15)
Entry requirements	None
Course contents	• Diagnostic exercises on poultry: consolidating diagnostic procedures • Poultry ambulation: poultry ambulation is carried out on selected farms with different directions of use and types of farming. Herd supervision and inventory management are at the centre of attention.
Educational objectives	• Diagnostic exercises on poultry: application and evaluation of laboratory diagnostic procedures; dissection of the animal, with special regard to specific changes due to different diseases and differential diagnoses; fixation of animals; various injection procedures; blood sampling • Poultry ambulation: Target is the diagnostics of the individual in order to draw conclusions to the entire herd. Economical factors of poultry production are also taken into account
Performance assessment	None

Clinical rotation – Pathology	
Form of the course	Exercise (4,6 SWH)

ECTH	4,6
Responsibility	Institute of animal pathology (WE12)
Entry requirements	None
Course contents	Section exercises on all species with a focus on section technique, attendence of routine operation in the pathological institute.
Educational objectives	Independent execution of a section, describing the findings by means of morphological diagnoses, discussion of possible differential diagnoses, including taking into account their respective possible aetiologies, clinical significance and pathogenesis.
Performance assessment	Compiling a written organ or section report

Clinical rotation – Meat hygiene	
Form of the course	Exercise (2,4 SWH)
ECTH	2,4
Responsibility	Institute of meat technology and hygiene (WE09)
Entry requirements	None
Course contents	Technical and practical implementation of the theoretical content of the lecture
Educational objectives	Ability to practically implement theoretically derived content of the lecture
Performance assessment	

Courses of 2th to 10th semester within the framework of the “external internships”