Courses for the 1st semester

Institute for Food Quality and Safety

0001 Inorganic and bioinorganic chemistry for students of veterinary medicine

Buchholz, Drotleff

1. SW: Introduction and safety instruction, change of aggregate state, chemical equations, strong acids and bases, law of mass action and forms of bonding, structure and reactions of complexes, pH values of weak acids and bases and buffer systems, redox reactions, material properties of the 14th and 15th group of the periodic table, special topics on inorganic and bioinorganic chemistry, focus on heavy metals, Christmas lecture (42 hours).

Structure of the atom and molecules, oxidation numbers of the elements
Crystallisation, boiling point, condensation, glass state
Stoichiometry, equilibria in chemical reactions
Acid-base concept, pH value calculation of strong acids and bases, pH values in the environment
Solubility product, law of mass action, ion exchange processes, bonding forms of metals
Structure and stability of complexes, reactions of complexes in biological systems
pH values of weak acids and bases, pH values of salt solutions, buffer systems, buffers in biological systems
Redox reactions and equations, bioinorganic redox reactions, standard and redox potentials, electrolysis, Nernst's equation
Redox reactions of nitrogen-containing compounds, nitrous gases and their effects in the biological system, nitrates and nitrites, reactions of phosphates, sulphur compounds
Overview of the most important heavy metals in living systems, their accumulation in certain organs. All topics are explained using case studies with a focus on veterinary medicine.

Learning objective / basis for:

Familiarisation with the periodic table
Recognising the significance of aggregate states in biological systems
Application of chemical equations
Application of the acid-base concept, calculation of pH values
Qualitative applications of the law of mass action, understanding the principle of the ion exchanger
Understanding of the basic concepts of complex chemistry and distribution equilibria
Knowledge of buffer systems, properties of weak acids and bases
Formulation of redox reactions, separation of different anions of the 16th and 17th group
Exemplary familiarisation with material properties and chemical reactions of the non-metals nitrogen, phosphorus and carbon and their compounds
Recognising the effect of heavy metals in enzyme systems, toxicological effects of heavy metals depending on their binding form
Chemical preparation for Christmas and New Year's Eve

Experiments / demonstrations:

Oxyhydrogen mixture in soap bubbles, banknote in flames, conservation of mass
Temperature reduction due to melting of cocoa crystals in chocolate, heat of dissolution of salts, cooling mixture, evaporation, their change of aggregate state, quantitative determination of gas evolution from eggshells

Acid/base reaction as a function of temperature, rainbow colours with acid/base indicators, equilibrium reaction of cobalt and copper complexes, shift of an equilibrium
Line and resin water, water hardness determination, Nernst's distribution theorem, solubilities
Haemoglobin chemiluminescence, destruction (disintegration) of an organic matrix,
Plant dyes as universal indicators, demonstration of the buffering effect, buffering effect of tap water, conductivity measurement of various additives, phosphoric acid buffer, blood decomposition by hydrogen peroxide, gold plating of copper pennies
Hazardous white phosphorus, reactions with liquid nitrogen, detection of phosphorus poisoning, detection of carbon dioxide
Photometry, absorption spectroscopy of coloured solutions

Lecturer:
Buchholz

Institute for Food Quality and Safety

0002 Seminar series "Inorganic and bioinorganic chemistry for students of veterinary medicine"

N.N., Buchholz

3. SW: Introduction to safety, states of matter, chemical equations - strong acids and bases, chemical equilibrium - ion exchangers, complex compounds - complex formation equilibria, weak acids and bases - buffer systems, oxidation and reduction - 16th and 17th group of the periodic table, 14th and 15th group of the periodic table (15 hours)

Working out the H and P phrases of various chemicals, familiarisation with frequently used chemicals such as caustic soda, hydrochloric acid, diethyl ether
States of aggregation, characterisation of substances, formulas of compounds, solutions and dissolution processes
Quantitative relationships (atomic and molar masses), stoichiometric calculations, concentration measures, energetics of chemical reactions, oxidation numbers
Reaction rate, Le Chatelier's principle, theory and application of the law of mass action, solubility product, competition of several equilibria, distribution equilibrium, Nernst's distribution theorem, anionic and cationic ion exchangers (structure, mode of action, regeneration), water hardness, desalination of water
Complexes: Definition of terms: central particle (-atom, -ion), ligand, chelate, coordination number, complex formation and dissociation equilibria, complex stability constant, ligand exchange
Application of the MWG to the protolysis of weak acids and bases, pH calculations of weak electrolytes, existence ranges of acid/base pairs, titration curves and indicator selection
Oxidation/reduction as electron exchange between two redox pairs, setting up redox equations, redox series, standard potentials, normal potentials, redox potentials, Nernst's equation, synproportionation, disproportionation, electrolysis, chemistry of the elements of the 16th and 17th groups and their compounds
Chemistry of the elements of the 14th and 15th group of the periodic table and their compounds
Development of the chemical content using practical examples

Learning objective / basis for:
Knowledge of H and P phrases, gain experience in handling chemicals
Learn simple chemical manipulations, familiarise yourself with simple material properties, learn to write formulas

Formulating chemical equations, setting up stoichiometric equations, knowledge of the acid/base concept
Qualitative application of the law of mass action, familiarisation with the "ion exchanger" principle
Understanding of the basic concepts of complex chemistry and distribution equilibria
Knowledge of important buffer systems, properties of weak acids and bases
Understanding of redox reactions, separation of different anions in a separation process
Exemplary familiarisation with material properties and chemical reactions of the non-metals nitrogen, phosphorus and carbon and their compounds
Transfer of the acquired knowledge to further subjects and practice-relevant case studies

Experiments / demonstrations:
Demonstration of the experiments and analyses by assistants:
Handling the Bunsen burner (danger when the flame flashes back), flame colouring, quantitative tracking of a chemical reaction, indicator paper and solutions, dimensional analysis, cation acids, anion acids, anion bases
Law of mass action using the example of silver ions, Nernst's distribution theorem, cation and anion exchangers, mixed bed ion exchangers, release of ions from the exchanger
Aquo-, ammine- and hydroxocomplexes, masking of Fe(3+), complexometric determination of water hardness, detection of Fe(3+) in haemin
Titration of an unknown weak acid, determination of the pKs value of the unknown acid, setting up a titration curve of the unknown acid with a pH meter, examples of buffer systems
Voltage series, metal deposition, redox reactions of halogens with each other, oxidation of chloride by potassium permanganate, detection of oxidising agents that can oxidise iodide to iodine, detection of reducing agents that can reduce iodine, reduction of halogen acids to halides, detection of sulphite and thiosulphate, differentiation of sulphite and thiosulphate, detection of sulphides, detection of sulphate, precipitation of silver halides, qualitative analysis with a separation step
Thermal dissociation of ammonium compounds and formation of nitrous oxide, detection of ammonia, reaction of nitrites, detection of nitrite by formation of an azo dye, formation of a nitroso complex from the nitrite anion, ring test for the detection of nitrate, reactions of cations with phosphates and hydrogen phosphates, detection of phosphates, carbonate detection, qualitative analysis with one separation step

Lecturer:
Buchholz

Institute for Food Quality and Safety

0003 Introduction to the seminar series "Inorganic and Bioinorganic Chemistry for Students of Veterinary Medicine"

N.N., Buchholz

1. **SW: Preparation for the teaching content in the chemistry exercises, calculations for stoichiometry, oxidation numbers, pH value calculations, solubility products, complex compounds, buffer solutions, redox equations, redox reactions** (7 hours)

Glass apparatus for chemical exercises, atomic structure, periodic table
Determining oxidation numbers, setting up structural formulae, amount and concentration of substances
Stoichiometric calculations
pH value calculations for strong acids and bases

Tasks on the law of mass action and solubility product
Complex connections and Nernst's distribution theorem
Calculating the pH value of weak acids and bases and buffer solutions
Redox reactions, solving redox equations

Learning objective / basis for:
Knowledge of glassware, understanding of the atomic model and the periodic table
Acquire an understanding of oxidation numbers and the ability to draw up structural formulae
Carrying out stoichiometric calculations, derivation of sum and structural formulae
Setting up equations according to the law of mass action
Calculation of the solubility or solubility product
Naming of complex compounds, formulation of dissociation equations
Understanding the calculation of pH values of weak acids and bases as well as buffer solutions
Setting up and solving redox equations

Experiments / Demonstrations:
Demonstration of the glassware and equipment (spectrometer, photometer, chromatography) for the chemistry exercises
Experiments on the topic

Lecturer:
Buchholz

Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology

0010 Professional ethics

Kunzmann

2. SW: Introduction to scientific work with the aim of writing a doctoral or diploma thesis Limited number of participants: 12 (mainly doctoral students in their own working group, veterinarians, food chemists, chemists with a diploma or master's degree, biologists with a diploma or master's degree). Students who are writing their diploma, bachelor's or master's thesis in food technology at the institute are also eligible to participate. (12 hours)

Code of conduct for scientists in research
Literature research scientific abstract databases and
Procurement of full texts
Introduction to experimental work for a doctoral thesis
Documentation and statistical validation of the measured values
Writing scientific essays

Learning objective / basis for:
Knowledge of the basics of scientific work
Determination of valid measurement results and critical categorisation of self-generated experimental results
Writing a scientific essay

Experiments / demonstrations:
Introductory work on the operation of the working group's large appliances

Co-operation / consultation with:
Participants from co-operation projects

Lecturer:
Ternes, Drotleff

Department of General Radiology and Medical Physics

0013 Practical course in physics

Seifert, Lüpke, Bräuninger

4. SW: Light microscope and polarimeter (2 hours)

Nature of light, polarisation, beam path through lenses or lens system, structure of the light microscope, beam path with magnifying glass and microscope, real and virtual image, calculation of magnification, resolving power, beneficial magnification, numerical aperture, bright field illumination, length measurement under microscope, optically active substances, concentration determinations and purity tests with the polarimeter

Learning objective / basis for:

- Laboratory work with the microscope,
- Correct adjustment of the microscope,
- Length measurement with the microscope,
- Prerequisite for understanding special microscopes (e.g. stereo microscope, polarisation microscope, fluorescence microscope, electron microscope)
- Laboratory work with the polarimeter,
- Estimation of the measurement error and assessment of the reliability of the measurement

Experiments / demonstrations:

Attempts:

- Basic settings and operation of the microscope,
- Length measurement of structures of a specimen,
- Concentration measurements with the polarimeter,
- Purity analyses with the polarimeter

Co-operation / consultation with:

Anatomical Institute

Lecturer:

Lüpke

4. SW: Current, voltage, resistance (2 hours)

Basic electrical quantities (current, voltage, resistance), Kirchhoff's rules, electrical circuits (series connection, parallel connection), measurement of current and voltage, Ohm's law

Learning objective / basis for:

- electrical properties of biological materials,
- Effects of current and voltage on humans and animals,
- Basic understanding of potentials (physiology),
- Basic understanding of electrophoresis,
- Occupational safety when handling electrical appliances (electrical accidents),
- electrical fusing of devices,
- Acquisition of digital skills
- Understanding the electrocardiogram (ECG),
- Understanding of electrical anaesthesia,
- Understanding the resistance thermometer,
- Function of the X-ray tube,
- Calculation of variables that cannot be measured directly from measurement results
- Estimation of the measurement error and assessment of the reliability of the measurement

Experiments / demonstrations:

Attempts:

- Validity of Ohm's law,

- Electrical resistance of a test subject,
- Temperature-dependent resistance,
- Kirchhoff's rules (stitch rule, knot rule)

Lecturer:
Bräuninger

4. SW: Flow through vessels (2 hours)

Fundamentals of hydrodynamics, models for flowing fluids, laminar flow, turbulent flow, Reynolds number, viscosity, Hagen-Poiseuille's law, hydrodynamic paradox, law of conservation of energy

Learning objective / basis for:
- Familiarisation with models for the characterisation of flowing liquids,
- Characterisation of the liquid blood,
- Application of basic hydrodynamic knowledge to the blood circulation of humans and animals,
- Basics of blood pressure measurement,
- Calculation of quantities that cannot be measured directly from measurement results,
- Estimation of the measurement error and assessment of the reliability of the measurement

Experiments / Demonstrations:
Attempts:
- Flow as a function of the pressure difference,
- Flow as a function of the pipe radius

Lecturer:
Lüpke

4. SW: Photometer and Wheatstone bridge circuit (2 hours)

Light, emission, absorption, absorption law (Beer's law), transmission, extinction, reflection, scattering, e-function and logarithms, structure and function of the photometer, emission and absorption spectra, spectral decomposition of light
Measurement of resistances and measurement of small resistance changes using the Wheatstone bridge circuit

Learning objective / basis for:
- Understanding the interaction of light with matter,
- Laboratory work with the photometer / densitometer,
- Recognise that the quantity e*, which is not directly accessible by measurement, can be determined by determining directly accessible quantities (x, c, I),
- Be able to measure and interpret the blackening of an X-ray film (densitometry),
- Radiography with film-slide system,
- Estimation of the measurement error and assessment of the reliability of the measurement,
- Recognise what information the spectral composition of light can provide,
- Understanding the principle of the spectrophotometer
- Understanding the principle of the Wheatstone bridge circuit

Experiments / demonstrations:
Attempts:
- Determination of the calibration curve of the photometer,
- Calculation of the transmission,
- Measurement of an unknown concentration,
- Measurement of the blackening of an exposed X-ray film,

- Determination of the calibration curve of the spectral apparatus,
- Measurement of the absorption spectra of different solutions
- Determination of unknown resistances from the ratio of the wire lengths with a calibrated W. bridge
- Determination of unknown resistances from the bridge voltage with an almost equalised W. bridge

Co-operation / consultation with:
Physiological Institute

Lecturer:
Bräuninger

11. SW: Light microscope and polarimeter (2 hours)

Nature of light, beam path through lenses or lens system, structure of the light microscope, beam path with magnifying glass and microscope, real and virtual image, calculation of magnification, resolving power, favourable magnification, numerical aperture, bright field illumination, length measurement under microscope, optically active substances, concentration determinations and purity tests with the polarimeter

Learning objective / basis for:
- Laboratory work with the microscope,
- Correct adjustment of the microscope,
- Length measurement with the microscope,
- Prerequisite for understanding special microscopes (e.g. stereo microscope, polarisation microscope, fluorescence microscope, electron microscope),
- Laboratory work with the polarimeter,
- Estimation of the measurement error and assessment of the reliability of the measurement

Experiments / demonstrations:
Attempts:
- Basic settings and operation of the microscope,
- Length measurement of structures of a specimen,
- Concentration measurements with the polarimeter,
- Purity analyses with the polarimeter

Co-operation / consultation with:
Anatomical Institute

Lecturer:
Lüpke

11. SW: Current, voltage, resistance (2 hours)

Basic electrical quantities (current, voltage, resistance), Kirchhoff's rules, electrical circuits (series connection, parallel connection), measurement of current and voltage, Ohm's law

Learning objective / basis for:
- electrical properties of biological materials,
- Effects of current and voltage on humans and animals,
- Basic understanding of potentials (physiology),
- Basic understanding of electrophoresis,
- Occupational safety when handling electrical appliances (electrical accidents),
- electrical fusing of devices,
- Acquisition of digital skills
- Understanding the electrocardiogram (ECG),

- Understanding of electrical anaesthesia,
- Understanding the resistance thermometer,
- Function of the X-ray tube,
- Calculation of variables that cannot be measured directly from measurement results
- Estimation of the measurement error and assessment of the reliability of the measurement

Experiments / Demonstrations:
Attempts:
- Validity of Ohm's law,
- Electrical resistance of a test subject,
- Temperature-dependent resistance,
- Kirchhoff's rules (stitch rule, knot rule)

Lecturer:
Bräuninger

11. SW: Flow through vessels (2 hours)

Fundamentals of hydrodynamics, models for flowing fluids, laminar flow, turbulent flow, Reynolds number, viscosity, Hagen-Poiseuille's law, hydrodynamic paradox, law of conservation of energy

Learning objective / basis for:
- Familiarisation with models for the characterisation of flowing liquids,
- Characterisation of the liquid blood,
- Application of basic hydrodynamic knowledge to the blood circulation of humans and animals,
- Basics of blood pressure measurement,
- Calculation of quantities that cannot be measured directly from measurement results,
- Estimation of the measurement error and assessment of the reliability of the measurement

Experiments / demonstrations:
Attempts:
- Flow as a function of the pressure difference,
- Flow as a function of the pipe radius

Lecturer:
Lüpke

11. SW: Photometer and Wheatstone bridge circuit (2 hours)

Light, absorption, absorption law (Beer's law), transmission, extinction, reflection, scattering, e-function and logarithms, structure and function of the photometer, emission and absorption spectra, spectral decomposition of light
Measurement of resistances and measurement of small resistance changes using the Wheatstone bridge circuit

Learning objective / basis for:
- Understanding the interaction of light with matter,
- Laboratory work with the photometer / densitometer,
- Recognise that the quantity e*, which is not directly accessible by measurement, can be determined by determining directly accessible quantities (x, c, I),
- Be able to measure and interpret the blackening of an X-ray film (densitometry),
- Radiography with film-slide system,
- Estimation of the measurement error and assessment of the reliability of the measurement,
- Recognise what information the spectral composition of light can provide,

- Understanding the principle of the spectrophotometer
- Understanding the principle of the Wheatstone bridge circuit

Experiments / demonstrations:
Attempts:
- Determination of the calibration curve of the photometer,
- Calculation of the transmission,
- Measurement of an unknown concentration,
- Measurement of the blackening of an exposed X-ray film,
- Determination of the calibration curve of the spectral apparatus,
- Measurement of the absorption spectra of different solutions
- Determination of unknown resistances from the ratio of the wire lengths with a calibrated W. bridge
- Determination of unknown resistances from the bridge voltage with an almost equalised W. bridge

Co-operation / consultation with:
Physiological Institute

Lecturer:
Bräuninger

Department of General Radiology and Medical Physics

0014 Physics

Seifert, Lüpke, Bräuninger

1. SW: Introductory Lecture Physics (1 h)

Why physics, working methods in physics, information on studying (e.g. organisation, literature), physical quantities and units, SI units, representation of very large and very small numbers (powers of ten)

Learning objective / basis for:
Basis for further physics lectures, radiology lectures and other lectures

Lecturer:
Seifert, Lüpke

1. SW: Mechanics I (Kinematics) (2 hours)

Laws of uniform and non-uniform motion, velocity, acceleration, friction, momentum, law of conservation of momentum

Learning objective / basis for:
Basic understanding of all forms of uniform and accelerated movements in the field of veterinary medicine, Brownian molecular motion

Experiments / Demonstrations:
Attempts:
- Examples of uniform and accelerated movements,
- Principle of pulse transmission,
- Effect of the law of conservation of momentum

Lecturer:
Seifert, Lüpke

1. SW: Mechanics II (Dynamics) (2 hours)

Newton's axioms, force, law of gravitation, mechanical work and power, potential and kinetic energy, law of conservation of energy

Learning objective / basis for:
Basic understanding of the causes of movements in the field of veterinary medicine (e.g. stomach rotation, uterine rotation), cardiac work, cardiac output, respiratory work, force transmission via tendons, bone growth under the influence of various forces

Experiments / Demonstrations:
Attempts:
- Effects of the law of inertia,
- Effect of the law of conservation of energy in mechanics (thread pendulum)

Lecturer:
Seifert, Lüpke

2. SW: Mechanics III (1 hour)

Centre of gravity, different types of equilibrium, levers, lever laws, torque

Learning objective / basis for:
Basis for suspension harnesses for large animals, balance when riding, function of upper and lower arm, function of sesamoid bones, holding scalpel, forceps, etc., general function of mechanical aids, function of the middle ear, function of pharmacist's scales

Experiments / Demonstrations:
Attempts:
- stable equilibrium,
- unstable equilibrium,
- indifferent balance

Lecturer:
Seifert, Lüpke

2. SW: Mechanics IV (rotary motion) (1 hour)

Rotary motion, centrifugal force, moment of inertia, law of conservation of angular momentum

Learning objective / basis for:
Understanding rotational movements in veterinary medicine,
Centrifuge

Experiments / Demonstrations:
Attempts:
- Centrifuge,
- Law of conservation of angular momentum

Lecturer:
Seifert, Lüpke

2. SW: Mechanics V (deformability of solid bodies) (1 hour)

Elasticity, plasticity, viscoelasticity, stresses, Hooke's law, torsion

Learning objective / basis for:
Basic understanding of anatomy (e.g. laws of bone structure), different types of bone fractures, behaviour of muscles under the influence of different forces

Experiments / Demonstrations:
Attempts:
- Force gauge with weights (tensile stress, Hooke's law),
- Elongation of a copper wire until it breaks (viscoelasticity, plastic behaviour)

Co-operation / consultation with:
Anatomical Institute

Lecturer:
Seifert, Lüpke

2. SW: Mechanics VI (Hydrostatics) (1 hour)

Pressure, surface tension, viscosity, buoyancy, sedimentation

Learning objective / basis for:
Basics for blood pressure measurement, pressure measurement in the hoof joint, basics for various laboratory procedures (e.g. flotation procedure, sedimentation, haemolysis)

Experiments / demonstrations:
Attempts:
- Communicating tubes (hydrostatic pressure),
- Disturbance of the surface tension,
- Capillary action,
- Cartesian diver (buoyancy)

Co-operation / consultation with:
Clinic for small animals

Lecturer:
Seifert, Lüpke

2. SW: Mechanics VII (Hydrodynamics) (1 hr.)

Laminar flow, Hagen-Poiseuille's law, turbulent flow, Reynolds number, flow resistance

Learning objective / basis for:
Basic understanding of blood as a fluid, blood flow in vessels, function of the blood circulation, gas exchange in the lungs, basics of blood pressure measurement

Experiments / Demonstrations:
Reference to practical experiment "Flow through pipes (vessels)"

Lecturer:
Seifert, Lüpke

3. SW: Mechanics VIII (Physics of Gases) (1 hour)

Gas pressure, Boyle-Mariotte's law, equation of state of the ideal gas, equation of state of the real gas, barometric formula, partial pressures

Learning objective / basis for:
Basic understanding of gas pressure, gas exchange in the lungs, measurement of air pressure, measurement of respiratory volume

Experiments / Demonstrations:
Attempt:
- Boyle-Mariotte's law

Lecturer:
Seifert, Lüpke

3. SW: Thermodynamics I (2 hours)

Heat and temperature, temperature scales, heat capacity, basic equation of thermodynamics, statistical particle motion, Brownian motion, diffusion, osmosis, osmotic pressure

Learning objective / basis for:
Understanding of temperature measurement (e.g. clinical thermometer), understanding of diffusion (e.g. medication during embrocation, exchange of harmful substances in the kidneys, gas exchange in the lungs), understanding of physiological saline solution

Experiments / Demonstrations:
Attempts:
- Diffusion (drops of ink in water, cold / hot),
- Osmosis (pig's bladder with coloured sugar solution and riser tube in water vessel)

Lecturer:
Seifert, Lüpke

3. SW: Thermodynamics II (1 hour)

Thermal expansion of solids, liquids and gases, temperature measurement, calorimetry, animal calorimetry, combustion calorimetry

Learning objective / basis for:
Understanding the function of various thermometers (e.g. bimetallic thermometers, mercury thermometers, alcohol thermometers, gas thermometers), animal calorimetry (animal nutrition)

Experiments / Demonstrations:
Attempts:
- Temperature-dependent linear expansion of a solid (brass pipe),
- Function of the bimetal thermometer

Lecturer:
Seifert, Lüpke

3. SW: Thermodynamics III (2 hours)

Phase transformations, heat storage in solids, liquids and gases; transformation heats, phase transitions, air humidity, absolute and relative air humidity, measurement of air humidity

Learning objective / basis for:
Understanding of freezing point depression, freeze-drying (laboratory), thermoregulation in mammals, stable climate (temperature, humidity)

Experiments / Demonstrations:
Attempts:
- Melting heat (ice-water mixture),
- Heat of vaporisation (water),
- Function of a heat pad,
- Freezing point depression (ice-water mixture + common salt),
- Function of various hygrometers

Lecturer:
Seifert, Lüpke

4. SW: Thermodynamics IV (1 hour)

Heat transport, heat flow, heat conduction, thermal radiation, thermal imaging camera

Learning objective / basis for:
Understanding of thermography with infrared camera (e.g. application for the diagnosis of inflammation), thermal conductivity in carcasses, cooling of carcasses

Experiments / Demonstrations:
Attempt:
- Thermal radiation (thermopile according to Moll)
Demonstration:
- Applications of a thermal imaging camera in veterinary medicine

Lecturer:
Seifert, Lüpke

4. SW: Thermodynamics V (1 hour)

Volume change work, internal energy, 1st and 2nd law of thermodynamics

Learning objective / basis for:
Understanding of energy metabolism in animals, animal nutrition

Lecturer:
Seifert, Lüpke

5. SW: Vibration and Wave Theory I (Vibration Theory) (2 hours)

The concept of oscillation, laws of harmonic oscillation, damped oscillation, forced oscillation, resonance, superposition of oscillations (interference), beat, anharmonic oscillations, Fourier analysis

Learning objective / basis for:
Understanding of:
- Function of the vocal cords,
- Function of the eardrum,
- Function of the middle ear,
- Auscultation thorax,
- Functional principle of the ECG

Experiments / Demonstrations:
Attempts:
- Oscillations on thread pendulums, spring pendulums and torsion pendulums,
- Tuning fork,
- Damped oscillation on the rotary pendulum with damping,
- Forced oscillation,
- Reference to compulsory elective course "Fundamentals of the ECG"
Demonstration:
- Resonance catastrophe on bridge

Lecturer:
Seifert, Lüpke

5. SW: Vibration and Wave Theory II (Wave Theory) (2 hours)

Wave model, formation and propagation of waves, forms of a wave, characteristic quantities of a wave, interference, sound waves, tones, audible sound, noise, sound intensity, loudness, sound resistance, sound field quantities, diffraction, reflection and refraction, transmission, law of absorption, attenuation of sound waves

Learning objective / basis for:
Understanding of:
- Pulse wave in the aorta,
- Shock waves to break up kidney stones,
- Auditory sound in animals,
- Application of ultrasound in the laboratory,
- Functional principle of ultrasound diagnostics,
- Resolution for ultrasound diagnostics

Experiments / demonstrations:
Attempts:
- Wave model for longitudinal and transverse waves with elastic coupling of small weights,
- Tuning fork,
- Reference to compulsory elective course "Fundamentals of ultrasound diagnostics"

Lecturer:
Seifert, Lüpke

6. SW: Vibration and Wave Theory III (Ultra- and Infrasound) (3 hrs.)

Generation of ultrasound, piezoelectric effect, various transducers, ultrasound in the laboratory, A-mode method, B-mode method, image quality and local resolution, transducers, M-mode method, Doppler effect, colour Doppler sonography, ultrasound therapy, infrasound

Learning objective / basis for:
Understanding of:
- Ultrasound diagnostics,
- Colour Doppler sonography,
- Ultrasound therapy,
- Effect of infrasound
- Acquisition of digital skills

Experiments / demonstrations:
Trials and demonstrations:
- Components of the compulsory elective course "Fundamentals of ultrasound diagnostics"
- Reference to compulsory elective course "Fundamentals of ultrasound diagnostics"

Co-operation / consultation with:
Clinic for small animals

Lecturer:
Seifert, Lüpke

7 SW: Electricity and magnetism I (basic electrical quantities) (2 hours)

Charge, Coulomb's law, Electric current, Electric field, Electric potential or voltage, Ohm's law, Specific resistance, Specific conductivity, Short circuit

Learning objective / basis for:
Understanding of electrocardiogram (ECG), electrical anaesthesia, occupational safety (electrical accidents), measurement of specific conductivity (laboratory), function of the X-ray tube

Experiments / Demonstrations:
Attempts:
- Detection of charges (electroscope),
- Forces between charges,

- Circuit with light bulb,
- Ohm's law,
- Non-ohmic resistor (light bulb up to 40 V),
- Reference to practical experiment "Current, voltage, resistance"

Lecturer:
Seifert, Lüpke

8TH SW: Electricity and Magnetism II (3 hours)

Electrical conduction in solids, energy band model, conductors, semiconductors, insulators, electrical resistors, series connection, parallel connection, Kirchhoff's rules, resistance thermometers, voltage dividers, measurement of voltage and current, electrical work and power, diodes, transistors

Learning objective / basis for:
Understanding of resistance thermometers, protection of large electrical devices, amplification of electrical signals (e.g. ECG), acquisition of digital skills

Experiments / Demonstrations:
Attempts:
- Series connection of resistors,
- Parallel connection of resistors,
- Voltage divider

Lecturer:
Seifert, Lüpke

9TH SW: Electricity and Magnetism III (3 hours)

Capacitors, capacitance, charging, discharging, series connection, parallel connection, dielectrics, ion transport in an electric field, electrolysis, electrophoresis, ion movement through interfaces (e.g. cell membrane), diffusion potential, membrane resting potential

Learning objective / basis for:
Understanding of the cell membrane as a capacitor (physiology), nerve stimulus conduction (physiology), electrophoresis (laboratory), membrane resting potential (physiology), action potential (physiology), acquisition of digital skills

Experiments / demonstrations:
Attempts:
- Charging and discharging of capacitors,
- Capacities for series connection,
- Capacities for parallel connection

Co-operation / consultation with:
Physiological Institute

Lecturer:
Seifert, Lüpke

10. SW: Electricity and magnetism IV (alternating current) (1 hour)

Alternating current and alternating voltage, terms, ohmic resistance, effective voltage, effective current, capacitive resistance, inductive resistance, electromagnetic induction, transformer, electromagnetic oscillations (resonant circuit)

Learning objective / basis for:
Understanding of resistances along current paths in tissue (physiology), high-frequency therapy (diathermy), function of the pasture fence device, function of the electric driving rod, function of the transformer (e.g. for X-ray tube and electron microscope), telemetry of biological data (e.g. ECG, respiratory rate, body temperature)

Experiments / demonstrations:
Attempts:
- Oscillograph: Alternating voltages,
- Electromagnetic induction,
- Transformer with iron core,
- Oscillating circuit + oscillograph (damped oscillation)

Lecturer:
Seifert, Lüpke

11. SW: Electricity and Magnetism V (Magnetism) (1 h)

Ferromagnetism, cause, effects, application;
Paramagnetism, diamagnetism

Learning objective / basis for:
Understanding of magnetic probes, geomagnetic field, isotope mass spectrometer (laboratory), magnetic stirrer (laboratory), magnetic resonance tomography

Experiments / Demonstrations:
Attempts:
- Magnetisation of iron,
- Magnetic field lines,
- Magnetic stirrer,
- Sample measurement (decision as to whether ferro-, para- or diamagnetism)

Lecturer:
Seifert, Lüpke

11 SW: Electricity and Magnetism VI (Magnetism) (1 hr.)

Electromagnetism, current-carrying conductor or coil, forces, electromagnet, Lorentz force

Learning objective / basis for:
Understanding of X-ray tubes, electron microscopes, isotope mass spectrometers (laboratory), electromagnetic locks (e.g. on X-ray tubes, on patient positioning tables), magnetic probes
electromagnetic blood flow measurement, electromagnetic relay, driving rod, pasture fence device, magnetic resonance imaging

Experiments / demonstrations:
Attempts:
- Magnetic field of a current-carrying wire + compass needle,
- Magnetic field of a current-carrying coil,
- Magnetic field of two parallel wires and forces

Lecturer:
Seifert, Lüpke

11. SW: Optics I (1 hour)

Nature of light, wave and particle properties of light, basic laws of geometric optics, reflection, refraction, total internal reflection

Learning objective / basis for:
Understanding of:
- all optical laboratory equipment (e.g. magnifying glass, light microscope),
- Fibre optic endoscope

Experiments / Demonstrations:
Attempts:
- directional, diffuse and total reflection (law of reflection),
- Law of refraction

Lecturer:
Seifert, Lüpke

12. SW: Optics II (1 hour)

Reflection, scattering, absorption and transmission of light, Beer's law, extinction

Learning objective / basis for:
Understanding of:
- Light absorption by chlorophyll,
- Principle of absorption spectrometry,
- Function of the photometer

Experiments / Demonstrations:
Attempts:
- Function of the photometer,
Reference to practical experiment "Photometer"

Lecturer:
Seifert, Lüpke

12. SW: Optics III (2 hours)

Diffraction and interference, geometric resolution of imaging systems, polarisation, polarisation filters, luminescence (fluorescence, phosphorescence), colours

Learning objective / basis for:
Understanding of:
- Polarisation microscope (laboratory),
- Fluorescence microscope (laboratory),
- Illuminated screens (e.g. on the electron microscope),
- Amplifying films (radiography)

Experiments / Demonstrations:
Attempts:
- Polarisation

Lecturer:
Seifert, Lüpke

13. SW: Optics IV (1 hour)

Imaging through lenses, converging lenses, focal length, magnification, refractive power, eye, lens law, diverging lens, lens errors, correction of lens errors

Learning objective / basis for:
Understanding of:
- Function of the eye,
- Accommodation,
- Visual defects and correction options

Experiments / demonstrations:
Attempts:
- Converging lens: parallel, centre and focal point beam,
- Combination of collecting and diverging lens,
- Addition of the crushing forces

Co-operation / consultation with:
Anatomical Institute

Lecturer:
Seifert, Seiler

13. SW: Optics V (2 hours)

Photometer (filter photometer, spectrophotometer), magnifying glass, magnification, standard light microscope, construction and function of components, light path, magnification, resolution, favourable magnification, illumination principles (bright field and dark field illumination)

Learning objective / basis for:
Understanding of:
- Work with filter and spectrophotometer,
- Working with the magnifying glass,
- Working with a standard light microscope

Experiments / demonstrations:
Attempts:
- Practical experiment "Photometer",
- Practical experiment "Light microscope"

Lecturer:
Seifert, Lüpke

14. SW: Optics VI (1 hour)

Special microscopes and applications, stereo microscope, polarisation microscope, fluorescence microscope, phase contrast microscope, electron microscope, transmission and scanning electron microscope

Learning objective / basis for:
Understanding of the functional principle of specialised microscopes:
- Stereo microscope,
- Polarisation microscope,
- Fluorescence microscope,
- Phase contrast microscope,
- Electron microscope

Co-operation / consultation with:
Anatomical Institute

Lecturer:
Seifert, Lüpke

14. SW: Optics VII (2 hours)

Lasers, emission and absorption of light, structure, function, properties of laser radiation, interaction with biological tissues, effects of laser radiation, photochemical effects, photothermal effects, photoablation, photodisruption, photofragmentation

Learning objective / basis for:
Knowledge is a prerequisite for the clinical application of laser radiation in veterinary medicine (e.g. laser surgery: photoablation, photodisruption, photofragmentation)

Co-operation / consultation with:
Clinic for small animals

Lecturer:
Seifert, Lüpke

University library

0018 Vocational Studies (Vocational Field Exploration II)

Leonhard-Marek, Neßler, Plötz, Bauer, Volk, Hoedemaker, Feige, Wissing, Kleinsorgen, Kunzmann and guests

1. SW: Vocational studies (14 hours)

Introduction to relevant aspects of the profession. Equine medicine today - possibilities and limits, individual animal treatment and herd medicine, professionalism in small animal medicine, food safety and consumer health protection as a veterinary task with a long tradition, searching for and evaluating information, ethical aspects - individuals and veterinary aspects, economics and time management in practice, zoonotic infectious agents in everyday practice, economics for veterinarians, basics of successful communication.

Learning objective / basis for:
Basis for understanding the development and challenges of the veterinary profession.

Lecturer:
Feige, Hoedemaker, Volk, Plötz, Leonhard-Marek, Kunzmann, Bauer, Wissing and guests

Institute for Animal Nutrition

0020 Veterinary Botany

S. Aboling

1. SW: General Botany (28 hours)

We look at case reports in which farm animals have eaten plants and scientists have reported on them. What these plants do to the animals and vice versa is the subject of the lecture in winter.

Learning objective / basis for:
They should become familiar with the morphological and chemical properties of common and potentially toxic plant species and be able to classify the risk of poisoning for livestock on a case-by-case basis.

Experiments / Demonstrations:
I bring special illustrative material and special reading material for each topic: Films, plants, mushrooms and current enquiries for pets and farm animals from the Institute of Animal Nutrition on the subject of medicinal and poisonous plants.

Lecturer:
Abolishing

Institute of Zoology

0030 General Zoology

Pröhl, Scheumann, Esser, Felmy

1. SW: Introduction to Zoology (2 hours)

Animal welfare in training, introduction to zoological exercises

Learning objective / basis for:
Zoological exercises

Lecturer:
Pröhl

Remarks:
1st semester

2. SW: General Zoology, Lecture (2 hrs.)

1.SW: General introduction and evolution of animals (2 hours)
Objectives of the lecture. Framework programme. Textbooks. Diversity of organisms. Classification. Animal kingdom, characteristics, diversity. Phylogenetic trees. Mechanisms of evolution. Diversity of recent horses, domestication and phylogeny. Transitional forms. Endemism. Species concepts, speciation, isolation mechanisms.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

3RD SW: General Zoology, Lecture (2 hrs.)

3.SW: Reproduction and development (2 hours)
Asexual reproduction. Sexual reproduction. Oogenesis. Spermatogenesis. Fertilisation. Eiorganisation. Fouling. Cotyledon formation. Organogenesis. Parthenogenesis. Hermaphroditism. Metagenesis. Heterogony.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

4. SW: General Zoology, Lecture (2 hrs.)

4.SW: Hormonal regulation in the animal kingdom (2 hrs.)

Discovery and definition of hormones. Hormone systems in vertebrates. Main chemical classes, molecular mechanisms of action, hormone production sites. Neurohypophysis and "fidelity" hormone. Adenohypophysis, hormones, control of growth, development and reproduction. Stress syndromes. Diabetes. Pheromones. Bruce effect. Sex determination.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Scheumann

5 SW: General Zoology, Lecture (2 hrs.)

5.SW: Neuronal coordination (2 hours)
Diversity, function and evolution of nervous systems in the animal kingdom. Building blocks of the nervous system. Electrical properties of neurons. Synaptic transmission. Reflexes. Complex brain functions.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Experiments / demonstrations:
Animations on complex brain functions in animals

Lecturer:
Felmy, Esser

6 SW: General Zoology, Lecture (4 hrs.)

6th and 7th SW: Sensory organs and sensory functions in the animal kingdom I and II (4 hours)
Sensory world in animals and humans - similarities and differences. Classification of the senses. Sensory cell types. Occurrence, diversity and evolution of sensory systems (smell, taste, touch, feel, pain, hearing, sight in invertebrates and vertebrates). Performance of sensory organs. Primary processes of transduction.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Experiments / Demonstrations:
Animations on the function of sensory organs

Lecturer:
Eater

8TH SW: General Zoology, Lecture (2 hrs.)

8.SW: Movement, muscle and skeletal systems (2 hours)
Diversity of movement forms in the animal kingdom: similarities and differences. Contractile molecules. Molecular mechanisms. Muscle types. Structure of skeletal muscle. Molecular mechanism of contraction. Musculoskeletal systems.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Experiments / demonstrations:
Animations on forms of movement in the animal kingdom

Lecturer:
Felmy, Kladisios

9TH SW: General Zoology, Lecture (2 hrs.)

9th SW: Food intake and digestion (2 hours)
Diversity of food choice and specific food development in the animal kingdom. Types of digestion. Food intake and digestive systems. Tasks of digestion. Neural and humoral control of digestion. Energy production from nutrients.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Experiments / Demonstrations:
Animations on food intake and digestion in animals

Lecturer:
Felmy, Kladisios

10. SW: General Zoology, Lecture (2 hrs.)

10.SW: Respiration and circulation (2 hours)
General principles, respiratory organs (skin respiration, gill respiration, lungs, trachea). Blood pigments. Transport of substances. Gastrovascular system, cardiovascular system (open, closed). Evolution of the vertebrate circulatory system.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of

animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

11 SW: General Zoology, Lecture (2 hrs.)

11.SW: Osmoregulation, excretion, thermoregulation (2 hours)
Osmotic pressure. Poikilosmotic and homoiosmotic animals. Excretory products. Ammoniotelic, ureotelic, uricotelic animals. Excretory mechanisms. Excretory organs in the animal kingdom (protonephridia, metanephridia, kidneys, Malpighian vessels).
Temperature range of life. Poikilothermic and homoiothermic animals. Special adaptations to extreme temperatures.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

12TH SW: General Zoology, Lecture (2 hrs.)

12.SW: Behaviour I (2 hours)
Innate and overt behavioural programmes. Forms of learning: non-associative learning, conditioning, imprinting, tool use, insightful, social and strategic learning.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

13. SW: General Zoology, Lecture (2 hrs.)

13.SW: Behaviour II (2 hours)
Chronobiology. Communication. Behavioural ecology. Mating strategies and sexual selection. Social systems. Altruism and kin selection.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.

The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

14 SW: General Zoology, Lecture (2 hrs.)

14.SW: Ecology I (2 hrs.)
Distribution, habitat selection, biotic and abiotic factors, life cycles, population density and growth. Biocenoses, intra- and interspecific interactions.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

15. SW: General Zoology, Lecture (2 hrs.)

15.SW: Ecology II (2 hours)
Anthropogenic impacts on ecosystems. Climate change. Biodiversity. Species and nature conservation. Conservation Medicine.

Learning objective / basis for:
Basic knowledge of the diversity of life forms in the animal kingdom and their ethological and physiological adaptation strategies to the environment, illustrated using the example of animal groups relevant to veterinary medicine; basic principles of species and nature conservation.
The material covered forms the basis for in-depth courses in physiology, anatomy, zoology, behavioural science, animal nutrition, reproductive biology and wildlife biology.

Lecturer:
Pröhl

Institute of Zoology

0031 Special Zoology and Zoological Exercises

Pröhl, Rodriguez, Röll, Scheumann and colleagues

42ND SW: Special Zoology - Bauplankunde. (45 hrs.)

Special Zoology and the Zoological Exercises are combined into one course, which is held three times for the authorised year group (group courses). The content of the lecture and tutorial is the presentation of phyla of the animal kingdom according to their phylogeny. Acoelomates (Plathelminthes), pseudocoelomates (Nematoda) and coelomates (Annelida, Arthropoda, Mollusca, Acrania, several groups of Vertebrata) are explained in their biological characteristics in a systematic sequence starting from unicellular organisms (Protozoa). The phylogenetic features are analysed in detail by means of dissection.

Learning objective / basis for:
Teaching the basics of zoological-systematic animal phylogenetics with special consideration of the groups relevant to veterinary medicine. Introduction to the evolution of organisms and their morphological, anatomical and physiological features. Creation of a basis for in-depth courses in the subsequent degree programme.

Experiments / Demonstrations:
Preparations for building planks

Lecturer:
Pröhl, Rodriguez

Ruthe teaching and research estate

0038 General agriculture

Sürie, Christian

1. SW: General Agriculture (30 hours)

1. definition of agriculture with upstream and downstream sectors,
Basic tasks of agriculture in Germany,
Sustainability concept in agriculture
2. structure and change in the agricultural sector
3. agribusiness, markets, trade, supply and demand, consumer behaviour
4. methods of agricultural production - cattle
5. methods of agricultural production - pigs
6. methods of agricultural production - poultry
7. methods of agricultural production - plant
8. agriculture and environment
9. organic farming, organic livestock farming
10. renewable raw materials, renewable energies
11. agricultural business management, cost/performance accounting

Learning objective / basis for:
- Communicating the scope, importance and responsibility of agriculture
- Insight into changes in operating structures, trading conditions and consumer behaviour
- Understanding the links between agricultural production and consumer behaviour in society
- Analysing the links between agriculture and the environment
- Demonstration of alternative processes (plate, trough, tank)
- Forming an opinion on various agricultural production methods
- Demonstrating the importance of livestock farming
- Comparison possibilities between different husbandry methods in livestock farming
- Assessment of costs and performance in the processing industry
- Discussion of the advantages and disadvantages of extensive and intensive procedures

Lecturer:
Dr Christian Sürie

Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology

0216 Animal husbandry

Kemper, Fels, Spindler, Hiebl, Bohnet, Volkmann

1. SW: Specialised animal husbandry (2 hours)

Sow husbandry

Learning objective / basis for:
Knowledge of housing systems for sows and piglets

Lecturer:
Rock M.

2. SW: Specialised animal husbandry (2 hours)

Piglet rearing and fattening

Learning objective / basis for:
Housing systems for weaned piglets and fattening pigs

Lecturer:
Fels, M.

3. SW: Specialised animal husbandry (2 hours)

Keeping turkeys
Keeping broiler chickens

Learning objective / basis for:
Knowledge of common husbandry methods for turkeys and broilers

Lecturer:
Spindler B.

4. SW: Specialised animal husbandry (2 hours)

Keeping pullets and laying hens

Learning objective / basis for:
Knowledge of systems for keeping hens

Lecturer:
Spindler B.

5. SW: Specialised animal husbandry (2 hours)

Keeping ducks, geese and ostriches

Learning objective / basis for:
Knowledge of common husbandry methods for ducks, geese and ostriches

Lecturer:
Spindler B.

6. SW: Specialised animal husbandry (2 hours)

Keeping calves and beef cattle

Learning objective / basis for:
Housing methods in calf rearing
Systems for fattening calves and cattle

Lecturer:
Fels, M.

6. SW: Specialised animal husbandry (2 hours)

Keeping dairy cows

Learning objective / basis for:
Dairy farming methods

Lecturer:
Volkmann

7. SW: Specialised animal husbandry (2 hours)

Keeping exotic farm animals (e.g. llamas and alpacas, bison and buffalo)

Learning objective / basis for:
Husbandry methods for exotic farm animals

Lecturer:
Spindler, B.

8. SW: Specialised animal husbandry (2 hours)

Keeping sheep and goats

Learning objective / basis for:
Housing methods for small ruminants (stall, pasture and herd housing)

Lecturer:
Kemper

9. SW: Specialised animal husbandry (2 hours)

Horse keeping

Learning objective / basis for:
Housing methods for horses

Lecturer:
Kemper N.

10. SW: Specialised animal husbandry (2 hours)

Donkey husbandry

Learning objective / basis for:
Husbandry methods for donkeys

Lecturer:
Bohnet

11. SW: Specialised animal husbandry (2 hours)

Keeping rabbits

Learning objective / basis for:
common methods of keeping rabbits for fattening (cage, floor, free-range), recommendations for keeping rabbits as pets

Lecturer:
Rock M.

12. SW: Specialised animal husbandry (2 hours)

Aquaculture

Learning objective / basis for:
Farming methods for fish in aquacultures

Lecturer:
Spindler

13. SW: Specialised animal husbandry (2 hours)

Keeping animals for experimental purposes

Learning objective / basis for:
Laboratory animal husbandry systems

Lecturer:
Hiebl B.

Institute of Zoology

0218 Ethology

Bohnet

1. SW: Behavioural science (14 hours)

Fundamentals of behavioural science including definitions of terms (e.g. ethogram, functional circuits). Development of behaviour (innate behaviour, maturation of behaviour, basics of animal learning). Models of behaviour control including choice experiments, consumer demand theory. Differentiation between normal behaviour and problem behaviour, including behavioural disorders.
Fundamentals of the special ethology of dogs, cats, rabbits, guinea pigs, gerbils, hamsters, rats and mice. Aspects of the expressive behaviour of dogs and cats.

Learning objective / basis for:
The material covered forms the basis for the assessment of the behaviourally appropriate keeping and handling of pets and small animals.

Experiments / Demonstrations:
Practical exercises with students' dogs on classical and operant conditioning.
Various videos on animal behaviour.

Lecturer:
Bohnet

Courses for the 2nd semester

Institute for Food Quality and Safety

0501 Organic-chemical basics for students of veterinary medicine

Plötz, Buchholz, Drotleff

1. SW: Reaction mechanisms, alcohols, thioalcohols, ethers, thioethers, haloalkanes, amines, optical activity, aldehydes and ketones, carboxylic acids, functional derivatives of carboxylic acids, hydroxycarboxylic acids, ketocarboxylic acids, sulphonic acids, aromatics, carbohydrates, amino acids, peptides and proteins (36 hours).

(continuation from winter semester)
5. reaction mechanisms
5.1 Addition reactions
5.2 Elimination reactions
5.3 Nucleophilic substitution reactions
5.4 Competition between elimination and substitution
6. alcohols
6.1 Nomenclature of alcohols
6.2 Properties of alcohols
6.3 Representation of alcohols
6.4 Reactions of alcohols
6.5 Polyhydric alcohols
7. thioalcohols
7.1 Nomenclature of thioalcohols
7.2 Reactions of thioalcohols
8 Ether
8.1 Nomenclature of ethers
8.2 Properties of ethers
8.3 Reactions of ethers
9. thioether
9.1 Nomenclature of the thioethers
10. haloalkanes
10.1 Nomenclature of the haloalkanes
10.2 Properties of haloalkanes
10.3 Representation of haloalkanes
10.4 Reactions of haloalkanes
11. amines
11.1 Nomenclature of amines
11.2 Properties of amines
11.3 Representation of amines
11.4 Reactions of amines
12. optical activity
12.1 The polarimeter
12.2 Structure and optical activity
12.3 Fischer projection
12.4 Cahn-Ingold-Prelog nomenclature
13. aldehydes and ketones
13.1 Nomenclature of aldehydes
13.2 Nomenclature of ketones

13.3 Preparation of aldehydes and ketones
13.4 Addition reactions to the carbonyl group
13.5 Oxidation of aldehydes
13.6 Keto-enol tautomerism and CH acidity
14. carboxylic acids
14.1 Nomenclature of carboxylic acids
14.2 Properties of carboxylic acids
14.3 Representation of carboxylic acids
14.4 Reactions of carboxylic acids
15. functional derivatives of carboxylic acids
15.1 Nomenclature of carboxylic acid derivatives
15.2 Representation and reactions of derivatives of carboxylic acids
15.3 Fats, oils and waxes
16. hydroxycarboxylic acids
16.1 Nomenclature of hydroxycarboxylic acids
16.2 Representation of hydroxycarboxylic acids
16.3 Reactions of hydroxycarboxylic acids
16.4 Stereoisomers of tartaric acid
16.5 Citric acid
17. ketocarboxylic acids
17.1 Nomenclature of ketocarboxylic acids
17.2 α-Ketocarboxylic acids
17.3 β-Ketocarboxylic acids
18. sulphonic acids
19. aromatics
19.1 Nomenclature of aromatic compounds
19.2 Electrophilic aromatic substitution
19.2.1 Halogenation
19.2.2 Nitration
19.2.3 Sulphonation
19.2.4 Alkylation
19.2.5 Acylation
19.2.6 Influence of a substituent on the second substitution
19.3 Acidity of phenols
19.4 Aromatic diazonium salts and their reactions
19.5 Oxidation reactions in aromatic compounds
20. carbohydrates
20.1 Monosaccharides
20.1.1 Nomenclature of monosaccharides
20.1.2 Cyclic, semi-acetalic structure of monosaccharides
20.1.3 Haworth projection of monosaccharides and glycosides
20.1.4 Glycosides
20.1.5 Reactions of monosaccharides
20.1.6 Related compounds of monosaccharides
20.2 Disaccharides
20.3 Polysaccharides
21. amino acids, peptides and proteins
21.1 Amino acids
21.1.1 Nomenclature of amino acids
21.1.2 Essential amino acids
21.1.3 Properties of amino acids

21.1.4 Representation of amino acids
21.1.5 Reactions of amino acids
21.1.6 Biogenic amines
21.1.7 Transamination
21.2 Peptides and proteins
21.2.1 Structure of peptides and proteins
21.2.2 Isolation of peptides and proteins
21.2.3 Reactions of peptides and proteins
21.2.4 Denaturation of proteins
22 Toxicology of alcohols, PAHs, nitrosamines and aromatic amines

Learning objective / basis for:
Familiarisation with organic compound classes, their structures and nomenclature as well as the typical reaction behaviour of these substances. Basis for biochemistry. Topics relevant to other subjects (e.g. toxicology, pharmacology, physiology, embryology) are also covered.

Experiments / Demonstrations:
Miscibility of ethanol/water and salting out, alcoholic fermentation, combustion of alcohol, alcoholate, oxidation of ethanol with potassium dichromate, Beilstein assay, nucleophilic substitution of tert-butanol to tert-butyl chloride, addition of bromine to cyclohexene, nucleophilic substitution of ethyl bromide to ethanol, miscibility of cyclohexylamine/water, miscibility of aniline to waterbutyl chloride, addition of bromine to cyclohexene, nucleophilic substitution of ethyl bromide to ethanol, miscibility of cyclohexylamine/water, miscibility of aniline/water, benzalaniline, 2,4-dinitrophenylhydrazones, Tollens reaction, Fehling reaction, oxidation of acetaldehyde with potassium dichromate, detection of the enol form, Acidity of carboxylic acids, soaps, Tollens reaction with formic acid, oxidation of formic acid with potassium permanganate, oxidation of formic acid with potassium dichromate, hydrolysis of acetyl chloride, hydrolysis of acetic anhydride, nylon, burning of tartaric acid, ninhydrin reaction, alkane, alkene or benzene and bromine, bromination of benzene, bromination of phenol, acidity of phenol, solubility of phenol and phenolate in water, azo dyes, autoxidation of benzaldehyde, oxidation of hydroquinone, Fehling with glucose, Fehling with fructose, Tollens with glucose, osazone, Fehling with cane sugar, iodine-starch reaction, Schweizer's reagent, biuret reaction, xanthoprotein reaction

Lecturer:
Buchholz

Remarks:
Continuation of the lecture of the same name from the winter semester.
This lecture (V0501) is also held on dates that are not used for the courses V0503 or GV0502

Institute for Food Quality and Safety

0502 Seminar series organic chemistry for students of veterinary medicine

Plötz, Buchholz

3RD SW: Organic Chemistry (13 hours)

Alkanes, alkenes, alkynes, alcohols, ethers, haloalkanes and amines: Reaction of alkanes with bromine, reaction of alkenes with bromine, oxidation of alkenes with potassium permanganate, reaction of alkynes with bromine, substitution reaction in alcohols, oxidation of a primary alcohol with potassium dichromate, Oxidation of ethanol with iodine, complexation of glycerol with Cu(2+) ions, complexation of glycerol with boric acid, substitution reaction with alkyl halides, reaction of methylamine with nitrous acid.

Carbonyl compounds, reactions with CH-acidic compounds, aldol reaction: autoxidation of benzaldehyde, bisulphite compounds of aldehydes and ketones, presentation of Schiff bases, derivatisation of carbonyl compounds with 2,4-dinitrophenylhydrazine, detection of the enol form, aldol condensation of benzaldehyde with acetone, iodoform reaction, Fehling reaction, Tollens reaction.
Carboxylic acids and derivatives, α-hydroxycarboxylic acids, ß-ketocarboxylic acids, dicarboxylic acids, fats and oils: Synthesis of barbituric acid, acid nature of organic acids, precipitation of benzoic acid, water vapour volatility, hydrolysis of esters and amides, oxidation of formic acid, copper-tartrate complex, properties of salts of organic acids, Synthesis of aspirin, ketone cleavage of acetoacetic acid ethyl ester, ester formation by acylation of an alcohol (= alcoholysis of an acid anhydride), saponification of olive oil or margarine, detection of double bonds in olive oil, surface-active substances.
Aromatics, quinones and their reactions: Reactivity of double bonds in aromatics, oxidation of hydrocarbons, acid nature of phenol and ethanol, experiments with phenol, reduction of ammoniacal silver nitrate solution by hydroquinone, oxidation of hydroquinone by potassium dichromate, representation of fluorescein, reduction of methylene blue.
Carbohydrates, amino acids, proteins, thin-layer chromatography: Fehling's sample with monosaccharides, reduction of triphenyltetrazolium chloride, reduction capacity of disaccharides, iodine-starch reaction, acid hydrolysis of starch, Schweizer's reagent, thin-layer chromatographic separation of an amino acid mixture, Van Slyke reaction, reaction of an amino acid with benzaldehyde, oxidation of cysteine, biuret reaction, xanthoprotein reaction, Pauly reaction.
The various substance classes with reference to topics relevant to veterinary practice.

Learning objective / basis for:
The substance dealt with is the basis for understanding biochemical metabolic processes. Knowledge of the H and P theorems; gaining experience in handling organic chemicals; learning simple organic chemical reactions; familiarisation with simple substance properties; learning to write formulae and reaction equations; qualitative application of the law of mass action in organic chemistry; understanding organic redox reactions; exemplary familiarisation with substance properties and chemical reactions of organic substance classes, application in qualitative and quantitative analysis; interdisciplinary transfer of practical relevance of the individual topic complexes.

Experiments / demonstrations:
Demonstration of the experiments and analyses by assistants.

Lecturer:
Buchholz

Institute for Food Quality and Safety

0503 Introduction to Chemical Experimental Seminar II Organic Chemistry for Students of Veterinary Medicine

Plötz, Buchholz

3. SW: Organic Chemistry (5 hours)

Alkanes, alkenes, alkynes, alcohols, ethers, amines. Carbonyl compounds, reactions with CH-acidic compounds, aldol reaction. Carboxylic acids and derivatives, alpha-hydroxycarboxylic acids, alpha-ketocarboxylic acids, ß-ketocarboxylic acids, dicarboxylic acids, fats and oils. Aromatics, quinones and their reactions. Carbohydrates, amino acids, proteins, thin-layer chromatography.

Learning objective / basis for:
Preparation for the "Chemical exercises II". Information on special hazards (R-phrases) and safety advice (S-phrases) are given for the respective seminar day. Furthermore, the experiments to be carried out are discussed with information on possible sources of error. Practice and consolidation of the reaction mechanisms of the individual substance classes.

Experiments / demonstrations:
Organic-chemical experiments on the individual subject areas with a focus on practical relevance in veterinary haematology

Lecturer:
Buchholz

3. SW: Organic Chemistry (5 hours)

Alkanes, alkenes, alkynes, alcohols, ethers, amines. Carbonyl compounds, reactions with CH-acidic compounds, aldol reaction. Carboxylic acids and derivatives, -hydroxy-carboxylic acids, -keto-carboxylic acids, ß-keto-carboxylic acids, dicarboxylic acids, fats and oils. Aromatics, quinones and their reactions. Carbohydrates, amino acids, proteins, thin-layer chromatography.

Learning objective / basis for:
Preparation for the "Chemical exercises II". Information on special hazards (R-phrases) and safety advice (S-phrases) are given for the respective practical day. Furthermore, the experiments to be carried out are discussed with information on possible sources of errors.

Lecturer:
Cancer

Institute for Animal Nutrition

0520 Special botany

Aboling

1. SW: Specialised botany with special consideration of useful, medicinal and poisonous plants (28 hours)

1. morphological-chemical characteristics, taxonomy, association and ecology of selected plant species. Crop plants: sweet grasses including cereals and root crops, bee forage plants, deciduous hay species, selected other crop plants relevant for animal nutrition; poisonous plants: Poisonous and animal species-specific plant species found on grassland, in meadows, parks, gardens and forests, fresh or dried; medicinal plants: Species used in historical and current veterinary medicine; Other plants: Extinct species, representatives of the Red List, neophytes, legally protected species, indicator plants
2. synthesis, occurrence, significance and function of selected plant constituents
3. basic principles of contractual nature conservation
4. grassland communities and management regimes
5. presentation of case studies on the significance of plant species from a veterinary perspective

Learning objective / basis for:
Students should master the basics of plant biodiversity as well as species and biotope protection. The problem-orientated teaching of the subject matter should enable students to apply their knowledge in later veterinary practice.

Experiments / demonstrations:
Identification exercises indoors (lecture theatre) and outdoors (Bischosholer Damm campus).
Demonstrations in the medicinal and poisonous plant garden of the TiHo.

Lecturer:
Aboling, Stelzer

University library

0538 Vocational training

Leonhard-Marek, Volk, Pees, Jung-Schroers

13. SW: Vocational Studies (Vocational Field Exploration III) (14 hours)

Reports from various professional fields - requirements and paths, challenges, stress factors and highlights. Dealing with stress, lifelong learning.
The Professional Studies course is designed to inform students about traditional and new fields of work and areas of activity that open up after studying veterinary medicine and obtaining a licence to practise.

Learning objective / basis for:
Providing up-to-date knowledge about current and future veterinary tasks and fields of activity.

Co-operation / consultation with:
Guest speakers from a wide range of professional fields

Lecturer:
Leonhard-Marek, Schweizer, Detmers, Pees, Detlefsen, Sindern, Volk, Färber, Jung-Schroers, Molnár, Tobias, Thielke, Nienhoff, Selig, Schnug, Schimanski, Venner, Walther, Eckstein

Institute of Physiology and Cell Biology

0562 Physiology and Nutritional Physiology I

Benz, Elfers, Mazzuoli-Weber, Muscher-Banse,

2. SW: Neurophysiology (4 hours)

Physiological principles of the functioning of the nervous system
Introduction to the pathophysiology of neurophysiology

Learning objective / basis for:
After completing the lecture, students will be able to
Describe the composition of nerve tissue
name the functional properties and structure of a neuron
Describe the functions of glial cells
Explain the electrophysiology (excitation) of the neuron
Explain electrochemical equilibrium
Classify the terms resting membrane potential, tonic potentials and action potentials
Explain involvement of channels and refractory phase
Explain the pathways of excitation transmission
Classify the interruption of signal transmission and its clinical relevance
Explain synaptic transmission and integration of signals
Explain the development of botulism and tetanus

Lecturer:
Mazzuoli-Weaver

3. SW: Muscle physiology (6 hours)

Physiological principles of the functioning of the (skeletal, cardiac and smooth) musculature
Introduction to the pathophysiology of muscle physiology

Learning objective / basis for:
After completing the lecture, students will be able to
Describe the function of the muscles
Characterise the fine structure of skeletal muscle and muscle fibre types
Describing the neuromuscular synapse
Explain electromechanical coupling and contraction of the muscle
Explain the development and resolution of rigor mortis
Describe muscle mechanics
Explain the terms motor unit, recruitment and summation
Emphasise the term muscle energetics
Explain the function, structure, contraction and energetics of smooth muscles

Lecturer:
Mazzuoli-Weaver

4TH SW: Heart (4 hrs.)

Physiological principles of the functioning of the heart
Introduction to the pathophysiology of cardiac physiology

Learning objective / basis for:
After completing the lecture, students will be able to
Describe and explain the structure and basic data of the heart
Describe the function of the heart and phases of the cardiac cycle
Explain excitation formation and conduction
Explain the function and properties of pacemaker and working myocardial cells
Explain how cardiac potentials are influenced by the autonomic nervous system
Explaining electromechanical coupling in the heart muscle
Explain the development of an ECG signal and assign the individual waves and spikes to the corresponding electrophysiological processes in the heart muscle cells
To deal with the mechanisms that control the work of the heart
Explain the energy metabolism of the heart

Lecturer:
Mazzuoli-Weaver

6. SW: Vegetative nervous system (2 hours)

Physiological principles of the autonomic nervous system
Participation in the regulation of biological control circuits

Learning objective / basis for:
After completing the lecture, students will be able to
Discuss the function and structure of the autonomic nervous system
describe the transmitters, receptors and intracellular transmission of the sympathetic and parasympathetic nervous system involved
Explain the importance of the adrenal medulla as an interaction partner

Lecturer:
Muscher-Banse

6. SW: Breathing (5 hours)

Physiological basics of breathing
Introduction to the pathophysiology of respiration

Learning objective / basis for:
After completing the lecture, students will be able to
name the control circuit of respiration
Explain the chemical regulation of respiration
describe the function of the mammalian and avian lungs
explain ventilation, lung volumes and respiratory mechanics
explain pulmonary gas exchange
Explain the transport of respiratory gases
explain obstructive and restrictive lung diseases as well as pneumothorax

Lecturer:
Benz

7. SW: Circulation (5 hours)

General tasks and categorisation of the circuit sections
Haemodynamic principles/physical laws
Properties of the arterial and venous vessel walls and arterial and venous haemodynamics
Microcirculation/processes in the capillary bed
Significance of the lymphatic vessels
Local blood circulation regulation
Centralised short-term and long-term circulation regulation

Learning objective / basis for:
After completing the lecture, students will be able to
name the anatomical and functional classification of the circulatory system
name the five most important physical laws for haemodynamics and explain the significance of the individual components of the law
recognise arterial and venous pressure pulse curves, describe the curve progression and specific phenomena of the curves
describe the processes in the capillary bed
explain the significance of the effective filtration pressure and clarify the causes and consequences of its deviation from physiological ranges
name the five mechanisms involved in local blood flow regulation
explain the pressoreceptor reflex
name the mechanisms of medium- and long-term central circulatory regulation and the hormones involved in it and illustrate their mode of action using different blood pressure situations
name the four most important classes of shock, explain their underlying pathomechanisms and list at least one example relevant to (veterinary) medicine in each case

Lecturer:
Elfers

10. SW: Kidney (4 hours)

Physiological principles of kidney function

Introduction to the pathophysiology of kidney function

Learning objective / basis for:
After completing the lecture, students will be able to
Name the functions of the kidneys
Describe the morphology of the kidneys
explain the mechanisms involved in urine formation (glomerular filtration, tubular reabsorption and secretion)
Describe the regulation of renal blood flow
Explain diuresis and antidiuresis

Lecturer:
Muscher-Banse

11. SW: Blood (4 hours)

Physiological principles of haematopoiesis
Central importance of the blood in maintaining homeostasis in the body

Learning objective / basis for:
After completing the lecture, students will be able to
Describe the tasks of blood
name the liquid and cellular components of the blood
Describe the mechanisms of haemostasis, haemostasis, blood clotting and fibrolysis
Explain blood group systems in humans

Lecturer:
Muscher-Banse

12. SW: Thermoregulation (3 hrs.)

Basics and control circuit of thermoregulation
Heat dissipation mechanisms and heat production
Seasonal & circadian heterothermy
Pathophysiology of thermoregulation

Learning objective / basis for:
Participation in the course enables participants to
Basics and & definitions of thermoregulation
Describe the mechanisms of thermoregulation
explain four heat dissipation strategies
to reproduce the regulation of thermoregulation
describe the pathophysiology of thermoregulation using examples
discuss seasonal & circadian heterothermy

Lecturer:
Benz

13. SW: Sensory physiology (4 hours)

Classification and structure of sensory cells
Basics of sensory physiology incl. transduction
Transformation and coding behaviour
Physiological principles of vision, hearing, balance, smell, taste and mechanosensation and pain perception/nociception including pain elimination

Learning objective / basis for:
After completing the lecture, students can:
explain the processes of transduction and transformation and transfer these to the two different types of sensory cells
explain the transduction process for the 5 flavours, odours and mechanical stimuli
describe the difference between P and D sensors, their coding and adaptation behaviour and give at least one example of each
name the physical principles of optics relevant to vision and assign them to the corresponding structures of the eye
describe the transduction process in the retina when exposed to light, including the intracellular processes in the photoreceptors
describe the transduction process in the hair cells of the vestibular apparatus and the organ of Corti

Lecturer:
Elfers

14. SW: CNS (2 hours)

Classification of the central nervous system
Structure of the cerebrum, cerebellum and spinal cord
Cell types of the CNS
Functions of the individual brain regions
Transmitter in the CNS
Protective mechanisms of the brain
Motor, sensory, limbic system incl. pathophysiological significance
Regulation of autonomous functions such as sleep

Learning objective / basis for:
After completing the lecture, students can:
name the 7 main regions of the CNS and explain their main functions
name the cell types found in the CNS and describe their properties and functions
Describe reflex arcs of the spinal cord for motor control
explain the structure/components of the brain stem, their functions and significance for physiological control circuits
name the structure of the cerebellum and its significance/functioning and derive pathophysiologies and the associated clinic from this
explain the structure of the cerebrum and the functions of the individual cortical lobes as well as the medullary fibres and subcortical core areas
name the most important excitatory and inhibitory transmitters in the CNS and explain their (patho-) physiological significance on the basis of specific clinical pictures or their therapeutic use in veterinary medicine
name the 4 essential protective mechanisms of the CNS
Explain the structure and significance of the blood-brain barrier and clarify the diagnostic and pathophysiological significance of cerebrospinal fluid

Lecturer:
Elfers

Institute of Physiology and Cell Biology

0563 Physiological and nutritional physiological exercises I

Benz, Brede, Elfers, Mazzuoli-Weber, Muscher-Banse, Stern and others.

1. SW: Exercise Neurophysiology (4 hours)

Basics of applied neurophysiology

Learning objective / basis for:
After participating in this exercise, students will be able to
to determine the sum action potentials of the skeletal muscles as well as after electrical stimulation of the nerve
Calculate excitation conduction velocities
explain the development of monosynaptic reflexes

Experiments / Demonstrations:
The experiments are based on the PowerLab system. With this system, biological signals can be recorded, displayed on a computer and analysed.

Lecturer:
Brede, Mazzuoli-Weber, Stern et al.

1. SW: Exercise muscle physiology (4 hours)

Organisation and structure of skeletal muscles
Influence of stimulus strength and frequency on muscle contraction
Effect of muscle pre-stretching on strength development

Learning objective / basis for:
After participating in this exercise, students will be able to
name the minimum and maximum stimulus thresholds
identify the influence of stimulus frequency on the form of contraction and differentiate between different forms of contraction
explain the effect of pre-stretching on the contraction force
Differentiate between the causes of fatigue

Experiments / Demonstrations:
SimMuscle computer simulation

Lecturer:
Brede, Muscher-Banse et al.

1. SW: Electrocardiography exercise (4 hours)

Electrophysiological basics of the ECG signal
Forms of derivation in humans and animals
Effect of physical labour on the ECG
Special features of the canine ECG
Practically relevant pathophysiological changes in the ECG

Learning objective / basis for:
After participating in this exercise, students will be able to
explain the electrophysiological processes in the myocardial cells that underlie the ECG signal
name the individual teeth and waves of the ECG signal and relate them to the corresponding electrical processes in the heart
name the 3 most important forms of derivation, describe the procedure of the respective derivation and explain the differences between the forms

recognise an important physiological phenomenon in the dog's ECG and explain the basis of its development
name the two most important pathophysiological groups of abnormalities in the ECG and recognise corresponding examples in the ECG and explain their causes

Experiments / Demonstrations:
ECG recordings on humans and dogs, ultrasound visualisation of the dog's heart

Lecturer:
Elfers, Mazzuoli-Weber et al.

1. SW: Exercise cardiac physiology (4 hours)

Fundamentals of applied cardiac physiology

Learning objective / basis for:
After participating in this exercise, students will be able to
assess cardiac activity following the administration of various active substances (acetylcholine, atropine, adrenaline, propanolol, verapamil, g-strophantin and phentolamine)
list the receptors and second messenger systems involved

Experiments / Demonstrations:
Computer simulation SimHeart (Langendorff preparation); protocol submission via TiHo Moodle

Lecturer:
Muscher-Banse, et al. (instead of none)

9. SW: Circulatory regulation exercise (4 hours)

Physical principles of haemodynamics
Influence of resistance, aortic compliance and stroke volume on arterial blood pressure in a circulatory model
Indirect blood pressure measurement
Recording an ECG and heart sounds

Learning objective / basis for:
After participating in this exercise, students will be able to
name the 4 most important physical laws that play a role in haemodynamics and describe their significance/influence
define the terms systolic and diastolic blood pressure, mean arterial pressure and blood pressure amplitude, as well as laminar and turbulent flow
describe the structure and function of the cycle model
use the circulatory model to describe the effect of an increase or reduction in stroke volume, aortic compliance and total peripheral resistance on systolic and diastolic blood pressure, blood pressure amplitude and mean arterial pressure, and interpret the corresponding pressure curves
transfer the above effects in the circuit model to situations in vivo
explain the physiological principles and the procedure for indirect blood pressure measurement according to Riva Rocci

Experiments / demonstrations:
Experiments on a circulatory model, indirect blood pressure measurement in humans, recording of an ECG and simultaneous recording of heart sounds in humans

Lecturer:
Mazzuoli-Weber, Elfers et al.

9. SW: Seminar on kidney function (4 hours)

Basis for understanding kidney function

Learning objective / basis for:
After attending this seminar, students will be able to
explain the function of primary and final urine formation
using the clearance technique to calculate the GFR, ERPF, RPF. RBF and the percentage filtration fraction using the clearance technique
explain the significance of maximum tubular reabsorption using the example of glucose

Experiments / demonstrations:
Seminar with exercise calculations on renal clearance

Lecturer:
Benz, Mazzuoli-Weber, Muscher-Banse and others.

9TH SW: Exercise breathing/spirometry (4 hours)

Methods for the determination and significance of lung volumes and lung capacities
Determination of dynamic parameters, pathophysiological changes in the respiratory tract, respiratory regulation and respiratory reflexes

Learning objective / basis for:
After participating in this exercise, students will be able to
identify the spirometer and pneumotachograph devices and name the respective areas of application
discuss the processes of expiration and inspiration, including interpulmonary and interpleural pressure
describe the helium scrubbing method and the background to its use
8 Name lung volumes and capacities and explain differences
three dynamic lung parameters
put the FEV1 and FVC in relation to each other and explain their significance
Differentiate between obstructive and restrictive pulmonary dysfunction and give at least one example of each

Experiments / demonstrations:
Demonstration tests with the pneumotachograph, demonstration of the spirometer

Lecturer:
Benz, Dornbusch, Hein

9. SW: Exercise ergometry in horses via TiHo Moodle (4 hours)

Effects of physical work on cardiovascular parameters (respiratory rate, heart rate, pulse rate) and thermoregulation in horses
Recording and special features of the equine ECG

Learning objective / basis for:
After participating in this exercise, students will be able to
Describe the technique for recording the respiratory, heart and pulse rate in horses
Describe the technique for recording an ECG in horses
Define the terms oxygen deficit and oxygen debt and explain their physiological significance in connection with physical exertion
describe the effects of physical work on the horse's breathing, heart and pulse rate
describe the effects of physical work on the horse's thermoregulation and name the possible forms of heat dissipation
describe the development of the 4 heart sounds

Recognise and explain special features of the resting ECG in horses

Experiments / Demonstrations:
Demonstration tests (video) with a horse at rest and at work

12TH SW: Abtestat summer semester (4 hours)

(Self-)control of the learning objectives from the resulting exercises
Training in the free presentation of (patho-)physiological facts as preparation for examinations.
The following exercises are covered:
Pneumotachography
Electrocardiography
Circulation
Kidney function

Learning objective / basis for:
After attending the course, students will be able to
Independently describe the set-ups and sequences of practical exercises
relate exercise content to theoretical content from the lecture

Lecturer:
Benz, Elfers, Mazzuoli-Weber, Muscher-Banse, Stern and others.

Institute of Biochemistry

0572 Biochemistry I

Gerold, von Köckritz-Blickwede, Kues, Steffen, de Buhr, Meurer, Becker, Cirksena, Laßwitz

1. SW: Biochemistry/ Physiological Chemistry (3 hours)

Topobiochemistry
Nucleic acids
Amino acids
Blood coagulation
Enzymes
Carbohydrates
Glycolysis
Gluconeogenesis
Fermentation
Pyruvate dehydrogenase complex
Citrate cycle
Respiratory chain and oxidative phosphorylation
Lipids and lipid syntheses
Fatty acid biosynthesis/metabolism
Lipid transport
Eicosanoids
Triglyceride synthesis
Cholesterol
Steroid hormones

Learning objective / basis for:
Understanding of the 'chemistry of life' - biochemistry as the basis for animal/medicine.

Experiments / Demonstrations:
As part of the biochemical exercises.

Lecturer:
Naim, Kues, von Köckritz-Blickwede, Gerold, Branitzki-Heinemann, Steffen, de Buhr, Schulz, Stegmann, Cirksena, Becker

Institute of Biochemistry

0574 Biochemical exercises

von Köckritz-Blickwede, Gerold, Kues, de Buhr, Lassnig, Becker, Cirksena, Stegmann, Laßwitz, Henneck and assistants

Biochemistry/ Physiological Chemistry (7 hours)

Practical application of the lecture content

Learning objective / basis for:
The theoretical knowledge in biochemistry is to be supplemented by practical experiments and thus contribute to a better understanding of the subject matter.

Experiments / demonstrations:
- Separation of an amino acid mixture by ion exchange chromatography
- Determination of collagen via hydroxyproline
- Optical test according to Warburg
- Enrichment of glycoproteins from a pig intestine and detection of the enzymatic activity of saccharase-isomaltase
- Isolation and restriction mapping of plasmids
- Sex determination using polymerase chain reaction

Lecturer:
Prof Naim, Prof von Köckritz-Blickwede, Dr Kues, Prof Lepenies, Dr de Buhr, Dr Brogden, Dr Branitzki-Heinemann, Dr Becker

Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology

0711 Behavioural science

Fels, Spindler, Bohnet and others.

1. SW: **Applied ethology of farm animals** (12 hours)

Applied ethology of farm animals: pig, cattle, chicken, duck, turkey, sheep & goat, honeybee, horse, rabbit, methods of applied ethology

Learning objective / basis for:
Understanding the natural behaviour of common livestock species and assessing the animal welfare of husbandry systems

Co-operation / consultation with:
Institute of Zoology

Lecturer:
Fels, Spindler, Kemper

Courses for the 3rd semester

Institute of Biochemistry

0054 Biochemical exercises

von Köckritz-Blickwede, Gerold, Kues, de Buhr, Schulz, Meurer, Wanes, Steffen, Hoter, Lassnig, Becker, Cirksena, Stegmann, Henneck and assistants

1. SW: Cell Biology, Molecular Biology, Biochemistry (1 hr.)

Current topics from research in the field of life sciences

Learning objective / basis for:
Teaching methodological procedures in applied research to solve current scientific questions

Co-operation / consultation with:
Herrler

Lecturer:
Naim, von Köckritz-Blickwede and lecturers

Institute of Physiology and Cell Biology

0063 Physiology and Nutritional Physiology II

Brede, Elfers, Hoffmann, Mazzuoli-Weber, Muscher-Banse

1. SW: Digestive physiology (13 hours)

Physiological principles of digestion
Comparison of the digestion of ruminants and non-ruminants
Introduction to the pathophysiology of digestive physiology

Learning objective / basis for:
After completing the lecture, students will be able to
Explain saliva secretion/production and its regulation in ruminants and non-ruminants
Describe the motor function of the oesophagus, stomach, small intestine and large intestine and explain their regulation
Explain the structure and motor function of the forestomachs in ruminants and their regulation
Name the function of the forestomachs, microbial colonisation and metabolic processes
Explain digestion and absorption in the rumen
Explain gastric secretion and its regulation
Describe small intestinal secretion, pancreas and bile secretion
Explain the digestion and absorption of carbohydrates, fats, proteins, nucleic acids, water and electrolytes
Describe the functions of the large intestine
Explain the structure and function of the enteric nervous system
Name the importance and function of gastrointestinal hormones and secretions
Explain the development of diarrhoea

Lecturer:
Hoffmann, Mazzuoli-Weber

5. SW: Physiology of the liver (3 hours)

Physiological basics of the liver as a central organ in metabolism

Pathohysiology of the liver

Learning objective / basis for:
After completing the lecture, students will be able to
Explain the role of the liver in digestion, detoxification, inactivation and acid-base balance
Describe the morphology of the liver

Lecturer:
Muscher-Banse

7. SW: Energy metabolism and regulation of feed intake (4 hours)

Physiological principles of energy metabolism
Physiological principles of the regulatory mechanisms of feed intake

Learning objective / basis for:
After completing the lecture, students will be able to
explain the importance and function of energy metabolism
explain the measurement of the energy content of nutrients
Describe the measurement of energy metabolism
Explain the respiratory quotient
Explain the mechanisms that regulate feed intake

Lecturer:
Muscher-Banse

9. SW: Growth and metabolic regulation (3 hours)

Anabolism and catabolism
Homeostatic metabolic regulation using the example of blood glucose and blood calcium
Homeorhetic metabolic regulation using the example of body growth and bone metabolism
Hormones involved, relevant pathophysiologies

Learning objective / basis for:
After completing the lecture, students can:
describe the difference between catabolic and anabolic metabolism
explain the regulation of blood glucose levels and the structure, mode of action and (patho-) physiological significance of insulin and glucagon
clarify the endocrine functions of adipose tissue in connection with the regulation of blood glucose
describe the regulation of blood calcium levels and explain the three most important hormones involved and their site of synthesis and mode of action
name derailments of calcium homeostasis relevant to practice, describe the underlying pathomechanism and the associated clinic
name the hormone axes involved in the regulation of body growth and establish the connection to relevant pathophysiologies
name the composition of bone substance and the most important (three) hormones involved in bone formation and degradation and list and explain at least 2 examples of pathophysiological imbalances

Lecturer:
Elfers

10. SW: Physiology of the acid-base balance (3 hours)

Physiological basics of the acid-base balance (SBH)
Introduction to the pathophysiology of SBH

Learning objective / basis for:
After completing the lecture, students can
explain the importance of intracellular and extracellular pH for SBH
explain the significance of the Henderson-Hasselbalch equation for the SBH
List SBH malfunctions
Name the regulatory systems involved in the SBH

Lecturer:
Muscher-Banse

11. SW: Endocrinology, reproduction, pregnancy and birth (7 hours)

General principles in endocrinology incl. (neuro-) endocrine regulatory circuits
Classification and mechanisms of action of hormones, endocrine reproductive axes of the female and male animal
Hormonal establishment and maintenance of pregnancy
Hormonal regulation of birth

Learning objective / basis for:
After completing the lecture, students can:
describe the structure, classification and mode of action (receptors involved) of peptide hormones, glycoprotein hormones and catecholamines, as well as steroid hormones and tyrosine derivatives and name at least one representative of each of these hormone groups
define the terms endocrine and neuroendocrine control circuit and explain them using an example
name the 9 most important hormones/hormone classes involved in male and female reproductive regulation and explain their mode of action
describe the hormonal regulation of the sexual cycle in female animals and name methods for its detection/monitoring
describe the hormonal establishment of pregnancy and explain it in comparison with other animal species
Explain the hormonal maintenance of pregnancy
Describe hormonal changes that lead to the induction of labour and name the 4 stages of the birth process
define the Ferguson reflex and explain its physiological significance

Lecturer:
Brede

13TH SW: Lactation (4 hours)

Physiological principles of lactation and milk production
Hormonal regulation of milk production

Learning objective / basis for:
After completing the lecture, students can:
Name the function of the mammary gland and the composition of milk
explain the individual stages of lactation and their hormonal regulation
Describe the importance of colostrum
describe pathophysiologies of the mammary gland that are relevant to practice.

Lecturer:
Elfers

Institute of Physiology and Cell Biology

0064 Physiological and nutritional physiological exercises II

Brede, Elfers, Hoffmann, Johannigmann, Mazzuoli-Weber, Muscher-Banse, Plenge, Stern, Zillinger and others.

2. SW: Gastric motor skills (4 hours)

Structure and function of the forestomachs, development of the motor patterns of the reticulorumen (A and B cycle), rumination and ruminal transit, composition of rumen gases

Learning objective / basis for:
After participating in this exercise, students will be able to
Describe the setup and use of the apparatus for intraruminal pressure measurement
Describe the structure and function of the 3 forestomachs of cattle
Name and describe the 3 layers of rumen content
Explain the development and regulation of the A and B cycle
Name the additional organs and structures that can be palpated during rumen palpation
Explain the regulation and importance of rumination and the ructus

Experiments / demonstrations:
Pressure measurements in the reticulorumen, palpation of the rumen, video "forestomach"

Lecturer:
Mazzuoli-Weber,Elfers et al.

2. SW: Abtestat winter semester (4 hours)

(Self-)control of learning objectives from exercises, training in the free presentation of (patho-)physiological facts as preparation for examinations.
The following exercises are covered:
Indirect calorimetry
Thermoregulation
Intestinal motor function
Rumen metabolism
Gastric motor skills

Learning objective / basis for:
After attending the course, students will be able to
Independently describe the set-ups and sequences of practical exercises
to express in their own words the key results achieved in the individual exercises
relate exercise content to theoretical content from the lecture

Lecturer:
Elfers, Hoffmann, Mazzuoli-Weber, Muscher-Banse and others.

2. SW: Rumen metabolism (4 hours)

Understanding the role of rumen fermentation for the metabolism of ruminants
Cellulose degradation
Rumen fauna

Learning objective / basis for:
After participating in this exercise, students will be able to
explain the pH and temperature changes after feeding a fistulated sheep
explain the involvement of rumen microorganisms in the breakdown of nutrients in the forestomach
Identify factors that influence gas production in the forestomach

explain the importance of saliva for pH regulation in the forestomach system

Experiments / Demonstrations:
In vitro measurements of gas formation in rumen juice, microscopy of forestomach fauna

Lecturer:
Brede, Mazzuoli-Weber, Muscher-Banse et al.

2. SW: Thermoregulation (4 hours)

Thermoregulatory mechanisms in mammals and birds
Clinical relevance of thermoregulation, external and internal heat flow

Learning objective / basis for:
After participating in this exercise, students will be able to
explain thermal imaging and heat release mechanisms using the example of pigs and chickens
Associating heat radiation in the infrared range with pathophysiological conditions
relate the heat detection to the self-experiment carried out

Experiments / Demonstrations:
Pig on the treadmill, chicken in the heating cabinet (as video material), self-experiment, measurements with the thermal imaging camera

Lecturer:
Hoffmann, Sehnert et al.

2. SW: Indirect calorimetry (4 hours)

Measurement of energy metabolism in the mouse, forms of calorimetry, determination and significance of the respiratory quotient and the calorific equivalent, forms of metabolism, relationship between body weight and basal metabolic rate

Learning objective / basis for:
After participating in this exercise, students will be able to
Describe the design and operation of the open, indirect calorimetry system used
Describe the structure and operation of a closed indirect calorimetry system
Calculate the respiratory quotient (RQ) and the calorific equivalent and explain their meaning
Describe the causes of deviations of the RQ from the physiological range
To explain the influence of food intake and lowered ambient temperature on the energy metabolism of mice
Define and differentiate between the terms gross energy, digestible energy, convertible energy and net energy
Define and differentiate between the terms basal metabolic rate, maintenance metabolic rate, resting metabolic rate and power metabolic rate

Experiments / Demonstrations:
Indirect calorimetry method (open + closed system)

Lecturer:
Brede, Elfers, Mazzuoli-Weber, Muscher-Banse and others.

2. SW: Intestinal motor skills (4 hours)

Development of the peristaltic reflex and significance for intestinal motor function
Effect of endogenous and exogenously supplied substances on the motor function of the isolated intestine

Contractions of the intestine

Learning objective / basis for:
After participating in this exercise, students will be able to
localise the occurrence of smooth muscle in the body
describe the structural organisation of smooth muscle
discuss the influence of interstitial cells according to Cajal
classify the effect of agonists and antagonists on smooth muscle contraction
derive the influence of the parasympathetic and sympathetic nervous system on intestinal motility
to characterise the peristaltic reflex

Experiments / Demonstrations:
In vitro measurements with intestinal tissues from guinea pigs

Lecturer:
Hoffmann, Muscher-Banse, et al.

11. SW: Acid-base balance (4 hours)

Basis for understanding physiology
Pathophysiology of the acid-base balance

Learning objective / basis for:
After attending this seminar, students will be able to
explain the regulation of the SBH
categorise the significance of the Henderson-Hasselbalch equation for the SBH
describe compensation mechanisms by different organ systems
Recognising SBH disorders based on blood parameters

Experiments / Demonstrations:
Group work in the seminar

Lecturer:
Mazzuoli-Weber, Muscher-Banse et al.

11. SW: Endocrinology (4 hours)

Endocrine function of the thyroid gland and patient case presentation and processing with relevant thyroid gland pathophysiology, endocrine function of the adrenal cortex and patient presentation and processing with relevant adrenal cortex pathophysiology

Learning objective / basis for:
After completing the CASUS cases, students are able to
name the histological structure of the thyroid gland and the site of formation of the thyroid hormones T3 and T4
explain the regulatory cycle of thyroid hormone production and the importance of iodine in this process
explain the effects of the thyroid hormones T3 and T4 on their target tissues and name the receptor involved
describe the pathophysiology of hypothyroidism relevant to practice, including the cause and clinical picture
name the three layers of the adrenal cortex and the site of cortisol production
explain the regulatory cycle of cortisol production
explain the effects of cortisol on its target tissues
describe the pathophysiology of hypercortisolism relevant to practice with the cause of the clinical picture

Experiments / demonstrations:
Implementation via TiHo Moodle (CASUS cases)

Lecturer:
Brede, Elfers et al.

Institute of Biochemistry

0079 Biochemistry II

von Köckritz-Blickwede, Gerold, Kues, Steffen, de Buhr, Schulz, Stegmann, Cirksena, Becker

1. SW: Biochemistry / Physiological Chemistry (3 hours)

Structure of nucleic acids
Nucleotide biosynthesis
DNS replication
Transcription and translation in eukaryotes and prokaryotes
Protein degradation
Biogenic amines
Minerals
Vitamins
Peptide hormones and signal transduction
Protein target control
Immunnology I & II
Cytoskeleton
Cell death, function and pathological consequences
Tissue hormones

Learning objective / basis for:
Understanding the 'chemistry of life' - biochemistry as the basis for medicine.

Experiments / Demonstrations:
As part of the biochemical exercises

Lecturer:
Naim, Kues, von Köckritz-Blickwede, Gerold, Branitzki-Heinemann, Steffen, de Buhr, Schulz, Stegmann, Cirksena, Becker

Institute for Animal Genomics

0180 Animal Breeding and Genetics I

Metzger and employees

1. SW: Animal Breeding and Genetics (41 hours)

Fundamentals of domestic animal genetics (inheritance, quantitative genetics, selection methods, structure and function of DNA, genome structure, forms of genetic variants of DNA and RNA, mutations and trait imprinting, QTL, association, genetic testing in domestic animals, genomics, genomic breeding values) with examples from veterinary practice (anomalies, breeding traits, pharmacogenetics, infection genetics, metabolic defects, epigenetics, etc.) and
Fundamentals of animal breeding (breeds, utilisation of breeds, breeding characteristics, breeding methods, genomic selection) for dogs, cats and small animals

Learning objective / basis for:
(1) Basic knowledge of genetics, molecular genetics, breeds and animal breeding

(2) Understanding the mechanisms of heredity and their consequences for combating hereditary defects, genetic predispositions and the development of genetic tests
(3) Basic knowledge of genetic counselling in veterinary practice and for breeding associations
(4) Interpretation of breeding values and genetic tests for breeding for health and performance
(5) Recognising and evaluating domestic animal breeds and assessing their conservation value
(6) Design of breeding programmes for health and control of hereditary defects and legislation
(7) Mechanisms of molecular regulation of traits and molecular pathogenesis
(8) Mechanisms for the evolution of genome architecture and selection signatures

Lecturer:
Metzger and employees

Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology

0211 Animal welfare I

Hiebl, Fels, Spindler, Kunzmann

1. SW: Animal Welfare Act, §§ 01-04 (2 hrs.)

§§ 1-4 of the Animal Welfare Act

Learning objective / basis for:
Basic understanding of §§ 1-4 of the Animal Welfare Act

Lecturer:
Hiebl

2. SW: Animal Welfare Act, §§ 05-06 (2 hrs.)

§§ 5-6 of the Animal Welfare Act

Learning objective / basis for:
Basic understanding of §§ 5-6 of the Animal Welfare Act

Lecturer:
Hiebl

3. SW: Animal Protection Act, §§ 07-10 (2 hrs.)

§§ 7-10 of the Animal Welfare Act

Learning objective / basis for:
Basic understanding of §§ 7-10 of the Animal Welfare Act

Lecturer:
Hiebl

4. SW: Animal Protection Act, §§ 11-18 (2 hrs.)

§§ 11-18 of the Animal Welfare Act

Learning objective / basis for:
Basic understanding of §§ 11-18 of the Animal Welfare Act

Lecturer:
Hiebl

6. SW: Animal Welfare Experimental Animal Ordinance (2 hrs.)

Requirements of the Animal Welfare Experimental Animal Ordinance

Learning objective / basis for:
Basic understanding of the requirements of the Animal Welfare Experimental Animal Ordinance

Lecturer:
Hiebl

9. SW: Animal welfare law and current topics on animal welfare (2 hrs.)

National and international animal welfare law,
Animal welfare dog ordinance

Learning objective / basis for:
Overview of animal welfare legislation in Germany and the EU
Knowledge of the contents of the Animal Welfare Dog Ordinance and its application

Lecturer:
Spindler B.

10. SW: Slaughter (2 hours)

Legal basis for slaughtering in Germany and the EU

Learning objective / basis for:
Knowledge of the legal basis for slaughtering
Knowledge of common stunning methods and assessment from an animal welfare perspective

Lecturer:
Rock M.

11. SW: Ethics (2 hours)

Ethical aspects in livestock farming

Learning objective / basis for:
Fundamentals of ethics

Lecturer:
Kunzmann

12. SW: Animal transport (2 hours)

TierschutzTransportV and Regulation 1/2005/EU on animal welfare during transport

Learning objective / basis for:
Knowledge of animal welfare law during transport, animal welfare-relevant aspects of animal transport

Lecturer:
Rock M.

13. SW: Animal welfare in pig farming (2 hours)

Animal welfare aspects in pig farming
Piglet castration
Tail docking

Learning objective / basis for:
Knowledge of the legal requirements for pig farming
Piglet castration: current procedures, problems and prospects
Tail docking in pigs: reasons, problems and perspectives

Lecturer:
Rock M.

14. SW: Animal welfare in poultry farming (2 hours)

Animal welfare law in poultry farming and current topics
Beak shortening

Learning objective / basis for:
Animal welfare law in poultry farming
Overview of the problem of beak trimming

Lecturer:
Spindler B.

Ruthe teaching and research estate

0480 Course on agriculture, livestock farming and breeding on an educational estate

Sürie; Distl, Metzger; Wendt, Wilhelm, Roth; Hoedemaker, Wissing, Heppelmann, Wunderlich; Visscher, Lingens, Wilke, Spiess; Kemper, Spindler, Schulz, Fels, Volkmann; Jeßberger, Plötz, Kain; Auerbach, Jung, Rautenschlein, Wunderl, Grund; Kunzmann; employees; LFG employees

1. SW: Animal Breeding and Genetics (8 hours)

Practical application of the assessment of breeding animals with regard to conformation, health and selection goals. Focus on cattle and pigs.

Learning objective / basis for:
Learning the basics for advising breeders and breeding organisations on animal health and selection.

Experiments / Demonstrations:
Demonstrations on cattle and pigs

Co-operation / consultation with:
Realisation as part of the "Ruthe internship" (Ruthe teaching and research estate)

Lecturer:
Metzger and employees

1. SW: Fundamentals of practical arable and grassland farming, forage production (8 hours)

Crops in fodder production.
Market crops in arable farming.
Fundamentals of production methods in arable and forage farming.
Forms and methods of utilisation in grassland farming.
Economic framework data for forage and cash crop production

Learning objective / basis for:
Presentation of the production processes in fodder production "from field and meadow to trough".

Discussion of the quality and cost-determining factors in forage production.

Experiments / demonstrations:
Species identification of crops on arable land and grassland
Hub bonitures in grassland
Soil structures in the field

Co-operation / consultation with:
Animal nutrition

Lecturer:
Sürie (instead of Sürie)

1. SW: Production control in milk production (16 hours)

Basic aspects of dairy science, dairy farming, the role of the vet, practical aspects such as milking and cow-side tests

Learning objective / basis for:
Raising awareness of the problems associated with modern dairy farming, practical implementation of milking hygiene activities, basic knowledge of the topic of "mastitis"

Experiments / demonstrations:
Proper milking, barn tests for udder health, first insights into milking technology

Co-operation / consultation with:
LFG Ruthe

Lecturer:
Ahlfeld, Grabowski, Lis, Becker

1. SW: Veterinary care of poultry (4 hours)

Introduction to the topic of 'keeping large flocks of poultry'; development of the necessary compromises in poultry husbandry; husbandry systems; economic aspects; clinical examination of broilers, turkeys, ducks, laying hens; introduction to the possible veterinary measures for farm animals.

Learning objective / basis for:
Raising awareness of the keeping and importance of poultry; independent handling of the animals and assessment of the animals' environment and health status.

Experiments / demonstrations:
Inspection of the barn units; discussion of the vaccination system; collection of blood samples and swab samples.

Co-operation / consultation with:
Realisation as part of the Ruthe internship

Lecturer:
Glünder, Legler, Kothe, Jung, Ryll, Rautenschlein

1. SW: Health management in pig herds (8 hours)

Demonstration of the basic structure of a piglet farm, veterinary examination of a pig herd, health management, routine measures, diagnostics, prophylaxis;
Practising zootechnical measures using the example of suckling piglet castration

Learning objective / basis for:
Determination of the health status of a pig herd (conventional/SPF), strategic approach to health promotion, basic understanding of veterinary herd management;

Practising zootechnical measures

Experiments / Demonstrations:
Clinical examinations, castration of suckling piglets if necessary, vaccinations, treatments

Co-operation / consultation with:
Consultation with LFG Ruthe

Lecturer:
Kubel, Wilhelm, Bürstel, Thies, Schröder, Dühlmeier, Roth, v. Altrock

15. SW: Air and ventilation in stables, special animal husbandry (17 hrs.)

- Biological and technical background to stable climate control
- Possibilities and limits of the various ventilation systems ventilation systems
- Measurement (including measurement technology) and control of the barn climate
- Animal hygiene assessment of a barn (cattle, pigs, poultry fattening, egg production)
- Specialised animal husbandry (requirements, husbandry techniques): Cattle, pigs, laying hens, fattening ducks, horses, sheep & goats

Learning objective / basis for:
Knowledge and skills in the field of animal hygiene

Experiments / Demonstrations:
In four groups:
- Demonstration and practical exercise in the use of the measuring devices
- Survey and assessment of animal hygiene parameters in pig and cattle housing

Lecturer:
Fels, Schulz, Kemper

Courses for the 4th semester

Department of General Radiology and Medical Physics

0515 General radiology and exercises

Seifert, Bräuninger

1. SW: Structure of matter (1 hour)

Structure of atoms and elementary particles, Bohr's atomic model, orbital model and quantum numbers, periodic table of the elements, structure and energy of atomic nuclei, stability and instability of atomic nuclei

Learning objective / basis for:

- Basis for the understanding of diagnostic and therapeutic procedures in the fields of X-ray diagnostics, nuclear medicine, radiotherapy and magnetic resonance imaging in veterinary medicine
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:

Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:

Seifert, Bräuninger

2. SW: Fundamentals of radioactivity (2 hours)

Nature of nuclear transformations compared to changes in the atomic shell, alpha radiation (decay diagram and spectrum),
Beta radiation (decay schemes and spectra), electron capture reaction, gamma radiation (decay scheme and spectrum), law of radioactive decay, physical half-life, concept of activity, biological and effective half-life

Learning objective / basis for:

- Basis for the understanding of diagnostic and therapeutic procedures in the fields of nuclear medicine and radiotherapy in veterinary medicine
- Prerequisite for basic knowledge in the field of radiation protection in veterinary radiology
- Basis for understanding technical applications of ionising radiation such as feed and food irradiation
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Experiments / Demonstrations:

Attempt:
- Measurement of gamma radiation with a scintillation counter

Co-operation / consultation with:

Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:

Seifert, Bräuninger

4. SW: Interaction of ionising radiation with matter (2 hours)

Wavelength and frequency of radiation, interaction of photon radiation (X-rays and gamma radiation) with matter: classical scattering, photoelectric effect, Compton effect, pair formation effect, exponential attenuation law, concept of attenuation coefficient, concepts of half-value and tenth-value layer thickness;
Interaction of charged particles with matter:
Excitation of an atom, ionisation of an atom, bremsstrahlung, annihilation radiation;
Terms direct and indirect ionising radiation

Learning objective / basis for:
- Basis for understanding diagnostic and therapeutic procedures in the fields of X-ray diagnostics, nuclear medicine and radiotherapy in veterinary medicine
- Prerequisite for understanding the basics of radiobiology (effects of radiation on cells, tissue and organisms)
- Basis for understanding the effects and risks of radiation
- Prerequisite for basic knowledge in the field of radiation protection in veterinary radiology
- Basis for understanding technical applications of ionising radiation such as feed and food irradiation
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

6. SW: Dose terms (1 hour)

Physical doses (ion dose, absorbed dose), biologically assessed doses (equivalent dose and quality factor, organ dose, effective dose and weighting factors, body dose), concept of dose rate, dose concepts in radiation protection (local dose, personal dose)

Learning objective / basis for:
- Basis for understanding dosage in therapeutic procedures in the fields of nuclear medicine and radiotherapy in veterinary medicine
- Prerequisite for understanding the basics of radiobiology (effects of radiation on cells, tissue and organisms)
- Basis for understanding the effects and risks of radiation
- Prerequisite for basic knowledge in the field of radiation protection in veterinary radiology
- Basis for understanding technical applications of ionising radiation such as feed and food irradiation
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

7. SW: Fundamentals of Radiation Biology (2 hours)

Radiobiological effect chain (physical phase, chemical phase, biological phase), concept of LET, direct and indirect radiation effect, radiation effect on the cell (radiosensitivity in the cell cycle, cell survival curves, oxygen effect), fractionation of the radiation dose in radiotherapy, radiation effect on tissue (radiosensitivity)

Learning objective / basis for:
- Basis for the understanding of therapeutic procedures in the fields of nuclear medicine and radiotherapy in veterinary medicine
- Basis for understanding the effects and risks of radiation
- Prerequisite for basic knowledge in the field of radiation protection in veterinary radiology
- Basis for understanding technical applications of ionising radiation such as feed and food irradiation
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

9. SW: Radiation effects and radiation risk (2 hours)

Non-stochastic radiation effects (early damage, late damage, lethal dose), stochastic radiation effects, radiation cancer risk and risk models (relative risk model, absolute risk model), quantitative risk estimation (e.g. in X-ray diagnostics), visualisation of radiation cancer risk, objectives of radiation protection in veterinary medicine

Learning objective / basis for:
- Basis for the understanding of therapeutic procedures in the fields of nuclear medicine and radiotherapy in veterinary medicine
- Prerequisite for basic knowledge in the field of radiation protection in veterinary radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Ministry of the Environment of Lower Saxony
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

11. SW: Measurement, dosimetry and spectrometry of ionising radiation (4 hours)

Principle of ionisation dosimetry,
Ionisation in gases (ionisation chamber, rod dosimeter as personal dosimeter, proportional counter tube, Geiger-Müller counter tube),
Ionisation in solids (semiconductor detector and its application for the spectrometry of ionising radiation),
Scintillation detector (spectrometry),
Thermoluminescence dosimetry (materials, glow curve) including applications as personal dosimeters,

Film dosimetry (materials, optical density, density curve) including use as a personal dosimeter

Learning objective / basis for:
- Basis for understanding the operation of radiation detectors in large radiological devices (e.g. X-ray devices, computer tomographs, gamma cameras)
- Acquisition of digital skills
- Prerequisite for basic knowledge in the field of radiation protection in veterinary radiology, especially in the field of radiation protection monitoring and personal dosimetry
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Experiments / demonstrations:
Attempt:
- Measurement and spectrometry of gamma radiation with a scintillation detector
Demonstrations:
- Rod dosimeter
- Electronic personal dosimeters
- Thermoluminescence dosimeter (finger ring dosimeter)
- Film dosimeter

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

Institute of Pathology

0588 General Pathology (Lecture)

Beineke, Wohlsein, Puff, Gerhauser, Leitzen, Stoff, Hülskötter

1. SW: General Pathology (41 hours)

The subject of general pathology teaches basic knowledge about the development and progression as well as the characteristics and naming of pathological processes. The focus is on pathomechanisms at the molecular and cellular level and their macroscopic manifestation, with particular emphasis on the terminology used to describe pathological processes.
Topics include: History and causes of disease, characteristics of death, immunology and immunopathology, circulation, inflammation, cell growth, regeneration and repair, cellular damage and metabolic disorders, tumourigenesis.

Learning objective / basis for:
Teaching the basic reaction mechanisms of various organ systems.
The material covered forms the basis for a systematic understanding of pathological processes, with a particular focus on generally applicable laws, taking into account macroscopic, cellular and molecular mechanisms. In addition, the focus is on teaching subject-specific terminology for professional communication as well as understanding pathogenesis under formal and aetiological pathogenetic aspects.

Lecturer:
see above;

Institute of Pathology

0589 General Pathology (Seminar)

Beineke, Wohlsein, Puff, Gerhauser, Leitzen, Stoff, Hülskötter

1. SW: General pathology (seminar, weekly) (13 hours)

As part of this course, based on or in addition to the General Pathology lecture, selected chapters will be deepened in the sense of interactive learning. For this purpose, the semester will be divided into four groups, each of which will be further divided into 7 subgroups. For each course, selected chapters, which will be announced in advance, will be worked on using selected questions. The content of the question is realised by the individual groups working on and answering questions on the topics announced to them a week in advance on TiHo-StudIS. The results of the group work are then communicated to the other students in the remaining time in the form of a question-and-answer dialogue. In addition, the questions of the individual subgroups will be discussed and debated. Successful and regular participation is guaranteed by active participation and regular attendance checks (preparation and discussion of the content of the announced text in the sense of a test).

Learning objective / basis for:
Independent development, formulation and answering of questions from the field of special pathology as well as simultaneous development of rhetorical and didactic skills with interactive presentation.

Co-operation / consultation with:
The questions to be addressed in the seminar are regularly announced in advance.

Lecturer:
see above;

Institute of Immunology; Institute of Microbiology; Institute of Virology

0600 General Infectious Diseases (Microbiology, Virology, Immunology)

Dresen, Goethe, Kadlec, Schaaf, Valentin-Weigand (Microbiology); Becher, Behrens, Gremmel, Postel, Volz (Virology); Schuberth, Lepenies (Immunology)

1. SW: General Infectious Diseases (Immunology) (11 hours)

Introduction to the immune system, its components and its basic modes of reaction. Recognising pathogens and danger, the innate immune system, cytokines and chemokines, the complement system, myeloid cells, the adaptive immune response, MHC molecules, B and T cells, antigens and epitopes, antibodies.

Learning objective / basis for:
The material covered lays the foundations for understanding pathogen and infection-relevant immune mechanisms, which are discussed in the 5th semester as part of the lecture Special Infection Theory (Immunology) in the 5th semester. The contents of the lecture are tested in a written examination at the end of the 5th semester.

Lecturer:
Schuberth, Lepenies

1. SW: General infection and epidemiology as well as general bacteriology and virology (28 hours)

Introduction to medical microbiology, infection and epidemiology; general bacteriology (including taxonomy, morphology, growth, metabolism, genetics, pathomechanisms); general virology (including replication, pathogenesis, genetics);

Antimicrobial agents and antibiotic resistance; vaccination and vaccines; hygiene measures against infectious agents

Learning objective / basis for:
Acquiring knowledge and interrelationships in infection and epidemiology as well as general bacteriology and virology

Co-operation / consultation with:
Joint event of the Institutes of Microbiology and Virology

Lecturer:
Becher, Behrens, Gremmel, Postel, Volz (virology); Goethe, Schaaf, Valentin-Weigand (microbiology)

Institute for Animal Genomics

0681 Animal Breeding and Genetics II

Metzger and employees

1. SW: Animal Breeding and Genetics II (40 hours)

Animal breeding and genetics of farm animals; breeds, breeding programmes, basics of genetic diseases and congenital anomalies in cattle, horses, pigs, small ruminants and poultry; selection of breeding animals in particular via the assessment of conformation (preparation for the practical courses at the end of the semester).

Learning objective / basis for:
Learning and practical application of knowledge about animal breeding and the genetics of farm animals. This includes basic knowledge of the various breeds, breeding directions, breeding methods, selection of animals and genetic diseases.

Experiments / demonstrations:
Practical exercise for the conformation assessment of breeding animals

Co-operation / consultation with:
Hanover Mounted Police

Lecturer:
Metzger and employees

Institute for Animal Genomics

0681 Practical exercises for animal breeding and genetics II

Metzger and employees

1. SW: Practical exercises in animal assessment and breeding (42 hours)

Independently carry out animal assessment using linear descriptions of physical characteristics and recording of utilisation-limiting and health defects in dairy cattle, beef cattle, horses, pigs, sheep and goats
Assessment of the animals in free movement and during presentation
Learn how to handle animals, avoid dangerous situations with animals, prevent accidents
Recognising and evaluating breed-specific characteristics and use-limiting defects
Estimating the age, weight and breed-specific development of the animals
Recording and evaluating important anatomical anchor points, muscle areas, fat deposits, changes to joints, claws and other parts of the body directly on the animal
Examination for abnormalities in cattle, documentation of findings and diagnosis including molecular genetic test results

Learning objective / basis for:
Comprehensive practical knowledge in the assessment of body characteristics and the correlation between certain characteristics of conformation traits and health and physiological function such as limitation of utilisation in dairy cattle, beef cattle, horses, pigs, sheep and goats

Experiments / Demonstrations:
Practical courses in groups and on groups of animals at the Ruthe Training and Experimental Farm, Institute for Animal Breeding and Mounted Police Hanover
One group of animals is available per course

Co-operation / consultation with:
Ruthe Training and Experimental Farm, Hanover Mounted Police

Lecturer:
Distl and employees

Institute for Animal Nutrition

0700 Animal nutrition I (feed science/general animal nutrition)

Hankel, Hartung, Lingens, Schwennen, Visscher, Wilke

1. SW: Introduction, feed (FM) categorisation, overview, FM tests (2 hours)

Criteria for categorising feed, sampling - Methods for feed testing - Analysis

Learning objective / basis for:
In addition to a general introduction and the presentation of accompanying or further literature, an overview of the categorisation of feedstuffs according to the criteria of type and origin, consistency and water content, according to the main ingredients, the number of components, the use and application as well as business and economic aspects will be given.
In addition, methods of feed testing are presented (sensory testing, microscopic, physical, microbiological-toxicological and chemical feed tests such as the Weender analysis and feeding trials), which are essential for a more detailed characterisation of the value and quality of feed.

Lecturer:
Visscher

2. SW: Feed digestibility (2 hours)

Concepts of digestibility, determination of digestibility (apparent, true, partial, in-vitro digestibility), influencing digestibility

Learning objective / basis for:
Classically, digestibility is determined in animal experiments in which the feed to be tested is used alone or in combination with other components in a defined and constant quantity. This is used to determine the apparent and true digestibility as well as the partial digestibility (e.g. in fistulated animals).
Various in-vitro methods are also presented as an alternative to determining digestibility in animal experiments. In addition, various factors (e.g. the animal itself, feed and ration ingredients as well as feed preparations and additives) that can influence the digestibility of the feed to be tested are discussed.

Lecturer:
Hankel

3. SW: Energy assessment/demand assessment (2 hours)

Energy evaluation systems for different species - Estimation of the energy content in single and compound feeds

Learning objective / basis for:
The question of the energy value of a feed is one of the original questions of animal nutrition. The exclusive determination of the calorific value of a feed in the bomb calorimeter would only inadequately or completely misrepresent the possible energetic benefit. Thus, the question of digestibility must inevitably be included in the assessment of the energy benefit. Furthermore, whether digestion is carried out by the body's own enzymes or by microorganisms in the gastrointestinal tract is important for the energy value. Last but not least, the nutrient composition of the feed is also of considerable importance. In principle, different techniques are used for the energy evaluation of a feed - depending on the energy level at which the evaluation is to be carried out.
Two main methods are available for determining requirements: dose-response tests and factorial derivation, in which the requirement is derived from the sum of various partial performances (maintenance, growth, pregnancy, milk or egg production and exercise performance).

Lecturer:
Visscher, Wilke

4. SW: Protein evaluation/requirement (2 hours)

Protein content in feedstuffs, essential amino acids, amino acid patterns, protein evaluation based on the precaecal digestibility of protein and amino acids, protein evaluation by N-balance, classification of feedstuffs according to intraruminal Rp degradability; amino acids as feed additives

Learning objective / basis for:
The protein supply of an animal can initially be assessed on the basis of the protein content of a feed. In addition, the organism requires amino acids in a certain quantity and ratio for the maintenance metabolism as well as for the formation of proteins contained in performance products (body mass gain, milk, eggs, hair, feathers). The non-essential amino acids can be formed in the metabolism, while essential amino acids must be supplied with the feed.
The amino acid requirement is determined according to the dose-response principle, whereby the amino acid to be tested is initially present in deficiency and then gradually added.

Lecturer:
Visscher

5. SW: Mineral supply (2 hours)

Mineral content in feed and in the organism, basic data for calculating mineral requirements, interactions in trace element metabolism

Learning objective / basis for:
In addition to organic nutrients such as protein, carbohydrates and fats, the animal organism also requires small amounts of inorganic elements. Single or compound feeds containing one or more minerals are therefore used to supplement mineral-poor feeds and rations. They are either applied in isolation from the other ration components or mixed into the rations/mixed feed.

In addition to the needs-based supply, the effects and consequences of an excess or deficiency in the animal with the corresponding consequences for animal health and regulatory disorders in the mineral balance are to be shown.

Lecturer:
Visscher

6. SW: Vitamin supply (2 hours)

Vitamin contents in feed and in products from food-producing animals - recommendations for the optimal supply of fat- and water-soluble vitamins

Learning objective / basis for:
Vitamins are defined as a group of organic substances that occur in small quantities in feed of natural origin. Unlike fats, carbohydrates or proteins, the various vitamins are structurally very heterogeneous. A basic distinction is made between two groups based on solubility. The fat-soluble vitamins include vitamins A, D, E and K, while the B-complex vitamins and vitamin C are categorised as water-soluble vitamins.
They are organic substances that are essential for metabolic processes and cannot be produced in the animal's organism, or only in insufficient quantities. They must therefore be supplied with food. The feeding practice, i.e. the supply, will be presented using examples. The effects of an excess (see vitamin A in the liver) as well as deficiency situations (see vitamin E) will be addressed.

Lecturer:
Visscher

7. SW: FM production (arable land, grassland) (2 hours)

Definition and botanical characterisation of green fodder, botanical and chemical composition, negative ingredients, use in various animal species

Learning objective / basis for:
Green fodder is the above-ground parts of forage plants that have not yet completed their growth and come from both permanent grassland and arable land or are by-products of arable farming.
Forage from permanent grassland includes grasses, legumes and herbs. Maize is by far the most important forage crop from arable land in terms of area. In addition, lucerne and red clover are still of some importance as green fodder plants from main crop cultivation. From intercropping, green rape, stubble turnips with leaves and marrow stem cabbage (regionally) are more widespread.
The composition and feed value of the green fodder are significantly influenced by the botanical composition, the stage of vegetation and the time of use, as well as the use of appropriate fertilisers. In addition, special ingredients (e.g. nitrate, S-methyl-cystine, saponins, etc.) must be taken into account, which may be the cause of veterinary problems (e.g. methaemoglobin formation) (e.g. NO3 poisoning, carbonaemia, hyperoestrogenism)

Lecturer:
Visscher

8. SW: FM conservation/processing (2 hours)

Method of processing green fodder / drying / ensiling

Learning objective / basis for:
Long-term storage of green fodder is only possible if it is preserved accordingly. Appropriate preservation methods include drying, ensiling and alkalisation (use of urea or NH3).
During the drying process, various extraction methods are used (harvesting time, soil/root/under-roof drying), which have a decisive influence on the nutrient content, but also the storage stability of the feed to be harvested.
Ensiling - the steps of which are described in detail - ensures the shelf life of water-rich feedstuffs and minimises the risks of harvesting, whereby the processing is largely independent of the weather. The lactic acid fermentation used here as a preservative principle produces a digestible feed that is generally well absorbed.
The success of ensiling depends on the initial product, but also on the fermentation process, which is primarily ensured by adhering to the various process steps. The veterinarian is particularly required to assess the silage, i.e. the silage success (preservation process) and the feed value.

Lecturer:
Visscher

9. SW: FM spoilage (2 hours)

Changes in feed caused by microorganisms and/or storage pests as well as abiotic processes with effects on feed value, animal health and/or product quality

Learning objective / basis for:
Feed spoilage includes detrimental changes in feed that can be attributed to both biotic and abiotic processes, which have an impact on feed value, animal health and/or product quality.
The biotic spoilage of a feed is a process whose dynamics are essentially dependent on the initial load of stored pests and/or germs or the possible introduction of these organisms, the environmental or substrate conditions, natural protective mechanisms and the time factor. Under conditions of PRaxis, the moisture content in the feed is probably the most important factor when it comes to spoilage/deterioration.
Abiotic spoilage includes processes such as oxidation (the process of becoming rancid), the polymerisation of unsaturated fatty acids or the condensation of amino acids.
Recognising and objectifying the hygienic quality (e.g. based on the types and numbers of germs in the feed or water) of feed is an important part of the veterinary spectrum of tasks.

Lecturer:
Visscher

10. SW: Mycotoxins (2 hours)

Presentation of secondary metabolites formed by certain fungi; differentiation between field and storage fungi, according to their clinical effects and organ affinities; legal framework (maximum values/orientation values)

Learning objective / basis for:
Mycotoxins are secondary metabolites that are formed by certain fungi on animal feed before or after harvesting. Accordingly, it makes sense to differentiate between field and storage fungi and their toxins. In addition to the occurrence and detection possibilities, the clinical significance of mycotoxins in particular should be highlighted. The effects of mycotoxins are manifold with different organ affinities (local, e.g. in the gastrointestinal tract, possibly also systemic, e.g. hormone-like) and only become visible when mycotoxin uptake has already occurred for a long time or is no longer present.

Lecturer:
Hankel

11. SW: FM contamination (2 hours)

Impurities, contaminants or inputs of animate or inanimate nature that get onto/introduce feed from outside; contaminants of inanimate or animate nature and origin (poisonous plants, seeds with poisonous ingredients, pathogens of infectious diseases, toxins of bacterial origin)

Learning objective / basis for:
Contaminants are impurities, burdens or inputs of animate or inanimate nature that enter the feed from outside, i.e. they are not constitutive feed components, although they may be partially integrated into the feed (e.g. certain mycotoxins inside the grain) (and thus can no longer be cleaned).
Poisonous plants are also often a source of contamination. The same applies to seeds with poisonous ingredients or plants that are not primarily intended for feeding.
Even if there are certain transitions/intermediate forms, feed contamination should be differentiated from feed spoilage, even if it sometimes results from spoilage. Many contaminants are listed in the Feed Directive 2002/32/EC and deserve special attention, particularly from the point of view of food safety (see "feed scandals" caused by dioxins etc.).

Lecturer:
Visscher

12. SW: Negative FM ingredients (2 hours)

Feed with harmful/undesirable ingredients (inorganic substances, simple N-compounds, glycosides, carbohydrates, proteins, chelating agents, agonists, antagonists)

Learning objective / basis for:
Quite a few feedstuffs contain ingredients with adverse effects on animals or foodstuffs derived from animals, not least depending on the plant species and variety, location and fertilisation as well as other environmental influences.
In international usage, the term ANF (anti-nutritional factors) has become established for such substances. However, these ingredients do not justify the term toxic ingredients or toxic plants, so that they must be treated differently. In addition, some of these negative ingredients are regulated under feed law (undesirable substances) with corresponding maximum levels. Examples of these are Phytates, nitrate, glucosinolates or isoflavones.

Lecturer:
Visscher

13. SW: Feeding and food quality (2 hours)

Influence of nutrition on the quality of products derived from animals (nutrient content, residues, contamination), quality criteria in meat, milk and egg production

Learning objective / basis for:
The link between feeding and food quality was already emphasised in the first version of the German Feedstuffs Act (1926).
Due to various events in recent years (dioxin/BSE), this topic has attracted more public/political interest than ever before. In addition to scientifically clearly defined quality criteria for food, further requirements and consumer expectations have been added. It is

often/generally assumed that "food safety" begins with "safe animal feed". However, this only covers part of the factors that have an influence on food quality in terms of feeding. In particular, the possibilities of a targeted positive influence on food quality as well as possible negative influences (e.g. undesirable substances such as aflatoxins, ochratoxins, heavy metals) are discussed in more detail. In addition, examples of a targeted positive influence (functional food, milk and eggs as examples that can be influenced very positively) are shown. Furthermore, the importance of feeding for the occurrence of zoonotic pathogens in animal production is emphasised.

Lecturer:
Visscher

14. SW: FM law (2 hours)

Fundamentals and objectives of the Feedstuffs Act, Feedstuffs Ordinance and Feedstuffs Transport Ordinance, instruments of feedstuffs legislation, definitions, overviews of the most important regulations

Learning objective / basis for:
A significant proportion of the feed legislation currently in force at national level has a long tradition, and some of the wording is almost identical to passages from the first Feed Act from 1926.
Driven by the BSE incident and other scandals, there have been increased efforts at EU level to achieve the highest possible safety standard for animal feed. Various demands in the White Paper are based on the assumption that the safety of food begins with the safety of animal feed.
The relevant passages from the EC Basic Regulation on Foodstuffs, the EC Regulation on Official Controls, the Food and Feed Code and the FM Hygiene Regulation are presented in more detail. In practice, i.e. in everyday compound feed production, the FM Transport Regulation is the most important regulation today. Individual EU directives (e.g. on additives) are also addressed.

Lecturer:
Lingens, Visscher

Institute for Animal Nutrition

0702 Exercises in animal nutrition I

Visscher, Hankel, Hartung, Lingens, Lohkamp, Schubert, Schwennen, Spieß, Ullrich, Wilke

1. SW: Sampling and feed analysis / water quality (2 hours)

Procedure for taking samples (authorisation, implementation), submission of samples, criteria for the necessity of feed testing, range of tests, analysis (standard methods and further tests)

Learning objective / basis for:
Basic knowledge with regard to the indication for sampling, the technical implementation, the legal framework and the necessity of feed analyses; knowledge of standard analysis methods, determination of useful analysis spectra (case-specific), assessment of the necessity of further analyses; basic parameters of water quality

Experiments / Demonstrations:
Presentation of feedstuffs; demonstration of sampling technology, sample packaging and dispatch; image material

Lecturer:
Visscher as well as scient. employees

2. SW: Feed digestibility (2 hours)

Specialist terminology, carrying out digestion tests (questions, practical implementation, problems, understanding), evaluation of digestibility tests (calculation, interpretation), calculation and derivation of energy contents

Learning objective / basis for:
Knowledge of technical terms, the background to digestibility tests, how to carry them out taking into account the research question; evaluation and assessment of the results of digestibility tests; calculation of digestibility, gross energy and digestible energy

Experiments / Demonstrations:
Demonstration of a balance cage or stalls for carrying out digestibility studies, including fistulated animals

Lecturer:
Visscher as well as scient. employees

3. SW: Basic calculations (2 hours)

Introduction to the common energy dimensions and terms, stages of energy assessment and basics of calculation (using examples for the various species); use of estimation formulae without knowledge of the digestibility of nutrients

Learning objective / basis for:
Knowledge of the basic concepts of energy evaluation, the different energy evaluation levels and their application to different animal species; ability to independently calculate energy contents in feed and compound feed for different species; calculation of energy contents using estimation formulae by the students

Experiments / Demonstrations:
Feed samples to assess the energy content or milk production capacity of the respective substrate

Lecturer:
Visscher as well as scient. employees

4. SW: Compound feed production and assessment (2 hours)

Introduction to the technical terms, classification of feedstuffs into the various groups, presentation of compound feed production (technology, special features, problems); practical exercises in compound feed assessment (sensory, observance of the declaration), basic principles such as grinding, pelletising, extrusion; ideas on the advantages and disadvantages of special compound feed formulations; question of the "physical structure" in compound feed.

Learning objective / basis for:
Basic knowledge of the classification of feedstuffs into the various groups, the production of compound feed and possible problems during production; ability to independently assess compound feed; declaration control issues; sieve analysis results: Assessment according to animal species and utilisation group

Experiments / Demonstrations:
Feed samples; demonstration of a technical plant for compound feed production

Lecturer:
Visscher as well as scient. employees

5. SW: Bulk element compounds, additives (2 hours)

Providing an overview of the most important bulk element compounds and - separately - of additives (15 groups from amino acids to preservatives and radionuclide binding agents), their use and significance in animal nutrition; risks of improper use as well as the legal basis and requirements for use; use by animal owners, by the MF industry, by veterinarians?

Learning objective / basis for:
Basic knowledge of the requirements, the quantities and concentrations used, the availability for the organism, limitations of use (quantity, animal species) and the legal background of bulk elements and additives; successful application of the knowledge imparted to case reports from practice (intoxications in animals due to incorrect supply of bulk and trace elements and additives)

Experiments / Demonstrations:
Sample material from the areas of bulk elements, additives, premixes and mineral feed; case reports on intoxications/cross contamination

Lecturer:
Visscher as well as scient. employees

6. SW: Animal feed (2 hours)

Presentation of the different types of feed of animal origin, their classification and explanation of the current legal situation; characterisation of the individual product groups (milk and milk processing products, fish and fish processing products as well as products from land animals, eggs and egg products) with regard to value-determining ingredients, possible uses and possible hazards when using these products

Learning objective / basis for:
Knowledge of the different types of feed of animal origin, their special features, chemical composition, possible uses and the current legal situation to be observed, dangers such as BSE, contamination with classic zoonotic pathogens such as salmonella

Experiments / Demonstrations:
Feed samples from the various sub-sectors of feed of animal origin, in particular milk processing products and processed animal proteins, i.e. current slaughter by-products

Lecturer:
Visscher as well as scient. employees

7. SW: Cereals and cereal by-products (2 hours)

Presentation and characterisation of the different types of cereals (characteristics, structure, special features); composition and feed value of cereals, possible uses for different animal species; cereal by-products; quality issues (botanical purity, contaminants, mycotoxins)

Learning objective / basis for:
Recognise the different types of grain, knowledge of the structure of the grain kernel, the feed value and the chemical composition; knowledge of the use of the different types of grain and grain by-products in the individual animal species; recognise and evaluate (by the students) quality defects and contamination with regard to a risk to humans and animals

Experiments / demonstrations:
Feed samples of cereal and cereal by-products; images; demonstration of pest preparations and other contaminants in cereals (e.g. ergot/ ergot alkaloids etc.)

Lecturer:
Visscher as well as scient. employees

8. SW: Legumes, oilseeds and oil mill by-products (2 hours)

Presentation and characterisation of the various legume species with regard to their identifying features, their botanical classification, negative ingredients and use in the various animal species; oil mill by-products (occurrence, characterisation, use, limits of use), communication of risks associated with improper use of legumes and oil mill by-products (negative ingredients and contamination) -> "domestic and imported" protein sources

Learning objective / basis for:
In-depth understanding of the characteristics, possible applications and limitations of the use of legumes and oil mill by-products in the various animal species; knowledge of health risks and disorders associated with improper or too intensive use of these feedstuffs, understanding of the background to the discussion: Food-Feed-Fuel

Experiments / Demonstrations:
Feed samples of legumes, oilseeds and oil mill by-products; images; case studies from practice with regard to health disorders/risks

Lecturer:
Visscher as well as scient. employees

9. SW: Roots, tubers and their by-products; other by-products used in feeding (2 hours)

Presentation of the most important characteristics (botanical features, ingredients, feed value, special ingredients and possible uses) of roots and tubers; presentation of various processing technologies for roots (especially beets) and tubers (especially potatoes and tapioca), characteristics of the resulting by-products and their possible uses, including an explanation of the possible dangers of excessive use

Learning objective / basis for:
Recognise the most important roots and tubers as well as knowledge of their feed value, special ingredients and possible uses in animal nutrition; knowledge of the processing of roots and tubers, the type and quantities of by-products and the utilisation of the same (with special consideration of the main uses and possible dangers, for example dangers such as throat blockage in horses due to swelling dry pulp).

Experiments / Demonstrations:
Feed samples (original feed and processed products); images; new by-products such as pomace from juice production, old bread and similar products ("date goods")

Lecturer:
Visscher as well as scient. employees

10. SW: Forage from meadows/pastures and fields (2 hours)

Characterisation of the most important forage plants (grasses, herbs, legumes) with regard to botanical classification, nutrient content, use in animal nutrition and special features to be observed (antinutritive ingredients, quantity limits); reference to frequently encountered poisonous plants on grassland and arable land

Learning objective / basis for:
Recognising the most important green fodder plants from meadows/pastures and fields, assessing their composition (feed value) and knowledge of risks when used as animal feed

Experiments / demonstrations:
Presentation of forage plants and poisonous plants; images and "useful plants and poisonous plants" in front of the institute building

Lecturer:
Visscher as well as scient. employees

11. SW: Silage preparation/silage assessment (2 hours)

Presentation of the various production steps in silage preparation, the techniques; questions of silage success and explanation of the use of silage in the various animal species; introduction to silage assessment (theoretical and practical; sensory and chemical-physical assessment parameters)

Learning objective / basis for:
Understanding the basics of ensiling and ensiling technology, including possible faults; knowledge of the test options (sensory and chemical) for assessing silage quality; recognising different silages and assessing feed value and conservation success, especially as a basic feed in ruminant feeding; silages as an alternative to hay in horse and calf feeding

Experiments / Demonstrations:
Silage preparation using a model; feed samples; sensory evaluation of samples; images; various types and qualities of silage from the Ruthe teaching and research farm and from the Institute's service area

Lecturer:
Visscher as well as scient. employees

12. SW: Hay and straw assessment (2 hours)

Presentation of the various methods for obtaining and storing hay and straw; importance of the time of cutting for use and composition and feed value; use in different animal species and indications of possible poisonous plants; assessment of hay and straw in theory and practice (i.e. on site, in livestock), hygiene deficiencies in hay and straw -> importance in equine practice of COPP and similar diseases

Learning objective / basis for:
Knowledge of the procedures for obtaining and storing hay and straw and the use of the feed obtained for the various animal species; ability to assess the feed value and hygienic quality of hay and straw samples from the Institute's submission area (in particular hygiene deficiencies in hay and straw)

Experiments / Demonstrations:
Feed samples; practical implementation of a hay and straw assessment; image material

Lecturer:
Visscher as well as scient. employees

13. SW: Infections through feed and compound feed against infections? (2 hrs.)

Presentation of cases of damage from practice with special consideration of possible associated infections of animals/animal herds. Imparting knowledge with regard to feed and feeding-related measures to reduce/limit infections in animals and their effects on the

animal. Feeding against certain infections / in the presence of certain infections / after surviving infectious diseases

Learning objective / basis for:
Deeper insight into the topic of feed-related cases of damage (assessment of the risk potential, prevention and case reports) as well as potential measures on the part of animal nutrition to influence infections in animals / livestock preventively, to modulate their course and to reduce the damage to the animal.

Experiments / Demonstrations:
Case reports from the submission area

Lecturer:
Visscher as well as scient. employees

Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology

0710 Animal welfare II

Spindler, Fels, Hiebl, Bohnet

1. SW: Current animal welfare issues in the keeping of farm animals, pets and laboratory animals (13 hours)

Legal basis for animal welfare and current case studies

Learning objective / basis for:
Knowledge and legal assessment of current topics relevant to animal welfare in farm animal, pet animal and laboratory animal husbandry

Lecturer:
Hiebl, Spindler, Fels, Bohnet

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0780 Propaedeutics incl. exercises (small cloven-hoofed animals)

Ganter, Hennig-Pauka, Höltig, Waberski, Bauer, Kiene, Roth, Schregel, v. Altrock, Wagener, Wilhelm, Luther

1. SW: Propaedeutics incl. exercises (small cloven-hoofed animals) (20 hrs.)

Clinical examination of pigs and small ruminants, including herd examination;
Forms of application as part of the therapy

Learning objective / basis for:
Basics of the clinical examination of individual animals and the examination of livestock

Experiments / demonstrations:
Exercises in general clinical and advanced diagnostics (clinical examination, blood sampling, joint puncture, obstetric examination, CNS examination);
Application options

Lecturer:
Ganter, Wendt, Waberski, von Altrock, Wagener, Roth, Wilhelm, Rath, Oberheide, Schregel, Nicolaisen, Kiene, Wagener, Neubert (instead of Ganter, Wendt, Waberski, von Altrock, Wagener, Roth, Wilhelm, Rath, Oberheide, Schregel, Nicolaisen, Kiene, Wagener, Neub

Clinic for horses

0800 Clinical propaedeutics for horses

Feige, Sieme, Geburek, Ohnesorge, Bartmann, Delling, Verhaar, employees

1. SW: Clinical propaedeutics for horses (28 hours)

Signalling, dental age, medical history, restraint and taming measures, general examination, cardiovascular system, upper and lower respiratory tract, lameness diagnostics, neurological examination, examination of the digestive tract, urinary and reproductive organs

Learning objective / basis for:
Learning the systematic and targeted examination of the various organ systems of the horse to determine the normal condition or to diagnose pathological deviations

Experiments / Demonstrations:
Practical exercises in small groups on horses on the topic presented in the lecture (7 x 2 hours each)

Lecturer:
see above.

Clinic for small animals

0820 Clinical propaedeutics for small animals

Volk H., Kästner, Mischke, Tipold, Goericke-Pesch, Kramer, Busse C., Sehn, Volk, A.

1. SW: General examination, coercive measures (1 hour)

Signalling (natural and artificial characteristics, anamnesis and documentation; assessment of the general condition based on posture, behaviour, conformation, developmental condition, nutritional condition, grooming condition and body weight; discussion and demonstration of the general clinical examination, diagnosis, list of differential diagnoses.

Learning objective / basis for:
Recording the most important patient data, taking a detailed medical history, assessing the general condition and performing a general clinical examination to identify the presumed location of the disease and formulate a further diagnostic plan

Experiments / demonstrations:
Short video sequences on the clinical examination procedure, practical exercises

Lecturer:
H. Volk

2. SW: Heart/respiratory tract (1 hour)

The most important anatomical and physiological principles of the cardiovascular system are repeated and the individual steps of the clinical cardiological examination are explained, from signalling, special anamnesis, inspection via palpation (mucous membranes with capillary refill time (KFZ), pulse, lateral cardiac impulse), percussion and auscultation (FIRAG; puncta maxima, temporal relationship of heart sounds to cardiac action, pulse deficit; grading of heart sounds). In addition, further diagnostics such as ECG, X-ray and echocardiography are presented and their indications and findings explained.
The most important anatomical and physiological principles of the upper and lower respiratory tract are repeated and the clinical examination of the nose, larynx, trachea, bronchi and lungs as part of an adspection (e.g. mucous membrane colour, nasal discharge, swelling, asymmetries, breathing type), palpation, percussion and auscultation are explained

and normal findings and pathological findings are presented. Further diagnostics such as X-ray, CT and endoscopy are then presented.

Learning objective / basis for:
Students should be able to carry out a clinical cardiological examination, recognise arrhythmias on the basis of a pulse deficit and be able to assign heart murmurs (with degree) to an action phase and a punctum maximum. They should also be able to develop a plan for further diagnostics.
Students should then be able to carry out a clinical respiratory examination independently and be able to recognise normal findings and pathological findings. In addition, students should know the indications for further diagnostics.

Experiments / Demonstrations:
Visual material and demonstrations, practical exercises

Co-operation / agreement with:
no

Lecturer:
Sehn/Lietz

3. SW: Orthopaedics (1 hour)

Orthopaedic examination: special anamnesis, examination while standing, walking, trotting and sitting, position/posture faults; degrees of lameness; orientating palpation from proximal to distal, special deep palpation from distal to proximal, more detailed explanation with the aid of images, further diagnostics (in particular imaging)

Learning objective / basis for:
Correct performance of an orthopaedic examination, including taking a special medical history

Experiments / Demonstrations:
Image and film material, practical exercises

Lecturer:
Harms/Kramer

4. SW: Neurology (1 hour)

The instruments required for the neurological examination and their areas of application are discussed. In addition, the anatomical principles of the CNS and PNS are repeated and the relationship between the upper (OMN) and lower motor nerve system (UMN) is explained. In this context, the effects of disorders in the OMN or UMN on reflex activity, paralyses (paresis, paralysis), muscle tone, movement, postural reactions and irritation symptoms are examined.
The individual steps of the neurological examination (consciousness, posture, gait, head nerves, postural and positional reactions, spinal reflexes and pain sensation) are explained with the tests and assessment criteria required to carry them out and normal and pathological findings are presented.
Finally, the indications for further diagnostics such as myelography, CT, myelo-CT, MRI, EEG and electrodiagnostics are given.

Learning objective / basis for:
Knowledge of the anatomical basics of the central and peripheral NS.
Knowledge of the individual steps of the neurological examination and their implementation

Knowledge of the cranial nerves, the OMN and UMN and the spinal reflexes to determine the localisation of a lesion

Experiments / Demonstrations:
Image and video material, practical exercises

Lecturer:
A. Tipold

5. SW: Ophthalmology (1 hour)

The various steps of the ophthalmological examination are explained and demonstrated. Tools required for an eye examination under certain conditions (local anaesthetics, mydriatics, staining agents, splinting agents, Schirmer tear test. In addition, the most important instruments and examination devices for the eye examination are presented and their use on eyes or adnexa is shown.
Breakdown of the special eye examination into:
1. External examination of the eye and the area around the eye
2. internal examination of the eye using special examination techniques (direct and indirect ophthalmoscopy, tonometry, slit lamp biomicroscopy, gonioscopy, fundus camera, electroretinography)

Learning objective / basis for:
Knowledge of the anatomy of the eye and the adnexa
Carrying out an ophthalmological examination with knowledge of the necessary examination procedures and normal findings
Determination of the sections of the eye that are involved in the disease process

Experiments / demonstrations:
Images, demonstrations

Lecturer:
C. Buses

6. SW: Abdomen (1 hour)

Indications for a detailed examination of the abdomen, examination techniques: Adspection, palpation technique: normal findings and pathological findings of various organs (urinary organs, liver, spleen, stomach, intestines), other examination procedures (e.g. undulation test).

Learning objective / basis for:
Recognising the need for a detailed examination of the abdomen, teaching the technical principles for clinical examination of the abdomen in dogs and cats.

Experiments / Demonstrations:
Demonstration of selected examination techniques on animals and by means of video film, practical exercises

Lecturer:
Mischke

7. SW: Dermatology (1 hour)

Taking a general and specific medical history of the skin patient. Clinical examination of the skin patient including initial (e.g. flea comb examination, skin scraping) and further diagnostic test procedures (e.g. skin biopsy, intradermal test) as well as documentation of findings.

Learning objective / basis for:
Learning objectives Propaedeutics Dermatology
-Lesion type / distribution
-Dermatological surface samples (incl. fine needle aspiration and skin biopsy) which and how performed
-Ear anatomy and examination

Experiments / Demonstrations:
Demonstration of various examination procedures on animals.

Lecturer:
A. Volk

8. SW: Sexual apparatus (1 hour)

Taking of a signalling and special anamnesis, carrying out an andrological and gynaecological examination including the mammary gland. Adspection and palpation of the external genital organs and abdominal palpation as well as rectal examination of the palpable internal genital organs (prostate). Uterus and ovaries not normally palpable, uterus if enlarged. Further examinations such as sonography and X-ray to visualise non-palpable parts such as ovaries and uterus.
Vaginoscopy, vaginal (cycle diagnostics) and preputial smear (hyperoestrogenism), hormone tests

Learning objective / basis for:
Knowledge of the anatomical basics.
Performance of an andrological and gynaecological examination including the mammary gland.
Knowledge of further examination techniques such as vaginoscopy, sonography, X-ray, vaginal and preputial smears and hormone tests

Experiments / demonstrations:
Visual material, practical exercises

Lecturer:
S. Goericke-Pesch

9. SW: Injection techniques and blood sampling (1 hour)

The most important principles of antisepsis are discussed: Hand hygiene, handling of injection solutions (handling and storage), needles and syringes. The anatomical principles of the veins used for blood collection/intravenous administration and the muscles used for intramuscular injections are illustrated using images. In addition, the technique of blood collection, intravenous, intramuscular and subcutaneous injection is explained.

Learning objective / basis for:
Learning the basic rules of antisepsis in relation to blood collection and injection.
Refreshing the anatomical principles relevant to blood collection and injection. Correct procedure for blood collection and injection.

Lecturer:
S.Kramer

10. SW: Sample techniques, blood testing, cytological diagnostics (1 hour)

Indications for blood tests, sample materials, haematological examination techniques (blood smear, visual cell counting and automatic haematology systems); basics of cytological

diagnostics: indication, advantages and disadvantages, sample collection and processing, cytological examination procedure

Learning objective / basis for:
Selection of suitable sample materials for blood tests; basic knowledge of selected haematology examination procedures; basic knowledge of the possibilities of cytological diagnostics and the sample techniques recommended for the preparation of cytological specimens.

Lecturer:
R. Mischke

11. SW: Anaesthesia/Analgesia (1 hour)

Medical history; signalling; assessment of general condition, general clinical examination, examination of the respiratory system, examination of the cardiovascular system

Learning objective / basis for:
Anaesthesia preliminary examination, indication for further diagnostic tests. Application of the ASA status classification

Experiments / Demonstrations:
Short video sequences on the clinical examination procedure

Lecturer:
Kästner

12. SW: X-ray positioning, X-ray anatomy (1 hour)

The standard planes of the most important body regions are presented and the X-ray anatomy is explained. Rules and tips for positioning the thorax, abdomen and pelvic cavity are also given. The positioning of the elbow and knee joints is also discussed by way of example.

Learning objective / basis for:
Knowledge of the standard planes that must be produced for each body region and learning the correct positioning and subsequent assessment of the technical quality of the X-ray image

Experiments / Demonstrations:
Image material

Co-operation / agreement with:
no

Lecturer:
S. Kramer

13. SW: Instrumentology / only on Moodle (1 hour)

The most important basic surgical instruments (forceps, needle holders, clamps, grasping forceps, scissors, scalpel) are presented in their function and their handling is explained using images. In addition, the various suture materials are presented and the differences are explained.

Learning objective / basis for:
Correct use and handling of basic surgical instruments, avoidance of injuries

Experiments / Demonstrations:
Image material

Lecturer:
S. Kramer (only on Moodle)

Clinic for small animals; Clinic for cattle

0840 Propaedeutics cattle

Hoedemaker, Bajcsy, Gundling, Heppelmann, Höltershinken, Neßler, Böker, Debertolis, Gaude, Jensen, Kallmeyer, Krause, Küskens, Luhr, Morawitz, Risch, Schwär, Szura, Wegerich, Weitz, Yücesoy

1. SW: General examination, coercive measures (4 hours)

Behaviour and dangers when handling cattle, methods of restraint, general short examination course

Learning objective / basis for:
Accident prevention when handling cattle and assessment of general condition

Experiments / Demonstrations:
Exercises on handling cattle, restraint measures and non-invasive interventions

Lecturer:
Kehler and wiss. Employee (instead of)

Remarks:
Proven participation in this first teaching unit is a prerequisite for applying as a student assistant.

2ND SW: Circulation, heart, lymph nodes (4 hours)

Examination of the cardiovascular system of cattle

Learning objective / basis for:
Clinical examination of the heart and circulation

Experiments / demonstrations:
Demonstration and practical exercise of the examination of the heart and circulation in cattle

Lecturer:
Grünberg and scient. employee

Remarks:
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4. SW: Respiratory/urinary tract (4 hours)

Teaching the propaedeutics of the respiratory and urinary act

Learning objective / basis for:
The material covered forms the basis for clinical examination of the respiratory and urinary tract. Teaching of the nomenclature as well as the individual examination techniques.

Experiments / demonstrations:
Clinically ill cow with visible changes in breathing and lung sounds on inspection

Lecturer:
Höltershinken and wiss. employee

Remarks:
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6. SW: Digestive tract (4 hours)

- Examination techniques of the individual sections of the digestive tract
- Discussion of aids
- Findings from studies

Learning objective / basis for:
Introduction to independent examination of the digestive tract

Experiments / Demonstrations:
Demonstration of examination techniques on animals as an introduction to teaching in small groups

Lecturer:
Kehler and scient. employee

Remarks:
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8. SW: Udder (3 hours)

Teaching theoretical and practical knowledge of examination techniques on the udder of cattle, including milk sampling

Learning objective / basis for:
Application of examination methods in the above-mentioned areas

Experiments / Demonstrations:
Demonstration and practical exercises in small groups

Lecturer:
Hoedemaker and employees

Remarks:
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10. SW: Andrology (3 hours)

Andrological examination Bulle

Learning objective / basis for:
Examination of the genital apparatus in bulls (clinical and advanced)

Experiments / demonstrations:
Demonstration of clinical and sonographic examination of the genital apparatus bull, preputial flush sample

Lecturer:
Heppelmann and employees

Remarks:
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12. SW: Obstetrics/gynaecology (4 hours)

Propaedeutics gynaecology

Learning objective / basis for:
Gynaecological examination of cattle

Experiments / Demonstrations:
Practical demonstration on patients (rectal and vaginal examination, ultrasound)

Lecturer:
Heppelmann and employees

Remarks:
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14. SW: CNS, musculoskeletal system (2 hours)

Neurological examination and assessment of lameness

Learning objective / basis for:
Detection of neurological diseases and localisation of lesions

Experiments / Demonstrations:
Practising neurological examinations and lameness on test subjects (calves)

Lecturer:
Neßler/Kehler and wiss. staff (instead of)

Remarks:

Clinic for cattle

0851 Evening treatments (in small groups)

Hoedemaker, Gundling, Heppelmann, Böker, Gaude, Korte, Krause, Küskens, Morawitz, Proios, Risch, Schwär, Szura

1. SW: Evening treatments (4 hours)

Examination, sampling, treatment, holding and restraining of animals etc. as a practical activity (hands on patient) under supervision

Learning objective / basis for:
Teaching of skills and abilities in diagnostics and therapy (incl. introduction to surgical manipulation on patients)

Experiments / Demonstrations:
Examination and treatment of patients (sampling, treatment, holding patients, etc.) directly on the animal

Lecturer:
Hoedemaker, , Grünberg, Kehler and research associates employees

Remarks:
50 % of the hours attended can be credited as general compulsory electives.

Clinic for pets, reptiles and birds

0860 Clinical propaedeutics for pets, reptiles and birds

Pees, Dierig, Hennig, Hetterich, Kopp, Krull, Legler, Reuschel, Stelter, Willems

1. SW: Clinical propaedeutics in birds (2 hours)

Anamnesis, labelling, inspection, catching and handling, clinical examination, sampling

Learning objective / basis for:
The student can perform a general and specific anamnesis on ornamental birds, catch and examine the bird and take swabs, rinse and blood samples. Theoretical basis for the practical exercises

Experiments / Demonstrations:
1h lecture, 1h question time

Co-operation / consultation with:
(none)

Lecturer:
Pees

Remarks:
Lecture hours only in SS

2. SW: Clinical propaedeutics in reptiles (2 hours)

Anamnesis, labelling, inspection, catching and handling, clinical examination, sampling

Learning objective / basis for:
The student can perform a general and specific anamnesis on reptiles and knows the legal regulations on keeping and labelling, as well as the basics of keeping and feeding. He/she can catch and examine snakes, lizards and tortoises and determine their sex, carry out a swab, blood and tracheal lavage sample and knows the basics of euthanasia. Theoretical basis for the practical exercises

Experiments / demonstrations:
1h lecture, 1h question time

Co-operation / consultation with:
(none)

Lecturer:
Pees

Remarks:
Lecture hours only in SS

3. SW: Clinical propaedeutics in pets (2 hours)

Medical history, handling, clinical examination, sex determination, sample collection

Learning objective / basis for:
The student recognises the most common pet species, can take a general and specific medical history, catch and restrain the animal and examine it clinically and adequately, in particular the oral cavity. He/she can determine the sex, can take samples and knows the most important indications for taking samples. Theoretical basis for the practical exercises

Experiments / Demonstrations:
1h lecture, 1h question time

Co-operation / consultation with:
(none)

Lecturer:
Reuschel

Remarks:
Lecture hours only in SS

4. SW: Medication applications in pets, reptiles and birds (2 hours)

Enteral and parenteral administration of medication

Learning objective / basis for:
The student knows the advantages and disadvantages of the different types of application and the most important indications. He/she can perform the various applications on pets, reptiles and birds

Experiments / Demonstrations:
1h lecture, 1h question time

Co-operation / consultation with:
(none)

Lecturer:
Pees, Reuschel

Remarks:
Lecture hours only in SS

5. SW: Imaging diagnostics in pets, reptiles and birds (2 hours)

Indications and performance of X-ray and ultrasound examinations

Learning objective / basis for:
The student knows the indications for an X-ray or ultrasound examination in pets, reptiles and birds and is able to perform these. He/she can identify the most important organs and structures

Experiments / Demonstrations:
1h lecture, 1h question time

Co-operation / consultation with:
(none)

Lecturer:
Pees, Reuschel

Remarks:
Lecture hours only in SS

6. SW: Clinical propaedeutics in birds (2 hours)

Practical exercises on animals

Learning objective / basis for:
The student can apply the theoretical skills acquired in the lecture, in particular handling, examination, sampling and medication application, to animals.

Experiments / Demonstrations:
Practical exercise

Co-operation / consultation with:
(none)

Lecturer:
Pees and employees

Remarks:
in small groups, SS and WS

7. SW: Clinical propaedeutics in reptiles (2 hours)

Practical exercises on animals

Learning objective / basis for:
The student can apply the theoretical skills acquired in the lecture, in particular handling, examination, sampling and medication application, to animals.

Experiments / Demonstrations:
Practical exercise

Co-operation / consultation with:
(none)

Lecturer:
Pees and employees

Remarks:
in small groups, SS and WS

8. SW: Clinical propaedeutics in pets (2 hours)

Practical exercises on animals

Learning objective / basis for:
The student can apply the theoretical skills acquired in the lecture, in particular handling, examination, sampling and medication application, to animals.

Experiments / Demonstrations:
Practical exercise

Co-operation / consultation with:
(none)

Lecturer:
Pees and employees

Remarks:
in small groups, SS and WS

9. SW: Imaging diagnostics in pets, reptiles and birds (2 hours)

Practical X-ray and ultrasound exercises on animals

Learning objective / basis for:
The student can correctly position pets, reptiles and birds for X-ray examination. He/she can perform an ultrasound examination (coupling, organ visualisation) on these animals

Experiments / demonstrations:
Practical exercise

Co-operation / consultation with:
(none)

Lecturer:
Pees and employees

Remarks:
in small groups, SS and WS

Institute of Parasitology, Department of Fish Diseases and Fish Husbandry

0880 Propaedeutics incl. exercises (fish diseases)

Jung-Schroers

11. SW: Propaedeutics for fish (2 hours)

Catching fish from a holding tank
General examination of fish
Anaesthesia of fish via the water
Anaesthesia monitoring
First aid measures for anaesthetic incidents
Taking skin swabs including microscopic examination
Macroscopic examination and assessment of the gills
Taking gill swabs including microscopic examination
Taking samples from the stomach using a button cannula, including microscopic examination
Taking samples from the bowel using a brown needle, including microscopic examination
Taking a swab sample of the skin for bacteriological examination
Intramuscular injection in fish
Blood sampling from the caudal vein (on a live animal or model)

Learning objective / basis for:

The aim of the exercise is to teach future veterinarians the basic examination methods for fish in theory and practice. After completing the exercise, students should know which diseases are most common in fish and which examinations are suitable for investigating these diseases. They should be able to carry out the most important examinations independently. They should also be able to recognise and assess stages of anaesthesia in fish and know what measures can be taken in the event of an anaesthetic incident.

Experiments / Demonstrations:

The following investigations are carried out independently by the students in groups of two:
Catching fish from a holding tank
General examination of fish
Anaesthesia of fish via the water
Anaesthesia monitoring
Taking skin swabs including microscopic examination
Macroscopic examination and assessment of the gills
Taking gill swabs including microscopic examination
Taking samples from the stomach using a button cannula, including microscopic examination
Taking samples from the bowel using a brown needle, including microscopic examination
Taking a swab sample of the skin for bacteriological examination
Intramuscular injection in fish
Blood sampling from the caudal vein (on a live animal or model)
The following will also be demonstrated:
First aid measures for anaesthetic incidents

Lecturer:

Jung-Schroers, Bröcker, Miebach

Courses for the 5th semester

Department of General Radiology and Medical Physics

0017 General radiology and exercises

Seifert, Lüpke, Bräuninger

1. SW: Measurement, dosimetry and spectrometry of ionising radiation (3 hours)

Principle of ionisation dosimetry, ionisation in gases (ionisation chamber, rod dosimeter as personal dosimeter, proportional counter tube, Geiger-Müller counter tube), ionisation in solids (semiconductor detector and its application for the spectrometry of ionising radiation), scintillation detector (spectrometry), thermoluminescence dosimetry (materials, glow curve) including applications as personal dosimeter, film dosimetry (materials, optical density, density curve) including application as personal dosimeter

Learning objective / basis for:

- Basis for understanding the operation of radiation detectors in large radiological devices (e.g. X-ray devices, computer tomographs, gamma cameras)
- Prerequisite for basic knowledge in the field of radiation protection in veterinary radiology, especially in the field of radiation protection monitoring and personal dosimetry
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Experiments / Demonstrations:

Attempt:

- Measurement and spectrometry of gamma radiation with a scintillation detector

Demonstrations:

- Rod dosimeter
- Electronic personal dosimeters
- Thermoluminescence dosimeter (finger ring dosimeter)
- Film dosimeter

Co-operation / consultation with:

Ministry of the Environment of Lower Saxony
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:

Seifert, Bräuninger

2. SW: Radiation exposure (2 hours)

Natural radiation exposure through: terrestrial radiation, cosmic radiation, radioactive substances in food (incorporation), radon and radon by-products (inhalation); civilisational radiation exposure through: Radiation exposure in medicine, radiation exposure from nuclear radiation
power plants, radiation exposure from nuclear explosions

Learning objective / basis for:

- Prerequisite for basic knowledge in the field of radiation protection including radiation protection in veterinary radiology and nuclear medicine
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / agreement with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

3. SW: Basics of radiation protection (3 hours)

Practical radiation protection including the law of distance squared and the law of attenuation (minimise activity or intensity of useful radiation, minimise time spent in the radiation field, maximise distance to the radiation source, optimise shielding), shielding from ionising radiation, structural radiation protection, equipment-related radiation protection, radiation protection of personnel with dose limits, radiation protection areas and legal regulations, radiation protection of the population

Learning objective / basis for:
- Basic knowledge in the field of radiation protection including radiation protection in veterinary radiology and nuclear medicine
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

5. SW: Scientific and technical applications of ionising radiation (2 hrs.)

Production of radionuclides, principle of nuclear fission and nuclear fusion, irradiation of feed and food with various irradiation techniques, germination inhibition, insect control, pasteurisation, sterilisation and legal regulations

Learning objective / basis for:
- Basic knowledge of scientific and technical applications of ionising radiation
- Basic knowledge on the irradiation of feed and food with ionising radiation

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

6. SW: Generation of X-rays (2 hours)

Principle of an X-ray device, X-ray source, bremsstrahlung, characteristic X-rays, spectrum of X-rays, structure and mode of operation of the X-ray source, efficiency of the X-ray tube, depth diaphragm, filtering, electronic and optical focal spot, detail recognisability, Heel effect, X-ray generator, console with setting parameters, types of settings

Learning objective / basis for:
- Basis for working with diagnostic X-ray equipment or a linear accelerator for radiotherapy

- Prerequisite for attending the compulsory elective course "Fundamentals of X-ray diagnostics"
- Basic knowledge in the field of radiation protection in veterinary radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

7. SW: Image creation and image quality (3 hours)

Absorption of X-ray radiation, dose, dose rate, radiation quality, geometry of image generation (distances, magnification, penumbra, distortions), quality of the X-ray image (focus size, contrast, modulation transfer function, visual resolution, noise, test specimen)

Learning objective / basis for:
- Basis for working with diagnostic X-ray equipment
- Basis for the diagnosis of X-ray images
- Basis for the realisation of adequate image quality in X-ray diagnostics
- Prerequisite for attending the compulsory elective course "Fundamentals of X-ray diagnostics"
- Basic knowledge in the field of radiation protection in veterinary radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Ministry of the Environment of Lower Saxony
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

8. SW: Conventional radiography (3 hours)

Principle of radiography, automatic exposure, reduction of scattered radiation (fade-in, compression, spacing, scattered radiation grid), film-film system (structure of the film, film development, structure of the intensifying film, function of the FFS, optical density, density curve, contrast factor, gradation, sensitivity of the FFS), selection of exposure parameters, exposure point system, radiography equipment (stationary, mobile)

Learning objective / basis for:
- Basis for working with diagnostic X-ray equipment
- Basis for the diagnosis of X-ray images
- Basis for the realisation of adequate image quality in X-ray diagnostics
- Prerequisite for attending the compulsory elective course "Fundamentals of X-ray diagnostics"
- Basic knowledge in the field of radiation protection in veterinary radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

10. SW: Digital radiography (2 hours)

Principle of digital radiography, digital luminescence radiography (digital image, matrix image with grey scales, imaging plate and its scanning), digital image processing, digital direct radiography with flat panel detector

Learning objective / basis for:
- Basis for working with a digital X-ray system
- Basis for processing digital images (X-ray, CT, MRI)
- Basis for the realisation of adequate image quality
- Acquisition of digital skills
- Prerequisite for attending the compulsory elective course "Fundamentals of X-ray diagnostics"
- Basic knowledge in the field of radiation protection in veterinary radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Ministry of the Environment of Lower Saxony
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

11. SW: Basics of fluoroscopy (1 hour)

Principle of fluoroscopy, fluorescent screen (history), electronic image intensifier including characteristics, image intensifier television chain, digital fluoroscopy, digital subtraction angiography, fluoroscopy equipment (stationary and mobile C-arm devices)

Learning objective / basis for:
- Basis for working with a fluoroscopy device
- Basis for the diagnosis of fluoroscopic images
- Basis for the realisation of adequate image quality during fluoroscopy
- Prerequisite for attending the compulsory elective course "Fundamentals of X-ray diagnostics"
- Basic knowledge in the field of radiation protection in veterinary radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

11. SW: X-ray computed tomography (3 hours)

Principle of image generation, CT number, window technology, device technology (gantry, tube, detectors), imaging quality (spatial resolution, contrast resolution, low-contrast resolution, artefacts), imaging techniques, spiral CT

Learning objective / basis for:
- Basis for working with an X-ray CT
- Basis for the processing of CT images
- Basis for the realisation of adequate image quality
- Acquisition of digital skills
- Prerequisite for attending the compulsory elective course "Fundamentals of X-ray diagnostics"
- Basic knowledge in the field of radiation protection in veterinary radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

12. SW: Basics of Nuclear Medicine (2 hrs.)

Therapy with open radionuclides, principle of nuclear medicine diagnostics, radionuclides, planar scintigraphy, renal function scintigraphy, structure of the gamma camera, thyroid scintigraphy, skeletal scintigraphy, Single Photon Emission Computed Tomography (SPECT), Positron Emission Tomography (PET)

Learning objective / basis for:
- Basis for working with nuclear medicine methods
- Basis for the realisation of adequate image quality in nuclear medicine
- Basic knowledge in the field of radiation protection in veterinary nuclear medicine
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Ministry of the Environment of Lower Saxony
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

12. SW: Fundamentals of radiotherapy (2 hours)

Brachytherapy (contact therapy, interstitial therapy, intracavitary therapy), teletherapy (soft radiation therapy (conventional X-ray radiation), high-energy photons), construction of a linear accelerator, depth dose curve, irradiation with standing fields, motion irradiation, irradiation planning

Learning objective / basis for:
- Basis for working with radiotherapy methods
- Basic knowledge in the field of radiation protection in veterinary radiotherapy
- Prerequisite for the acquisition of radiological protection expertise

- Requirements for working as a radiation protection officer

Co-operation / consultation with:
Ministry of the Environment of Lower Saxony
Chamber of Veterinarians of Lower Saxony
Clinic for small animals

Lecturer:
Seifert, Bräuninger

Institute for Microbiology

0101 Specialised Infectious Diseases (Bacteriology, Mycology)

Dresen, Goethe, Rohde, Schaaf, Siesenop, Valentin-Weigand

1. SW: Specialised bacteriology and mycology (14 hours)

Taxonomy, morphology, culture and biochemistry, pathogenic significance, clinic and pathogenesis, control and prophylaxis of the most important bacteria and fungi relevant to veterinary medicine

Learning objective / basis for:
The material covered is the basis for the examination in the subject "Bacteriology and Mycology"

Experiments / Demonstrations:
Close coordination with the content of the infection diagnostics course

Lecturer:
Goethe, Rohde, Runge, Schaaf, Siesenop, Valentin-Weigand

Institute of Immunology

0101 Specialised Infection Theory (Immunology)

Schuberth, Lepenies

1. SW: Infection Immunology (12 hours)

Basic immune mechanisms against pathogens. Defence mechanisms against bacteria (extra- and intracellular), fungi, protozoa, viruses and parasites. Strategies of pathogens to escape the immune response. Neonatal immunology. Immunoprophylactic concepts (vaccination, immunomodulation).

Learning objective / basis for:
The material covered is the basis for understanding protective immunological defence mechanisms against various pathogens. Students should be able to correctly categorise different vaccination concepts against infectious diseases and be able to classify immunomodulatory measures in individual animals or herds. The contents of the lecture will be tested in a written examination at the end of the semester.

Lecturer:
Schuberth, Lepenies

Institute of Immunology; Institute of Microbiology; Institute of Virology

0104 Infection diagnostic course

Becher, Behrens, Gremmel, Leveringhaus, Meyer, Schulz (virology); Dresen, Goethe, Rohde, Schaaf, Siesenop, Valentin-Weigand (microbiology); Lepenies, Schuberth (immunology)

1. SW: "Virology" (8 hours)

The course covers the usual methods used in the diagnosis of viral infections. These include methods of direct pathogen detection, e.g. cell culture, antigen ELISA, haemagglutination test, as well as methods of indirect pathogen detection, i.e. antibody detection methods (e.g. antibody ELISA, virus neutralisation test, haemagglutination inhibition test).

Learning objective / basis for:
The course aims to familiarise students with the nature of the diagnostic test procedures commonly used in virology. This should enable them to correctly interpret the results of laboratory tests later on, as well as to assess the advantages and disadvantages of test systems, sensitivity and specificity, as well as the amount of work and time required. In the summer semester, the appropriate test procedures for the respective disease will be mentioned in the lecture "Special Virology", but will not be discussed in detail.
The content of this part of the course will be tested in theory as part of the virology examination.

Experiments / Demonstrations:
Passaging of a cell culture, virus titration to determine a culture infectious dose (KID50), calculation of a neutralisation titer, performance of a haemagglutination and immunodiffusion test, performance of an antigen ELISA.
Other methods, such as the immunofluorescence test or lateral flow assay, are explained.

Co-operation / consultation with:
The event is part of a joint course with the Institute of Microbiology and the Immunology Group. The contents are coordinated with these institutions and complement each other.

Lecturer:
Becher, Behrens, Meyer, Postel

3RD SW: "Bacteriology and Mycology" (44 hours)

The course deals with the most important pathogenic bacteria and fungi relevant to veterinary medicine. In addition to the nomenclature, occurrence and medical significance, their differentiation on the basis of morphological, cultural, biochemical and serological criteria is dealt with in particular. General microbiological techniques and the most important culture media and stains are also presented and applied using practical examples (diagnostic exercises with preparation of findings)

Learning objective / basis for:
The microbiology course is intended to familiarise students with the examination techniques used in bacteriological and mycological diagnostics and to train them in working with infectious agents in order to learn the procedures required for the targeted identification and differentiation of various pathogens and later to apply what they have learned in solving simple diagnostic tasks.
The material covered is the basis for the examination in "Bacteriology and Mycology" after the 5th semester. The test on the last day of the course is also the practical part of the exam.

Experiments / Demonstrations:
Preparation of microscopic preparations, creation of a culture, preparation and evaluation of resistance tests, microscopic and cultural examination and assessment of findings, diagnostic exercises and demonstrations of diagnostics (using practical examples)

Co-operation / consultation with:
The course is part of a joint course with the Institute of Virology and the Immunology Group. The contents are coordinated with the corresponding lectures. The immunological part of the course is also the basis for the examination "Bacteriology and Immunology".

Lecturer:
Goethe, Rohde, Siesenop, Schaaf, Valentin-Weigand

14. SW: Immunology (4 hours)

In this course, the diagnostics of immune cell functions and selected serological test procedures are dealt with practically and theoretically. The immune cell functions include the testing of phagocytosis performance and the formation of reactive oxygen species by neutrophil granulocytes. Serological diagnostics focuses on testing antigen specificity using the immunoblot method.

Learning objective / basis for:
The course aims to familiarise students with the principle and significance of selected immunological test procedures. This should enable them to correctly determine the indication for the initiation of diagnostics in infectious diseases and suspected immunodeficiencies and to correctly interpret the findings of laboratory tests. The contents of the course will be tested in a written examination at the end of the winter semester.

Experiments / demonstrations:
Immunoblot method, phagocytosis of bacteria by neutrophil granulocytes. Induction of the formation of reactive oxygen species by neutrophil granulocytes.

Co-operation / consultation with:
The event is part of a joint course with the Institute of Microbiology and the Institute of Virology. The contents are coordinated with these institutions and complement each other.

Lecturer:
Schuberth, Lepenies

Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology

0210 Animal hygiene

Kemper, Schulz

1. SW: Introduction to animal hygiene, cleaning and disinfection I (2 hours)

Introductory definitions, principles of environmental and animal hygiene, introduction to cleaning and disinfection

Learning objective / basis for:
Understanding of the goals and tools of animal and environmental hygiene

Lecturer:
Schulz

2. SW: Cleaning, Disinfection II, Sterilisation (2 hours)

Cleaning, disinfection, sterilisation: definitions, objectives, differences, modes of action. Cleaning and disinfection steps. Chemical disinfectants: advantages and disadvantages. Proof of effectiveness.

Learning objective / basis for:
Ability to assess and effectively carry out cleaning and disinfection measures

Lecturer:
Schulz

3. SW: Stable climate and ventilation (2 hours)

Influence of the barn climate on the health, performance and behaviour of farm animals. Presentation of the various ventilation principles for adjusting the barn climate and legal requirements.

Learning objective / basis for:
Familiarisation with the decisive barn climate parameters and assessment of the barn climate with regard to the well-being and health of the animals. Recognise different thermoregulatory behaviours. Understanding the principles of ventilation and climate regulation as well as the associated problems and limitations.

Lecturer:
Schulz

4. SW: Disinfestation (2 hours)

Disinfestation/pest control: sense and purpose, rodent control, control of insects and arachnids, control of birds

Learning objective / basis for:
Ability to assess the occurrence of pests, knowledge of the risks of pest infestation and of prevention and control measures

Lecturer:
Kemper

5. SW: Gases, dusts and bioaerosols in stable air: concentrations and effects (2 hours)

Characterisation of stable air pollutants and their concentrations in different housing systems. Possible health effects of air pollution on animals and Volk working in stables. Preventive measures to reduce exposure to polluted stable air.

Learning objective / basis for:
Understand air pollution in stables as a risk to animal health and the health of Volk working in stables. Familiarisation with the biological effects of air pollution on animals and humans. Recommend and apply preventive measures.

Lecturer:
Schulz

6. SW: Livestock facilities: Emissions and immissions (2 hours)

Legal principles of immission control with influence on the authorisation practice, the location and the design of livestock facilities against the background of environmental protection and the protection of residents. Potential airborne transmission of animal pathogens between livestock. Emission control measures.

Learning objective / basis for:
Knowledge of the environmental regulations to which the construction or expansion of livestock facilities is subject. Assessment of hazards from barn-specific emissions, including the risk of transmission to neighbouring barns. Knowledge of the most important preventive measures to reduce emissions and their modes of action.

Lecturer:
Schulz

7. SW: Zoonosis control in livestock (2 hours)

Occurrence of the most important zoonotic pathogens in the context of consumer protection and occupational safety and their resistant forms in livestock and control measures to reduce zoonoses in primary production

Learning objective / basis for:
Knowledge and assessment of risks posed by zoonotic pathogens in livestock and the use and evaluation of suitable measures to reduce the respective pathogens in livestock

Lecturer:
Schulz

8. SW: Water supply and drinking water hygiene (2 hours)

Drinking water quality and assessment, drinking water supply, hygiene risks and optimisation options

Learning objective / basis for:
Knowledge of the evaluation of drinking water and the minimisation of hygiene risks in the water supply

Lecturer:
Kemper

9. SW: Disposal of animal carcasses (2 hours)

Disposal of animal carcasses: Legal regulations, disposal steps, structure and processes in rendering plants

Learning objective / basis for:
Knowledge of the regulations, steps and methods of rendering

Lecturer:
Kemper

10. SW: Feed and pasture hygiene (2 hours)

Feed and pasture hygiene: hygiene risks, abiotic and biotic influences, hygienisation measures, feed storage and transport

Learning objective / basis for:
Ability to assess the hygiene of feed and grazing areas as well as grazing area management and to assess storage and transport conditions.

Lecturer:
Kemper

11. SW: Practice and clinic hygiene (2 hours)

Practice and hospital hygiene, nosocomial infections

Learning objective / basis for:
Ability to assess and implement hygiene measures in veterinary practices and clinics

Experiments / demonstrations:
Hand hygiene trials

Lecturer:
Schulz

12. SW: Waste disposal, waste and faecal hygiene (2 hours)

Disposal of liquid municipal waste (sewage treatment plants) and sewage sludge, manure/faeces as organic fertiliser in the sense of the circular economy: legal regulations, methods and risks

Learning objective / basis for:
Knowledge of the methods and risks of disposing of liquid and solid waste from agricultural operations, taking into account the legal regulations

Lecturer:
Kemper

13. SW: Stock protection, pasture hygiene (2 hours)

Purpose and measures for stock protection and pasture hygiene

Learning objective / basis for:
Implementation and evaluation of stock protection and pasture hygiene measures

Lecturer:
Kemper

14. SW: Current topics in animal hygiene (2 hours)

Presentation of several current topics from the field of animal hygiene, e.g. current disease outbreaks and hygienic prevention measures. Exam preparation.

Learning objective / basis for:
Knowledge of the importance of animal hygiene measures in professional veterinary practice. Preparation for the examination procedure.

Lecturer:
Schulz

Institute for Food Quality and Safety

0227 Food science

Plötz, Spieler, Rühlmann, Krischek

1. SW: Food Science (28 hours)

Food law, hygiene management, quality assurance and food monitoring, HACCP concepts, food microbiology, food hazards, preservation, product-related hygiene regulations, food labelling, general product knowledge, preparation for the hygiene internship, European and international food hygiene, basic aspects of milk hygiene

Learning objective / basis for:
Basic knowledge in the field of food science, product knowledge, food safety and consumer protection, preparation for the hygiene internship

Co-operation / consultation with:
Veterinary administration

Lecturer:
Research assistants (see above)

Institute of Pharmacology, Toxicology and Pharmacy

0260 Pharmacology and Toxicology I

Richter, Meissner

1. SW: General Pharmacology (11 hours)

I. Pharmacodynamics (effect of drugs via receptors and other mechanisms of action; dose-response relationship).
II. pharmacokinetics (absorption of drugs [including determination and significance of the bioavailability of drugs]; distribution of drugs [including determination and significance of the volume of distribution]; determination and significance of the half-life of drugs; elimination kinetics of drugs; elimination processes of drugs [renal, metabolic, biliary, pulmonary, etc.]; animal species differences in the effect of drugs; biological barriers [CNS, placenta, milk];
III Adverse drug reactions
IV. Tolerance and dependence

Learning objective / basis for:
Basic principles of pharmacology and toxicology

Lecturer:
J. Meissner, F. Richter Assencio

1. SW: Introduction to the subject Pharmacology and Toxicology (1 hour)

Explanation of the meaning of "Pharmacology" and "Toxicology"; overview of courses and examinations in these subjects; structure of the lecture "General and Special Pharmacology and Toxicology" in the 3rd year of study; presentation of the most important textbooks

Learning objective / basis for:
The material covered forms the basis for further lectures in pharmacology and toxicology

Lecturer:
Richter Assencio

5 SW: Special pharmacology 1. vegetative (autonomic) nervous system (13 hours)

Transmitters of the autonomic nervous system; Parasympathomimetics; Parasympatholytics; Ganglion-active substances; Peripheral muscle relaxants; Sympathomimetics; Adrenolytics (alpha- and beta-blockers); Antisympathotonics

Learning objective / basis for:
Treated substance is the basis for understanding medicinal products that act by influencing the autonomic nervous system

Lecturer:
Richter Assencio

10 SW: Special pharmacology 2. central nervous system (19 hours)

Introduction (blood-brain barrier; neurotransmitters etc.); anaesthesia in general; anaesthetic stages; anaesthetic premedication; anaesthetic risks and their mitigation; anaesthetic

incidents and their treatment; injection anaesthetics; inhalation anaesthetics; hypnotics; psychotropic drugs; benzodiazepines / ataractics; neuroleptics (incl. neuroleptanalgesia); central analeptics (incl. wake-up amines); antidepressants; antiepileptics; non-morphine-like analgesics (xylazine and other alpha-analgesics). neuroleptanalgesics); Central analeptics (incl. wake-up amines); Antidepressants; Antiepileptics; Non-morphine-like analgesics (xylazine and other alpha2-agonists with analgesic effect); Strong morphine-like analgesics; Local anaesthetics

Learning objective / basis for:
Treated substance is the basis for understanding drugs that act by influencing the central nervous system

Lecturer:
Richter Assencio

E-learning counselling

0279 Communication Propaedeutics

Kleinsorgen, Wissing

3. SW: Communication (4 hours)

1 + 2 SWS: Basics and the structured anamnesis interview
Theoretical basics: familiarisation with various means and methods of communication (verbal, non-verbal, paraverbal)
Empathy: Identification and understanding of the relevance of empathy in professional veterinary situations (understanding and incorporating e.g. the client's perspective and expressing empathy)
Sending information: Get to know strategies for structured dialogue (collecting and giving information, counselling)
Receiving information: Using active listening to check and ensure accurate understanding (receive, participate and assign meaning) in order to respond appropriately in the veterinary profession
3rd +4th SWS: Communication in a team and challenging conversations
Self-regulation: Actively regulate your own emotions, behaviour and insights within the veterinary profession, especially in stressful communication situations
Reflection: Think about your own communication behaviour, the skills and limitations within the veterinary profession and about communication situations in general
Fundamentals of communication in a team: communicating veterinary professional topics clearly and appropriately in an interprofessional and/or intercultural team, recognising team dynamics and challenges and learning strategies for dealing with them
Difficult interactions: Recognising sensitive issues in the veterinary profession and acting and communicating appropriately in difficult or challenging situations, outlining the basics of escalation and de-escalation to deal with conflict

Learning objective / basis for:
- Basic knowledge of communication with patient owners
- Basic knowledge of communication in a team

Lecturer:
Kleinsorgen, Wissing

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0280 Propaedeutics incl. exercises (small cloven-hoofed animals)

Ganter, Waberski, Luther, Oberheide, Roth, v. Altrock, Wagener, Wilhelm, Neubert, Kiene, Schregel, Rath, Nicolaisen, Bauer, Niepold, De Matheu, Weitz

1. SW: Propaedeutics for pigs and small ruminants (28 hours)

Forms of production in pig and small ruminant husbandry
Medical history
Clinical examinations (general examination, special examinations)
Sampling techniques
Application techniques
Inventory analysis

Learning objective / basis for:
Treated substance is the basis for the independent clinical and further examination and treatment of pigs and small ruminants

Experiments / Demonstrations:
Practical exercises relating to the above teaching content

Lecturer:
Ganter, Wendt, Waberski, Roth, v. Altrock, Wagener, Wilhelm, Bauer, Kiene, Schregel, Nicolaisen, Neubert, Rath, Oberheide

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0282 General internal medicine

Ganter, Wagener, Humann-Ziehank, Kiene, Schmicke

1. SW: General internal medicine (28 hours)

The lecture is usually held online with MS teams. Exceptionally, discussed lectures can also be uploaded as videos on Moodle; this will be communicated in advance in the lecture.
In the documents you will find a detailed timetable and the accompanying script

Learning objective / basis for:
The material covered is the basis for the laboratory course and the clinical demonstrations

Experiments / Demonstrations:
Timing and content coordination with the laboratory course

Lecturer:
Ganter, Wagener, Humann-Ziehank

14. SW: Pathophysiology of neurological diseases (2 hrs.)

Cross-species, development of neurological symptoms (difference between intracranial, spinal cord and peripheral nervous system, discussion of the individual clinical pictures according to the VETAMIN D scheme (vascular, inflammatory, trauma, anomaly, metabolic-toxic, idiopathic, neoplastic, degenerative)

Learning objective / basis for:
Understanding the basic principle of damage to the nervous system, principles of clarification in the clinic

Experiments / demonstrations:
Case studies

Co-operation / consultation with:
Gander

Lecturer:
Tipold

Clinic for small animals

0320 Clinical propaedeutics for small animals

Volk, Tipold, Mischke, Kästner, Kramer, Amon, Busse, Frommeyer, Goericke-Pesch, Hünerfauth, Meller, Metje, Meyerhoff, Nerschbach, Neßler, Ostermann, Raue, Rieder, Sehn, Schütter, Steffensen, ten Hagen, Verburgh Hoffmann, Verhoeven, Volk A., Walter.

1. SW: General examination, coercive measures (1 hour)

Signalling (natural and artificial characteristics, anamnesis and documentation; assessment of the general condition based on posture, behaviour, conformation, developmental condition, nutritional condition, grooming condition and body weight; discussion and demonstration of the general clinical examination, diagnosis, list of differential diagnoses.

Learning objective / basis for:
Recording the most important patient data, taking a detailed medical history, assessing the general condition and performing a general clinical examination to identify the presumed location of the disease and formulate a further diagnostic plan

Experiments / demonstrations:
Short video sequences on the clinical examination procedure, practical exercises

Lecturer:
H. Volk

2. SW: Heart/respiratory tract (1 hour)

The most important anatomical and physiological principles of the cardiovascular system are repeated and the individual steps of the clinical cardiological examination are explained, from signalling, special anamnesis, inspection via palpation (mucous membranes with capillary refill time (KFZ), pulse, lateral cardiac impulse), percussion and auscultation (FIRAG; puncta maxima, temporal relationship of heart sounds to cardiac action, pulse deficit; grading of heart sounds). In addition, further diagnostics such as ECG, X-ray and echocardiography are presented and their indications and findings explained.
The most important anatomical and physiological principles of the upper and lower respiratory tract are repeated and the clinical examination of the nose, larynx, trachea, bronchi and lungs as part of an adspection (e.g. mucous membrane colour, nasal discharge, swelling, asymmetries, breathing type), palpation, percussion and auscultation are explained and normal findings and pathological findings are presented. Further diagnostics such as X-ray, CT and endoscopy are then presented.

Learning objective / basis for:
Students should be able to carry out a clinical cardiological examination, recognise arrhythmias on the basis of a pulse deficit and be able to assign heart murmurs (with degree) to an action phase and a punctum maximum. They should also be able to develop a plan for further diagnostics.
Students should then be able to carry out a clinical respiratory examination independently and be able to recognise normal findings and pathological findings. In addition, students should know the indications for further diagnostics.

Experiments / Demonstrations:
Visual material and demonstrations, practical exercises

Co-operation / consultation with:
no

Lecturer:
Sehn/Lietz

3. SW: Orthopaedics (1 hour)

Orthopaedic examination: special anamnesis, examination while standing, walking, trotting and sitting, position/posture faults; degrees of lameness; orientating palpation from proximal to distal, special deep palpation from distal to proximal, more detailed explanation with the aid of images, further diagnostics (in particular imaging)

Learning objective / basis for:
Correct performance of an orthopaedic examination, including taking a special medical history

Experiments / Demonstrations:
Image and film material, practical exercises

Lecturer:
Harms/Kramer

4. SW: Neurology (1 hour)

The instruments required for the neurological examination and their area of application are discussed. In addition, the anatomical principles of the CNS are repeated and the relationship between the upper (OMN) and lower motor nerve system (UMN) is explained. In this context, the effects of disorders in the OMN or UMN on reflex activity, paralyses (paresis, paralysis), muscle tone, movement, postural and positional reactions and irritation symptoms are examined.
The individual steps of the neurological examination (consciousness, posture, gait, head nerves, postural and positional reactions, spinal reflexes and pain sensation) are explained with the tests and assessment criteria required to carry them out and normal and pathological findings are presented.
Finally, the indications for further diagnostics such as myelography, CT, myelo-CT, MRI, EEG and electrodiagnostics are given.

Learning objective / basis for:
Knowledge of the anatomical basics of the central and peripheral NS.
Knowledge of the individual steps of the neurological examination and their implementation
Knowledge of the cranial nerves, the OMN and UMN and the spinal reflexes to determine the localisation of a lesion

Experiments / Demonstrations:
Image and video material, practical exercises

Lecturer:
A. Tipold

5. SW: Ophthalmology (1 hour)

The various steps of the ophthalmological examination are explained and demonstrated. Tools required for an eye examination under certain conditions (local anaesthetics,

mydriatics, staining agents, splinting agents, Schirmer tear test. In addition, the most important instruments and examination devices for the eye examination are presented and their use on eyes or adnexa is shown.
Breakdown of the special eye examination into:
1. External examination of the eye and the area around the eye
2. internal examination of the eye using special examination techniques (direct and indirect ophthalmoscopy, tonometry, slit lamp biomicroscopy, gonioscopy, fundus camera, electroretinography)

Learning objective / basis for:
Knowledge of the anatomy of the eye and the adnexa
Carrying out an ophthalmological examination with knowledge of the necessary examination procedures and normal findings
Determination of the sections of the eye that are involved in the disease process

Experiments / Demonstrations:
Images, demonstrations

Lecturer:
C. Buses

6. SW: Abdomen (1 hour)

Indications for a detailed examination of the abdomen, examination techniques: Adspection, palpation technique: normal findings and pathological findings of various organs (urinary organs, liver, spleen, stomach, intestines), other examination procedures (e.g. undulation test).

Learning objective / basis for:
Recognising the need for a detailed examination of the abdomen, teaching the technical principles for clinical examination of the abdomen in dogs and cats.

Experiments / demonstrations:
Demonstration of selected examination techniques on animals and by means of video film, practical exercises

Lecturer:
Mischke

7. SW: Dermatology (1 hour)

Taking a general and specific medical history of the skin patient. Clinical examination of the skin patient including initial (e.g. flea comb examination, skin scraping) and further diagnostic test procedures (e.g. skin biopsy, intradermal test) as well as documentation of findings.

Learning objective / basis for:
Learning objectives Propaedeutics Dermatology
-Lesion type / distribution
-Dermatological surface samples (incl. fine needle aspiration and skin biopsy) which and how performed
-Ear anatomy and examination

Experiments / demonstrations:
Demonstration of various examination procedures on animals.

Lecturer:
A. Volk

8. SW: Sexual apparatus (1 hour)

Taking of a signalling and special anamnesis, carrying out an andrological and gynaecological examination including the mammary gland. Adspection and palpation of the external genital organs and abdominal palpation as well as rectal examination of the palpable internal genital organs (prostate). Uterus and ovaries not normally palpable, uterus if enlarged. Further examinations such as sonography and X-ray to visualise non-palpable parts such as ovaries and uterus.
Vaginoscopy, vaginal (cycle diagnostics) and preputial smear (hyperoestrogenism), hormone tests

Learning objective / basis for:
Knowledge of the anatomical basics.
Performance of an andrological and gynaecological examination including the mammary gland.
Knowledge of further examination techniques such as vaginoscopy, sonography, X-ray, vaginal and preputial smears and hormone tests

Experiments / demonstrations:
Visual material, practical exercises

Lecturer:
S. Goericke-Pesch

9. SW: Injection techniques and blood sampling (1 hour)

The most important principles of antisepsis are discussed: Hand hygiene, handling of injection solutions (handling and storage), needles and syringes. The anatomical principles of the veins used for blood collection/intravenous administration and the muscles used for intramuscular injections are illustrated using images. In addition, the technique of blood collection, intravenous, intramuscular and subcutaneous injection is explained.

Learning objective / basis for:
Learning the basic rules of antisepsis in relation to blood collection and injection.
Refreshing the anatomical principles relevant to blood collection and injection. Correct procedure for blood collection and injection.

Lecturer:
S.Kramer

10. SW: Sample techniques, blood testing, cytological diagnostics (1 hour)

Indications for blood tests, sample materials, haematological examination techniques (blood smear, visual cell counting and automatic haematology systems); basics of cytological diagnostics: indication, advantages and disadvantages, sample collection and processing, cytological examination procedure

Learning objective / basis for:
Selection of suitable sample materials for blood tests; basic knowledge of selected haematology examination procedures; basic knowledge of the possibilities of cytological diagnostics and the sample techniques recommended for the preparation of cytological specimens.

Lecturer:
R. Mischke

11. SW: Anaesthesia/Analgesia (1 hour)

Medical history; signalling; assessment of general condition, general clinical examination, examination of the respiratory system, examination of the cardiovascular system

Learning objective / basis for:
Anaesthesia preliminary examination, indication for further diagnostic tests. Application of the ASA status classification

Experiments / demonstrations:
Short video sequences on the clinical examination procedure

Lecturer:
Kästner

12. SW: X-ray positioning, X-ray anatomy (1 hour)

The standard planes of the most important body regions are presented and the X-ray anatomy is explained. Rules and tips for positioning the thorax, abdomen and pelvic cavity are also given. The positioning of the elbow and knee joints is also discussed by way of example.

Learning objective / basis for:
Knowledge of the standard planes that must be made for each body region and learning the correct positioning

Experiments / Demonstrations:
Image material

Co-operation / consultation with:
no

Lecturer:
S. Kramer

13. SW: Instrumentology / only on Moodle (1 hour)

The most important basic surgical instruments (forceps, needle holders, clamps, grasping forceps, scissors, scalpel) are presented in their function and their handling is explained using images. In addition, the various suture materials are presented and the differences are explained.

Learning objective / basis for:
Correct use and handling of basic surgical instruments, injury prevention

Lecturer:
S. Kramer (only on Moodle)

Clinic for cattle

0340 Propaedeutics cattle

Hoedemaker, Bajcsy, Heppelmann, Höltershinken, Gaude, Proios, Küskens and research assistants

1. SW: General examination, coercive measures (4 hours)

Behaviour and dangers when handling cattle, methods of restraint, general short examination course

Learning objective / basis for:
Accident prevention when handling cattle and assessment of general condition

Experiments / Demonstrations:
Exercises on handling cattle, restraint measures and non-invasive interventions

Co-operation / consultation with:

Lecturer:
and scient. employees

Remarks:
Proven participation in this first teaching unit is a prerequisite for applying as a student assistant.

2ND SW: Circulation, heart, lymph nodes (4 hours)

Examination of the cardiovascular system of cattle

Learning objective / basis for:
Clinical examination of the heart and circulation

Experiments / Demonstrations:
Demonstration and practical exercise of the examination of the heart and circulation in cattle

Co-operation / consultation with:

Lecturer:
Grünberg and scient. employee

4. SW: Respiratory/urinary tract (4 hours)

Teaching the propaedeutics of the respiratory and urinary tract

Learning objective / basis for:
The material covered forms the basis for clinical examination of the respiratory and urinary tract. Teaching of the standardised terminology as well as the individual examination techniques.

Experiments / Demonstrations:
Clinically ill calf with visible changes in breathing and lung sounds

Co-operation / agreement with:

Lecturer:
Höltershinken and wiss. employee

6. SW: Digestive tract (4 hours)

- Examination techniques of the individual sections of the digestive tract
- Discussion of aids
- Findings from studies

Learning objective / basis for:
Introduction to independent examination of the digestive tract

Experiments / Demonstrations:
Demonstration of examination techniques on animals as an introduction to teaching in small groups

Co-operation / agreement with:

Lecturer:
Kehler and scient. employee

8. SW: Udder (3 hours)

Teaching theoretical and practical knowledge of examination techniques on the udder of cattle, including milk sampling

Learning objective / basis for:
Application of examination methods in the above-mentioned areas

Experiments / Demonstrations:
Demonstration and practical exercises in small groups

Co-operation / consultation with:

Lecturer:
Hoedemaker and wiss. employee

Remarks:
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10. SW: Andrology (3 hours)

Andrological examination Bulle

Learning objective / basis for:
Examination of the genital apparatus in bulls (clinical and advanced)

Experiments / Demonstrations:
Demonstration of clinical and sonographic examination of the genital apparatus bull, preputial flush sample

Co-operation / consultation with:

Lecturer:
Heppelmann and employees

Remarks:
Participation of 2 students in the demonstration

12. SW: Obstetrics/gynaecology (4 hours)

Gynaecology and obstetrics

Learning objective / basis for:
Knowledge of gynaecological and obstetric findings in cattle

Experiments / Demonstrations:
Practical demonstration on the patient (rectal examination, vaginal examination, ultrasound)

Co-operation / consultation with:

Lecturer:
Herzog and scient. employees

14. SW: CNS, musculoskeletal system (3 hours)

Neurological examination and assessment of lameness

Learning objective / basis for:
Detection of neurological diseases and localisation of lesions

Experiments / demonstrations:
Practising neurological examinations and lameness

Co-operation / consultation with:

Lecturer:
and scient. employees

Clinic for Cattle; Reproductive Medicine Unit of the clinics

0342 Obstetrics and neonatology

Hoedemaker, Bajcsy, Sieme, Goericke-Pesch, Yücesoy

Obstetrics and infant diseases of foetuses and neonates (14 hours)

Comparative presentation of the physiology, pathophysiology and clinic of the establishment of pregnancy, the endocrinology of the gravid dam, the endocrinology of birth and the mechanics of birth.
Abnormalities of the membranes and amniotic fluid, disorders of pregnancy originating from the fruits and the maternal genitals, disorders of the duration of pregnancy, termination of pregnancy
Birth disorders on the part of the dam and the fruit.
Disorders of labour pains and afterbirth, bacterial diseases in the puerperium.
Foetopathies, birth injuries, organ, deficiency and infectious diseases.

Learning objective / basis for:
Basic understanding of the factors provided by the mother and embryo/foetus that maintain pregnancy and their specific disorders. Basic understanding of the endocrine processes during pregnancy and labour as well as the mechanics of birth. Basic knowledge of the aetiology, pathogenesis, diagnosis and treatment of disorders of pregnancy, birth, puerperium and pathologies of foetuses and neonates in cattle.

Experiments / Demonstrations:
Lecture

Lecturer:
Bajcsy, Hoedemaker, Heppelmann, Schmicke; Sieme

Clinic for cattle

0351 Evening treatments (in small groups)

Hoedemaker, Heppelmann, Höltershinken and research assistants

Evening treatments (0 hours)

Examination, sampling, treatment, holding and restraining of animals etc. as a practical activity (hands on patient) under supervision

Learning objective / basis for:
Teaching of skills and abilities in diagnostics and therapy (incl. introduction to surgical manipulation on patients)

Experiments / Demonstrations:
Examination and treatment of patients (sampling, treatment, holding patients, etc.) directly on the animal

Co-operation / consultation with:

Lecturer:
Hoedemaker, , Grünberg, Herzog, Kehler and scientific staff. employees

Remarks:
50 % of the hours attended can be credited as general compulsory electives.

Clinic for cattle

0363 Diagnostic-therapeutic exercises on cattle (in small groups)

Hoedemaker, Heppelmann, Höltershinken and research assistants

Diagnostics and therapy in cattle (4 hours)

Internal Medicine, Orthopaedics, Abdominal Surgery, Physiology and Pathology of the Fortplanzung directly on the patient

Learning objective / basis for:
Teaching of skills and abilities in diagnostics and therapy including surgical manipulation of patients through examination and treatment of patients

Experiments / Demonstrations:
Small group lessons

Co-operation / consultation with:

Lecturer:
Hoedemaker and employees

Remarks:
50 % of the hours attended can be credited as general compulsory electives.

Clinic for Cattle; Reproductive Medicine Unit of the clinics

0380 Reproductive medicine and biotechnology

Bajcsy, Goericke-Pesch, Sieme, Waberski

1. SW: Function and regulation of male reproduction and spermatogenesis (1 hour)

Development of the sex. (Mal)Descensus testis. Sexual maturity in male breeding animals. Basics of spermatogenesis (stages, duration, efficiency) and possible confounding factors.

Learning objective / basis for:
Stages of sexual development. Testicular descent and its disorders; testicular concealment (cryptorchidism) prevalence and diagnosis. Data on the attainment of sexual maturity in male breeding animals. Knowledge of the duration of spermatogenesis and sperm maturation in the epididymis and its significance in spermatological diagnosis. Importance of the efficiency of spermatogenesis and daily sperm production for the practice of artificial semen transfer. Disorders of spermatogenesis and possible aetiological factors.

Co-operation / consultation with:
see above.

Lecturer:
Sieme

2. SW: Applied endocrinology in male pets (1 hour)

Application of the physiological principles of testicular hormone secretion and the superordinate regulatory mechanisms in the diagnosis and therapy of endocrine testicular dysfunctions and their consequences for downstream organ systems (e.g. accessory sex glands) and behaviour.

Learning objective / basis for:
Derivation of an optimal diagnostic procedure and efficient therapeutic approaches based on the current state of knowledge about the physiology of the endocrine control of the male genital organs.
Specialisation and supplementation in the compulsory elective subject 1508 Hormonal diagnostics and therapy in gynaecology and andrology

Co-operation / consultation with:
see above.

Lecturer:
Günzel-Apel

3. SW: Ethology of mating and sperm production (1 h)

Neuroendocrine control of libido and the mating reflex chain in male domestic mammals. Presentation of species-specific behavioural patterns during mating, taking into account the co-evolution of the mating organs and the oestrus behaviour of the female partners. Transfer of the physiological aspects of mating behaviour to the instrumental equipment and technique of semen collection in bulls, rams and goats, stallions, boars, males and tomcats.

Learning objective / basis for:
Evaluation of libido and mating ability (potentia coeundi) during the andrological examination (examination for health and sexual fitness for breeding) of sires.
Deepening and implementation in practical application within the framework of clinical demonstrations and the practical year.

Co-operation / consultation with:
see above.

Lecturer:
Günzel-Apel

4. SW: Spermatology (1 hour)

Spermatology: indications and methods of standard spermatological and extended diagnostics; assessment of findings, nomenclature

Learning objective / basis for:
Basis for the spermatological seminars as part of the seminars 0881 and 0883 in the summer semester (reproductive medicine and biotechnology). Practical application as part of the practical year and clinical demonstrations.

Co-operation / consultation with:
see above.

Lecturer:
Waberski

5. SW: Sperm preservation (1 hour)

Sperm preservation: principles of liquid and frozen sperm preservation, basics of cryobiology of spermatozoa; storage influences and cold shock problems under preservation conditions;
Sperm sexing: Indications, methods, insemination techniques with sexed sperm

Learning objective / basis for:
Basis for the spermatological seminars as part of the seminars 0881 and 0883 in the SS (Reproductive Medicine and Biotechnology).
Practical application as part of the practical year and clinical demonstrations.

Co-operation / consultation with:
see above.

Lecturer:
Waberski

6. SW: Sperm transport and fertilisation (1 hour)

Sperm deposition site in the female genitalia, sperm transport mechanisms to the fertilisation site (differences between vaginal and uterine inseminators), sperm reservoir formation, temperature gradient and chemotaxis, passage through the egg sheaths, sperm selection and elimination, aspects of sperm competition, Survival time of male and female gametes in the female genitalia, ovulation and egg collection mechanism, oocyte/embryo transport through the fallopian tube and in the uterus (embryo migration), fertilisation cascade (mechanisms of capacitation, acrosome reaction, fusion and oocyte activation), transport in the male and female genitalia. Epididymal maturation, role of the functional sperm reservoir in the fallopian tube.

Learning objective / basis for:
Development of the physiological basis for artificial insemination, embryo transfer and other measures to influence fertility, modern andrological diagnostics and the knowledge base for biotechnical measures in domestic animals.

Co-operation / consultation with:
see above.

Lecturer:
Waberski

7. SW: Insemination I (1 hour)

Insemination: definition, meaning and development in livestock species; basic principles of insemination management (insemination technique, timing); low-dose insemination

Learning objective / basis for:
Basis for species-specific consolidation of the material and practical application in the context of seminars 0881 and 0883 in the summer semester (Reproductive Medicine and Biotechnology), clinical demonstrations and the practical year.

Co-operation / consultation with:
see above.

Lecturer:
Waberski

8. SW: Insemination II (1 hour)

Physiology of follicle maturation and ovulation in dogs and cats; ovulation diagnostics; definition and determination of the optimum insemination time or period, taking into account the fertilisation competence of freshly ejaculated and frozen-preserved, thawed sperm in the female genitalia. Examination and preparation of the inseminate (fresh semen, chilled semen, frozen semen). Techniques for vaginal and intrauterine deposition of the insemination dose.

Learning objective / basis for:
Practical application as part of the practical year and clinical demonstrations.
Deepening and supplementation in the context of seminars 0881 and 0883 in the summer semester.

Co-operation / consultation with:
see above.

Lecturer:
Waberski

9TH SW: Cycle, oestrus, ovulation (1 hour)

Definitions of terms and temporal relationships as well as central and decentralised physiological control elements of the reproductive cycle, comparing animal species.

Learning objective / basis for:
Recognition of physiological oestrus and ovulation

Co-operation / consultation with:
see above.

Lecturer:
Günzel-Apel

10. SW: Applied endocrinology in female pets (1 h)

Physiological principles of the ovarian cycle of cattle, horses, pigs, small ruminants, dogs and cats as well as the superordinate regulatory mechanisms and their application in cycle diagnostics and in the diagnosis and treatment of ovarian dysfunctions. Hormonal pregnancy markers. Cycle manipulation.

Learning objective / basis for:
Optimal diagnostic procedures and efficient therapeutic approaches based on the current state of knowledge about the physiology of endocrine regulation of the menstrual cycle (comparing animal species).

Co-operation / consultation with:
see above.

Lecturer:
Günzel-Apel

11. SW: Contraception (1 hour)

Permanent/irreversible and temporary/reversible contraception in male and female individuals of the various domestic animal species. Surgical: sterilisation, castration. Hormonal methods. Immunocontraception. Mechanical methods. Mechanisms of action, desired effects and risks to be considered with regard to health and fertility.

Learning objective / basis for:
Practical application of surgical and non-surgical procedures for contraception, taking into account the respective indication. Critical assessment of existing risks, undesirable side effects and possible long-term consequences, taking into account species- and sex-specific sexual physiology.

Co-operation / consultation with:
see above.

Lecturer:
Günzel-Apel

12. SW: Biotechnology female, part I (1 h)

Artificial insemination, superovulation, embryo transfer

Learning objective / basis for:
Knowledge of biotechnological procedures; artificial insemination; oestrus conduction; embryo transfer

Co-operation / consultation with:

Lecturer:
Bajcsy, Gürler

13. SW: Female biotechnology, part II (1 h)

IVP, cryopreservation, sex determination, cloning, gene transfer

Learning objective / basis for:
Teaching of biotechnological techniques in cattle

Experiments / demonstrations:

Co-operation / consultation with:

Lecturer:
Bajcsy, Gürler

14. SW: New breeding strategies (1 h)

Development of livestock breeding, key developments in new animal breeding, genome editing tools and how they work, examples of genome editing applications, legal categorisation of genome editing

Learning objective / basis for:
Basics of genome editing, knowledge transfer of the technologies, the application potential and the legal classification in the EU

Co-operation / consultation with:
see above.

Lecturer:
Petersen

Institute of Biometry, Epidemiology and Information Processing

0390 Fundamentals of veterinary biometry and epidemiology (biomathematics)

L. Kreienbrock, F. Freise

1. SW: Introduction and basics of data acquisition (2 hrs.)

- Definitions and tasks of biometrics (biostatistics) and epidemiology
- Areas of application of biometrics and epidemiology
- Definition of VPH
- Difference between population parameter and corresponding estimated value from a sample
- Introduction of the example data set Retriever breeding data
- Basic statistical terms
- Statistical forms of data collection
- Examination units
- Features
- Data matrix
- Scale level of measured values

Learning objective / basis for:

- You can define biometrics and epidemiology and describe their tasks
- You can describe the concept of Veterinary Public Health
- They can explain the principle of sampling and the relationship between population parameters and corresponding estimates
- You can assign scale levels using practical examples and explain the differences between different scale levels

Lecturer:

Kreienbrock, Freise

2. SW: Measures of position and dispersion (2 hours)

Position dimensions:
- Arithmetic mean and properties
- Bar chart
- Organised data and ranks
- Median
- Quantiles
- Mode

Scattering measures:
- Range (span)
- Quartile spacing
- Box plot
- Variance, standard deviation
- Coefficient of variation

Learning objective / basis for:

- You can characterise data material using the known measures of position and dispersion depending on the scaling of the variables (mean, median, mode, minimum, maximum, range, percentiles)
- They can reproduce the meaning of basic descriptive measures (LG 3.2) by appropriately evaluating data using these measures
- You can correctly interpret data displayed using various graphics

Experiments / demonstrations:
Presentation of a data acquisition exercise by the students

Lecturer:
Kreienbrock, Freise

3. SW: Diagrams and epidemiological indicators (2 hours)

Diagrams:
- Pie chart
- Block diagram
- Bar chart
- Histogram

Key figures frequency of illness:
- Morbidity (prevalence, incidence)
- Mortality, lethality

Learning objective / basis for:
- They can apply and assess central epidemiological methods of morbidity measures (prevalence, (cumulative) incidence and mortality measures (total, disease-specific)
- You can graphically represent frequency distributions of measured values in a scale-dependent manner (pie chart, bar chart, histogram, box plot)

Experiments / demonstrations:
Presentation of an exercise on location and scattering measures by the students

Lecturer:
Kreienbrock, Freise

4. SW: Measures of association (2 hours)

- Contingency table
- Association coefficient according to Yule
- Contingency coefficient and Cramer's V
- Relative risk
- Odds Ratio

Learning objective / basis for:
You can calculate and interpret the relative risk (RR) and odds ratio (OR) based on a cross table

Experiments / Demonstrations:
Presentation of an exercise on diagrams and key figures by the students

Lecturer:
Kreienbrock, Freise

5. SW: Correlation and Regression (2 hours)

- Scatterplot
- Correlation coefficient according to Bravais-Pearson
- Rank correlation coefficient according to Spearman
- Causality, spurious correlations
- Simple linear regression
- Coefficient of determination

Learning objective / basis for:
- You can calculate and correctly interpret correlation coefficients (Pearson, Spearman) and parameters of a simple linear regression model

Experiments / demonstrations:
Presentation of an exercise on measures of association by the students

Lecturer:
Kreienbrock, Freise

6. SW: Probabilities (2 hours)

Terms used in probability theory
- Probability
- Coincidence
- Event
Laplace probability
Venn diagrams
Calculating with probabilities
Conditional probabilities

Learning objective / basis for:
You can apply the basic rules for calculating with probabilities (addition, multiplication, conditional probabilities)

Experiments / Demonstrations:
Presentation of an exercise on correlation and regression by the students

Lecturer:
Kreienbrock, Freise

7. SW: Diagnostic tests (2 hours)

Definition and use of diagnostic tests
Properties of tests
- Sensitivity, specificity
- Truthfulness of test results
Threshold values
Serial and parallel testing

Learning objective / basis for:
- You can use Bayes' theorem to calculate predictive values of diagnostic tests
- They can describe the difference between apparent and true prevalence and assess the quality of diagnostic tests based on diagnostic test characteristics (sensitivity, specificity)
- You can calculate and interpret positive and negative predictive values to assess the significance of a diagnostic test result

Experiments / Demonstrations:
Presentation of an exercise on the topic of probabilities by the students

Lecturer:
Kreienbrock, Freise

8. SW: Repetition of descriptive statistics (2 hours)

Information about the exam
Questions
Repetition

Learning objective / basis for:
Exam preparation

Experiments / Demonstrations:
Processing of test questions via Pingo

Lecturer:
Kreienbrock, Freise

9. SW: Distributions (2 hours)

- Binomial distribution
- Normal distribution
- Standard normal distribution
- Assessment of normality
- (Clinical) reference ranges (reference values)

Learning objective / basis for:
- Students can describe the difference between continuous and discrete probability functions and can characterise probability quantities using probabilities and distribution functions
- Students can visualise the model of the Bernoulli experiment and the binomial distribution and use the binomial function to calculate probabilities
- Students use the normal distribution as a special continuous probability distribution and can Richter whether a normal distribution can be assumed for the data available

Lecturer:
Kreienbrock, Freise

10. SW: Confidence intervals (2 hours)

- Difference between descriptive and inductive statistics
- Mean value as a random variable
- Definition of confidence intervals (CI)
- Confidence interval for metric data (normal distribution)
- Confidence interval for proportions (binomial distribution)
- Broad AI; influence of sample size

Learning objective / basis for:
- Students can assess the results of findings using clinical reference values (normal ranges)
- You can calculate and interpret confidence intervals for mean value estimators and proportions from samples
- You can explain the difference between clinically relevant normal ranges and statistically based confidence intervals
- You can explain the influence of the sample size on the width of the confidence interval
- You can define the concept of a simple random sample and explain the influence of sample size on the accuracy of parameter estimates (confidence intervals)

Experiments / Demonstrations:
Presentation of an exercise on distributions by students

Lecturer:
Kreienbrock, Freise

11. SW: Decisions and tests (2 hours)

Basic principles of statistical testing
- Philosophy
- Decision problem

- Components
- Realisation
- Interpretation

Learning objective / basis for:
- You can explain the basic concepts of null hypothesis, alternative hypothesis, 1st type error, 2nd type error using examples
- You can explain the terms "acceptance and rejection range" and "critical value"

Experiments / Demonstrations:
Presentation of an exercise on diagnostic imaging decisions by students

Co-operation / consultation with:
Clinic for small animals

Lecturer:
Kreienbrock, Freise

12. SW: One-sample test (2 hours)

Terms of statistical testing in comparison with standard and target values:
- Significance
- Error probabilities
- Power
- p-value

Basic principle of 1-sample tests
One-sample t-test:
- Prerequisites, concept, calculation, interpretation

Binomial test:
- Prerequisites, concept, calculation, interpretation

Learning objective / basis for:
- You can formulate a scientific question about target and standard values in a statistical hypothesis pair consisting of a null and an alternative hypothesis
- You can explain the difference between one-sided and two-sided alternative hypotheses using an example
- You can explain the basic concepts of type 1 error, type 2 error and power using the example of 1-sample test procedures
- You can explain the term statistical significance using the p-value of a statistical test and error of the first kind (alpha)

Experiments / demonstrations:
Presentation of an exercise on statistical testing by students

Lecturer:
Kreienbrock, Freise

13. SW: Two-sample tests (2 hours)

Basic principle of 2-sample tests
Connected and unconnected samples
2-sample t-test:
Prerequisites, concept, calculation, interpretation
Four-field Chi² test:
Prerequisites, concept, calculation, interpretation

Learning objective / basis for:
- They can describe the concept of simple statistical test procedures including the prerequisites for their applicability (scale levels, assumptions)
- Using a practical example, they can carry out the correct statistical procedure for comparing measured values between two test groups (t-test, chi-square test) and interpret the results

Experiments / Demonstrations:
Presentation of an exercise on two-sample tests by students

Lecturer:
Kreienbrock, Freise

14. SW: Repetition of inductive statistics (2 hours)

Information about the exam
Questions
Repetition

Learning objective / basis for:
Exam preparation

Experiments / Demonstrations:
Test questions for the exam via Pingo

Lecturer:
Kreienbrock, Freise

Courses for the 6th semester

Institute of Pathology

0580 Special pathological anatomy (lectures)

Beineke, Wohlsein, Puff, Gerhauser, Leitzen, Stoff, Hülskötter

1. SW: Special pathological anatomy (39 hours)

The Special Pathological Anatomy lecture builds on the General Pathology lecture to teach the aetiology and pathogenesis of diseases in domestic animals, taking into account morphological and aetiological differential diagnoses.

Learning objective / basis for:
Teaching and understanding of specific diseases, taking into account the differential diagnoses and generally applicable pathogenic mechanisms of the most important organ systems.

Lecturer:
see above;

Institute of Pathology

0581 Pathological-histological exercises

Beineke, Wohlsein, Puff, Gerhauser, Leitzen, Stoff, Hülskötter

1. SW: Pathological-histological exercises (26 hours)

This practically oriented course focuses on the recognition of pathological processes at the light microscopic level and the formulation and interpretation of histopathological diagnoses, taking into account morphological and aetiological differential diagnoses.

Learning objective / basis for:
The aim of the course is to convey an understanding of disease processes at the cellular level. The prerequisite for successful participation is a basic knowledge of histology and special pathology.

Experiments / Demonstrations:
Use of histological preparations

Lecturer:
see above;

Institute of Virology

0621 Specialised virology

Bächlein, Becher, Behrens, Gremmel, Leveringhaus, Meyer zu Natrup, Postel, Volz

1. SW: This lecture discusses relevant viral diseases of animals (especially dogs, cats, rabbits, horses, cattle, sheep, goats, pigs and fish), categorised by virus families. (33 hrs)

Flaviviridae (genus Pestivirus):
Bovine viral diarrhoea (BVD)
Classical swine fever (CSF)
Border Disease
Piglet tremors (atypical porcine pestivirus)
Flaviviridae (genus Flavivirus):

Infections with West Nile virus and Usutu virus
Picornaviridae:
Foot-and-mouth disease
Vesicular stomatitis
Teschen/Talfan
Coronaviridae:
Infections with feline coronaviruses including feline infectious peritonitis
Transmissible gastroenteritis
Porcine epidemic diarrhoea
Infections with zoonotic coronaviruses
Arteriviridae:
Equine viral arteritis
Porcine reproductive and respiratory syndrome
Herpesviridae:
Infections with equine herpesviruses (EHV-1/-4)
Infections with bovine herpesvirus-1 (BHV-1)
Malignant catarrhal fever
Infections with canine herpes viruses
Infections with feline herpes viruses
Infections with koi herpes virus
Paramyxoviridae:
Distemper
Kennel cough
Enzootic bronchopneumonia
Bunyaviridae:
Schmallenberg virus infection
Parvoviridae:
Infections with canine, feline and porcine parvoviruses
Circoviridae:
Infections with porcine circoviruses
Poxviridae:
Cowpox and infections with other orthopox viruses
Smallpox in sheep and goats
Lumpy Skin Disease
Pig pox
Myxomatosis
Orf
Bovine stomatitis papulosa
Udderpox
Asfarviridae:
African swine fever
Adenoviridae:
Hepatitis contagiosa canis
Caliciviridae:
Infections with feline calicivirus
Rabbit haemorrhagic disease
Rhabdoviridae:
Rabies
Viral haemorrhagic septicaemia (VHS)
Infectious haematopoietic necrosis (IHN)
Retroviridae:

Infections with feline leukaemia virus
Infections with feline immunodeficiency virus
Equine infectious anaemia
Maedi-Visna
Caprine arthritis encephalitis
Ovine pulmonary adenocarcinoma
Enzootic bovine leucosis
Orthomyxoviridae:
Swine influenza
Equine influenza
Reoviridae:
Rotavirus infections
Bluetongue disease
Epizootic haemorrhagic diarrhoea
African horse sickness
Bornaviridae:
Born ash disease and other infections with Borna viruses

Learning objective / basis for:
At the end of the 3rd year of study, students in the 6th semester should have basic knowledge of the aetiology, clinic, pathogenesis, immunology, epidemiology, diagnosis and prophylaxis/control of relevant viral infections in animals (see list of course contents). The subject matter covered is the basis for the examination in the speciality of virology (special part).

Lecturer:
Bächlein, Becher, Behrens, Gremmel, Leveringhaus, Meyer zu Natrup, Postel, Volz

Clinic for poultry; clinic for pets, reptiles and birds

0649 Propaedeutics of poultry diseases

Jung, Legler, Lindenwald, Pees, Rautenschlein

1. SW: Basics and strategies for anamnesis and further examinations including sampling and dissection of different bird species and utilisation directions. Further species knowledge and husbandry-related diseases in ornamental and wild birds (24 hours)

Presentation of general and special anamneses with reference to symptoms and husbandry conditions. The basics of the stages of a clinical examination and the differences between bird species. Initiation and performance of further examinations such as taking samples from live animals and necropsy. Diagnosis and treatment of husbandry-related diseases in ornamental and wild birds, taking into account the different bird species and husbandry conditions.

Learning objective / basis for:
Learn and deepen the procedure for the examination of ornamental birds and the management of hobby and productive poultry using case studies. The material covered forms the basis for recognising diseases, husbandry and management problems in ornamental bird and poultry medicine as well as the implementation of prophylactic strategies and therapeutic measures. Skills that should be achieved at the end of the programme.

Experiments / demonstrations:
Case discussions, examination of the animal (bird/poultry) including blood and swab sampling, dissection exercise

Co-operation / consultation with:
Clinic for pets, reptiles and birds

Lecturer:
see above

Clinic for poultry; clinic for pets, reptiles and birds

0651 Poultry diseases I

Jung, Legler, Pees, Rautenschlein, Rubbenstroth

1. SW: Diseases of farm poultry and ornamental, zoo and wild birds (14 hours)

Notifiable and reportable diseases as well as other diseases of animal health and economic importance are presented, taking into account other influencing factors. Zoonotic relevance, epidemiology, pathogenesis, clinic, pathology, diagnostics, differential diagnoses as well as therapy and prophylaxis strategies are discussed and explained using examples. Furthermore
breeding and rearing as well as measures for stock management such as vaccine application are discussed. Current legal bases are also addressed.

Learning objective / basis for:
The aim is to introduce students to bird and poultry diseases and to explain the diagnostic, therapeutic and prophylactic measures so that they are able to take an appropriate diagnostic approach to clinical cases and to clarify the differential diagnosis of possible causes of disease and to initiate treatment and preventive measures. This learning objective should be achieved by the end of the programme after attending further courses in the areas of poultry, ornamental birds and wild birds.

Experiments / Demonstrations:
Example cases, images with clinical symptoms, pathological-anatomical and histological changes, etc.

Co-operation / consultation with:
Clinic for pets, reptiles, ornamental and wild birds

Lecturer:
see above

Institute for Parasitology

0663 Parasitology (Exercises)

Strube, Becker, Raulf, Springer

1. SW: Acarology/Entomology (10 hours)

Course 1: Ticks (Ixodes, Dermacentor, Rhipicephalus, Haemaphysalis, Hyalomma, Argas)
Course 2: Mites I (Dermanyssus, Ornithonyssus, Varroa, Tropilaelaps, Acarapis, Demodex, Cheyletiella, Neotrombicula)
Course 3: Mites II, Phthiraptera (Psoroptes, Chorioptes, Otodectes, Sarcoptes, Notoedres, Knemidocoptes
Course 4: Bovicola, Werneckiella, Trichodectes, Felicola, Menacanthus, Menopon, Haematopinus, Linognathus, Solenopotes, Fleas

Course 5: Diptera, beetles (Ctenocephalides, Archaeopsylla, Ceratophyllus, Pulex, Anopheles, Culex, Aedes, Culicoides, Simulium, Phlebotomus, Tabanus, Haematopota, Hybomitra, Chrysops, Musca, Fannia, Hydrotaea, Stomoxys, Haematobia, Lucilia, Calliphora, Sarcophaga, Wohlfahrtia, Oestrus, Hypoderma, Gasterophilus, Melophagus, Hippobosca, Aethina)

Learning objective / basis for:
Knowledge of the morphology and understanding of the biology and epidemiology of the parasitic pathogens presented here. Understanding of the pathogenesis, clinic, diagnosis, therapy and control of the diseases caused by these parasites.
This knowledge is the basis for the examination in parasitology.

Experiments / Demonstrations:
Explanation and microscopy of entomological specimens during each event.

Co-operation / consultation with:
Not applicable

Lecturer:
Strube, Springer, Raulf

Remarks:
Protective clothing (smock) required for participation.

6. SW: Protozoology (10 hours)

Course 1: Metamonada (Giardia spp.), Parabasala (Histomonas, Tritrichomonas, Trichomonas)
Course 2: Euglenozoa (Trypanosoma, Leishmania), Coccidia I (Eimeria)
Course 3: Coccidia II (continuation of Eimeria, Cystoisospora, Toxoplasma)
Course 4: Cyst-forming coccidia (Neospora, Besnoitia, Sarcocystis, Cryptosporidium)
Course 5: Piroplasmas (Babesia, Theileria), Ciliophora (Balantidium), Microspora (Encephalitozoon, Nosema)

Learning objective / basis for:
Knowledge of the morphology and understanding of the biology and epidemiology of the parasitic pathogens presented here. Understanding of the pathogenesis, clinic, diagnosis, therapy and control of the diseases caused by these parasites.
This knowledge is the basis for the examination in parasitology.

Experiments / demonstrations:
Explanation and microscopy of protozoological specimens during each course.

Co-operation / consultation with:
Not applicable

Lecturer:
Springer, Raulf, Becker

Remarks:
Protective clothing (smock) and disposable gloves are required for participation.

11. SW: Helminthology (8 hrs.)

Course 1: Trematodes (Fasciola, Dicrocoelium, Calicophoron, Paramphistomum)
Course 2: Cestodes I (Dibothriocephalus, Dipylidium, Mesocestoides, Anoplocephala, Paranoplocephala)
Course 3: Cestodes II (Taenia, Hydatigera, diseases caused by metacestodes)

Course 4: Faecal examination techniques (flotation, McMaster, sedimentation, emigration methods)

Learning objective / basis for:
Knowledge of the morphology and understanding of the biology and epidemiology of the parasitic pathogens presented here. Understanding of the pathogenesis, clinic, diagnosis, therapy and control of the diseases caused by these parasites.
This knowledge is the basis for the examination in parasitology.

Experiments / Demonstrations:
Explanation and microscopy of helminthological preparations during each event.

Co-operation / consultation with:
Not applicable

Lecturer:
Springer, Becker

Remarks:
Protective clothing (smock) and disposable gloves are required for participation.

Institute for Parasitology

0664 Elective internship in infectious medicine (parasitology)

Strube and research assistants

Optional internship in parasitology as part of the practical year (0 hours)

Collaboration in the context of ongoing projects or in parasitological diagnostics

Learning objective / basis for:
Familiarisation with and application of various techniques of molecular, applied and diagnostic parasitology

Experiments / demonstrations:
variable

Co-operation / consultation with:
Not applicable

Lecturer:
Strube, Raulf, Springer

Institute for Food Quality and Safety

0720 Meat hygiene and poultry meat hygiene

Plötz, Siekmann, Sudhaus-Jörn, Kreitlow, Abdulmawjood, Krischek

1. SW: Meat hygiene (14 hours)

Slaughterhouses, cutting and processing plants; slaughter lines for cattle, pigs and other animal species;
Microbiology of slaughtered poultry;
Cleaning and disinfection;
Cooling and freezing;
Import examination;
Process control and hygiene monitoring;
Game meat hygiene;
EU law, animal welfare, animal disease, feed and pharmaceutical law;
Meat inspection statistics, quality meat programmes

Learning objective / basis for:
Students know the basic structure of abattoirs, cutting and processing plants.
They are familiar with instruments for hygiene monitoring and quality assurance as part of process control.
They know the most important legal texts on the legal areas of waste/SRM, import inspections, game, animal welfare, animal diseases, animal feed and medicinal products.
They know the main elements of meat inspection statistics and their weak points.
They are familiar with quality meat programmes and know where and how they are applied.
They know the elements and legal basis of import inspections.
They know the microbiological risks associated with poultry carcasses for the consumer.

Experiments / Demonstrations:
Video recordings of slaughterhouses, cutting and processing plants

Lecturer:
Research assistants (see above)

Institute for Food Quality and Safety

0722 Food toxicology; residues and contaminants: Risks and consumer protection

Seeger, Haiber, Lampen (BfR Berlin)

1. SW: Food Toxicology (12 hours)

Introduction, basics of risk assessment,
Toxicokinetics and metabolism of foreign substances;
Contaminants, dioxins, polychlorinated biphenyls, mycotoxins, heavy metals, Contaminants Ordinance;
Residues from animal production;
Residues from plant production;
Current food safety problems from the BfR's perspective;
Risks from processing and preparation of food (heterocyclic aromatic amines / polycyclic aromatic hydrocarbons / nitrates, nitrites, nitrosamines / acrylamide);
Analytics I: Basics;
Analytics II: Application, legal consequences

Learning objective / basis for:
Students should familiarise themselves with basic aspects of food toxicology.

Co-operation / consultation with:
Federal Institute for Risk Assessment (lamps)

Lecturer:
Seeger, Kühne, lamps

Institute for Food Quality and Safety

0742 Milk hygiene and dairy farming

Plötz, Sudhaus-Jörn, Jeßberger, Grabowski, Krischek

1. SW: Milk hygiene (14 hours)

Dairy hygiene and technology issues from primary production to the product; chemistry of milk; EU and national law

Learning objective / basis for:
Knowledge of milk hygiene law (national and EU law); knowledge of the hygiene and technology of milk production and processing, basics of the chemistry of milk as preparation for the subsequent exercises

Lecturer:
Grabowski, Ahlfeld, Mengden, Becker

Institute of Pharmacology, Toxicology and Pharmacy

0760 Pharmacology and Toxicology II

Richter Assêncio, Meißner, Feja, Käufer, Bruer

1. SW: Special Pharmacology II (39 hours)

1. inflammation and allergy, 3h
(NSAIDs, glucocorticoids, antihistamines)
2. respiratory system, 1h
(bronchospasmolytics, expectorants, secretolytics)
3. water and ion balance, 1h
(Fluid spaces in the organism, regulatory mechanisms, disorders of the electrolyte and water balance, pharmacology of important cations and anions
4. pharmacology of the kidney, 1h
(Introduction, diuretics, antidiuretics, inhibitors of the tubular transport system)
5. cardiovascular, 4h
(cardiac glycosides, antiarrhythmic drugs, antihypertensive drugs)
6. antimicrobial chemotherapy, 6h
(General principles of antibacterial chemotherapy; resistance types and mechanisms in bacteria; sulphonamides (and trimethoprim); beta-lactam antibiotics (penicillins, cephalosporins); aminoglycoside antibiotics; chloramphenicol and tetracyclines; gyrase inhibitors (quinolones); narrow-spectrum antibiotics (macrolide antibiotics such as erythromycin and tylosin, lincomycin / clindamycin, fusidic acid, colistin, polymixin B) and local antibiotics (e.g. bacitracin).(e.g. bacitracin); new developments)
7. antiparasitics/antifungals, 2h
(Brief introduction to the classification of antiparasitic agents according to the type of parasite; introduction to anthelmintics, then presentation of the most important anthelmintics (focus on pharmacology and adverse effects); pathogenic fungi; most important treatment options; due to time constraints, only anthelmintics can be dealt with in this lecture. Agents against ectoparasites will be dealt with in toxicology towards the end of the semester. Antiprotozoal agents are not covered)
8. disinfectant, 1h
(Aims of disinfection; differentiation from chemotherapy; presentation of the most important groups of disinfectants and their prototypes)
9. substances with local effect, 3h
9.1.(Substances with effects on skin and mucous membranes (mucinalinosa, adsorbents, skin irritants, astringents, caustics, keratolytics, haemostyptics, etc.)
9.2.(Gastrointestinal therapeutics (laxatives, antacids, antidiarrhoeals, spasmolytics, emetics and antiemetics, etc.))
10. pharmacology of hormones, 4h
(anterior pituitary hormones, mineralocorticoids, thyroid hormones, thyreostatics, parathyroid hormone, insulin and oral antidiabetics; the most important vitamins)
11.sex hormones and uterus-active drugs, 1h
(oxytocin, testosterone, progesterone etc., oxytocics, tocolytics)

12. pharmacology of the blood, 1h
(iron, copper, cobalt, anticoagulants, antithrombotics, fibrinolytics, rodenticides)

Learning objective / basis for:
Treated mechanisms of action are the basis for clinical pharmacotherapy

Lecturer:
F. Richter Assencio

11TH SW: General and special toxicology (11 hours)

General poisoning treatment; gases and vapours (oxygen, CO2, CO, cyanides, organic solvents); heavy metal poisoning (lead, thallium, cadmium, zinc, mercury, arsenic); pesticides (organochlorine compounds = chlorinated cyclic hydrocarbons such as DDT and lindane; alkyl phosphates and carbamates; rodenticides); mutagenesis, carcinogenesis, teratogenesis

Learning objective / basis for:
Understanding the most important poisonings and their treatment

Lecturer:
J. Meissner

Institute of Parasitology, Department of Fish Diseases and Fish Husbandry

0776 Diseases of bees and fish

Jung-Schroers

1. SW: Fish as patients (7 hours)

Providing basic knowledge about the development, progression and diagnostic possibilities of diseases in fish
Topics:
Symptoms of diseases
Procedure for portfolio management
Procedure for the diagnosis of fish diseases Diseases of the skin and gills
Systemic diseases of fish Bacterial diseases of fish Animal diseases in fish
Therapy of fish diseases

Learning objective / basis for:
Teaching a basic strategy for diagnosing diseases in fish, knowledge of frequently occurring parasitic, bacterial and viral infectious agents, recognising notifiable diseases in fish, procedure for treating fish diseases

Lecturer:
Jung-Schoers

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0779 Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics (quota), clinic for small cloven-hoofed animals (6th semester)

Ganter, Höltig, Hennig-Pauka, von Altrock, Wagener, Bauer, Nickolaisen

1. SW: Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics (quota) Clinic for small cloven-hoofed animals (12 hours)

Diseases of pigs and small ruminants;
Presentation of sick animals together with students who have previously examined their patient;
Parallel small group lessons: case discussion, examination and treatment of sick animals in the stable

Learning objective / basis for:
Learning of examination procedures and methods, understanding of aetiology, pathogenesis, epidemiology, therapy and prophylaxis of various diseases;
Implementation of treatment measures

Experiments / Demonstrations:
Case demonstrations

Lecturer:
Ganter, von Altrock, Wagener, Bauer (instead of Ganter, v. Altrock, Wagener, Bauer)

Clinic for horses

0799 Clinical training on patients - quota 6th semester

Feige, Sieme, Geburek, Ohnesorge, Bartmann, Delling, Verhaar, employees

1. SW: Internal medicine, orthopaedics and surgery, reproductive medicine (36 hours)

Presentation of horses currently admitted to the clinic with diseases from all areas of equine medicine. Particular attention is paid to hoof diseases, lameness-causing diseases of the limbs with special consideration of tendon and joint diseases, back diseases, foal diseases, diseases of the upper and lower respiratory tract, cardiovascular diseases, diseases of the kidneys and urinary organs, gastrointestinal diseases with special consideration of equine colic, metabolic diseases, skin diseases, neurological diseases, fertility disorders and peripartum diseases, and andrological diseases.

Learning objective / basis for:
Development of diagnosis and therapy of practice-relevant diseases by students under the guidance of lecturers. This is supplemented by a theoretical review of the diagnosed illness.

Experiments / Demonstrations:
1 to 3 patients are presented per lesson.

Lecturer:
see above.

Equine Clinic; Reproductive Medicine Unit of the clinics

0802 Equine diseases, equine reproductive medicine

Sieme, Delling, Frers

1. SW: Gynaecology, obstetrics, andrology (1 hour)

This lecture provides knowledge of modern clinical reproductive medicine in equidae. In the areas of gynaecology, obstetrics and andrology, students will learn about the most important disorders of reproductive regulatory mechanisms and diseases of the genital tract as well as diagnostic, prophylactic and therapeutic measures.
Organisation of the lecture notes: I. non-pregnant mare, II. pregnant mare, III. peripartum mare, IV. initial care of the neonate, V. castration
The main topics are
Ovulation and ovulation induction/synchronisation (Sieme)
Cyclical and pathological changes in the ovary (Sieme)
Changes to the perineum, vulva, vestibule (Sieme)
Changes to the uterus (Sieme)
Stages of pregnancy, pregnancy diagnostics (Sieme)
Pregnancy disorders, pregnancy losses (Sieme)
Birth, birth disorders (Sieme)
Obstetrical measures (Sieme)
Genital diseases in mares and stallions (Sieme)
Care of the neonatal foal (J.Schwieder)
Special surgery of the genital tract in mares and stallions (Delling)

Learning objective / basis for:
Acquisition of up-to-date knowledge in the diagnosis, prophylaxis and therapy of clinical-reproductive disorders and diseases in horses.

Experiments / Demonstrations:
"none"

Co-operation / consultation with:
"none"

Lecturer:
Sieme, Delling, Schwieder

Clinic for horses

0804 Equine diseases, orthopaedics including hoof diseases

Geburek

1. SW: Orthopaedics and surgery, hoof diseases, farriery (18 hours)

Diagnostics including imaging as well as conservative and surgical therapy of practice-relevant diseases of the musculoskeletal system of horses - lower limb sections: Hoof, toe, metatarsus.
1. presentation of relevant textbooks
2. diseases of the hoof capsule
Horn gap, horn cleft
Loose wall
Hollow wall
Horn column
3. diseases of the hoof corium and the soft tissue in the hoof area
Septic (infectious) hoof dermatitis

Hoof abscess
Nail kick
Aseptic hoof dermatitis
Stone bile
Hemophytosis
Sole dermatitis
Laminitis
Hoof cancer
4. diseases of the coffin bone
Fractures of the coffin bone
5TH OVERRIDING FOCUS TOPIC - Drug therapy of arthropathies
6. diseases of the hoof joint
Synovialitis (podarthritis aseptica)
Septic arthritis (podarthritis infectiosa)
Osteoarthritis / osteoarthritis (podarthrosis)
Hoof joint navicular disease
Desmitis of the collateral ligaments
Fracture of the proc. extensorius (e.g. OCD)
Subchondral cyst-like lesions (coffin bone)
7. diseases of the hoof roll region
Podotrochlitis (aseptic, septic)
Podotrochlos (degenerative changes of the navicular surface, central collapse, tendopathy of the TBS)
Desmopathies (pastern bone - navicular bone - coffin bone ligament, distal impar sesamoideum ligament, combinations)
8. diseases of the crown joint
Osteoarthritis / osteoarthritis (shell)
Osteochondral fragments
Subchondral cyst-like lesions
Subluxations of the coronet bone/pastern (coronet bone palmar/dorsal)
9. diseases of the fetlock joint region
Osteoarthritis / arthrosis
Osteochondral fragments (osteochondrosis dissecans/fractures)
Subchondral cyst-like lesions (pastern bone, cannon bone)
Lateral ligament ruptures (subluxations)
Pastern fractures
Equine disease (sesamoidosis)
Fetlock ring ligament syndrome
Splicing (longitudinal tears) of the deep flexor tendon
Diseases of the proximal manica flexoria of the superficial flexor tendon
10TH OVERVIEW TOPIC - Pathogenesis, diagnosis and therapy of tendopathies in horses
11. diseases of the metatarsal region
Diseases of the tendons (ligaments)
Superficial flexor tendon
Deep flexor tendon
Supporting ligament of the deep flexor tendon
Pasterns (M. interosseus medius)
(extensor tendons)
12. diseases of the bones of the metatarsus
Grip bones (Os metacarpale / - tarsale II and IV)
Tarsal bone (Os metacarpale / - tarsale III)

Atavism
Polydactyly
13th OVERVIEW TOPIC - First aid for horses with limb fractures

Learning objective / basis for:
Knowledge of practice-relevant diseases of the lower sections of the musculoskeletal system - hoof up to and including metatarsus: drug therapy, therapeutic shoeing, orthopaedic measures, surgical treatment options, prospects of success of therapeutic procedures.

Experiments / Demonstrations:
Film material with movement disorders

Lecturer:
Geburek

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic; Clinic for pets, reptiles and birds; Clinic for small animals; Clinic for horses; Clinic for cattle

0815 General surgery

Delling, Geburek, Wendt, Heppelmann, Kramer, Volk, Fehr

2. SW: Suture material science, principles of suture technique (1 hour)

The basics of suture and knotting techniques are discussed and the basics of suture material science are presented.

Learning objective / basis for:
Theoretical learning of suturing techniques
Theoretical learning of knotting techniques
Presentation of the basics of suture material science

Co-operation / consultation with:
Kramer (Clinic for Small Animals)

Lecturer:
Delling (clinic for horses)

3. SW: Instrument knowledge and handling (1 hour)

Surgical instruments and their application are presented, which are used in the basic set. Selected instruments for special applications are also presented. The preparation and storage of the instruments is also briefly discussed.

Learning objective / basis for:
Basic cutlery and application basics
Instruments for special applications (selection)
Basics of preparation and storage

Co-operation / consultation with:
Kramer

Lecturer:
Delling

4. SW: Haemostasis, wound healing, wound care (1 hour)

The basics of haemostasis and wound healing are discussed and the various wound stages/types are presented. In addition, the procedure for primary, delayed primary and secondary wound closure and secondary wound healing is discussed. In this context, the

most important wound dressings and their function are presented, as well as simple techniques for closing larger skin defects (pre-stretching the skin, skin grafting techniques).

Learning objective / basis for:
Learning various techniques for blouse stilling
Assessment and categorisation of wounds.
Knowledge of wound healing and the resulting consequences for the therapeutic/surgical procedure
Knowledge of the procedure for the various wound stages and wound types; knowledge of the function and area of application of the most important wound dressings.

Co-operation / consultation with:
Delling (Clinic for Small Animals and Clinic for Horses)

Lecturer:
Sabine Kramer

5. SW: Wound healing disorder and forms of wound infection (phlegmon, abscess, fistula, etc.) Wound healing disorder and forms of wound infection (phlegmon, abscess, fistula, etc.) (1 hour)

Basic terms (inflammation, infection, forms of diffuse and focal swelling or filling) are discussed.
Furthermore, the factors (wound, patient, treatment) and the various forms of a wound healing disorder are presented.

Learning objective / basis for:
Terminology of diffuse and focal swelling
Factors and forms of wound healing disorders

Co-operation / consultation with:
Heppelmann

Lecturer:
Delling

6. SW: First aid fracture, dislocation, transport (1 hour)

Development of fractures
Fracture shapes/configurations
Salter-Harris fractures
Degree of soft tissue damage in fractures
Influences on the prognosis after fracture treatment (focus on horses)
Principles of initial treatment of fractures: immobilisation of the patient, wound care, stabilisation of the fracture, analgesia, indication for antibiotics, shock treatment, transport (focus on horses)
Immobilising bandages (fibreglass cast bandage, splint bandage, Robert Jones bandage; focus on horses)
Extension of immobilisation in the limb depending on the localisation of the fracture (focus on large animals)
Indications for fracture treatment in small animals
Use of orthoses for dogs
Conservative treatment of dislocations of the femur in small animals

Learning objective / basis for:
Internalisation of appropriate and professional initial treatment under practice conditions with the aim of avoiding deterioration and creating optimal conditions for successful final treatment (e.g. osteosynthesis); special consideration of ethical aspects

Co-operation / consultation with:
Harms (Clinic for Small Animals), Pees (Clinic for Pets, Reptiles and Birds)

Lecturer:
Geburek

7. SW: Pre- and post-operative information / liability / killing an animal (1 hour)

We have analysed the topic depending on the animal species. We show you many similarities, but also the individual differences.

Please answer the quiz in your own words first. This will not be tested, but it will help you to find out how much you already know about a very, very important topic.

Take a look at the example to understand why this learning opportunity is so important.

Then take a look at the 2 lectures.

We have put together some very interesting articles - take the time to read them.

If you have any questions, please post a question in the discussion forum

Good luck and stay healthy!

Focus on horses:
Who bears what responsibility and the treatment costs?
Scope and methods of information before a surgical procedure
What influences the scope of education?
What needs to be considered if the patient is insured?
Dealing with liability cases
Killing an animal: Indications Permission
Killing a horse: veterinary indications, possible procedures (euthanasia, slaughter, captive bolt)

Learning objective / basis for:
After the course, students should be able to

to know and understand the legal basis for informed consent and killing.

to know the components of a counselling interview.

to know the different methods of killing and their indications and to discuss the advantages and disadvantages of the individual procedures.

Experiments / Demonstrations:
Image material

Co-operation / consultation with:
Geburek

Lecturer:
Volk, Geburek

Clinic for small animals

0819 Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics Clinic for small animals (quota 6.)

Volk H., Siedenburg, Kästner, Kramer, Mischke, Tipold, Busse, Karbe, Meller, Merhof, Metje, Nerschbach, Neßler, Neudeck, Rieder, Schütter, Volk A., Wang

1. SW: Dentistry: current cases (2 hours)

Presentation of patients with dental diseases, diagnostics, including imaging and development of a therapeutic plan. Presentation of the dental treatment techniques to be carried out

Learning objective / basis for:
Diagnosis of dental caries and development of a therapeutic plan. Learning important dental treatment techniques

Experiments / Demonstrations:
Image material

Lecturer:
Metje

1. SW: Intensice care unit (ICU): current cases (2 hours)

Diagnostics, monitoring and treatment of intensive care patients, with a special focus on the assessment of laboratory parameters.
Presentation of various diagnostic procedures and intensive care techniques and interventions

Learning objective / basis for:
Diagnosis of an intensive care patient, initiation of the necessary intensive care treatment, monitoring and, if necessary, adjustment of therapy

Experiments / Demonstrations:
Image and video material

Lecturer:
Neudeck

1. SW: Imaging: Discussion of X-ray images (2 hours)

Structured procedure for the diagnosis, interpretation and assessment of radiographs in small animals. The following scheme should be adhered to:
1. assessment of the technical quality
2. description of the X-ray image - normal X-ray anatomy vs. pathological X-ray anatomy
3. x-ray diagnosis
4. diagnosis or differential diagnosis list and, if necessary, further diagnostic plan

Learning objective / basis for:
Independent assessment of X-ray images, X-ray diagnosis, differential diagnosis list and creation of a further diagnostic plan

Experiments / Demonstrations:
X-ray images

Lecturer:
Wang

1. SW: Problem-orientated learning: Leading symptoms (2 hours)

Definition and clinical relevance of symptoms, pathophysiological mechanisms, differential diagnosis based on key symptoms, examination procedure, development of a treatment plan.

Learning objective / basis for:
Problem-orientated approach to small animal patients.

Experiments / Demonstrations:
Image and video material

Lecturer:
Rieder, Mischke, A. Volk, H. Volk, Kramer, Busse, Harms, Karbe

1. SW: Internal Medicine: Discussion of current cases (2 hours)

Problem-orientated processing of internal medicine patients who are hospitalised at the clinic at the time of the event. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated approach to small animal patients. with diagnostics, differential diagnoses and a therapeutic plan

Experiments / demonstrations:
Images, examination of a patient

Lecturer:
Rieder, Mischke, A. Volk, H. Volk

2. SW: Dermatology: Discussion of current cases (2 hours)

Problem-oriented processing of dermatological patients who are hospitalised at the clinic at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and further diagnostics (cytology, pathohistology) and procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated approach to small animal patients in dermatology. Creation of a differential diagnosis list, a diagnosis and therapy plan

Experiments / demonstrations:
Images, examination of a patient

Lecturer:
A. Volk

2. SW: Ophthalmology: Discussion of current cases (2 hours)

Problem-oriented processing of ophthalmological patients who are admitted to the clinic as inpatients at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a treatment proposal

Learning objective / basis for:
Problem-oriented work-up of ophthalmological patients: Examination technique - localisation of the problem, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / Demonstrations:
Examination of current patients, discussion of findings, laboratory results, demonstration and discussion of imaging procedures (e.g. sonography)

Lecturer:
Buses/Boeve

3. SW: Surgery: Discussion of current cases (2 hours)

Systematic processing of current inpatient surgical patients (e.g. gastric torsion, fractures, accident patients). Examination of the patients by the students and discussion of the symptoms, resulting choice of further examination measures, discussion of the results of the general and special clinical and imaging examinations and interactive development of the diagnoses and possible differential diagnoses as well as the possible therapeutic procedures, taking into account the prognosis.

Learning objective / basis for:
Problem-oriented processing of surgical patients, learning the examination procedure, recognising the localisation of the disease, developing a diagnosis and its differentiation from similar diseases as well as a treatment plan

Experiments / Demonstrations:
Clinic patients, videos.
Performing the examination on current surgical patients; demonstration and discussion of further imaging examination procedures (X-ray, CT, MRI, arthroscopy if necessary)

Lecturer:
Kramer, Harms, Karbe

3. SW: Anaesthesiology: Discussion of current cases (2 hours)

Problem-oriented work-up of dogs and cats undergoing anaesthesia at the clinic at the time of the event. Pre-anaesthesia examination including interpretation of laboratory results and imaging procedures to assess the risk of anaesthesia and development and discussion of an anaesthesia protocol with the entire group.

Learning objective / basis for:
Problem-oriented work-up of patients who have to undergo anaesthesia for therapeutic or diagnostic purposes: Examination technique - localisation of the problem. Application of ASA classification for risk assessment. Selection of an individually adapted anaesthesia method. Prediction of possible anaesthesia complications
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics). Demonstration of the functioning of anaesthesia machines and monitoring monitors

Experiments / Demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics). Demonstration of the functioning of anaesthesia machines and monitoring monitors

Lecturer:
Kästner/Schütter

4. SW: Neurology: Discussion of current cases (2 hours)

Problem-orientated processing of neurological patients who are hospitalised at the clinic at the time of the course. Presentation and examination of patients by students, discussion of

findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated work-up of neurological patients: Examination technique - localisation of the problem, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / Demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics)

Lecturer:
Tipold, Volk H., Nessler

4. SW: Oncology: Discussion of current cases (2 hours)

Problem-oriented processing of oncological patients who are hospitalised at the clinic at the time of the event. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-oriented work-up of oncological patients: Examination technique - localisation of the problem, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / Demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics)

Lecturer:
Nerschbach

Clinic for Small Animals; Reproductive Medicine Unit of the clinics

0822 Small Animal Diseases Surgery and Reproductive Medicine (6th semester)

Goericke-Pesch

Diagnosis and treatment of menstrual cycle disorders in dogs and cats (1 hour)

Diagnosis of ovarian dysfunction in bitches and cats on the basis of the previously learnt ovarian cycle. Collection and diagnostic consolidation of anamnestic data as well as vaginoscopic, vaginal cytological, endocrinological and, if necessary, sonographic findings. Discussion of modern treatment methods, their prospects of success and possible side effects.

Learning objective / basis for:
Presentation of causal relationships between ovarian dysfunction and cycle abnormalities. Presentation as leading symptoms. Derivation of diagnostic and therapeutic procedures with reference to the physiological/endocrinological regulatory mechanisms.

Physiology and pathology of pregnancy in dogs and cats (1 hour)

Definition, physiology incl. endocrinology of canine and feline pregnancy. Pregnancy-specific changes in blood count and coagulation. Pseudogravidity. Methods for pregnancy detection and pregnancy diagnostics, including existing advantages and disadvantages. Recognition and pathogenesis of pregnancy disorders with embryonic or foetal death. Diagnosis and treatment of diseases of the gravid dam.

Learning objective / basis for:
To teach the species-specific characteristics of canine and feline pregnancy with regard to fertilisation, embryonic transuterine migration, implantation, placentation and embryonic/fetal development up to birth as a basis for the veterinary care of pregnant breeding animals and for the recognition of pregnancy disorders and gestational diseases.

Lecturer:
none (instead of none)

1. SW: Sexual cycle and breeding hygiene management in bitches and cats (1 hour)

Species-specific characteristics of the sexual cycle of the bitch and cat. Ovulation diagnostics and determination of the mating date in the bitch. Ovulation diagnostics and mating management with regard to ovulation induction. Detection and assessment of the vaginal bacterial germ content in bitches and cats used for breeding.

Learning objective / basis for:
the veterinary care of bitches and cats used for breeding.

Lecturer:
none (instead of none)

2. SW: Castration (1 hour)

Definition of castration/sterilisation, legal basis, surgical methods, castration side effects and side effects, focus on dogs

Learning objective / basis for:
Understanding when and how neutering is performed in dogs and cats, how it differs from sterilisation, why using the correct terminology with colleagues/owners is essential and the side effects (short/medium/long term) of neutering;
Final statement: cat castration generally recommended, dog individual decision taking into account legal basis and breed disposition for certain diseases. diseases

Lecturer:
Goericke-Pesch

3RD SW: Caesarean section (1 hour)

Definition of dystocia, indications for caesarean section/sectio porro and implementation, introduction of the caesarean section model

Learning objective / basis for:
Presentation of physiological and pathological birth situations, absolute and relative indications for caesarean section, elective caesarean section, caesarean section porro; important aspects of the practical implementation of caesarean section
Presentation of the surgical model to give students more confidence before the 1st independent execution

Clinic for Small Animals; Reproductive Medicine Unit of the clinics

0826 Small Animal Diseases Internal Medicine (6th semester)

Volk, H., Nerschbach, Rieder, Volk, A.

4. SW: Vomitus / Regurgitation (1 hour)

The aim of this lecture is the application of problem-orientated, structured work-up in dogs and cats with vomiting and regurgitation.

Learning objective / basis for:
Students should then be able to
1. to understand how to clearly differentiate clinically between vomitus and regurgitation.
2. to demonstrate a structured, problem-orientated approach to dogs and cats presenting with vomiting or regurgitation.
3. create a weighted differential diagnosis list.

Experiments / Demonstrations:
Image material

Lecturer:
Rieder

5. SW: Diarrhoea (1 hour)

The aim of this lecture is the application of problem-orientated, structured treatment in dogs and cats with diarrhoea.

Learning objective / basis for:
Students should then be able to
1 to demonstrate a structured, problem-orientated work-up for dogs and cats presenting with diarrhoea.
2. to differentiate between small and large bowel diarrhoea by taking a specific medical history.
3. create a weighted differential diagnosis list.

Experiments / demonstrations:
Images

Lecturer:
Rieder

6. SW: Inappetence/weight loss (1 hour)

The aim of this lecture is to apply problem-orientated, structured treatment to dogs and cats with inappetence and weight loss.

Learning objective / basis for:
Students should then be able to
1 to demonstrate a structured, problem-orientated approach to dogs and cats presenting with inappetence.
2. demonstrate a structured, problem-orientated work-up in dogs and cats presenting with weight loss and good food intake.
3. ... and as always: create a weighted differential diagnosis list!

Experiments / Demonstrations:
Images

Lecturer:
Rieder

8. SW: Weakness (1 h)

The aim of this lecture is the application of problem-orientated, structured work-up in dogs and cats with the clinical presentation of weakness.

Learning objective / basis for:
Students should then be able to

1 to demonstrate a structured, problem-orientated work-up for dogs and cats presented with weakness.
2. whether the neuromuscular system is primarily or secondarily affected and to define the primary affected body system.
3. draw up a structured and well-founded list of clinical symptoms and, based on this, a differential list.

Experiments / Demonstrations:
Image and video material

Lecturer:
H. Volk

9. SW: Sneezing/ coughing/ dyspnoea (1 h)

The aim of this lecture is the application of problem-oriented, structured work-up in dogs and cats with sneezing, coughing and dyspnoea.

Learning objective / basis for:
Students should then be able to
1 to demonstrate a structured, problem-orientated work-up in dogs and cats presenting with sneezing, coughing and dyspnoea.
2. to distinguish which patients need to be stabilised first and which need to be diagnosed first.
3. create a weighted differential diagnosis list for patients who sneeze, cough and need to breathe!

Experiments / Demonstrations:
Image material

Lecturer:
Rieder

10. SW: Itching (1 hour)

The aim of this lecture is the application of problem-orientated, structured treatment in dogs and cats with pruritus.

Learning objective / basis for:
Students should then be able to
1 to demonstrate a structured, problem-orientated approach to dogs and cats presenting with pruritus.
2. create a weighted differential diagnosis list for patients with pruritus!
3. to create a therapy plan based on the aetiopathogenesis.

Experiments / demonstrations:
Image material

Lecturer:
A. Volk

11. SW: Head shaking (1 h)

The problem-based approach to the topic of "head shaking" is presented on the basis of a specific clinical case

Learning objective / basis for:
Learning objectives Shake your head

-Understanding ear anatomy and pathogenesis of otitis (incl. PSPP system) for dogs and cats
-Understanding of the patient's clinical problem (pruritus, pain, hearing incl physiology and specific tests)
-Ear examination
-Pharmacology Ear

Experiments / demonstrations:
Image material

Lecturer:
A. Volk

12. SW: Circumferential proliferation and tumour staging (1 hour)

What to do in the event of an increase in circumference/suspected tumour, how to proceed and what examinations are necessary.

Learning objective / basis for:
1. possible diagnostic measures
2. tumour staging - why is it important and what does it mean?

Experiments / Demonstrations:
Photos and videos

Lecturer:
Nerschbach/ Betz

Clinic for pets, reptiles and birds

0829 Clinical training on patients - pets/reptiles

Pees, Reuschel, Hetterich

1. SW: Diseases of pets and reptiles and their diagnosis and therapy (8 hours)

Discussion of clinical cases and common diseases in pets and reptiles, taking into account the clinic, diagnostics, therapy and prophylaxis

Learning objective / basis for:
Physiology and pathophysiology of the individual organ systems, medical and surgical treatment of various diseases, taking into account species-specific characteristics

Experiments / demonstrations:
Supplemented by clinical case demonstrations (interactive)

Lecturer:
see above.

Clinic for cattle

0839 Clinical training on patients: Physiology and pathology of reproduction

Hoedemaker, Bajcsy, Gundling, Schmicke and research assistants

1. SW: Cysts, diagnosis, biology, therapy (2 hrs.)

Ovarian cysts

Learning objective / basis for:
Diagnosis, aetiology and treatment of ovarian cysts

Experiments / Demonstrations:
- Clinical examination of the genital apparatus
- Ultrasound examination of the genital apparatus

Lecturer:
Heppelmann

Remarks:
- For students of quota 1
- External quotas in small groups (LMV, ND)

2. SW: Udder diseases (2 hours)

Stenosis due to thelitis subacuta, stenosis treatment

Learning objective / basis for:
The material covered is the basis for learning the diagnosis of covered teat injuries, the differential diagnosis, prognostic assessment and treatment of covered teat injuries. Classification, prognostic assessment and therapy of covered teat injuries

Experiments / demonstrations:
Demonstration on the patient

Lecturer:
Hoedemaker

Remarks:
- For students of quota 1
- External quotas in small groups (calves AM administration, uterine care, sc. inject.)

3. SW: Pregnancy and cycle diagnostics (2 hours)

Pregnancy diagnostics, procedure for differential diagnoses in the case of a preliminary report of "no oestrus"

Learning objective / basis for:
Stages of pregnancy, embryonic mortality, PAG, cysts, use of progesterone measurement

Experiments / Demonstrations:
Ovarian ultrasound, gestation 3/4 months and yellow body with cavity

Lecturer:
Piechotta

Remarks:
For students of quota 1

4TH SW: Gestation, birth, early puerperium (2 hours)

- Clinical examination of a cow in the final stage of pregnancy
- Physiological birth process in cattle
- Examination of freshly calved cow

Learning objective / basis for:
...the examination of animals before and after birth
...diagnosis of the final stage of pregnancy/pre-pregnancy stage
...Diagnosis of diseases of the uterus in early puerperium

Experiments / demonstrations:
- Examination of heavily pregnant cow in preparation for birth
- Birth process cow

- Examination of freshly calved cow with grade II metritis

Lecturer:
Gundling

Remarks:
External quotas in small groups: s.c. injection, rumen fluid per PNSS, uterine supply

5. SW: Udder diseases (2 hours)

M. catarrhalis acuta, diagnosis, diff. diagnosis, therapy

Learning objective / basis for:
Learning about the diagnosis of various forms of mastitis, the differential diagnoses to M. catarrhalis acuta and the therapy

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
Hoedemaker

Remarks:
- For students of quota 1
- External quotas in small groups: Medication application, Drenchen

6. SW: Udder diseases (2 hours)

M. catarrhalis acuta, diagnosis, diff. diagnosis, therapy

Learning objective / basis for:
Learning about the diagnosis of different forms of mastitis, the differential diagnoses to M. catarrhalis acuta and the therapy

Experiments / demonstrations:
Demonstration on the patient

Lecturer:
Hoedemaker

Remarks:
- For students of quota 2
- Outside quotas in small groups: Medication application, drenching of rumen fluid, birth monitoring, ketosis/lameness

7. SW: Stages and complications of pregnancy (2 hours)

Pregnancy examination at various stages; possible complications

Learning objective / basis for:
Differentiation between the prolapse stage and final stage of pregnancy; preparatory stage

Experiments / Demonstrations:
Clinical examination of pregnant animals VI. + VIII. Month, focus on pregnant uterus, possible causes of abortion or indications of abortion

Lecturer:
Gundling

Remarks:
- For students of quota 2
- Outside quotas in small groups: Rumen juice collection, drenching, s.c. injection, rectal examination

8. SW: Pregnancy diagnostics, cycle problems (2 hours)

Pregnancy diagnostics, progesterone, PAG, diagnosis and treatment of acyclia, absence of oestrus, intravaginal P4 device (PRID, CIDR)

Learning objective / basis for:
Methods of pregnancy examination, structured procedure for the preliminary report "absence of oestrus"

Experiments / demonstrations:
Ultrasound Pregnancy IV - V month
Ultrasound ovary, determination, functional body

Lecturer:
Piechotta

Remarks:
- For students of quota 2
- External quotas in small groups: gynaec. Examination, blood parameters

10. SW: Udder diseases (2 hours)

Teat dome stenosis, cisternitis with mast. cat. chron.

Learning objective / basis for:
Learning how to diagnose teat stenosis (examination), diff. diagnosis and therapy, in particular temporary drying off, surgical measures

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
Hoedemaker

Remarks:
- For students of quota 3
- External quotas in small groups: postnatal care examination, uterine care

11. SW: Cycle determination and ovarian cysts (2 hours)

Ovarian cysts

Learning objective / basis for:
Diagnosis, aetiology, pathogenesis and treatment of ovarian cysts

Experiments / Demonstrations:
- Clinical examination of the genital apparatus
- Ultrasound examination of the genital apparatus

Lecturer:
Heppelmann

Remarks:
- For students of quota 3
- External quotas in small groups: Condition n. LM-Op, examination, IBR samples

12. SW: Udder diseases (2 hours)

- Torsio uteri
- Retentio secundinarum

Learning objective / basis for:
Learning about the diagnosis and treatment of torsio uteri and learning about the cause, diagnosis and treatment of ret. sec.

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
Hoedemaker

Remarks:
For students of quota 3

13. SW: Udder diseases (2 hours)

- Mastitis after teat injury
- Treatment of teat injuries
- Intertrigo

Learning objective / basis for:
Diagnosis of mastitis, treatment of teat injuries, intertrigo treatment

Experiments / Demonstrations:
Demonstration on the patient:
- Emptying a udder quarter with a teat injury using a drainage cannula
- Antibiotic treatment of this quarter
- Local treatment of the intertrigo with ointment

Lecturer:
Gundling

Remarks:
- for students of quota 3
- Outside quotas in small groups: Uterine care, abomasal inspection, examination and treatment of calves

14. SW: Pregnancy examination (2 hours)

- Pregnancy examination (transrectal, ultrasound, PAG)
- Structured procedure for preliminary report "No oestrus"

Learning objective / basis for:
Pregnancy diagnostics, cycle diagnostics

Experiments / Demonstrations:
Ultrasound of pregnant animal, visualisation of caruncle, ovarian ultrasound

Lecturer:
Piechotta

Remarks:
For students of quota 3

Clinic for cattle

0842 Gynaecology and andrology of cattle

Bajcsy, Schmicke, Heppelmann, Taylor, Yücesoy

1. SW: Gynaecology (12 hours)

Ovarian dysfunctions; cycle and oestrus disorders; fallopian tube diseases, uterine diseases; diseases of the cervix; diseases of the vagina, vestibule, vulva; subfertility, oestrus synchronisation

Learning objective / basis for:
Aetiology, pathogenesis, diagnostics, therapy and prevention of gynaecological diseases

Experiments / demonstrations:
Lecture

Lecturer:
Hoedemaker, Bajcsy, Schmicke, Rath, Heppelmann

13. SW: Andrology (2 hours)

Disturbed mating behaviour; malformations, injuries, inflammations and other diseases of the penis and prepuce; diseases of the scrotum, testicles, epididymis, accessory sex glands; infectious genital diseases

Learning objective / basis for:
Etiology, pathogenesis, diagnostics, therapy and prevention of andrological diseases

Experiments / demonstrations:
Lecture

Co-operation / consultation with:
FLI Celle

Lecturer:
Rath and scient. employee

Clinic for cattle

0846 Excursions as part of integrated veterinary herd management

Hoedemaker, Gundling, Debertolis, Jensen, Kallmeyer

1. SW: Integrated veterinary herd management (2 hours)

Practical instruction on the use of examination tools in the context of veterinary herd management in the areas of herd fertility, udder health, claw health, feeding, husbandry, etc.

Learning objective / basis for:
Learning practical skills in gynaecological examination (rectal, vaginal), udder health, assessment of lameness and body condition scoring, evaluation of MLP data and feed rations, assessment of husbandry systems

Experiments / Demonstrations:
Practical exercise on dairy farms.

Co-operation / consultation with:
Various dairy farms

Lecturer:
Hoedemaker and wiss. employee

Remarks:
The number of hours refers to the usual creditable hours per student as a compulsory elective subject.

Clinic for cattle

0852 Diagnostic-therapeutic exercises on cattle (in small groups)

Hoedemaker, Gundling, Heppelmann, Böker, Gaude, Korte, Krause, Küskens, Morawitz, Proios, Risch, Schwär, Szura

1. SW: Diagnostics and therapy in cattle (4 hours)

Internal medicine, orthopaedics, abdominal surgery, physiology and pathology of reproduction directly on the patient

Learning objective / basis for:
Examination and treatment of patients to teach diagnostic and therapeutic skills, including surgical manipulation of the patient

Experiments / demonstrations:
Small group lessons on Fridays from 8am-12pm

Lecturer:
Hoedemaker, and employees

Remarks:
50% of the hours attended can be credited as general compulsory electives.

Clinic for cattle

0859 Clinical training on patients: Internal medicine and surgery

Höltershinken, Heppelmann, Küskens, Gaude and research assistants

1. SW: Report of findings / metabolism, electrolytes, blood gases in adult cattle (2 hours)

Introduction to the findings protocol / metabolic disorders in cows with abomasal displacement

Learning objective / basis for:
Understanding the pathophysiological-typical metabolic derailments in cows with LMV

Experiments / demonstrations:
Clinical examination on the subject of LMV

Lecturer:
Grünberg

Remarks:
External quotas in small groups: Examination, s.c. injection, ear tag insertion on calf / drenching, administering eye ointment

1ST SW: Abomasal surgery according to Dirksen (2 hours)

Surgical method, preparation of the cattle, procedure, instruments, medication, techniques

Learning objective / basis for:
Step-by-step development of the surgical method like a "cookbook" and performance of omentopexy of the displaced abomasum according to Dirksen.

Experiments / demonstrations:
Simulation of a bovine operation.

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
For students of quota 1

2. SW: Remedy LMV (2 hours)

- Endoscopic repair LMV
- Sterner-Grymer: percutaneous fixation

Learning objective / basis for:
Understanding the surgical procedure with possible problems and complications

Experiments / Demonstrations:
- Endoscopy: practical on the patient
- Sterner-Grymer: Film

Co-operation / consultation with:

Lecturer:
Kehler

Remarks:
- For students of quota 1
- External quotas in small groups: 3 calves with intravenous application, uterine care, drenching

2. SW: LEAL complex (2 hours)

Diseases during the transition cow phase; especially LEAL complex = abomasal disease, endometritis, acetonuria and liver diseases. Occurrence of diseases and use of laboratory diagnostics in preventive detection

Learning objective / basis for:
Recognising the disease complex and using problem-oriented laboratory tests for individual animal and herd problems

Experiments / demonstrations:
Clinical demonstration on a patient and case studies

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
- For students of quota 1
- External quotas in small groups: 3 calves i.v. application / uterine care, drain removal => wound toilet

3RD SW: Simple claw disease with discarding (also RGSA/AB) and claw care; pain elimination on the cattle claw; arthritis (knee) with sonography/VW (2 hours)

Lameness examination, 2 patients: 1 example of claw/support leg lameness, 1 patient with mixed lameness. Arthritis diagnostics and therapy using the example of gonitis.

Learning objective / basis for:
- Strategic approach to the examination of lame cattle
- Further diagnostics (ultrasound)

Experiments / demonstrations:
Sonography of a knee joint (patient with gonitis), dressing change, construction of a claw dressing

Lecturer:
Ifing

Remarks:
External quotas in small groups: i. V. medication application, urine collection/i. V. injection, uterine care (postpartum collection)

3RD SW: Muscle injuries/diseases, abscesses, wound complications, wound decontamination and drainage; inflammation of synovial structures, especially arthritis, periarthritis (2 hours)

Diseases of the musculoskeletal system; splitting and drainage of abscesses and treatment of bursitis; technopathies

Learning objective / basis for:
Recognising and differentiating the various circumferential enlargements of the muscles, bursae and subcutaneous tissue. Treatment of these changes.

Experiments / Demonstrations:
Diagnosis and treatment discussed with the patient.

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
External quotas in small groups: Uterine care, drench, sc. Injection, blood collection / sc. injection, oral application, dislocation/caecum

4TH SW: Ventricular septal defect (VSD) (2 hours)

Clinical diagnosis and pathophysiology of the VSD

Learning objective / basis for:
Understanding the pathophysiology of VSD

Experiments / Demonstrations:
Clinical examination of the patient

Lecturer:
Grünberg

Remarks:
External quotas in small groups: calf: blood gases + blood samples / cattle: medication application

4. SW: Elimination of abomasal displacement / tympania in cattle (2 hours)

1. endoscopic abomasal fixation according to Janowitz
2. recurrent tympany in young cattle
3. sprue pneumonia

Learning objective / basis for:
1. demonstration of the procedure under normal circumstances
2. aetiology and treatment
3. avoidance and diagnosis

Experiments / demonstrations:
1. demonstration on the patient
2nd patient with recurrent tympany
3rd patient with sprue pneumonia: demonstration of oral medication

Lecturer:
Kehler

Remarks:
External quotas in small groups: AM administration calves / gastrointestinal tract, s.c. application, physiotherapy

5. SW: Foreign body bovine (2 hours)

Aetiology, pathogenesis, diagnostics (incl. sonography), therapy

Learning objective / basis for:
Recognition and treatment of ret. per. traum.

Experiments / demonstrations:
Demonstration on the patient

Lecturer:
Deer

Remarks:
External quotas in small groups: Drench with LSS, uterine care, general examination, medication application

5. SW: Umbilical diseases (diagnostics; therapy; surgery with positioning and analgesia), umbilical ultrasound (procedure) (2 hours)

Umbilical inflammation in calves

Learning objective / basis for:
Strategic approach to the treatment of various umbilical diseases of the calf / Conservative and surgical procedures / Preparation for surgery

Experiments / Demonstrations:
Calf with omphalourachitis (anaesthesia) / Demonstration of sonographic examination

Lecturer:
Ifing

Remarks:
- For students of quota 1
- External quotas in small groups: Drenching, uterine care, medication application

6. SW: Report of findings / foreign bodies (2 hours)

Introduction to the findings protocol / foreign body disease of cattle

Learning objective / basis for:
Diagnostics, pathophysiology and therapy of bovine FK disease

Experiments / Demonstrations:
- Clinical examination
- Interpretation of laboratory results

Lecturer:
Grünberg

Remarks:
External quotas in small groups: Uterine care

6. SW: Abomasal surgery according to Dirksen (2 hours)

Surgical method, preparation of the cattle, procedure, instruments, medication, techniques

Learning objective / basis for:
Step-by-step development of the surgical method like a "cookbook" and performance of omentopexy of the displaced abomasum according to Dirksen.

Experiments / demonstrations:
Simulation of a bovine operation.

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
For students of quota 2

7. SW: Remedy LMV (2 hours)

- Endoscopic repair LMV
- Sterner-Grymer: percutaneous fixation

Learning objective / basis for:
Understanding the surgical procedure with possible problems and complications

Experiments / Demonstrations:
- Endoscopy: practical on the patient
- Sterner-Grymer: Film

Co-operation / consultation with:

Lecturer:
Kehler

Remarks:
- For students of quota 2
- External quotas in small groups: Uterine care, Drenchen, s.c. Appl.

8. SW: Cardiovascular diseases (2 hours)

Ventricular septal defect (VSD)

Learning objective / basis for:
Clinical diagnosis, differential diagnoses, prognosis and therapy

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
Deer

Remarks:
External quotas in small groups: Uterine examination, stationary cattle, AM application, calf examination

8. SW: Umbilical diseases (diagnostics, therapy, surgery with positioning and analgesia) and anaesthesia; umbilical sonography (2 hours)

Umbilical inflammation in calves

Learning objective / basis for:
Strategic approach to the treatment of various umbilical diseases of the calf / Conservative and surgical approach / Preparation for surgery

Experiments / Demonstrations:
Calf with omphalourachitis (anaesthesia) / Demonstration of sonographic examination

Lecturer:
Ifing

Remarks:
- For students of quota 2
- External quotas in small groups: Medication application s.c. and p. os

9. SW: Dismounting a cow, condition after amputation (1 hour)

- Handling cattle
- Coercive measures
- Surgery claw

Learning objective / basis for:
Teaching claw treatment techniques

Experiments / Demonstrations:
Demonstration of a patient

Lecturer:
Roe deer

Remarks:
External quotas in small groups: Medication application calves, Drenchen, LMV

9th SW: Amyloid nephrosis, op-arm, LMV left (2 hours)

1. necessary instruments and their function for the surgical method according to Dirksen.
2. diarrhoea in adult cattle, differential diagnoses, procedure on the farm

Learning objective / basis for:
1. understand the use and function of the individual surgical instruments
2. preliminary report, clinical examination, procedure and differential diagnoses in the clinical picture of "diarrhoea" in adult cattle. Recognition and differentiation of kidney diseases in cattle in the stable. Discussion of the auxiliary samples urine and blood (sense and nonsense)

Experiments / Demonstrations:
Clinical patient R0571/15 Amyloid nephrosis

Lecturer:
Höltershinken

Remarks:
Outside quotas in small groups: Calves medication application; blood sampling; drenching linseed mucus
95% of students participated very actively right up to the end with questions and answers and comments on the lessons

10 SW: 1. deformities (hypotrichosis, oligodentia) 2. hoof care + utilisation of the hoof trimming crush (5 point scheme) 3. proximal radial paralysis (2 hours)

1. effects of autosomal recessive inheritance on the population with artificial insemination
2. hoof care under practical conditions (sprouting stock)
3. handling of nerve paralyses

Learning objective / basis for:
1. importance of reporting malformations
2. advantages and disadvantages as well as handling of a drift stand
3. typical claw paralysis during hoof care

Experiments / Demonstrations:
1. malformation hypotrichosis, oligodentia
2. demonstration of hoof care in the clinic's own animal
3. prox. Radial nerve palsy (patient)

Lecturer:
Kehler

Remarks:
External quotas in small groups: Treatment, blood sampling, therapy

10. SW: Neonatal diarrhoea (2 hours)

Neonatal diarrhoea therapy

Learning objective / basis for:
- Creation of a therapy plan
- Interpretation of laboratory results
- Understanding the pathophysiology

Experiments / demonstrations:
Assessment of clinical patients

Lecturer:
Grünberg

Remarks:
External quotas in small groups: Calf treatment, drench, medication application,

11. SW: Introduction to the findings protocol / umbilical diseases (2 hours)

- Umbilical inflammation in calves: diagnosis and treatment
- Hernia umbilicaris (short): Diagnosis and differential diagnosis

Learning objective / basis for:
- Strategic approach to the treatment of various umbilical diseases of the calf
- Conservative and surgical procedure

Experiments / demonstrations:
- Calf with omphalophlebitis

- Demonstration of sonographic examination

Lecturer:
Ifing

Remarks:
For students of quota 3

11. SW: Metabolism, electrolytes, blood gases (2 hours)

Metabolic disorder and therapy of the cow with LMV

Learning objective / basis for:
- Understanding the pathogenesis of metabolic disorders in LMV
- Understanding therapeutic approaches

Experiments / Demonstrations:
Examination, clinical findings and laboratory results of a patient

Lecturer:
Grünberg

Remarks:
External quotas in small groups: Treatment (medication application, blood sampling from tail vein)

12. SW: Cardiovascular diseases (2 hours)

- Pleuritis/pericarditis as a differential diagnosis
- Lung and heart examination, clinical and ultrasonographic incl. lung percussion

Learning objective / basis for:
Learning diagnostic techniques to differentiate between pericarditis and pleuritis

Experiments / demonstrations:
Sonography in a cow with severe pleurisy

Lecturer:
Ifing

Remarks:
- For students of quota 3
- External quotas in small groups: Treatment, medication application, general examination, uterine care

12. SW: Abomasal surgery according to Dirksen (2 hours)

Surgical method, preparation of the cattle, procedure, instruments, medication, techniques

Learning objective / basis for:
Step-by-step development of the surgical method like a "cookbook" and performance of omentopexy of the displaced abomasum according to Dirksen.

Experiments / demonstrations:
Simulation of a bovine operation.

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
For students of quota 3

13TH SW: Claw tip necrosis / spastic paresis (2 hours)

- Anatomy of the distal limb
- Analgesia
- Lameness diagnostics

Learning objective / basis for:
Diagnosis and treatment of orthopaedic bovine diseases

Experiments / Demonstrations:
Demonstration on patients and surgical procedures

Lecturer:
Deer

Remarks:
Outside quotas in small groups: Treatment, uterine care, LM control, faecal sample

13 SW: 1. hernia umbilicalis 2. hoof care in the impaction stand 3. omphalophlebitis with polyarthritis (2 hours)

- Umbilical diseases
- Hoof care under practical conditions (sprouting stock)

Learning objective / basis for:
- Classification of umbilical diseases
- Advantages and disadvantages of a drift stand

Experiments / Demonstrations:
Hernia umbilicalis, omphalophlebitis with polyarthritis

Lecturer:
Kehler

Remarks:
External quotas in small groups: Treatment and examination of cow (medication application, urine sample, uterine care), treatment and examination of calf (medication application)

14. SW: Arthritis / Polyarthritis (2 hours)

Clinical examination/interpretation of findings in the cow with arthritis

Learning objective / basis for:
Understanding the aetiology, pathogenesis and therapy of bovine arthritis

Experiments / demonstrations:
- Examination of the patient
- Demonstration of retrograde congestion antibiosis, joint puncture and joint irrigation

Lecturer:
Grünberg

Remarks:
External quota in small group: cow examination, uterine care

14. SW: LEAL complex (2 hours)

Diseases during the transition cow phase; especially LEAL complex = abomasal disease, endometritis, acetonuria and liver diseases. Occurrence of diseases and use of laboratory diagnostics in preventive detection

Learning objective / basis for:
Recognising the disease complex and using problem-oriented laboratory tests for individual animal and herd problems

Experiments / demonstrations:
Clinical demonstration on a patient and case studies

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
- For students of quota 3
- External quota as a small group: medication application, drenching, continuous drip

Clinic for cattle

0862 Bovine diseases I

Bajcsy, Heppelmann, Gaude, Gundling, Küskens, Ruda, Schmicke

1. SW: Internal and surgical bovine diseases (35 hours)

General surgery and anaesthesiology, dermatology, urinary tract diseases, orthopaedics, non-infectious diseases of the digestive system, metabolic diseases

Learning objective / basis for:
Recognising and treating cattle diseases and teaching prevention strategies

Lecturer:
, Grünberg, Höltershinken, Kehler

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic; Clinic for cattle; Reproductive medicine unit of the clinics

0886 Reproductive medicine and biotechnology incl. domestic animal insemination and spermatology

Bajcsy, Ganter, Goericke-Pesch, Heppelmann, Köhne, Körber, Luther, Oldenhof, Sieme, Tönißen, Waberski

1. SW: Insemination in pigs (insemination timing and technique) (2 hours)

Fertility parameters in breeding farms. Oestrus, ovulation and insemination management (insemination timing and technique) in pigs. Practical implementation of cycle diagnostics and insemination by students. Veterinary tasks in pig insemination.

Learning objective / basis for:
Imparting knowledge and practical skills in the field of pig insemination, specialising in insemination management.

Experiments / Demonstrations:
Cycle diagnostics and insemination in pigs.

Co-operation / consultation with:
Goericke-Pesch,Sieme,Bajscy, Wendt

Lecturer:
Waberski

1. SW: Spermatology: Basic course (2 hours)

Standard spermatological diagnostics: indications, methods, assessment of findings; nomenclature. Practical implementation of spermatological diagnostics by the students.

Learning objective / basis for:
Acquisition of theoretical and practical knowledge of standard spermatological examination procedures for the assessment of semen quality.

Experiments / Demonstrations:
Practical exercises in spermatological diagnostics in the course room.

Co-operation / consultation with:
Goericke-Pesch, Sieme, Waberski

Lecturer:
Oldenhof

1. SW: Insemination in dogs (insemination timing and technique) (2 hours)

Indications for the transfer of freshly collected and preserved semen in dogs. Definition and determination of the optimum insemination period. Diagnostic measures, interpretation of findings. Methods of intravaginal and intrauterine sperm deposition. Presentation of fertilisation results depending on the insemination technique.

Learning objective / basis for:
Treated substance is the basis for the successful application of semen transfer in dogs.

Experiments / Demonstrations:
Short film endoscopic transcervical insemination.
Test: Assignment of vaginoscopic, vaginal cytological and endocrinological findings (progesterone values) to determine the stage of heat.

Co-operation / consultation with:
Sieme, Waberski,

Lecturer:
Goeriscke-Pesch

5. SW: Insemination of cattle (2 hours)

Importance of artificial insemination, examination of the female cow to assess her suitability for insemination, insemination technique, assessment of the correct time for insemination

Learning objective / basis for:
Imparting knowledge and skills about examination methods for assessing female cattle with regard to their suitability for insemination, imparting knowledge about the optimal insemination time and possibilities for scheduling the optimal insemination time, imparting knowledge about the performance of insemination, especially the correct insertion of the insemination catheter

Experiments / Demonstrations:
3 female cattle that are tested for suitability for insemination

Co-operation / consultation with:
Sieme, Waberski, Goericke-Pesch

Lecturer:
Bajcsy

5. SW: Insemination in horses (insemination timing and technique) (2 hours)

Preliminary gynaecological examination of the mare's suitability for covering/insemination (practical demonstration by students). Focal points of veterinary care of broodmares during the breeding season (follicle control, ovulation timing). Animal species and methodological particularities in determining the optimum time for insemination. Semen handling and quality control prior to insemination. Indications and methodology of different insemination techniques.

Learning objective / basis for:
Acquisition of practical skills and communication of the function and main areas of work of the veterinarian in equine semen transfer.

Experiments / demonstrations:
s. Teaching content

Co-operation / consultation with:
Bajcsy, Goericke-Pesch, Waberski

Lecturer:
Sieme

9. SW: Insemination of small ruminants (2 hours)

Reproductive biology data, cycle control, oestrus detection, semen collection and treatment, special problems of artificial insemination in small ruminants, insemination methods (intracervical, transcervical intrauterine, laparoscopic)

Learning objective / basis for:
Teaching modern methods in connection with the insemination of sheep and goats as well as wild animals

Experiments / demonstrations:
Oestrus control, phantom exercise for laparoscopy

Co-operation / consultation with:
Goericke-Pesch, Sieme, Waberski, Bajcsy

Lecturer:
Gander

13. SW: Insemination in the cat (2 hours)

Current importance of semen transfer in pedigree cat breeding and with regard to the conservation of wild/big cat species threatened with extinction. Indications for the transfer of freshly collected and preserved semen in cats. Definition and determination of the optimum time for insemination. Diagnostic measures, interpretation of findings. Ovulation induction procedures. Techniques of intravaginal and intrauterine sperm deposition. Sperm collection, examination and preservation. Presentation of fertilisation results depending on the sperm used (fresh, preserved) and the insemination technique.

Learning objective / basis for:
Treated substance is the basis for the successful application of semen transfer in cats.

Experiments / Demonstrations:
Film on semen collection in males and insemination in cats.

Co-operation / consultation with:
Sieme, Waberski

Lecturer:
Goericke-Pesch

Courses for the 7th semester

Institute of Pathology

0081 Special Pathology (Seminar)

Beineke, Wohlsein, Gerhauser, Puff, Hülskötter, Lombardo, Störk, Stoff, Reineking, Lockow, Leitzen, Michaely, Gregor, Becker, Zdora, Krüger, Pahl, Wyst, Moeselaken, Maschmeier, de le Roi;

1. SW: Special pathology (seminar, weekly, 13 times) (13 hours)

As part of this course, based on or in addition to the Special Pathology lecture, selected chapters will be deepened in the sense of interactive learning. For this purpose, the semester will be divided into four groups, each of which will be further divided into 7 subgroups. For each course, selected chapters, which will be announced in advance, will be worked on using selected questions. The content of the question is realised by the individual groups working on and answering questions on the topics announced to them a week in advance on TiHoStudIS. The results of the group work are then communicated to the other students in the remaining time in the form of a question and answer dialogue. In addition, the questions of the individual subgroups will be discussed and debated together. Successful and regular participation is guaranteed by active participation and regular attendance checks (preparation and discussion of the content of the announced text in the sense of a test).

Learning objective / basis for:
Independent development, formulation and answering of questions from the field of special pathology as well as simultaneous development of rhetorical and didactic skills with interactive presentation.

Co-operation / consultation with:
The questions to be addressed in the seminar are regularly announced in advance.

Lecturer:
see above

Remarks:
Prerequisite for awarding a certificate: Regular attendance (100%) and presentation of the results.

Institute of Pathology

0084 Autopsies

Beineke, Wohlsein, Gerhauser, Puff, Hülskötter, Lombardo, Störk, Stoff, Reineking, Lockow, Leitzen, Michaely, Becker, Krüger, Pahl, Wyst, Moeselaken, Maschmeier;

1. SW: Autopsies (10 hours)

The aim of these courses is to deepen practical knowledge in the subject of pathology. For this purpose, group autopsies of animal carcasses of various domestic animals are carried out. In addition, the description of organ changes will be used to show how these lead to a pathological-anatomical diagnosis. Furthermore, the weighting of the findings with special consideration of intravital, agonal and post-mortem changes as well as a ranking of the degree of severity in relation to the cause of illness and death are in the foreground. In addition, the epicritical assessment and discussion of the diagnoses with a final overall assessment is another important learning objective.

Learning objective / basis for:
Teaching practical skills in relation to description, diagnosis and interpretation of findings. Preparation of pathological-anatomical diagnoses, differential diagnoses and scientific, critical discussion of the findings.

Experiments / demonstrations:
Practical exercise

Lecturer:
See above.

Remarks:
Prerequisite for the award of a certificate: Regular participation in all post-mortem exercises offered, writing of an accepted report per section.

Clinic for poultry; clinic for pets, reptiles and birds

0150 Clinic for pets, reptiles and birds: ornamental, zoo and wild bird diseases including clinical demonstrations

Hennig, Legler, Pees

5. SW: Special clinical and further examinations with evaluation of findings (6 hours)

Principles and strategies for the clinical evaluation of findings from different bird species kept individually or in groups and from wild birds

Learning objective / basis for:
Presentation of general and special anamneses with reference to the symptoms and husbandry conditions of sick birds. Deepening of the constructive stages of a further clinical examination and differences between the different bird species. Possibilities of further examinations and their clinical evaluation based on case studies, presentation of possibilities and limitations of new diagnostic methods

Experiments / Demonstrations:
Case discussions

Lecturer:
see above.

Clinic for poultry; clinic for pets, reptiles and birds

0151 Poultry diseases II

Jung, Legler, Pees, Rautenschlein, Rubbenstroth

1. SW: Bird diseases (13 hours)

Factor diseases, avian encephalomyelitis, botulism, aspergillosis, avian tuberculosis, mycoplasma infections, ORT, RA and BA infections, avian influenza, infectious bronchitis, infectious laryngotrachetis, E. coli, streptococcal and staphylococcal infections, paramyxovirosis and salmonellosis of pigeons, ectoparasites and endoparasites

Learning objective / basis for:
The material covered is the basis for passing the subject of poultry diseases as part of veterinary training. The aim is to familiarise students with the most important bird diseases in Germany and to be able to differentiate between them.

Co-operation / consultation with:
Clinic for pets, reptiles, ornamental and zoo birds

Lecturer:
see above

Institute for Parasitology

0163 Parasitology (Exercises)

Strube, Becker, Raulf, Springer

1. SW: Helminthology (26 hours)

Course 1: Cestodes III (Echinococcus)
Course 2: Morphology and biology of nematodes I (trichostrongylids)
Course 3: Morphology and biology of nematodes II (larval differentiation, strongyles of the horse)
Course 4: Morphology and biology of nematodes III (Oesophagostomum, Chabertia, hookworms, Strongyloides)
Course 5: Morphology and biology of nematodes IV (lungworms)
Course 6: Morphology and biology of nematodes V (ascardia)
Course 7: Morphology and biology of nematodes VI (oxyurans, filariae)
Course 8: Morphology and biology of nematodes VII (Enoplea)
Course 9: Introduction to strategic control/resistance development and helminths of poultry and control strategies
Course 10: Helminths of pigs and control strategies
Course 11: Helminths of ruminants and control strategies
Course 12: Equine helminths and control strategies
Course 13: Carnivore helminths and control strategies

Learning objective / basis for:
Morphology of helminths and their developmental stages, diagnosis of helminthoses, knowledge of the development, epidemiology and control of helminthoses.
Knowledge is the basis for the examination in parasitology.

Experiments / demonstrations:
Microscopic exercises with stained specimens, faecal samples, blood smears, histological sections, etc.

Co-operation / consultation with:
Not applicable

Lecturer:
Strube, Springer, Raulf, Becker

Remarks:
Protective clothing (smock) and disposable gloves are required for participation.

14. SW: Repetition of parasitological preparations (2 hours)

Course 1: Repetition of drip preparations

Learning objective / basis for:
Morphology of parasite development stages, diagnosis of parasitoses.
Knowledge is the basis for the examination in parasitology.

Experiments / Demonstrations:
Microscopic exercises with stained specimens, faecal samples, blood smears, histological sections, etc.

Co-operation / consultation with:
Not applicable

Lecturer:
Strube, Springer, Raulf, Becker

Remarks:
Protective clothing (smock) and disposable gloves are required for participation.

Institute for Animal Nutrition

0203 Animal Nutrition (Specialised Animal Nutrition)

Visscher, Hankel, Hartung, Lingens, Schubert, Wilke

1. SW: Horse nutrition I (1 hour)

Organisational aspects/development of horse husbandry from antiquity to the present day. Characteristics of feed intake behaviour and principles of feeding.

Learning objective / basis for:
Basic understanding of the development of horse husbandry from antiquity to the present day as well as characteristics of feed intake behaviour and principles of feeding.

Lecturer:
Visscher

1. SW: Horse nutrition II (1 hour)

Fundamentals of nutrition: anatomy, digestive physiological units, importance for feeding

Learning objective / basis for:
Basic understanding of the fundamentals of nutrition: anatomy, digestive physiological units, importance for feeding

Lecturer:
Visscher

2. SW: Horse nutrition III (1 hour)

Basic information on feeding, feedstuffs and energy and nutrient requirements

Learning objective / basis for:
In-depth understanding of feeding, feedstuffs and energy and nutrient requirements

Lecturer:
Visscher

2. SW: Horse nutrition IV (1 hour)

Feeding basics: maintenance, broodmares, foals, yearlings and two-year-olds, breeding stallions

Learning objective / basis for:
In-depth understanding of the basics of feeding and ration design: maintenance, broodmares, foals, yearlings and two-year-olds, breeding stallions

Lecturer:
Visscher

3. SW: Horse nutrition V (1 hour)

Feeding basics: healthy older horses, working horses, ponies and small horses, diagnostics to check adequate nutrition

Learning objective / basis for:
In-depth understanding of the basics of feeding: healthy older horses, working horses, ponies and small horses, diagnostics to check adequate nutrition

Lecturer:
Visscher

3. SW: Horse nutrition VI (1 hour)

Diseases and dietetics:
Principles/objectives/measures of dietetics for livestock and livestock lovers; variation of feed quantity, feeding technique, feeding intensity, feed composition, feed additives, legal categorisation of "dietetic feed"

Learning objective / basis for:
Basic understanding of dietetics; categorising, assessing and evaluating dietetic concepts, knowledge of the possibilities and limitations of dietetic concepts and their implementation in practice with regard to the legal background; differentiation between dietetic measures (variety) and the use of dietetic feed (partly limited/not available at all)

Lecturer:
Hankel

4. SW: Ruminant nutrition I (1 hour)

Basics of the structure of cattle husbandry and calf feeding

Learning objective / basis for:
In-depth understanding of the basics of the structure of cattle husbandry and calf feeding

Lecturer:
Visscher

4. SW: Ruminant nutrition II (1 hour)

The basics of fattening calves, rearing young cattle and facts about milk production

Learning objective / basis for:
In-depth understanding of the basics of fattening calves, rearing young cattle and facts about milk production

Lecturer:
Visscher

5. SW: Ruminant nutrition III (1 hour)

Basics of dairy cattle feeding (general nutrition), dry period, transit phase and lactation

Learning objective / basis for:
In-depth understanding of the basics of dairy cattle feeding (general nutrition), dry period, transit phase and lactation

Lecturer:
Visscher

5. SW: Ruminant nutrition IV (1 hour)

Basics of feeding fattening bulls, fattening young cattle in suckler cow husbandry, fattening heifers and steers, old cows, breeding bulls

Learning objective / basis for:
In-depth understanding of the basics of feeding fattening bulls, fattening young cattle in suckler cow husbandry, fattening heifers and steers, old cows, breeding bulls

Lecturer:
Visscher

6. SW: Ruminant nutrition V (1 h)

Basics of feeding sheep and goats

Learning objective / basis for:
In-depth understanding of the basics of sheep and goat feeding

Lecturer:
Visscher

6. SW: Ruminant nutrition VI (1 hour)

Fundamentals of feed-related health disorders in calves and fattening cows and nutrition-related diseases in dairy cows, sheep and goats

Learning objective / basis for:
In-depth understanding of the basics of feed-related health disorders in calves and fattening cows and nutrition-related diseases in dairy cows, sheep and goats

Lecturer:
Visscher

7. SW: Pig nutrition I (1 hour)

Fundamentals of the structure of pig production, nutritional-physiological and feed science basics (classification, anatomical-physiological characteristics, digestive system), species-appropriate feeding

Learning objective / basis for:
In-depth understanding of the basics of the structure of pig production, nutritional-physiological and feed science basics (classification, anatomical-physiological features, digestive system), species-appropriate feeding

Lecturer:
Visscher

7. SW: Pig nutrition II (1 hour)

Basics of feeding sows/young sows in the manure period, gestation and lactation

Learning objective / basis for:
In-depth understanding of the basics of feeding sows/young sows in the manure period, gestation and lactation

Lecturer:
Visscher

8. SW: Pig nutrition III (1 hour)

Basics of nutrition and feeding of suckling piglets, weaned piglets and fattening pigs

Learning objective / basis for:
In-depth understanding of the basics of nutrition and feeding of suckling piglets, weaned piglets and fattening pigs

Lecturer:
Visscher

8. SW: Pig nutrition IV (1 hour)

Fundamentals of nutrition-related diseases and disorders (occurrence, causes, prevention), dietetics/dietary measures in the nutrition of pigs (fundamentals, indication, effectiveness; feeding and food safety; salmonella categorisation)

Learning objective / basis for:
In-depth understanding of the basics of nutrition-related diseases and disorders (occurrence, causes, prevention), dietetics/dietary measures in the nutrition of pigs (basics, indication, effectiveness; feeding and food safety; salmonella categorisation)

Lecturer:
Visscher

9. SW: Nutrition carnivores I (1 h)

Basics of general information on feeding dogs and cats

Learning objective / basis for:
In-depth insights into the basics of general information on feeding dogs and cats

Lecturer:
Visscher

9. SW: Carnivore nutrition II (1 h)

Fundamentals of nutritional physiology, digestibility of feed components and feed characteristics in general

Learning objective / basis for:
In-depth understanding of the basics of nutritional physiology, the digestibility of feed components and feed characteristics in general

Lecturer:
Visscher

10. SW: Nutrition Carnivores III (1 h)

Basics of nutrition (energy requirements and feeding)

Learning objective / basis for:
In-depth understanding of the basics of nutrition (energy requirements and feeding)

Lecturer:
Hankel

10. SW: Carnivore nutrition IV (1 h)

Dietetics in dogs and cats/nutrition-related diseases and disorders (gastrointestinal disorders, diseases of the kidneys or urinary tract, other indications for dietary feed)

Learning objective / basis for:
Knowledge of nutritional disorders in dog and cat feeding, knowledge of dietary approaches to prevent and treat certain diseases

Lecturer:
Hankel

11. SW: Poultry nutrition I (1 hour)

Basics of poultry farming, nutritional physiology and feeding of laying hens

Learning objective / basis for:
In-depth understanding of the basics of poultry farming, nutritional physiology and laying hen feeding

Lecturer:
Visscher

11. SW: Poultry nutrition II (1 hour)

Basics of feeding laying hens and egg quality, feeding chicks and pullets and feeding parent stock

Learning objective / basis for:
In-depth understanding of the basics of laying hen feeding and egg quality, chick and pullet feeding and parent stock feeding

Lecturer:
Visscher

12. SW: Poultry nutrition III (1 hour)

Fundamentals of the structure of fattening poultry farming and feeding of young fattening chickens, turkeys, ducks and geese, feeding and food quality, nutrition-related diseases and disorders (skeletal system/digestive tract)

Learning objective / basis for:
In-depth understanding of the basics of the structure of poultry farming and feeding of young broilers, turkeys, ducks and geese, feeding and food quality, nutrition-related diseases and disorders (skeletal system/digestive tract)

Lecturer:
Visscher

12. SW: Poultry nutrition IV (ornamental birds) (1 h)

Fundamentals of the nutritional characteristics of different ornamental bird species (granivorous, soft-feeding ornamental bird species), basic biological data, energy and nutrient requirements, food and water intake, feeding practice, nutritional disorders in ornamental bird keeping (diversity in the components including the use of food in ornamental bird nutrition)

Learning objective / basis for:
Basic knowledge of the nutrition of ornamental birds with special consideration of the specific food spectrum, knowledge of nutrition-related disorders and their prevention, standard procedures in the feeding of ornamental birds (including practical supplements)

Lecturer:
Visscher

13. SW: Small rodent nutrition I (1 h)

Nutritional and physiological principles of small rodent nutrition (granivorous and folivorous/ herbivorous species), basic biological and nutritional data, feeding practice for small rodents

Learning objective / basis for:
Knowledge of the basic organisation of the feeding of various "small rodents" (rabbits, guinea pigs in contrast to hamsters, rats and mice); ideas on specific risks of feeding concepts used in practice (proportion of roughage/juice/concentrated feed)

Lecturer:
Hankel

13. SW: Small rodent nutrition II (1 h)

Nutritional disorders and particular risks in the feeding of small rodents (anorexia, obesity, lack of tooth wear, urolithiasis in small rodents)

Learning objective / basis for:
Basic knowledge of the causes of nutritional disorders in the feeding of small rodents (dental health, under/overfeeding, use of coccidiostats, weaning diseases)

Experiments / demonstrations:
and recommendation for the correction of detected deficiencies regarding the effects of an inappropriate diet (images)

Lecturer:
Hankel

14. SW: Fish nutrition (1 hour)

Nutritional-physiological and feeding principles and special features in the nutrition of farmed and ornamental fish, differences in the energy and nutrient requirements of cold-blooded species compared to homoiothermic animals, feed and feeding, nutrition-related diseases and disorders

Learning objective / basis for:
Basic knowledge of feeding farmed and ornamental fish, knowledge of nutrition-related diseases and disorders (excess and deficiency diseases), feed additives in the farmed and ornamental fish sector; importance of compound feed formulation; water quality under the influence of nutrition

Lecturer:
Visscher

14. SW: Reptile nutrition (1 hour)

Nutritional-physiological and feeding principles and special features of reptile nutrition, feeding behaviour of various species, feeding practice, food spectrum of different species, nutrition-related diseases and disorders

Learning objective / basis for:
Basic knowledge of feeding reptiles, knowledge of nutrition-related diseases and disorders and their causes (husbandry, vitamin D metabolism)

Experiments / Demonstrations:
on the effects of a diet that is not appropriate or species-appropriate

Lecturer:
Hankel

Institute for Animal Nutrition

0204 Exercises in animal nutrition II (ration design, review, feeding errors and dietetics)

Visscher, Hankel, Hartung, Homann, Lingens, Lohkamp, Schubert, Schwennen, Spieß, Ullrich, Weinberg, Wilke

2. SW: Horse I (2 hours)

Feed science and digestive physiological principles, principles of ration design, review and evaluation

Learning objective / basis for:
Basic knowledge of feeding horses, assessment of different requirements for energy and nutrient intake, design and assessment of existing "rations" and feeding techniques

Experiments / Demonstrations:
Demonstration of customary rations and measures (supplementing rations with certain compound feeds and products)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

3. SW: Horse II (2 hours)

Feeding of broodmares, foals, weanlings and sport horses, correction of errors in ration design (foals) and aspects of dietetics

Learning objective / basis for:
Feeding practice depending on the age and use of the horses, knowledge of nutritional disorders in horses and dietary approaches to remedy any disorders

Experiments / Demonstrations:
Demonstration of feed-related damage/health disorders in horses (e.g. intoxications, respiratory tract diseases, laminitis, osteochondrosis, etc.)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

4. SW: Ruminants I (2 hours)

Basics of dairy cattle feeding, ration design, feeding-related influences on milk constituents, feed intake capacity, feeding intensity

Learning objective / basis for:
Knowledge of the basics of ration design for dairy cows, feed intake capacity of cows, feed requirements, energy and nutrient content in the ration and knowledge of checking rations with regard to needs-based and ruminant-appropriate feeding, in particular "structural supply"; ration planning (basic and concentrated feed ratios)

Experiments / Demonstrations:
Demonstration of practice-relevant rations/ration calculations; sieve analyses of rations (derivation of the peNDF content)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

5. SW: Ruminants II (2 hours)

Feeding calves and beef cattle (basics, ration design, nutritional disorders)

Learning objective / basis for:
Basic knowledge of calf feeding, knowledge of feeding cattle for fattening and evaluation of certain feeding measures with regard to nutritional disorders

Experiments / Demonstrations:
Demonstration of practice-relevant rations and feeding techniques as well as feeding errors occurring here; presentation of MAT declarations; quality control procedure

Lecturer:
Visscher as well as the above-mentioned scient. Employees

6. SW: Ruminants III (2 hours)

Nutritive disorders in ruminants (ketosis, urolithiasis, etc.), special dietary concepts in the feeding of ruminants (e.g. DCAB) in dry cows

Learning objective / basis for:
Knowledge of the diagnosis of nutritional disorders in ruminant feeding, basic knowledge of certain dietary concepts for dairy cattle, sheep and goats

Experiments / Demonstrations:
Demonstration of various cases from the service sector (submissions/inquiries), procedure in the nutritive anamnesis

Lecturer:
Visscher as well as the above-mentioned scient. Employees

7. SW: Pig I (2 hours)

Feed science basics and digestive physiological principles of ration design and compound feed conception, review and evaluation

Learning objective / basis for:
Basic knowledge of the feeding/mixed feed concept of pigs, assessment of different demands on the energy and nutrient supply of sows in the reproductive cycle; feeding influences on the course of birth and puerperium; consequences of large litter sizes (for the sows/newborns)

Experiments / Demonstrations:
Demonstration of various compound feed concepts and feeding concepts

Lecturer:
Visscher as well as the above-mentioned scient. Employees

8. SW: Pig II (2 hours)

Feeding of fattening pigs, correction of the mixed feed concept in pigs with nutritional disorders, dietary measures in pig herds (sows / weaned piglets / fattening pigs)

Learning objective / basis for:
Basic knowledge in the detection of nutritional problems in pigs, knowledge of nutritional disorders and various dietary concepts in pigs (sows / weaned piglets / fattening pigs), feeding and carcass quality

Experiments / Demonstrations:
Demonstration of cases of nutrition-related health disorders and performance losses (sows: Puerperal disorders, mycotoxin effects; piglets: neonatal phase and weaning phase; fattening pigs: stomach ulcers and salmonella contamination)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

9. SW: Carnivores I (2 hours)

Nutritional and digestive physiological principles of dog and cat nutrition, principles of ration design, review and evaluation, conception and assessment of feed and feeding or feeding techniques in the nutrition of dogs and cats (depending on age and use), assessment of common compound feed declarations (ash content? NfE content? protein:energy ratios)

Learning objective / basis for:
Basic knowledge of the nutrition of carnivores, knowledge of the assessment of rations (ready-made food, home-made, etc.) for dogs and cats

Experiments / Demonstrations:
Demonstration of cases from the submission area / enquiries about carnivore nutrition

Lecturer:
Visscher as well as the above-mentioned scient. Employees

10. SW: Carnivores II (2 hours)

Basic principles of nutritional counselling, nutritional disorders in dogs and cats (case studies), principles of dietetics in carnivores, indications for dietetic measures, assessment of dietetic feeds

Learning objective / basis for:
Basic knowledge with regard to nutritional disorders in dogs and cats, knowledge of dietary concepts in the nutrition of carnivores, selection of suitable diets; special requirements of very old dogs and cats -> age dispositions and feeding measures)

Experiments / Demonstrations:
Case studies (e.g. obesity, struvite stone prophylaxis, pancreatic and renal insufficiency)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

11. SW: Poultry I (2 hours)

Feed science and digestive physiological principles (compound feed formulation), errors in compound feed design for productive poultry, wet-litter syndromes, use of anticoccidials and special feed additives (laying hens/fattening poultry)

Learning objective / basis for:
Basic knowledge of the feeding of poultry, assessment of different demands on the compound feed concept (performance, quality of the products, etc.), knowledge of nutritional disorders

Experiments / demonstrations:
Demonstration of various cases from the submission area (clinical cases, nutrition and litter quality, nutrition and egg quality, nutrition and carcass quality)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

12. SW: Poultry II (2 hours)

Ornamental bird nutrition: nutritional and digestive physiological basics, principles of feeding ornamental birds depending on species, age and keeping conditions, nutritional disorders and problems (over/underfeeding, lack of hygiene in the feed)

Learning objective / basis for:
Basic knowledge of the nutrition of ornamental birds, knowledge of the specific requirements (feed composition, etc.) of individual species

Experiments / demonstrations:
Demonstration of clinically relevant feeding practices, deficiency and excess diseases (visual material on excess and deficiency effects, quality of faeces under the influence of feeding; air sac mycoses and FM hygiene)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

13. SW: "Small rodents" (2 hours)

Feed science and digestive physiological principles for species-appropriate nutrition of the various species (granivorous, folivorous/ herbivorous diets), feed spectrum, compound feed/ration design, nutrition-related problems (urolithiasis, dental health, ketosis, diarrhoea, tympanosis)

Learning objective / basis for:
Basic knowledge of the nutrition of small rodents, knowledge of nutrition-related disorders and their targeted avoidance or influencing by certain feeding measures, veterinary nutritional advice)

Experiments / Demonstrations:
Demonstration of nutritional disorders in small pets (dental health, concretions from the urinary tract)

Lecturer:
Visscher as well as the above-mentioned scient. Employees

Institute for Food Quality and Safety

0220 Meat hygiene incl. poultry meat hygiene

Plötz, Sudhaus-Jörn, Kain, Kittler, Siekmann, Kreitlow, Vahle, Abdulmawjood, Krischek

1. SW: Meat hygiene (28 hours)

Basic lecture on meat hygiene with the following focal points:
Investigation process, auxiliary investigations, law;
Poultry meat hygiene, law, diseases.
Teaching units are: Examination of cattle, pigs, other animal species; examination of lymph nodes; meat hygiene law, AVV; ante-mortem inspection; information on the food chain; risk-orientated meat inspection; meat quality and quality defects; Trichinella examination; residues and contaminants; BU and microbiological examinations; zoonotic diseases/animal diseases; diagnoses; assessment/labelling; poultry meat production and production; labelling and classification of slaughtered poultry; poultry and poultry meat. microbiological examinations; zoonoses/animal diseases; diagnoses; assessment/labelling; poultry meat production and production; labelling and classification of slaughter poultry; poultry slaughter animal and meat inspection; findings and assessment; microbiology of slaughtered poultry

Learning objective / basis for:
Practical implementation of official ante-mortem and post-mortem inspections, including auxiliary inspections; legal knowledge; assessment and diagnosis, including Richterment

Lecturer:
Research assistants (see above)

Remarks:
Up to four external guest lectures from industry or authorities

Institute for Food Quality and Safety

0224 Ante-mortem and post-mortem inspection

Plötz, Siekmann, Sudhaus-Jörn, Kain, Kreitlow, Kittler, Abdulmawjood, Krischek

1. SW: Meat hygiene (28 hours)

Practical exercises on meat inspection of carcasses and by-products (pigs, cattle, sheep/goats, game, poultry, horses) and on carrying out auxiliary examinations (BU, Trichinella examination, substance defects, hygiene checks)

Learning objective / basis for:
Proper performance of the official meat inspection and the corresponding auxiliary inspections; assessment of findings, diagnosis and evaluation in accordance with meat hygiene legislation

Experiments / Demonstrations:
Demonstrations on the examination of carcasses and auxiliary examinations in small groups

Lecturer:
Research assistants (see above)

Institute for Food Quality and Safety

0250 Cross-sectional teaching

Kittler, Vahle, Siekmann, Sudhaus-Jörn, Krischek, Nowak

1. SW: Food Science (56 hrs.)

Interdisciplinary event on food hygiene topics with contributions from microbiology/infectiology, meat hygiene, poultry diseases, milk hygiene, animal nutrition, etc.

Learning objective / basis for:
In-depth study of food science issues by looking at the topic from different perspectives

Experiments / Demonstrations:
Basics in understanding the milking system

Co-operation / consultation with:
Inst. f. Food Toxicology and Chemical Analysis, Clinic for Poultry, Bakum Branch Office for Epidemiology, German Armed Forces, BfR, etc.

Lecturer:
Research assistants (see above)

Institute of Food Quality and Safety; Institute of Parasitology; Institute of Pharmacology, Toxicology and Pharmacy; Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology; Poultry Clinic

0250 Cross-sectional subject food

Barth, Empl, Hüser, Meißner, Schulz, Seeger, Steinberg, Strube, Wunderl

6. SW: Food safety from the perspective of different disciplines (18 hours)

Control of the red bird mite
Veterinary medicinal products: residue problems, entry into the environment, monitoring
Alternative methods to animal testing in toxicology: activity testing of botulinum toxins
Risk assessment of veterinary medicinal products
Nutrition and health: benefit-risk assessment of functional foods, food additives
Current topics: Glyphosate

Learning objective / basis for:
Important aspects of food safety and toxicology as well as consumer protection are presented and discussed. One aim is to assess the risk of residues and contaminants as well as the evaluation of functional ingredients in food. The learning objectives are supported by online material.

Co-operation / consultation with:
The course content is taught by
the Institute for Food Quality and Safety (Seeger),
the Institute of Pharmacology, Toxicology and Pharmacy (Meißner),
the Institute of Parasitology (Strube),
the clinic for poultry (Wunderl),
the Institute for Animal Hygiene, Animal Welfare and Farm Animal Ethology (Schulz),
the European Medicines Agency(Empl),
the Lower Saxony State Health Office (Hüser)
and Dr Willmar Schwabe GmbH (Barth)

Lecturer:
Barth, Empl, Hüser, Meißner, Schulz, Seeger, Steinberg, Strube, Wunderl

Institute of Pharmacology, Toxicology and Pharmacy

0261 Drug and narcotics law

Meissner, Richter

1. SW: Pharmaceutical law (14 hours)

Legal provisions relating to the manufacture, procurement, dispensing and prescribing of medicines by veterinarians, Medicines Act and ordinances (e.g. prescription obligation, pharmacy obligation, veterinary in-house pharmacy ordinance, pharmacopoeia, veterinary vaccine ordinance, etc.).

Learning objective / basis for:
Knowledge of the legal basis for handling medicinal products

Lecturer:
J. Meissner, F. Richter Assencio

8. SW: Food law regulations, residue problems (8 hours)

Food and feed regulations (as far as relevant for the handling of veterinary medicinal products),

Act on the Trade in DDT (DDT Act), Ordinance on Maximum Residue Limits, Ordinance on Substances with Pharmacological Effects, Ordinance on the Prohibition of the Use of Certain Substances in the Manufacture of Medicinal Products for Animal Use, Regulation (EEC) 2377/90,
MRL procedure, residue assessment, waiting time

Learning objective / basis for:
Knowledge of the principles of food law relevant to the handling of medicinal products, residue assessment, MRL, withdrawal period

Lecturer:
J. Meissner, F. Richter Assencio

12. SW: Narcotics regulations (6 hours)

Narcotics Act, Narcotics Internal Trade Ordinance, Narcotics Prescription Ordinance

Learning objective / basis for:
Knowledge of the legal provisions relevant to the handling of narcotics

Lecturer:
J. Meissner, F. Richter Assencio

Institute of Pharmacology, Toxicology and Pharmacy

0263 Exercises in preparing and prescribing medicines

Oltmanns, Käufer, Meißner, Gernert, Richter

3. SW: Pharmaceutical production (8 hours)

Determination of prices for veterinary medicinal products, labelling of veterinary medicinal products, prescription abbreviations, general basic rules of galenics, manufacture of powdered medicinal products, liquid and semi-solid dosage forms (powders, solutions and ointments)

Learning objective / basis for:
Basic knowledge of pharmaceutical production within the framework of dispensing law, including price calculation and labelling

Experiments / Demonstrations:
1. basic principles of production, price calculation, labelling
2. first practical training day: solid and liquid dosage forms
3. second practical exercise day: semi-solid dosage forms (ointments)
4. performance assessment (practical)

Lecturer:
J. Meißner, F. Richter Assencio and staff of the Institute

6. SW: Prescription exercises (4 hours)

Prescribing medicines and anaesthetics for food-producing and non-food-producing animals

Learning objective / basis for:
Prescribing within the framework of dispensing law, application of knowledge of clinical pharmacology, dosage conversion based on metabolic body weight or body surface area, repurposing cascade

Experiments / demonstrations:
Development of exemplary recipes

Lecturer:
J. Meißner, F. Richter Assencio and staff of the Institute

Clinic for pets, reptiles and birds

0271 Diseases of pets, reptiles and amphibians

Dierig, Hetterich, Krull, Pees, Reuschel

1. SW: Reptile diseases introduction (1 h)

Introduction, structure of the lecture, legal aspects, propaedeutics

Learning objective / basis for:
The student knows the legal framework for reptiles as patients, in particular the protection status and labelling, and is informed about the propaedeutic topics

Co-operation / consultation with:
(none)

Lecturer:
Pees

2. SW: Introduction to pets, anaesthesia (1 hour)

Introduction, vaccination, anaesthesia

Learning objective / basis for:
The student is informed about propaedeutic topics and knows the different possibilities of vaccination in small mammals. He/she knows the basics of pre-anaesthesia as well as the possibilities and implementation of anaesthesia

Lecturer:
Reuschel/Dierig

3. SW: Pets skin (1 hour)

Infectious and non-infectious skin diseases, mamma tumours, abdominal gland gerbil

Learning objective / basis for:
The student recognises relevant skin diseases, knows the aetiology and can carry out the necessary diagnostic and therapeutic measures.

Lecturer:
Reuschel

4. SW: Pets ears (1 hour)

Otitis externa, otitis media, E.c.

Learning objective / basis for:
The student knows the symptoms that indicate a disease of the ears or an E. cuniculi infection and knows possible differential diagnoses. He/she knows which diagnostic and therapeutic measures should be initiated.

Lecturer:
Reuschel/Krull

5. SW: Reptile skin (2 hours)

Moulting, infectious and non-infectious skin diseases (e.g. hypo-, hypervitaminosis, burns, bite injuries, CANV, BD, (ear) abscesses, carapace changes)

Learning objective / basis for:
The student knows the physiology and pathology of moulting in reptiles. He/she recognises relevant skin diseases, knows the aetiology and can carry out the necessary diagnostic and therapeutic measures.

Lecturer:
Pees, Hetterich

7. SW: Pets genital tract (1 hour)

Castration, neoplasia, ovarian cysts, pyometra hamsters

Learning objective / basis for:
The student recognises relevant changes to the genital tract in various small mammals, knows the aetiology and can carry out the necessary diagnostic and therapeutic measures. He/she can advise animal owners on prophylactic measures (castration counselling).

Lecturer:
Reuschel

8. SW: Pets urinary tract (1 hour)

Urolithiasis, cystitis

Learning objective / basis for:
The student knows the physiology of urinary calculi formation in pets and can recognise the corresponding symptoms. He/she can carry out the necessary diagnostic and therapeutic measures and advise pet owners on prophylaxis.

Lecturer:
Reuschel

9. SW: Reptile urogenital tract (1 hour)

Gout, renal insufficiency, urolithiasis, urinary calculi, urinary paralysis

Learning objective / basis for:
The student recognises relevant changes in the kidneys and genital tract in various reptile species, knows the aetiology and can carry out the necessary diagnostic and therapeutic measures.

Lecturer:
Pees, Hetterich

9. SW: Reptiles Gastrointestinal tract and liver (1 hour)

Diarrhoea, constipation, foreign bodies, prolapse, atony, fatty liver, herpes viruses

Learning objective / basis for:
The student knows the physiology of digestion and can assess disorders, knows the aetiology of the relevant diseases and can carry out the necessary diagnostic and therapeutic measures

Lecturer:
Pees, Hetterich

10. SW: Reptile endoparasites (1 h)

Endoparasites of the MDT, kidneys, respiratory tract

Learning objective / basis for:
The student knows the relevant endoparasites in reptiles, their occurrence, their development cycle, their significance as a cause of disease and their diagnosis and treatment

Lecturer:
Pees, Hetterich

11. SW: Pets digestive tract (3 hours)

1st ileus, endoparasites, appendicitis, wet-tail hamster, 2nd tooth in rabbits, 3rd tooth in guinea pigs, degu and chinchilla

Learning objective / basis for:
The student recognises the symptoms of a disease of the gastrointestinal tract in pets and can draw up a list of differential diagnoses. He/She recognises ileus in rabbits as an acute emergency and knows how to initiate appropriate emergency measures. He/She is able to carry out the necessary diagnostic and therapeutic measures in the event of a disease of the digestive tract. The student knows the anatomy of the teeth of the individual pet species and can diagnose them using diagnostic imaging.

Lecturer:
Reuschel

12. SW: Pets respiratory tract (1 h)

Rabbit rhinitis, pneumonia, rhinitis tooth, mycoplasma rat

Learning objective / basis for:
The student knows the most important infectious and non-infectious diseases of the respiratory tract in pets and can initiate further diagnostic measures. He/she can carry out therapeutic measures including emergency treatment and advise pet owners on possible prophylactic measures.

Lecturer:
Reuschel

12. SW: Reptiles respiratory tract and CNS (1 h)

Foreign bodies, pneumonia, mycoplasma, TINC, ferlaviruses, arenaviruses

Learning objective / basis for:
The student knows the special features of the anatomy and physiology of the respiratory tract in reptiles, as well as relevant non-infectious and infectious diseases of the respiratory tract and the CNS. He/she is able to carry out the necessary diagnostic and therapeutic measures.

Lecturer:
Pees, Hetterich

13. SW: Reptile anaesthesia, soft tissue surgery, analgesia (1 hour)

Anaesthesia, pain therapy, access to the abdominal cavity, soft tissue surgery

Learning objective / basis for:
The student knows the anaesthetics and painkillers commonly used in reptiles and can perform and monitor relevant anaesthesia. He/she knows the most important soft tissue

operations, including access to the abdominal cavity, in the various reptile groups and can describe these.

Lecturer:
Pees, Hetterich

13. SW: Pets Diseases of the musculoskeletal system (1 hour)

Fractures, dislocations, pododermatitis

Learning objective / basis for:
The student recognises relevant changes in the musculoskeletal system of small mammals, knows the aetiology and anatomy. He/she is able to carry out the necessary diagnostic and therapeutic measures and knows the important approaches for surgical measures.

Lecturer:
Reuschel

14. SW: Reptiles Diseases of the musculoskeletal system (1 hour)

MBD, osteomyelitis, joint infections, picornavirus

Learning objective / basis for:
The student knows the physiology and pathology of bone metabolism in reptiles, the causes of bone and joint diseases, and can carry out the necessary diagnostics and therapy.

Lecturer:
Pees, Hetterich

14. SW: Reptile traumatology and bone surgery (1 h)

Fall injuries, armour fractures, limb fractures, treatment, dressings, osteosynthesis, amputation

Learning objective / basis for:
The student knows the causes and consequences of common traumas in reptiles, can assess and diagnose them and initiate suitable therapeutic measures. He/she knows typical bone fractures and can describe the basics of treatment.

Lecturer:
Pees, Hetterich

15. SW: Diseases in ferrets (1 hour)

Lymphoma, insulinoma, hyperadrenocorticism

Learning objective / basis for:
The student knows the most important anatomical and physiological features of ferrets. He/she recognises the most important diseases in ferrets and can carry out diagnostic and therapeutic measures.

Lecturer:
Reuschel

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0281 Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics (quota) Clinic for small cloven-hoofed animals

Ganter, Bauer, v. Altrock, Wagener, Hennig-Pauka,Nikolaisen, Schregel

1. SW: Diseases of pigs, small ruminants and New World camels (2 hours)

Presentation of sick animals,
Small group lessons: case discussion, examination and treatment of sick animals in the stable

Learning objective / basis for:
Learning of examination procedures and methods, understanding of aetiology, pathogenesis, epidemiology, therapy and prophylaxis of various diseases;
Implementation of treatment measures

Lecturer:
v. Altrock, Bauer, Nicolaisen, Wagener, Kiene, Schregel, Neubert

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0285 Outpatient clinic

Wilhelm, Oberheide, Roth, Rath

1. SW: Outpatient clinic (5 hours)

Excursions to livestock farms in the veterinary practice area of the outpatient clinic, demonstration and instruction of students in veterinary work on farms;
Routine treatment of common diseases, operations, prophylactic measures

Learning objective / basis for:
Demonstration of veterinary work on the farm;
Comparison of the possibilities of veterinary measures on site and in the clinic;
Independent implementation of treatments under supervision

Experiments / Demonstrations:
Diagnostic examinations, treatments (e.g. injections, infusions, instillations, operations)

Lecturer:
Wilhelm, Rath, Oberheide, Roth (instead of Wilhelm, Rath, Roth, Oberheide)

Clinic for horses

0301 Clinical training on patients

Feige, Sieme, Geburek, Ohnesorge, Boevé, Bartmann, Delling, Bienert-Zeit and employees

1. SW: Internal medicine, orthopaedics and surgery, reproductive medicine (36 hours)

Presentation of horses currently admitted to the clinic with diseases from all areas of equine medicine. Particular attention is paid to hoof diseases, lameness-causing diseases of the limbs with special consideration of tendon and joint diseases, back diseases, foal diseases, diseases of the upper and lower respiratory tract, cardiovascular diseases, diseases of the kidneys and urinary organs, gastrointestinal diseases with special consideration of equine colic, metabolic diseases, skin diseases, neurological diseases, fertility disorders and peripartum diseases, and andrological diseases.

Learning objective / basis for:
Development of diagnosis and therapy of practice-relevant diseases by students under the guidance of lecturers. This is supplemented by a theoretical review of the diagnosed illness.

Experiments / demonstrations:
Demonstration of 1-3 horses during each lesson

Lecturer:
Feige; Sieme; Geburek; Ohnesorge; Venner

Clinic for horses

0308 Equine diseases - orthopaedics and surgery

Geburek

1. SW: Equine diseases - orthopaedics and surgery (7 hours)

Diagnostics, conservative and surgical therapy as well as prognosis of practice-relevant diseases of the musculoskeletal system of horses (upper limb sections as well as pelvic region, back and neck);
Surgical treatment of selected diseases of the equine dentition, the oral cavity, the gastrointestinal tract and common respiratory diseases.

Learning objective / basis for:
Knowledge of practice-relevant diseases of the upper sections of the musculoskeletal system, the dentition, the oral cavity, the gastrointestinal tract and the respiratory tract as well as their treatment options and prospects of success. In-depth knowledge of the applied anatomy of the musculoskeletal system. The focus of the course is on diseases of the musculoskeletal system.

Experiments / Demonstrations:
Film material on movement disorders

Lecturer:
Geburek

Clinic for small animals

0321 Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics (quota) Clinic for Small Animals

Volk H., Kästner, Mischke, Tipold, Kramer, Harms, Busse, Karbe, Klein-Richers, Nerschbach, Neßler, Rieder, Siedenburg, Schütter, Volk, A.

1. SW: Problem-orientated learning: Leading symptoms (1 h)

Definition and clinical relevance of the symptoms, pathophysiological mechanisms, differential diagnosis, examination procedure, most common causes, development of a treatment plan.

Learning objective / basis for:
Problem-orientated approach to small animal patients.

Lecturer:
Rieder, Mischke, A. Volk, H. Volk, Kramer, Busse, Harms, Karbe

1. SW: Internal Medicine: Discussion of current cases (2 hours)

Problem-orientated processing of internal medicine patients who are hospitalised at the clinic at the time of the event. Presentation and examination of patients by students,

discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated approach to small animal patients. with diagnostics, differential diagnoses and a therapeutic plan

Experiments / demonstrations:
Images, examination of a patient

Lecturer:
Rieder, Mischke, A. Volk, H. Volk, Kramer, Busse, Harms, Karbe

2. SW: Dermatology: Discussion of current cases (2 hours)

Problem-oriented processing of dermatological patients who are hospitalised at the clinic at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and further diagnostics (cytology, pathohistology) and procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated approach to small animal patients in dermatology. Creation of a differential diagnosis list, a diagnosis and therapy plan

Experiments / Demonstrations:
Images, examination of a patient

Lecturer:
A. Volk

2. SW: Ophthalmology: Discussion of current cases (2 hours)

Problem-oriented processing of ophthalmological patients who are admitted to the clinic as inpatients at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a treatment proposal

Learning objective / basis for:
Problem-oriented work-up of ophthalmological patients: Examination technique - localisation of the problem, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / Demonstrations:
Examination of current patients, discussion of findings, laboratory results, demonstration and discussion of imaging procedures (e.g. sonography)

Lecturer:
C. Buses

3. SW: Surgery: Discussion of current cases (2 hours)

Systematic processing of current inpatient surgical patients (e.g. gastric torsion, fractures, accident patients). Examination of the patients by the students and discussion of the symptoms and the resulting choice of further examination measures, discussion of the results of the general and special clinical and radiological examination and interactive development of the diagnoses and possible differential diagnoses as well as the possible therapeutic procedures, taking into account the prognosis.

Learning objective / basis for:
Problem-oriented processing of surgical patients, learning the examination procedure, recognising the localisation of the disease, developing a diagnosis and its differentiation from similar diseases as well as a treatment plan

Experiments / Demonstrations:
Clinic patients, videos.
Performing the examination on current surgical patients; demonstration and discussion of further imaging examination procedures (X-ray, CT, MRI, arthroscopy if necessary)

Lecturer:
Kramer, Harms, Karbe

3. SW: Anaesthesiology: Discussion of current cases (2 hours)

Problem-oriented work-up of dogs and cats undergoing anaesthesia at the clinic at the time of the event. Pre-anaesthesia examination including interpretation of laboratory results and imaging procedures to assess the risk of anaesthesia and development and discussion of an anaesthesia protocol with the entire group.

Learning objective / basis for:
Problem-oriented work-up of patients who have to undergo anaesthesia for therapeutic or diagnostic purposes: Examination technique - localisation of the problem. Application of ASA classification for risk assessment. Selection of an individually adapted anaesthesia method. Prediction of possible anaesthesia complications
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics). Demonstration of the functioning of anaesthesia machines and monitoring monitors

Experiments / Demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics). Demonstration of the functioning of anaesthesia machines and monitoring monitors

Lecturer:
Kästner/Tünsmeyer

4. SW: Oncology: Discussion of current cases (2 hours)

Problem-oriented processing of oncological patients who are hospitalised at the clinic at the time of the event. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-oriented work-up of oncological patients: Examination technique - localisation of the problem, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics)

Lecturer:
V. Nerschbach

4. SW: Neurology: Discussion of current cases (2 hours)

Problem-orientated processing of neurological patients who are hospitalised at the clinic at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated work-up of neurological patients: Examination technique - localisation of the problem, 5-finger rule, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / Demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics)

Lecturer:
Tipold/Nessler/Volk

Clinic for Small Animals; Reproductive Medicine Unit of the clinics

0324 Small animal diseases Surgery

Volk H., Kramer, Volk A., Karbe, Wang, Dobak.

1. SW: Joint diseases Vordergldm I (1 h)

Anatomy of the elbow joint
Aetiology, pathogenesis, diagnostics, treatment options and prognosis of one of the most important elbow joint diseases in dogs: FPC (fragmented medial coronoid process)

Learning objective / basis for:
Learning about diagnostics and acquiring knowledge about treatment options and prognosis of FPC

Experiments / Demonstrations:
Image and video material

Lecturer:
Harms/Kramer

1. SW: Joint diseases of the forelimb II (1 hour)

In this lecture, further important diseases of the forelimb are presented with a description of their aetiology, pathogenesis, diagnosis, treatment options and prognosis. The anatomical basics are repeated

Learning objective / basis for:
Knowledge and recognition of the most common diseases of the forelimb as well as treatment options and prognosis

Experiments / Demonstrations:
Image and video material

Lecturer:
Harms/Kramer

2. SW: Joint diseases Hintergldm I (1 h)

The anatomical basics of the knee joint are repeated and the aetiology, pathogenesis, diagnosis, treatment options and prognosis of one of the most important diseases of the hind limb, the cruciate ligament rupture (ACL), are given.

Learning objective / basis for:
Learning how to diagnose a CFT and acquiring knowledge about the various treatment options with their advantages and disadvantages

Experiments / Demonstrations:
Image and video material

Lecturer:
Harms/Kramer

2. SW: Joint diseases Hintergldm II (1 h)

The anatomical basics of the hind limbs are repeated and the aetiology, pathogenesis, diagnostics and treatment options of other important diseases of the hind limbs are presented:
Patellar luxation
Hip joint dislocation and hip joint dysplasia (HD)

Learning objective / basis for:
Learning about diagnostics and acquiring knowledge about possible treatment options and their prognosis

Experiments / Demonstrations:
Image and video material

Lecturer:
Harms/Kramer

3. SW: Imaging thorax (1 hour)

In this section, positioning, positioning planes and the normal X-ray anatomy of the thorax are presented. Some examples of pathological X-ray findings are then discussed.
These examples are used to explain in more detail the procedure from recording the findings to making a radiological diagnosis in the area of the thorax.

Learning objective / basis for:
Knowledge of the preparation of standard planes and the normal X-ray anatomy of the thorax. Learning the diagnostic procedure for the diagnosis of X-ray images of the thorax

Experiments / Demonstrations:
Images: X-ray images

Lecturer:
Merhof/Wang/Kramer

3. SW: Abdominal imaging (1 hour)

In this section, positioning, positioning planes and the normal X-ray anatomy of the abdomen are presented. Some examples of pathological X-ray findings are then discussed.
These examples are used to explain in more detail the procedure from recording the findings to making a radiological diagnosis in the abdominal area.

Learning objective / basis for:
Knowledge of the preparation of standard planes and the normal X-ray anatomy of the abdomen. Learning the diagnostic procedure for the diagnosis of abdominal X-rays

Experiments / Demonstrations:
Images: X-ray images

Lecturer:
Merhof/Wang/Kramer

4. SW: Musculoskeletal imaging (1 hour)

The X-ray anatomy of the skeletal system and soft tissue as well as standard positioning planes of the most important bones and joints are discussed. The reactions of bones, joints and soft tissue to noxious agents are presented on the basis of selected diseases.

Learning objective / basis for:
Acquisition of knowledge of the standard positioning planes of the various areas of the skeletal system.
Knowledge of normal X-ray anatomy
Recognising pathologies in bones, joints and soft tissue

Experiments / demonstrations:
Images: X-ray images

Lecturer:
Merhof/Wang/Kramer

5. SW: Stranguria & dysuria (1 hour)

Stranguria is a slow, painful discharge of small amounts of urine that is often associated with an unsuppressible urge to urinate.
Dysuria is difficult and/or painful urination
Causes of stranguria/dysuria can be localised into primary urinary tracts (urinary bladder, urethra) and secondary non-urinary tracts (e.g. prostate, uterus/vagina, rectum, pelvic bones, lymph nodes, anal sac, etc.). In addition, causes can be categorised as intra-luminal or extra-luminal.
A thorough medical history and complete general examination including rectal examination is important. X-rays with or without contrast medium as well as urinalysis and laboratory tests are important diagnostic procedures to recognise the underlying disease. Ultrasound and endoscopy (cystoscopy) are important in some disease processes to make a diagnosis. The most common cause of stranguria/dysuria is urolithiasis and, in cats, the disease complex FLUDT (Feline Lower Urinary Tract Disease). Obstructions of the lower urinary tract should be remedied as quickly as possible. Various procedures and disease processes are discussed using 3 patient examples.

Learning objective / basis for:
1. recognising the different causes of stranguria/dysuria in dogs and cats
2. understanding of the diagnostic procedures for differentiating the causes of stranguria
3. initiation of therapeutic measures for the various causes of stranguria

Lecturer:
Carb

6. SW: Urinary tract (1 hour)

In this lecture block, the most important surgical procedures in the area of the urinary tract are discussed on the basis of urolithiasis. In addition to diagnostics, the indications for the

individual procedures and possible complications are explained and the surgical procedures are explained using illustrations and images and some tips are given on how to avoid complications.

Learning objective / basis for:
Knowledge of the most important surgical interventions on the lower urinary tract, including possible complications and their prevention and prognosis

Experiments / Demonstrations:
Image material

Lecturer:
Kramer/Karbe

7. SW: Wound management (1 hour)

Wounds are first classified and the most important principles of wound care for different wounds are discussed: starting with wound cleansing, through debridement to wound closure.
Indications for primary wound closure are presented, the procedure is explained and simple ways of avoiding tension are discussed.
When discussing the indications for open wound treatment, irrigation solutions and wound dressings used in open wound treatment are also presented.
Finally, the further procedure after initially open wound treatment is discussed. Delayed primary closure, secondary closure and secondary wound healing are compared and procedures for wound closure (cutaneous vascular flap and skin grafting) are discussed.
The first part explains some important basics of wound care.
The second part explains the procedure for primary wound closure and discusses ways of avoiding tension. In addition, local and distant subdermal flaps are presented.
In addition to the indications for open wound treatment, the third part also presents irrigation solutions and wound dressings that are used in open wound treatment.
The last part discusses the further procedure after initial open wound treatment. Delayed primary closure, secondary closure and secondary wound healing are compared and other wound closure procedures (cutaneous vascular flap and skin grafting) are presented.

Learning objective / basis for:
Knowledge of wound classification and the therapeutic procedure for different wounds/wound stages. Learning the indications and techniques for primary or secondary wound closure and for secondary wound healing. Knowledge of wound irrigation solutions and wound dressings.

Experiments / Demonstrations:
Image material

Lecturer:
Kramer

8. SW: Ophthalmology - The cloudy eye (1 hour)

A cloudy eye can have very different causes. Clouding can affect the cornea, the anterior chamber of the eye, the lens or the vitreous body.
We will look at how different opacities can be distinguished from each other and what the possible causes are. Furthermore, diagnostic steps will be discussed in order to differentiate between different pathologies and thus create the basis for adequate patient care.

Learning objective / basis for:
-localise opacities within the eye

-causes of clouding of the cornea
-be able to differentiate between the causes of corneal opacities and initiate further diagnostic steps

Experiments / Demonstrations:
Image material

Lecturer:
Claudia Busse

8. SW: Ophthalmology - The red eye (1 hour)

A red eye can have very different causes. A distinction is made between hyperaemia, pathological vascularisation of the cornea and bleeding at various anatomical locations. We will discuss how to differentiate between these rednesses and what causes need to be considered in each case. Furthermore, we will discuss diagnostic steps to differentiate between different pathologies and thus create the basis for adequate patient care.

Learning objective / basis for:
- Classify and localise redness of the eye
- Causes for the various reddening of the eye
- Be able to initiate diagnostic steps to differentiate between the causes of redness
- Recognising emergencies that are associated with reddening of the eye

Experiments / demonstrations:
Image material

Lecturer:
Claudia Busse

9. SW: Ophthalmology - The painful eye (1 hour)

A painful eye can have very different causes, eyelid misalignments, aberrant hair, injuries, foreign bodies on the surface of the eye or in the conjunctival sac are just a few examples. With the help of a structured eye examination, we will shed light on and learn to recognise the differential diagnoses of a painful eye. Some of the presentations are emergencies that need to be recognised immediately to enable the best possible cure or reduce suffering. We will discuss initial therapeutic measures and draw up a treatment plan.

Learning objective / basis for:
- be able to name and recognise possible causes of painful eyes
- Being able to identify emergencies
- Understand the purpose of a possible referral to specialists
- Initiate first therapeutic steps

Experiments / Demonstrations:
Image material

Lecturer:
Claudia Busse

9. SW: Ophthalmology - The blind eye (1 hr.)

Visual deficits of various causes will be examined. We will look at how central blindness can be differentiated from ocular blindness. The focus will be on ocular changes in particular.
With the help of a structured eye examination, we will learn to differentiate the differential diagnoses for a blind eye. Some of the presentations are emergencies that need to be

recognised immediately to enable the best possible cure or reduce suffering. We will discuss initial therapeutic measures and develop a treatment plan.

Learning objective / basis for:
- be able to name and differentiate between possible causes of blindness
- Being able to identify emergencies
- Understand the purpose of a possible referral to specialists
- Initiate first therapeutic steps

Experiments / Demonstrations:
Image material

Lecturer:
Claudia Busse

Clinic for Small Animals; Reproductive Medicine Unit of the clinics

0325 Small animal diseases Internal medicine

Volk H., Tipold, Mischke, Volk, A., Rieder, Neudeck

6. SW: Leading symptom alopecia and obesity (1 hour)

In this lecture, students are given an overview of the definition of obesity and the metabolic basis, which can be both a consequence and a cause. Ways of treating and preventing obesity are also discussed. Some metabolic diseases - especially hormonal disorders - are associated with weight gain and changes in the coat. In addition, the diagnostic work-up for patients with alopecia is shown.

Learning objective / basis for:
After this lecture, students should
-dogs and cats with the Body Condition Score (BCS) to assess their nutritional status.
-be able to name metabolic diseases that need to be clarified in the case of weight gain +/- alopecia.
knowledge about the long-term consequences of obesity.
-patients with obesity and alopecia.
Learning objectives Alopecia (Derma AV)
- Instructions for structured, problem-based treatment of alopecia in dogs with a focus on obesity
-Wdh propaedeutics lesion type /- distribution = problem list dermatology
-Form differential diagnoses for the problem list
-Further diagnostics for processing the differential diagnosis list
-Understanding hair physiology including growth types
-Topical treatment of an endocrinopath

Experiments / Demonstrations:
Image material

Lecturer:
Rieder/ A. Volk

7. SW: Leading symptom fever vs. hyperthermia (1 h)

In this lecture, the differences between hyperthermia and fever are discussed. Furthermore, the respective development of hyperthermia/fever is explained and possible differential diagnoses are explained. Case studies are used to train the diagnostic and therapeutic work-up.

Learning objective / basis for:
After this lecture, students should
-Know the difference between hyperthermia and fever.
-Know the acute treatment of hyperthermia.
The diagnostic work-up of patients with hyperthermia/fever can.

Experiments / demonstrations:
Image material

Lecturer:
Rieder

8. SW: Leading symptom polyuria - polydipsia (1 hour)

Physiology of the water balance
Polyuria/polydipsia:
- Pathogenetic principles
- Diagnostic procedure (clinic, laboratory diagnostics, if necessary
  Imaging, special test procedures)
- Differential diagnosis
- Application and consolidation of what has been learnt on the basis of a
  Case study (dog with hypoadrenocorticism)

Learning objective / basis for:
Targeted handling of a small animal patient
with polyuria/polydipsia

Lecturer:
R. Mischke (instead of R. Mischke)

9. SW: Leading symptom jaundice (1 hour)

-Definition of jaundice
-Clinic of jaundice
-Metabolism of bile pigments
Differential diagnosis of pre-, intra- and post-hepatic jaundice
-Deepening of the differentiation between the forms of jaundice using a
Picture quiz
-Symptomatic therapy for hepatic jaundice
-Deepening of the clinical procedure for a hepatic
Icterus based on case studies of liver diseases in the
Cat

Learning objective / basis for:
Targeted identification of the form of icterus in the icteric small animal patient and clinical management of a feline patient with hepatic and/or post-hepatic icterus.

Lecturer:
R. Mischke (instead of R. Mischke)

10. SW: Leading symptom epilepsy (1 hour)

We will use a case study to familiarise you with the topic of epilepsy and its treatment.
Follow the process so that you learn as much as possible :-). I won't read your comments, but please take the chance to express in your own words what you already know and what you still want to learn.
If you have any questions, please ask them in the discussion forum!

Learning objective / basis for:
After the course, students should be able to
systematically work up a patient with epileptic seizures (even without MRI) and initiate treatment.
Understand the clinical factors that help to determine the prognosis and the choice of diagnostic pathway.

Experiments / demonstrations:
Image and video material

Lecturer:
H. Volk

13. SW: Antibiotics/Infusion Medicine (1 hour)

In the first part of the lecture, the possibilities, limits and risks of antibiotic therapy are presented. New aspects and principles of antibiotic use are discussed, particularly with regard to the formation of multi-resistant bacterial strains. Particular attention is paid to the avoidance of reserve antibiotics as first line therapeutics. Local treatment options and optimisation of hygiene management to prevent nosocomial infections will be addressed.
The first part of infusion therapy deals with the theoretical basics, which are very important for the understanding and subsequent management of cases.
In the second part of the Infusion Therapy lecture, the various infusion solutions and their basic indications are presented.

Learning objective / basis for:
Learning objectives Antibiotics
-When to use antibiotics including systemic versus topical treatment
-Pharmacology antibiotics incl. time versus concentration-dependent
-4-quadrant approach
-Mutant prevention concentration
-Alternative modalities for the treatment of bacterial infections
With the lecture "Infusion Management" and the reading material provided, students should be able to create an infusion management plan:
Which solution?
How much?
Over what period of time?

Experiments / Demonstrations:
Images, tables

Lecturer:
A. Volk/Neudeck/Tünsmeyer

14. SW: Emergencies (1 hour)

This lecture will use case studies to demonstrate how to deal with emergency patients/emergency situations. Recognising and appropriately assessing emergencies in the form of triage is a large part of the lecture and is illustrated using various examples.

Learning objective / basis for:
After the course, students should be able to
1.to be able to define an emergency
2.correctly assess an emergency situation
3.perform a triage
4.correctly collect and interpret clinical parameters

Experiments / Demonstrations:
Image material

Lecturer:
Neudeck

15. SW: Intracranial diseases (1 hour)

Localisation and clinical symptoms of intracranial diseases; presentation of selected common diseases of the brain Discussion using case examples for better demonstration: infarction, inflammatory diseases, craniocerebral trauma, anomalies such as hydrocephalus, tumours. The content can be prepared and followed up in a Moodle course.

Learning objective / basis for:
In this lecture, students learn a building block of clinical neurology: Basic understanding of the localisation of a disease in the brain, basic understanding of clarification (special examination methods including imaging procedures), knowledge of selected brain diseases and their therapeutic procedures.

Experiments / Demonstrations:
Case demonstrations/video examples

Lecturer:
Tipold

16. SW: Vestibular syndrome (1 hour)

The symptoms of a disease of the vestibular apparatus are discussed on the basis of case studies and the clarification/therapy of selected diseases is discussed. The significance of deafness in small animals is explained. The content can be prepared and followed up in a Moodle course.

Learning objective / basis for:
Students learn to recognise a vestibular syndrome and to differentiate between a peripheral and a central syndrome. After the lecture, they will have a basic understanding of the localisation of a disease in the vestibular apparatus, a basic understanding of clarification (special examination methods including imaging procedures), knowledge of selected diseases and their therapeutic procedures

Experiments / Demonstrations:
Case study/video demonstrations

Lecturer:
Tipold

Clinic for pets, reptiles and birds

0331 Clinical training on patients (quota pets, reptiles)

Pees, Reuschel, Krull, Dierig, Hetterich

Reptiles: General clinical examination and further examinations of reptiles Pets: Diseases of pets and their diagnosis and treatment (6 hours)

Reptiles:
Basics and strategies for anamnestic and clinical examination as well as clinical evaluation of findings of different reptile species. Focal points: Skeletal system, skin and subcutaneous tissue including carapace
Pets:

Discussion of clinical cases and common diseases in pets and reptiles, taking into account the clinic, diagnostics, therapy and prophylaxis

Learning objective / basis for:
Reptiles:
Presentation of general and special anamneses with reference to the symptoms and husbandry conditions. The basics of the constitutive stages of a clinical examination of reptiles:
Differences in performance between the various reptile species. Protective measures for vets and patients when capturing, restraining and examining. Possibilities of further examinations and their clinical evaluation, presentation of possibilities and limitations of new diagnostic methods.
Pets:
Physiology and pathophysiology of the individual organ systems, medical and surgical treatment of various diseases, taking into account species-specific characteristics

Experiments / Demonstrations:
Supplemented by clinical case demonstrations (interactive)

Co-operation / consultation with:
Clinic for pets, reptiles, ornamental and wild birds

Lecturer:
see above.

Clinic for cattle

0341 Clinical training on patients (physiology and pathology of reproduction, clinical demonstrations)

Hoedemaker, Bajcsy, Schmicke, Gundling, Heppelmann and research assistants

2. SW: Anaesthesia as a herd problem (2 hrs.)

Demonstration of cows with anaphrodisia

Learning objective / basis for:
Teaching of examination methods, diagnosis, therapy concept, differential diagnosis and prognosis

Experiments / Demonstrations:
Demonstration of clinical cases incl. external quotas in small groups

Co-operation / consultation with:

Lecturer:
Fieldman

Remarks:
2 external quotas (cow from the gynaecological area and fixed cow)

2ND SW: Udder oedema, teat skin necrosis, intertrigo, upper stenosis (2 hours)

Demonstration of a cow with udder oedema, teat skin necrosis, intertrigo, upper stenosis

Learning objective / basis for:
Teaching of examination methods, diagnosis, therapy concept, differential diagnosis and prognosis for the above-mentioned diseases

Experiments / demonstrations:
Demonstration of clinical cases incl. external quotas in small groups

Co-operation / consultation with:

Lecturer:
Heppelmann

Remarks:
2 external quotas on the calf (inject. s.c. and appl. p. os)

2. SW: Metritis / Endometritis (2 hours)

Demonstration of a cow with metritis and a cow with endometritis

Learning objective / basis for:
Learning about the diagnosis, differential diagnosis and prognostic assessment of inflammatory uterine diseases in the puerperium

Experiments / Demonstrations:
Demonstration of clinical cases incl. external quotas in small groups

Co-operation / consultation with:

Lecturer:
Hoedemaker

Remarks:
2 external quotas (treatment of immobilised animal and medication of Proc.pen. and Prop. Glyc. and uterine care)

6. SW: Castration bull (2 hours)

Demonstration of the bloody castration of a bull

Learning objective / basis for:
Teaching the indication, pain management, performance and aftercare of various castration methods

Experiments / Demonstrations:
Demonstration incl. external quotas in small groups

Co-operation / consultation with:

Lecturer:
Heppelmann

Remarks:
2 external quotas on the subject of intertrigo, uterine care, drenches

6 SW: Intertrigo, inter-leg eczema, M. cat. ac./chron., endometritis/metritis/cervicitis (2 hrs.)

Demonstration of a cow with the above-mentioned diseases

Learning objective / basis for:
Teaching of examination methods, diagnosis, therapy concept, differential diagnoses and prognoses

Experiments / demonstrations:
Demonstration incl. external quota in small groups

Co-operation / consultation with:

Lecturer:
Hoedemaker

Remarks:
1 external quota on the subject of Drenchen, sc. appl., LMV

6 SW: Cycle response/pregnancy II, hormone treatments (2 hours)

Demonstration of several cows from the field of gynaecology

Learning objective / basis for:
Imparting basic knowledge to enable examination, diagnosis and treatment

Experiments / demonstrations:
Demonstration incl. external quotas in small groups

Co-operation / consultation with:

Lecturer:
Fieldman

Remarks:
2 external quotas on the subject of Drenchen, LMV li, sc. appl.

12TH SW: Undisturbed puerperium, endometritis grade II (2 hours)

Puerperal diseases in the first 4 weeks after calving (uterus)

Learning objective / basis for:
Students should familiarise themselves with the clinical examination procedure for diagnosing metritis or endometritis

Experiments / demonstrations:
Rectal and vaginal examination of 2 cows in puerperium (incl. ultrasound and endoscopy)

Co-operation / consultation with:

Lecturer:
Fieldman

Remarks:
2 external quotas (calf: fracture, s.c. injection, drug administration per os)

12. SW: Ovarian cysts, cycle determination (2 hours)

Cycle determination, aetiology, diagnostics, therapy Ovarian cysts

Learning objective / basis for:
Cycle determination, aetiology, diagnostics, therapy Ovarian cysts

Experiments / demonstrations:
- Clinical examination of the genital apparatus
- Sonography of the genital apparatus

Co-operation / consultation with:

Lecturer:
Heppelmann

Remarks:
2 External quotas:

- Calf: fracture, s.c. injection
- Cow: drenches, i.m. injection, new wound dressing

12. SW: Udder diseases (2 hours)

- Diagnosis/differential diagnosis of supernumerary teats in patients with teats with their own parenchyma, treatment options
- Diagnosis, therapy, prognosis for phlegmonous disease

Learning objective / basis for:
Learning the examination techniques for supernumerary teats and mastitis as well as the therapeutic procedures

Experiments / Demonstrations:
Demonstration on two patient animals

Co-operation / consultation with:

Lecturer:
Hoedemaker

Remarks:
2 External quotas:
- Calf: fracture, s.c. injection, drug administration per os
- Immobilised cow, care, intensive care patient

Clinic for cattle

0343 Lectures and exercises in obstetrics and gynaecology of cattle

Hoedemaker, Bajcsy, Gundling, Herzog, Heppelmann and research assistants

Obstetrics and gynaecology of cattle (12 hours)

Caesarean section, uterine torsion, positional anomalies, postural anomalies, extraction of a calf, gynaecological examination and insemination

Learning objective / basis for:
Basic knowledge of the procedure for a caesarean section, basic knowledge of the diagnosis and treatment of a torsio uteri,
Teaching theoretical and practical knowledge of positional and postural anomalies and how to perform an extraction, teaching practical skills in gynaecological examination and semen insertion

Experiments / Demonstrations:
- Lecture and demonstration on animals on caesarean section, torsio uteri, positional and postural anomalies, extraction
- Lessons in small groups on gynaecological examination, insemination, positional, postural anomalies and extraction

Lecturer:
Hoedemaker, Herzog, Heppelmann and employees

Clinic for cattle

0346 Udder diseases

Hoedemaker

Udder and mammary diseases (14 hours)

Diagnosis, therapy, prophylaxis of mastitis in cattle at individual animal and herd level, udder and mammary inflammation in sheep, goats, pigs, horses and dogs/cats, functional disorders of the udder

Learning objective / basis for:
Basic knowledge of the diagnosis and treatment of clinical mastitis, importance of mastitis as a herd problem including herd diagnostics and rehabilitation of problem farms in cattle, basic knowledge of udder and mammary diseases in other domestic mammals, knowledge of diagnostics and treatment of functional disorders of the udder

Lecturer:
Hoedemaker

Clinic for cattle

0347 Exits as part of integrated veterinary herd management - cattle (ITB cattle)

Hoedemaker, Gundling, Debertolis, Jensen, Kallmeyer

Integrated veterinary herd management (2 hours)

Practical instruction on the use of examination tools in the context of veterinary herd management in the areas of herd fertility, udder health, claw health, feeding, husbandry, etc.

Learning objective / basis for:
Learning practical skills in gynaecological examination (rectal, vaginal), udder examination, assessment of lameness and body condition scoring, evaluation of MLP data and feed rations, assessment of husbandry systems

Experiments / Demonstrations:
Practical exercise on dairy farms

Lecturer:
Hoedemaker, Feldmann, Debertolis, Gundelach, Hartmann

Remarks:
The number of hours refers to the usual creditable hours per student as a compulsory elective subject.

Clinic for cattle

0361 Clinical training on patients: Buiatrics (clinical referrals)

Heppelmann, Schmicke, Gaude, Küskens, Proios, Wegerich

1. SW: Calf diarrhoea incl. laboratory and colostrum, diarrhoeal diseases of growing and adult cattle (2 hours)

Diarrhoea in calves, symptoms, findings, pathogens and their prophylaxis

Learning objective / basis for:
Diagnosis and treatment of diarrhoea-related diseases in calves; prevention and control mechanisms

Experiments / Demonstrations:
Clinical examination; discussion of preliminary reports on case examples and the veterinary information and facts to be derived from them; preparation of to-do lists for the on-site procedure

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
2 external quotas in small groups (uterine care, birth monitoring, eye ointment)

1. SW: LEAL Complex/How does the lab help? (2 hrs)

Diseases during the transition cow phase; especially LEAL complex = abomasal disease, endometritis, acetonuria and liver diseases. Occurrence of diseases and use of laboratory diagnostics in preventive detection

Learning objective / basis for:
Recognising the disease complex and using problem-oriented laboratory tests for individual animal and herd problems

Experiments / demonstrations:
Clinical demonstration on a patient and case studies

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
2 external quotas in small groups (calf i.m., s.c., IBR, drench)

1ST SW: Radial paralysis and fracture signs, cervical phlegmon, clostridiosis, gangrene (2 hours)

Nerve paralysis / development of phlegmons on the neck and their treatment

Learning objective / basis for:
Practical recognition of nerve palsies / assessment of phlegmons from an aetiological and therapeutic point of view

Experiments / Demonstrations:
Patient with nerve paralysis / patient with neck phlegmon

Co-operation / consultation with:

Lecturer:
Kehler

Remarks:
2 external quotas (calf s.c., diarrhoea, bronchopneumonia)

3RD SW: Bronchopneumonia (2 hours)

Respiratory examination, blood gas analysis, pathogen detection (nasal swab, tracheal lavage sample), therapy concepts, prevention concepts

Learning objective / basis for:
Recognition, determination of severity, therapy and prevention or diseases

Experiments / Demonstrations:
Presentation of patients

Co-operation / consultation with:

Lecturer:
Roe deer

Remarks:
2 external quotas in small groups (uterine care, prop. glyc., intertrigo)

3RD SW: Sonography and laboratory, generalised peritonitis due to reticoloperitonitis, ultrasound + abdominocentesis (2 hours)

Aetiology and pathogenesis of peritonitis in cattle, clinic + sonography of the abdomen, laboratory diagnostic information

Learning objective / basis for:
Recognising peritonitic conditions, clarifying causes, making a prognosis

Experiments / demonstrations:
Ultrasound examination of a cow with generalised peritonitis

Co-operation / consultation with:

Lecturer:
Ifing

Remarks:
2 external quotas (fixed cow, s.c. injections, calf infusion, calf cocktail)

3. SW: Chronic inflammatory diseases of cattle (2 hours)

Aetiology/pathophysiology/clinical/laboratory diagnostics of chronic inflammatory processes in cattle

Learning objective / basis for:
Clinical examination and interpretation of laboratory diagnostic findings in cattle with chronic inflammatory processes

Experiments / Demonstrations:
Demonstration of the clinical examination

Co-operation / consultation with:

Lecturer:
Grünberg

Remarks:
2 external quotas (uterine care, oral AM application, immobilised animal, AM application eye)

5 SW: Spastic paresis I, asphyxia calf (2 hours)

- Aetiology and clinic of spastic paresis
- Neonatal asphyxia in calves

Learning objective / basis for:
Knowledge of the clinic of spastic paresis and the aetiology/pathophysiology/diagnosis/therapy of various forms of asphyxia in calves

Experiments / demonstrations:
Demonstration of the clinical examination of an animal with spastic paresis and a calf with neonatal asphyxia

Co-operation / consultation with:

Lecturer:
Grünberg

Remarks:
1 external quota (milk sampling, medication application)

5. SW: Spastic paresis II, surgery, complications (2 hours)

- Hereditary diseases
- Function of nerves
- Surgical techniques

Learning objective / basis for:
Specifically: Examination and treatment of spastic paresis /
General: Procedure in diagnostics, prognosis, assessment of cost-effectiveness and evaluation of therapy

Experiments / Demonstrations:
Demonstration of the hereditary disease with subsequent therapy including a detailed demonstration of the surgical technique

Co-operation / consultation with:

Lecturer:
Kehler

Remarks:
2 external quotas (AM application, calf examination, rumen juice collection, oral administration to the calf)

5. SW: Bronchopneumonia (2 hours)

Respiratory examination, blood gas analysis, pathogen detection (nasal swab, tracheal lavage sample), therapy concepts, prevention concepts

Learning objective / basis for:
Recognition, determination of severity, therapy and prevention or diseases

Experiments / Demonstrations:
Presentation of patients

Co-operation / consultation with:

Lecturer:
Roe deer

Remarks:
2 external quotas (AM application, rectal examination, calf examination)

7. SW: Omphalitis, in particular omphalourachitis and omphalo-phlebitis, sonography, surgery (incl. the "marsupialisation of the umbilical vein" method) (2 hours)

Umbilical diseases in the calf, classification, aetiology, pathogenesis

Learning objective / basis for:
Recognising different forms of umbilical disease in calves and a strategic approach to treatment

Experiments / Demonstrations:
2 calf examinations with sonography demonstrated

Co-operation / consultation with:

Lecturer:
Ifing

Remarks:
2 external quotas (AM application, calf examination, uterine care, rectal examination)

7. SW: Calf diarrhoea incl. laboratory and colostrum, diarrhoeal diseases of growing and adult cattle (2 hours)

Diarrhoea in calves, symptoms, findings, pathogens and their prophylaxis

Learning objective / basis for:
Diagnosis and treatment of diarrhoea-related diseases in calves; prevention and control mechanisms

Experiments / Demonstrations:
Clinical examination; discussion of preliminary reports using case studies and the veterinary information and facts to be derived from them; preparation of to-do lists for the on-site procedure

Co-operation / consultation with:

Lecturer:
Höltershinken

Remarks:
2 external quotas in small groups (cow s.c., uterine supply, p. os, i. m.)

7. SW: Cardiology (2 hours)

Congenital heart disease of the calf

Learning objective / basis for:
Diagnostics and pathophysiology of congenital heart defects

Experiments / Demonstrations:
Clinical examination of a calf with a congenital heart defect

Co-operation / consultation with:

Lecturer:
Grünberg

Remarks:
2 external quotas (calf treatment diarrhoea, uterine care, AM application))

10. SW: Calf diarrhoea incl. laboratory and colostrum (2 hours)

Clinical examination, pathogen detection, acid-base balance, dehydration, colostrum supply, hygiene, therapy concepts

Learning objective / basis for:
Diagnosis and treatment of diarrhoea-related diseases in calves; prevention and control mechanisms

Experiments / Demonstrations:
Presentation of patients

Co-operation / consultation with:

Lecturer:
Deer

Remarks:
2 external quotas in small groups (uterine care, i.m. injection)

10. SW: Interclavicular abscess / Retrobulbar abscess with bone involvement (2 hours)

Claw disease / assessment of circumferential growth at specific localisations

Learning objective / basis for:
- Diagnosis and treatment of claw diseases
- Aims of therapeutic procedures for circumferential augmentation and the eye

Experiments / Demonstrations:
- R 1178/14 Abscess in the interclavicular cleft
- R 1180/14 Retrobulbar abscess

Co-operation / consultation with:

Lecturer:
Wenning/Kehler

10. SW: Omphalophlebitis and polyarthritis / general arthritis (2 hours)

Diagnosis and treatment of diseases of the navel and mono-arthritis in cattle

Learning objective / basis for:
Learning the diagnostic steps and therapeutic procedure for umbilical diseases and joint diseases

Experiments / Demonstrations:
a calf with omphalophlebitis and purulent polyarthritis, ultrasound of the umbilicus and knee joint puncture

Co-operation / consultation with:

Lecturer:
Ifing

Remarks:
2 external quotas in small groups (uterine care, drainage removal, drenching)

13. SW: Bronchopneumonia (also following ND) and adult cattle incl. blood gases (2 hours)

Pneumonia in calves, young cattle, symptoms, findings, pathogens and their prophylaxis

Learning objective / basis for:
Clinical examination; discussion of preliminary reports using case studies and the veterinary information and facts to be derived from them; preparation of to-do lists for the on-site procedure

Experiments / Demonstrations:
Patient 0056/15

Co-operation / consultation with:

Lecturer:
Höltershinken

13. SW: Metabolic disorders and laboratory diagnostics in LMV (2 hours)

Clinical examination and interpretation of findings in cows with LMV

Learning objective / basis for:
Understanding the pathophysiological background and metabolic imbalances in LMV

Co-operation / consultation with:

Lecturer:
Grünberg

13. SW: Kümmerer; Diagnosis chron. Diseases; nerve paralyses; umbilical surgery (2 hrs.)

- Chronic diseases
- Nerve paralyses
- OP procedure

Learning objective / basis for:
- Differentiation chron. diseases
- Recognising and treating nerve paralysis
- Analyse surgical procedures

Experiments / Demonstrations:
- Patient after navel surgery
- Patient: Carer
- Patient with nerve paralysis

Co-operation / consultation with:

Lecturer:
Kehler

Remarks:
Drenchen, s. c. application, birth monitoring, calf after fracture treatment

Clinic for cattle

0362 Bovine diseases II

Gaude, Heppelmann, Küskens, Proios, Schmicke, Wegerich

1. SW: Infectious diseases of the digestive tract of cattle (9 hours)

Stomatitis, necrobacillosis, actinobacillosis, actinomycosis, rinderpest, blue tongue, BKF, FMD, BVD, neonatal diarrhoea, NaCL poisoning, para-TB, clostridiosis, salmonellosis, coccidiosis, gastrointestinal parasitoses, fasciolosis, poisoning: Autumn crocus, rape, ricin, copper

Learning objective / basis for:
Recognition, differential diagnosis, treatment and prevention of the above diseases

Experiments / Demonstrations:
Lecture, presentation

Co-operation / consultation with:

Lecturer:
, Grünberg, Höltershinken, Kehler

10. SW: CNS diseases (5 hours)

Botulism, listeriosis, brain base abscess, BSE, meningoencephalitis, Aujeszky's disease, rabies, Pb poisoning, ISTMEM, tetanus, CCN

Learning objective / basis for:
Recognition, differential diagnosis, treatment, including surgical interventions, prevention of the above diseases

Experiments / demonstrations:
Lecture, presentation

Co-operation / consultation with:

Lecturer:
, Grünberg, Höltershinken, Kehler

Clinic for Cattle; Reproductive Medicine Unit of the clinics

0382 Clinical training on patients - Repro

Bajcsy, Goericke-Pesch, Körber, Luther, Oldenhof, Sieme, Tönißen, Waberski

2. SW: Physiology and Pathology of Reproduction (12 hours)

During this interactive course, students are trained to take responsibility for their own veterinary actions using the example of a specific patient and develop maxims for action in the following areas:
Preliminary examination of female animals (horses, cattle, dogs, pigs) prior to semen collection and special clinical questions from the gynaecology and obstetrics of horses, cattle, dogs and pigs.
Andrological examination (examination of the health and sexual fitness for breeding of sires - cattle, horses, small ruminants, dogs, pigs).

Learning objective / basis for:
Learning special examination and treatment techniques in the context of gynaecology and andrology as well as semen transfer and embryo transfer in the various domestic animal species.

Experiments / demonstrations:
Practical exercises on animals in small groups. A total of three quota rounds: (1) 2nd and 4th SW, 2) 6th and 8th SW, 3) 10th and 13th SW. Each quota round includes 6 central events, so-called main quotas, and 6-8 secondary quotas.

Lecturer:
Bajcsy, Goericke-Pesch, Köhne, Körber, Luther, Oldenhof, Sieme, Tönißen, Waberski

Reproductive medicine unit of the clinics

0384 Reproductive medicine seminar

Goericke-Pesch, Sieme, Waberski

2. SW: Physiology and Pathology of Reproduction (14 hours)

Students are given the opportunity to find out about the issues, methods and results of current research projects. In addition, guest lectures by nationally and internationally renowned researchers will present "focal points" of reproductive research

Learning objective / basis for:
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Lecturer:
External and internal lecturers

Institute of Microbiology; Institute of Parasitology

0664 Elective internship in infectious medicine (parasitology)

Strube and research assistants

1. SW: Current research in microbiology (240 hours)

Collaboration in ongoing research projects of the Institute of Microbiology

Learning objective / basis for:
Introduction to laboratory methods of molecular and cellular microbiology and experimental approaches to research questions

Experiments / demonstrations:
Laboratory methods

Lecturer:
Goethe, Meens, Rohde, Schaaf

1. SW: Current topics in basic parasitological research and diagnostics (0 hrs.)

Collaboration in the context of ongoing projects or in parasitological diagnostics

Learning objective / basis for:
Familiarisation with and application of various techniques of molecular, applied and diagnostic parasitology

Experiments / Demonstrations:
variable

Co-operation / agreement with:
project-dependent

Lecturer:
Strube, Raulf, Springer

Courses for the 8th semester

Institute of Pathology

0583 Pathological-anatomical referrals

Beineke, Wohlsein, Puff, Gerhauser, Leitzen, Stoff, Hülskötter

1. SW: Pathological-anatomical referrals (26 hours)

The aim of this practice-orientated course is to impart basic knowledge from the assessment of findings to the formulation of a pathological-anatomical diagnosis. This is to be achieved through an in-depth presentation of classic and unusual organ changes based on case studies and by working in small groups. The focus here is on critical discussion of the findings and formulation of a diagnosis from a morphological and aetiological differential diagnostic point of view.
In one part of the course, students are required to present independently prepared cases, focussing on the description of findings, formulation of the pathological-anatomical diagnosis and epicritical interpretation of findings. Lecturers from the institute are available for this part of the course during the preparation period.
In the second part of the course, which partly takes place in parallel, students will work together with an assistant in a group of approx. 7 participants on a selected spectrum of several organs with the aim of making pathological-anatomical diagnoses and differential diagnoses and, on the basis of the available findings, to show pathogenetic and aetiological aspects of the described alteration in more detail.

Learning objective / basis for:
Description of pathological changes, formulation of pathological-anatomical diagnoses and epicritical assessment of the diagnoses with special consideration of pathological-anatomical and aetiological differential diagnoses

Experiments / demonstrations:
Organ demonstration, partly small group lessons.

Lecturer:
see above;

Institute of Biometry, Epidemiology and Information Processing; Institute of Microbiology; Institute of Virology

0603 Animal disease control

Bächlein, Becher, Brüning, Campe, Gerdes, Goethe, Kreienbrock, Kunzmann, Postel, Runge, Valentin-Weigand, Volz, Werckenthin

1. SW: Animal disease control and infection epidemiology (42 hours)

General and special animal disease control, e.g. avian influenza and Newcastle disease, livestock traffic regulations, pig hygiene regulations, rendering law, compensation regulations and animal disease fund, rabies, epidemiology (risk measures), import/export, TRACE, animal pathogen regulations, animal vaccine regulations, EU animal health law (AHL, accompanying EU regulations and directives), etc.

Learning objective / basis for:
The material covered is the basis for the examination in the subject "Animal Disease Control and Infection Epidemiology".

Co-operation / consultation with:
The course is coordinated within the facilities of the Centre for Infection Medicine.

Lecturer:
The lecturers for the specific course content are listed.

Clinic for poultry

0653 Veterinary strategies for herd and individual animal diseases

Bexter, Dobner, Jung, Leger, Lindenwald, Pees, Rautenschlein

1. SW: Diagnostic strategies including pathological-anatomical examination and therapeutic strategies as well as clinical case studies from poultry, ornamental, zoo and wild bird medicine (4 hours)

Examples of diseases in poultry, ornamental, zoo and wild birds are presented. The focus is on clinical symptoms and pathological-anatomical as well as laboratory diagnostic aspects and therapeutic strategies, which are discussed or developed in direct exchange with the students. Current diseases will be dealt with specifically and presented in an international context (e.g. avian influenza, infectious bronchitis).

Learning objective / basis for:
The aim is to sensitise students to the non-specific clinic and the importance of the further diagnostics derived from it, including dissection in poultry and birds. The different approaches to individual animal and population-based veterinary medicine should be worked out and understood by the end of the course.

Experiments / Demonstrations:
Section exercises, sample cases and group discussion

Co-operation / consultation with:
Clinic for pets, reptiles and birds

Lecturer:
see above.

Institute for Food Quality and Safety

0721 Food microbiology and food science

Plötz, Jeßberger, Große-Peclum, Vahle, Abdulmawjood, Krischek

1. SW: Food hygiene (14 hours)

Bacterial and viral foodborne pathogens; food intoxication pathogens; focal points: Spore formers, Campylobacter, Salmonella, Listeria, Staphylococcus, E. coli; antibiotic resistance; starter cultures/probiotics, spoilage organisms; methods of food microbiology (quantitative and qualitative detection, molecular biology, rapid methods); product knowledge/technology; parasites/protozoa in food; nosocomial pathogens; other biological hazards emanating from food (e.g. in fish, prions)

Learning objective / basis for:
Students are familiar with parasitic, bacterial and viral food infection and food intoxication pathogens.
They know their characteristics, their significance for consumer health protection, the importance of food for their transmission routes and as vectors as well as possible control strategies for these pathogens.
They can explain the basics of product knowledge and technologies of food of animal origin.

They are familiar with parasites that can be transmitted to humans through the consumption of food and know the typical characteristics of infected animals in a living or slaughtered state.
They know the chemical principles and causes of food spoilage.
They know the mechanisms underlying antibiotic resistance in bacteria and are familiar with scenarios that promote the development of resistance.
They know the benefits and function of starter cultures in food and potential areas of application.

Experiments / Demonstrations:
Processing of pathogen-related questionnaires (literature will be provided) by students before the course and discussion in lecture

Lecturer:
Research assistants (see above)

Institute for Food Quality and Safety

0723 Course section "Analysis of food of animal origin"

Plötz, Seeger, Siekmann, Haiber, Kreitlow, Abdulmawjood, Krischek

2. SW: Practical exercises in food toxicology (4 hours)

Basics of risk assessment;
NOEL-ADI/DTA-MRL procedure;
Detection of mutagenic substances with the Ames test;
Enzyme activity test;
Use of trace analysis methods;
Focus: chromatographic processes
Carrying out gel chromatography and extraction using C-18 columns

Learning objective / basis for:
Students should gain practical experience in toxicological and residue analysis procedures.

Experiments / Demonstrations:
Ames test, enzyme activity test, chromatographic methods

Lecturer:
Seeger, Kühne, Jeßberger

Institute for Food Quality and Safety

0745 Production, treatment, processing, analysis and evaluation of milk and milk products

Plötz, Jeßberger, Kain, Vahle, Kreitlow

1. SW: Milk hygiene (28 hours)

Practical exercises on analysing milk and milk products (chemistry, microbiology, sensory analysis) and on milk extraction, production and production; introduction to milking technology with a view to evaluating its role in udder health

Learning objective / basis for:
Knowledge of technological processes and process hygiene, knowledge of the practical examination of milk and milk products as well as the evaluation of milking technology

Experiments / Demonstrations:
Demonstration of technological processes; analysis of milk and dairy products

Lecturer:
Ahlfeld, Grabowski, Mengden, Becker

Institute for Food Quality and Safety; Clinic for Small Cloven-hoofed Animals and Forensic Medicine and Outpatient Clinic; Clinic for Cattle

0750 Cross-sectional teaching

Plötz, Hoedemaker, Hennig-Pauka, Seeger, Siekmann, Sudhaus-Jörn, Jeßberger, Kain, Scheunemann, Schulenburg, Nowak, Reich, Kühne, Visscher, Krischek

1. SW: Meat hygiene, food technology, food hygiene, food science (31 hours)

Fundamentals of food risk assessment
Cutting of carcasses
Technology of raw sausage, cooked sausage and boiled sausage production as well as raw cured products, minced meat, cooked ham, canned food
Slaughter by-products and their use in the industry
Modern methods of molecular biological diagnostics of LM
Food packaging, legal issues, risks, problems
Veterinary ante-mortem inspection

Learning objective / basis for:
Students can explain the basic concept of "risk assessment of food".
You will be able to name the cuts of a carcass after rough cutting and know their value for the food industry.
They know the production technology of food of animal origin.
They can describe the definition of slaughter by-products and know the possibilities of their utilisation.
They are familiar with modern methods of molecular biological diagnostics that are used in food testing.
They can describe the individual work steps in the production of food of animal origin and recognise specific risks associated with errors in production.
They know the common types of food packaging and can name legal references to this topic.
Students know the definition of functional foods and can explain their significance for society and consumers and their health and name the appropriate legal background for their market launch and declaration.
Students know the core elements of the practical implementation of an ante-mortem inspection and know the reasons for a "postponement of slaughter", for a "slaughter ban" and for "slaughter under conditions".

Experiments / Demonstrations:
Demonstration of the cutting of carcasses
Demonstration of foods of animal origin Demonstration of the production of foods of animal origin
Demonstration of ante-mortem inspection with hospitalised animals

Co-operation / consultation with:
Clinic for small cloven-hoofed animals
Institute for Food Toxicology

Lecturer:
Greiner, Wendt, Popp, Sudhaus, Reich, Boulaaba, Scheunemann, Mäde, Empl, Krischek

9. SW: Milk hygiene, food technology of dairy products part I, edible insects, milk in human nutrition (20 hours)

Udder health in herd management and how it can be assessed with the help of data collected via the milk yield test and additional samples;
Milk market, cheese production (rennet cheese, whey cheese), product knowledge (standard cheeses);
Introduction to entomophagy, product knowledge, current legal framework, quality, microbiological evaluation;
Composition and quality of breast milk and milk-based infant formula, hygiene requirements for breast milk banks
Risks of milk consumption by humans (lactose maldigestion, whey protein allergy, calcium deficiency), pre-, pro- and symbiotics

Learning objective / basis for:
Students know methods for the efficient use of modern performance data to evaluate, control and improve the udder health of dairy herds.
They know the production steps for the different types of cheese and products made from cheese.
They know the risks involved in the production and preparation of milk-based infant formula.
They know the opportunities and challenges of the upcoming introduction of edible insects on the EU market.
They can name and assess the consumer risks associated with milk consumption.
They know the mechanisms of action of pre-, pro- and symbiotics and their limitations.

Experiments / Demonstrations:
Presentation of case studies
Tasting of standard cheeses
Demonstration of species and guided species recognition

Co-operation / consultation with:
Prof Volker Krömker, Ahlem University of Applied Sciences, Harry Fritsch, Milchland, Prof Jonigk, MHH

Lecturer:
Ahlfeld, Grabowski, Becker, Krömker, Fritsch, Jonigk, Bonaparte

14. SW: Food technology of dairy products Part II: Excursions (4 hours)

Trips to milk-processing companies (dairy, direct marketers, delicatessen producers)

Learning objective / basis for:
The students know the production processes including implemented HACCP procedures in milk processing companies.

Experiments / Demonstrations:
Guided tours through the companies, tasting if necessary

Co-operation / consultation with:
the companies to be visited

Lecturer:
Ahlfeld, Grabowski, Becker, Lis

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0781 Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics (quota) Clinic for small cloven-hoofed animals (8th semester)

Ganter, Höltig, Hennig-Pauka, von Altrock, Wagener, Bauer

1. SW: Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics (quota) Clinic for small cloven-hoofed animals (12 hours)

Diseases of pigs and small ruminants;
Presentation of sick animals together with students who have previously examined their patient;
Parallel small group lessons: case discussion, examination and treatment of sick animals in the stable

Learning objective / basis for:
Learning of examination procedures and methods, understanding of aetiology, pathogenesis, epidemiology, therapy and prophylaxis of various diseases;
Implementation of treatment measures

Experiments / Demonstrations:
Case demonstrations

Lecturer:
Wendt, Ganter, v. Altrock, Wagener, Bauer, Nicolaisen

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0783 Diseases of small cloven-hoofed animals II (pigs), incl. hoof diseases and reproductive medicine

Höltig, von Altrock

1. SW: Swine diseases (28 hours)

Clinic of notifiable and reportable animal diseases in pigs;
Diseases of the heart, circulation, blood, respiratory tract, stomach, intestines, muscles, musculoskeletal system, skin, CNS;
Intoxications;
Reproductive disorders of sow and boar

Learning objective / basis for:
Overview of all diseases relevant to pigs, their aetiology, pathogenesis, epidemiology, therapy and prophylaxis, taking into account legal requirements

Lecturer:
Hennig-Pauka, von Altrock

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0784 Diseases of small cloven-hoofed animals (sheep, goats) including claw diseases and reproductive medicine

Ganter, Humann-Ziehank, Bauer

1. SW: Sheep and goat diseases (13 hours)

Lecture sheep and goat diseases -- SS 2007
Clinic for small cloven-hoofed animals

Prof Dr M. Ganter
1.reproduction
1.1 Reproduction in sheep19.04.07- 15:00
1.1.1 Sexual and breeding maturity, fertility, reproductive cycle
1.1.2 Seasonality, influencing the cycle, oestrus, breeding operations
1.1.3 Pregnancy diagnosis
1.1.4 Measures to ensure the birth process and lactation
1.1.5 Motherless rearing
1.1.6 Reproductive disorders on the part of the buck
1.2 Gravidity disorders26.04.07- 15:00
1.2.1 Fruit death and abortion
1.2.2 Prolapsus vaginae
1.2.3 Hernia abdominalis, ovarian dropsy
1.2.4 Ketosis, hypocalcaemia, hypomagnesaemia, myopathy03.05.0715:00
1.3 Disruptions to the birth process:10.05.07-15:00
1.3.1. cervical dystocia, torsion and rupture of the uterus, juvenile pelvis, labour weakness
1.3.2 Faulty fHolding, absolutely too large fruit
1.3.3 Laparo-hysterotomy, fetotomy
1.4. disturbance in the puerperium: 24.05.07-15:00
1.4.1 Retentio secundinarum, Metzritis puerperalis
1.4.2 Wound infections
1.4.3 Mastitis
1.5. lambs diseases31.05.07-15:00
1.5.1 Respiratory distress syndrome due to immaturity or delayed birth
1.5.2 Hypoglycaemia and hypothermia
1.5.3 Watery mouth
1.5.4 Diarrhoea, septicaemia in the first week of life
1.5.5 Omphalophlebitis
1.5.6 Entropion and congenital malformations
2. skin diseases07.06.07-15:00
2.1. viral skin diseases (cold sores, foot and mouth disease)
2.2. bacterial skin diseases
2.3. parasitic skin diseases
2.4. alimentary skin diseases
2.5 Photodermatitis
2.6. chronic wound infections (pseudotuberculosis, actinomycosis)
3. diseases of the respiratory tract14.06.07-15:00
3.1. viral (adenopapillomatosis, adenomatosis, Maedi, CAE, PI3, RSV)
3.2. bacterial (pasteurellosis, mycoplasma infections)
3.3. parasitic (nasal rabbits, lungworms)
4. diseases of the blood28.06.07-10 a.m. c.t.
4.1. bacterial and parasitic anaemia
4.2. alimentary anaemia (cachexia, iron and copper deficiency, intoxication)
4.3 Leukoses
5. muscle diseases
5.1. alimentary muscle degeneration (Se and vitamin E deficiency)
6. diseases of the passive musculoskeletal system28.06.07-14:00
6.1. viral (Maedi and CAE)
6.2. bacterial joint inflammations (erysipelas, chlamydia, mycoplasma, etc.)
6.3 Foot rot and other claw diseases
6.4. alimentary bone metabolism disorders (vitamin D, phosphorus deficiency, calcinosis)

6.5 Fractures
7. eye diseases
7.1 Infectious keratoconjunctivitis
8. diseases of the central nervous system28.06.07-14:45
8.1 Scrapie
8.2. viral (Borna, rabies, M. Aujeszky, Visna)
8.3. bacterial (listeriosis, streptococcal meningitis, clostridial infections)
8.4. parasitic (coenurosis)
8.5. alimentary (copper, thiamine deficiency, intoxications)
9. gastrointestinal diseases05.07.07-15:00
9.1. viral (rotavirus infections)
9.2. bacterial (coli, salmonella, clostridial) infections
9.3. parasitic ((coccidia, Strongyloides, MDS, tapeworms)
9.4. alimentary (rumen acidosis and alkalosis)
10. liver diseases12.07.07-15:00
10.1.bacterial (coli, clostridia, necrosis bacteria)
10.2. parasitic (liver fluke)
10.3. alimentary (copper intoxication, cobalt deficiency)
11. diseases of the urinary system
11.1 Dysuria in ewes
11.2 Urolithiasis of bucks
11.3 Renal failure due to shock or toxic nephropathy
12. important acute intoxications (taxus, rhododendron, nitrate etc.)

Learning objective / basis for:
Treated substance is the basis for quotas and exits in sheep and goat flocks

Lecturer:
Prof Dr M. Ganter

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic

0785 Outpatient clinic

Wilhelm, Roth, Farmer

1. SW: Outpatient clinic (5 hours)

Excursions to livestock farms in the veterinary practice area of the outpatient clinic, demonstration and instruction of students in veterinary work on farms;
Routine treatment of common diseases, operations, prophylactic measures

Learning objective / basis for:
Demonstration of veterinary work on the farm;
Comparison of the possibilities of veterinary measures on site and in the clinic;
Independent implementation of treatments under supervision

Experiments / Demonstrations:
Diagnostic examinations, treatments (e.g. injections, infusions, instillations, operations)

Lecturer:
Wilhelm, Rath,Roth, Oberheide (instead of Wilhelm, Rath,Roth, Oberheide)

Branch Office for Epidemiology (Bakum); Clinic for Small Cloven-hoofed Animals and Forensic Medicine and Outpatient Clinic; Clinic for Horses

0786 Forensic veterinary medicine, professional and ethical law

Höltig, von Altrock, Althaus, Hellige, Bartmann, große Beilage, Volk, Riebe

1. SW: Forensic veterinary medicine, professional and ethical law (28 hours)

Civil law issues, structure of jurisdiction, process flow and control; criminal law
Sales law, product liability, legal status of animals, veterinary liability, animal owner liability, service and work contracts;
Federal Veterinary Code, Professional Code, TAppV, Fee Schedule, AM-Preis-VO, Chamber Act for the Medical Professions, Further Training Regulations

Learning objective / basis for:
Teaching the legal principles and requirements in the context of veterinary work

Co-operation / consultation with:
Specialisation in the history of veterinary medicine and domestic animals

Lecturer:
from Altrock, Althaus, Hellige

Clinic for small cloven-hoofed animals and forensic medicine and outpatient clinic; clinic for cattle

0791 Integrated veterinary herd management (ITB)

Hoedemaker, Ganter, Nicolaisen, Hennig-Pauka

2. SW: Integrated veterinary herd management (ITB) for small ruminants (2 hours)

Basics of small ruminant herd management Herd inspections, sanitation, vaccination of small ruminants, parasite management

Learning objective / basis for:
Basic understanding of the meaning and purpose of caring for sheep and goat herds as well as the general procedures, consolidation of basic knowledge using specific examples from the care sector. Legal basics (e.g. AMG, vaccine regulations). Control of "Iceberg" diseases, parasite management with sampling and presentation of Targeted Selective Treatment.

Co-operation / consultation with:
Hoedemaker, Wendt

Lecturer:
Gander

4. SW: Integrated veterinary herd management (ITB) in pigs (4 hours)

The basics of ITB for pig farms,
Legal basis (SchwHaltHygVO, NutztierhaltVO), care contract, herd controls, pig vaccinations/vaccination programmes, control of performance data (sow planner, reproduction events), examples of herd problems

Learning objective / basis for:
Basic understanding of the meaning and purpose of ITB in the pig sector as well as the general procedures, deepening of basic knowledge using specific examples from the care sector

Co-operation / consultation with:
Hoedemaker, Ganter

Lecturer:
Hennig-Pauka, von Altrock

8. SW: Integrated veterinary herd management (6 hours)

Fundamentals of ITB (quality assurance and management, procedure, documentation), ITB in the production areas of reproduction, udder health, young animal rearing, feeding, meat production

Learning objective / basis for:
Basic understanding of the meaning and purpose of ITB as well as the general procedures, deepening of basic knowledge by presenting ITB in the most important control areas of dairy cattle and beef cattle

Co-operation / consultation with:
Nicolaisen, Ganter

Lecturer:
Hoedemaker

Clinic for horses

0801 Clinical training on patients - quota 8th semester

Feige, Sieme, Geburek, Ohnesorge, Bartmann, Venner, Verhaar, employees

1. SW: Internal medicine, orthopaedics and surgery, reproductive medicine (36 hours)

Presentation of horses currently admitted to the clinic with diseases from all areas of equine medicine. Particular attention is paid to hoof diseases, lameness-causing diseases of the limbs with special consideration of tendon and joint diseases, back diseases, foal diseases, diseases of the upper and lower respiratory tract, cardiovascular diseases, diseases of the kidneys and urinary organs, gastrointestinal diseases with special consideration of equine colic, metabolic diseases, skin diseases, neurological diseases, fertility disorders and peripartum diseases, and andrological diseases.

Learning objective / basis for:
Development of diagnosis and therapy of practice-relevant diseases by students under the guidance of lecturers. This is supplemented by a theoretical review of the diagnosed illness.

Experiments / Demonstrations:
1 to 3 patients are presented per event hour

Lecturer:
see above.

Clinic for horses

0805 Equine diseases, internal medicine

Feige, Ohnesorge, Delling, employees

1. SW: Cardiovascular (3 hours)

congenital heart disease:
-Atrial, ventricular septal defect
acquired heart disease:
-Endocarditis
-myocarditis
-Pericarditis

combined with excitation and/or conduction disorders
Examination methods and findings:
-Auscultation: heart murmurs and cardiac arrhythmias (atrial fibrillation, atrial and ventricular extrasystoles, etc.)
-Echocardiography
ECG (resting, exercise, long-term)
-Cardiac catheterisation
Therapy of cardiac diseases:
ACE inhibitors
Diuretics
Digitalis preparations
Antiarrhythmics

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

2. SW: Muscular diseases (1 hour)

Symptoms, aetiology, therapy and prognosis of the most important muscle diseases in horses:
-Equine rhabdomyolysis
-White muscle disease
-Vit. E- /selenium deficiency (alimentary muscle degeneration)
-Postanaesthetic myopathies
-Polysaccharide storage disease
-typical myoglobinuria of grazing horses
-HYPP
Examination methods and detection procedures:
-Biopsy (muscle fibre typing)
-muscle enzyme values
-Load test

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

3. SW: Central nervous system (2 hours)

Neurostatus of the horse, Infectious diseases of the CNS (herpes virus infections, Bornasche disease), Traumatic diseases of the CNS, Cervical vertebral stenotic myelopathy, Degenerative diseases of the CNS (EMND, EDM), Polyneuritis equi, Cauda equina syndrome

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

3. SW: Metabolic diseases (1 hour)

Occurrence and frequency of metabolic diseases in horses, hyperlipaemia syndrome, equine Cushing's syndrome, metabolic syndrome, thyroid diseases

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

4. SW: Skin diseases (2 hours)

Inherited skin diseases, mechanical trauma, decubitus, gangrene, burns, papillomatosis, bacterial skin diseases (Staph. aureus, dermatophilosis), dermatomycosis, immunological skin diseases (urticaria, sweet itch, pemphigus), parasitic skin diseases (gasterophilosis, habronematosis, mange)

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

8. SW: Upper respiratory diseases (3 hours)

Acute and chronic diseases of the lungs and thorax: bronchitis, bronchopneumonia, pneumonia, pleuropneumonia, COB or RAO, EIPH, verminous bronchitis, lung tumours; according to the teaching material accompanying the lecture

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

10. SW: Deep respiratory diseases (3 hours)

Acute and chronic diseases of the lungs and thorax: bronchitis, bronchopneumonia, pneumonia, pleuropneumonia, COB or RAO, EIPH, verminous bronchitis, lung tumours; according to the teaching material accompanying the lecture

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

11. SW: Dental diseases (2 hours)

Anatomy of the horse's teeth and the periodontium; special features of the horse's teeth; change of teeth; essential diseases of young and old horses and their therapy; congenital and acquired dental diseases and their therapy; possibilities of tooth removal and their advantages and disadvantages.

Learning objective / basis for:
Overview of possible diseases in the area of the horse's oral cavity, their pathogenesis and therapy

Lecturer:
see above.

12TH SW: Oesophagus and stomach (1 hour)

Incidence and frequency of diseases of the oesophagus and stomach, various forms of gullet obstruction, oesophageal diverticula and stricture, injuries to the oesophagus. Diagnostic procedures on the horse's stomach, various forms of gastric overload, gastric rupture, gastric ulcers.

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

13. SW: Colic diseases (3 hours)

History taking in colic, pain symptoms in horses with colic, special clinical examination of the gastrointestinal tract in colic, transrectal examination, assessment of essential laboratory findings, taking and assessment of an abdominal puncture, analgesia, oral therapy, fluid therapy, differentiation between conservative and surgical patients, Discussion of individual clinical pictures including spastic colic, meteorism, constipation of the large intestine, displacement of the ascending colon into the spleno-renal space, volvulus coli, small bowel obstruction (hernia inguinalis, hernia foramen omentale, ileum obstruction, lipoma pendulans), paralytic ileus, peritonitis and their treatment

Learning objective / basis for:
Discussion of essential and practice-relevant internal diseases with regard to anamnesis, clinical symptoms, laboratory findings, diagnosis and prognostic assessment.

Lecturer:
see above.

Clinic for small animals

0821 Clinical training on patients incl. internal medicine, surgery, reproductive medicine and X-ray diagnostics Clinic for small animals (quota 8.)

Volk, H., Kästner, Mischke, Tipold, Busse, Siedenburg, Karbe, Nerschbach, Rieder, Volk, A.

1. SW: Problem-orientated learning: Leading symptoms (1 h)

Definition and clinical relevance of symptoms, pathophysiological mechanisms, differential diagnosis based on key symptoms, examination procedure, development of a treatment plan.

Learning objective / basis for:
Problem-orientated approach to small animal patients.

Experiments / Demonstrations:
Image and video material, examination of a patient

Lecturer:
Rieder, Mischke, A. Volk, Karbe, Busse, Kästner, Siedenburg Neßler

1. SW: Internal Medicine: Discussion of current cases (2 hours)

Problem-orientated processing of internal medicine patients who are hospitalised at the clinic at the time of the event. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated approach to small animal patients. with diagnostics, differential diagnoses and a therapeutic plan

Experiments / Demonstrations:
Images, examination of a patient

Lecturer:
Rieder, Mischke, A. Volk, H. Volk

2. SW: Dermatology: Discussion of current cases (2 hours)

Problem-oriented processing of dermatological patients who are hospitalised at the clinic at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and further diagnostics (cytology, pathohistology) and procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated approach to small animal patients in dermatology. Creation of a differential diagnosis list, a diagnosis and therapy plan

Experiments / Demonstrations:
Images, examination of a patient

Lecturer:
A. Volk

2. SW: Ophthalmology: Discussion of current cases (2 hours)

Problem-oriented processing of ophthalmological patients who are admitted to the clinic as inpatients at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a treatment proposal

Learning objective / basis for:
Problem-oriented work-up of ophthalmological patients: Examination technique - localisation of the problem, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / Demonstrations:
Examination of current patients, discussion of findings, laboratory results, demonstration and discussion of imaging procedures (e.g. sonography)

Lecturer:
C. Buses

3. SW: Surgery: Discussion of current cases (2 hours)

Systematic processing of current inpatient surgical patients. Examination of the patients by the students and discussion of the symptoms and the resulting choice of further examination measures, discussion of the results of the general and special clinical and radiological examination and interactive development of the diagnoses and possible differential diagnoses as well as the possible therapeutic procedures, taking into account the prognosis.

Learning objective / basis for:
Problem-oriented processing of surgical patients, learning the examination procedure, recognising the localisation of the disease, developing a diagnosis and its differentiation from similar diseases as well as a treatment plan

Experiments / Demonstrations:
Clinic patients, videos.
Performing the examination on current surgical patients; demonstration and discussion of further imaging examination procedures (X-ray, CT, MRI, arthroscopy if necessary)

Lecturer:
Karbe, Harms, Kramer

3. SW: Anaesthesiology: Discussion of current cases (2 hours)

Problem-oriented work-up of dogs and cats undergoing anaesthesia at the clinic at the time of the event. Pre-anaesthesia examination including interpretation of laboratory results and imaging procedures to assess the risk of anaesthesia and development and discussion of an anaesthesia protocol with the entire group.

Learning objective / basis for:
Problem-oriented work-up of patients who have to undergo anaesthesia for therapeutic or diagnostic purposes: Examination technique - localisation of the problem. Application of ASA classification for risk assessment. Selection of an individually adapted anaesthesia method. Prediction of possible anaesthesia complications
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics). Demonstration of the functioning of anaesthesia machines and monitoring monitors

Experiments / demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics). Demonstration of the functioning of anaesthesia machines and monitoring monitors

Lecturer:
Kästner/Schütter

4. SW: Neurology: Discussion of current cases (4 hours)

Problem-orientated processing of neurological patients who are hospitalised at the clinic at the time of the course. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-orientated work-up of neurological patients: Examination technique - localisation of the problem, 5-finger rule, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics)

Lecturer:
Tipold/Nessler/Volk

4. SW: Oncology: Discussion of current cases (2 hours)

Problem-oriented processing of oncological patients who are hospitalised at the clinic at the time of the event. Presentation and examination of patients by students, discussion of findings, laboratory results and imaging procedures with the entire group, development of a therapy proposal

Learning objective / basis for:
Problem-oriented work-up of oncological patients: Examination technique - localisation of the problem, drawing up a list of differential diagnoses and a diagnosis and treatment plan

Experiments / Demonstrations:
Examination of current patients, discussion of laboratory results, demonstration and discussion of imaging procedures (especially X-ray diagnostics)

Lecturer:
V. Nerschbach

Clinic for small animals

0823 Small Animal Diseases Surgery (8th semester)

Volk H., Harms, Kramer, Busse C., Karbe, Metje

1. SW: Fracture development, forms and therapy I (1 h)

The first part of this lecture focuses on the various functions of osteosynthesis plates. The aim of fracture treatment, primary and secondary bone healing

Learning objective / basis for:
Learning objectives are:
Understanding the different functions of plates
The principle of DCP plates and lag screws

Experiments / Demonstrations:
Image material

Co-operation / consultation with:
no

Lecturer:
Harms

1. SW: Fracture development, forms and therapy II (1 hour)

Complications, dressing techniques, angular stable plate systems

Learning objective / basis for:
Learning objectives:
Recognising and treating complications in fracture healing
Dressing technique: understanding indications, contraindications and complications
Advantages and disadvantages of stable-angle panels

Experiments / Demonstrations:
Image material

Lecturer:
Harms

2. SW: Dyspnoea and cough: surgical diseases of the upper respiratory tract (1 hour)

The most important surgical diseases of the upper respiratory tract (brachycephalic syndrome, laryngeal paralysis, tracheal collapse) are presented and the symptoms, diagnosis (including imaging), differential diagnoses and treatment are illustrated using images and film material.

Learning objective / basis for:
Basic understanding of the recognition and localisation of surgical diseases of the upper respiratory tract, learning special examination methods and teaching the basics of assessing findings from imaging procedures. Gain knowledge of the various treatment options (conservative and surgical).

Experiments / Demonstrations:
Image and film documentation

Lecturer:
Kramer

2. SW: Dyspnoea and cough - surgical diseases of the lower respiratory tract (1 hour)

The most important surgical diseases of the lower respiratory tract (lungs, pleura) are presented and the symptoms, diagnosis (including imaging), differential diagnoses and treatment are illustrated using images and film material.

Learning objective / basis for:
Basic understanding of recognising and localising surgical diseases of the lower respiratory tract, learning special examination methods and teaching the first principles for assessing findings from imaging procedures. Gain knowledge of the various treatment options (conservative and surgical).

Experiments / demonstrations:
Image and film documentation

Lecturer:
Carb

3. SW: Disease of the teeth (1 hour)

The lecture is intended to provide an overview of important and common dental diseases in dogs and cats. In addition, diagnostics and treatment options will be presented.

Learning objective / basis for:
Diagnosis of the most important dental diseases and their treatment

Experiments / Demonstrations:
Image material

Co-operation / consultation with:
no

Lecturer:
B. Metje

3. SW: Acute abdomen part 1 (1 hour)

Symptoms, diagnosis (including imaging), stabilising measures before surgery, surgical procedure, subsequent intensive medical treatment and prognosis of patients with torsio ventriculi or small bowel volvulus are discussed. In addition, the differentiation from other surgical diseases from the symptom complex of acute abdomen is explained.

Learning objective / basis for:
Learning the diagnosis and management of emergency patients, such as torsio ventriculi and small bowel volvulus.
Differential diagnosis of other surgical diseases that lead to an acute abdomen. Initiation of initial stabilising measures and knowledge of surgical procedures and possible complications.

Experiments / demonstrations:
Image material

Lecturer:
Sabine Kramer

4. SW: Acute abdomen part 2 (1 hour)

Symptoms, diagnosis (including imaging), stabilising measures before surgery, surgical procedure, subsequent intensive medical treatment and prognosis of patients with surgical diseases of the spleen, bile duct system and liver are compared. In addition, the differentiation from other surgical diseases from the symptom complex of acute abdomen such as torsio ventriculi or small bowel volvulus is explained.

Learning objective / basis for:
Learning the diagnosis and management of emergency patients, such as spleen torsion, rotation, bile duct obstruction and surgical diseases of the gallbladder and liver.
Differential diagnosis of other surgical diseases that lead to an acute abdomen. Initiation of initial stabilising measures and knowledge of surgical procedures and possible complications.

Experiments / Demonstrations:
Bid material

Lecturer:
Sabine Kramer

4. SW: Vomitus - surgical reasons (1 hour)

The most important surgical diseases of the gastrointestinal tract and vascular malformations of the liver (portosystemic shunt) are presented on the basis of the leading symptom "vomitus" and the symptoms, diagnosis (including imaging), differential diagnoses and treatment are explained using images.

Learning objective / basis for:
Basic understanding of recognising and localising surgical diseases with vomitus as the main symptom, learning special examination methods and teaching the first principles for assessing findings from imaging procedures. Gain knowledge of the various treatment options (conservative and surgical).

Experiments / Demonstrations:
Image material

Lecturer:
Sabine Kramer

5. SW: Regurgitation - surgical reasons (1 hour)

Based on the leading symptom "regurgitation", the most important surgical diseases of the upper digestive tract (pharynx, oesophagus) and the diaphragm are presented and the symptoms, diagnosis (including imaging), differential diagnoses and treatment are explained using images and drawings.

Learning objective / basis for:
Recognising and localising surgical diseases of the upper digestive tract and diaphragm, learning special examination methods and learning the basics of assessing findings from imaging procedures. Gain knowledge of treatment options.

Experiments / Demonstrations:
Image material

Lecturer:
Carb

5. SW: Eye diseases I - The blind animal (1 h)

Visual deficits of various causes will be examined. We will look at how central blindness can be differentiated from ocular blindness. The focus will be on ocular changes in particular.
With the help of a structured eye examination, we will learn to differentiate the differential diagnoses for a blind eye. Some of the presentations are emergencies that need to be recognised immediately to enable the best possible cure or reduce suffering.

Learning objective / basis for:
- be able to name and differentiate between possible causes of blindness
- Being able to identify emergencies
- Understand the purpose of a possible referral to specialists
- Initiate first therapeutic steps

Experiments / demonstrations:
Image material

Lecturer:
C. Buses

6. SW: Eye diseases II - The painful eye (1 hour)

A painful eye can have very different causes, eyelid misalignments, aberrant hair, injuries, foreign bodies on the surface of the eye or in the conjunctival sac are just a few examples. With the help of a structured eye examination, we will shed light on and learn to recognise the differential diagnoses of a painful eye. Some of the presentations are emergencies that need to be recognised immediately to allow the best possible healing or to reduce suffering. We will discuss initial therapeutic measures and draw up a treatment plan.

Learning objective / basis for:
be able to name and recognise possible causes of painful eyes
- Being able to identify emergencies
- Understand the purpose of a possible referral to specialists
- Initiate first therapeutic steps

Experiments / Demonstrations:
Image material

Lecturer:
C. Buses

6. SW: Eye diseases III- The red eye (1 hour)

A red eye can have very different causes. A distinction is made between hyperaemia, pathological vascularisation of the cornea and bleeding at various anatomical locations. We will discuss how to differentiate between these rednesses and what causes need to be considered in each case. Furthermore, diagnostic steps will be discussed to differentiate between different pathologies and thus create the basis for adequate patient care.

Learning objective / basis for:
Classify and localise redness of the eye
- can name the causes of the various reddening of the eye
- Be able to initiate diagnostic steps to differentiate between the causes of redness
- Recognising emergencies that are associated with reddening of the eye

Experiments / Demonstrations:
Image material

Lecturer:
C. Buses

7. SW: Neurological gait abnormalities I (1 hour)

Various gait patterns of dogs are shown. The aim is to differentiate between different neurological gait disorders based on various characteristics.
If you have more time to read, take a look at the article.

Learning objective / basis for:
After the course, students should be able to
to understand which gait disorders are due to which neurological disorders.
identify the main cause of the dog's gait disturbance and apply the five finger rule.
Understand the importance of the clinical examination and relate it to the diagnosis.

Experiments / Demonstrations:
Image and video material

Lecturer:
H. Volk

8. SW: Eye diseases IV - The cloudy eye (1 h)

A cloudy eye can have very different causes. Clouding can affect the cornea, the anterior chamber of the eye, the lens or the vitreous body.
We will look at how different opacities can be distinguished from each other and what the possible causes are. Furthermore, diagnostic steps will be discussed in order to differentiate between different pathologies and thus create the basis for adequate patient care.

Learning objective / basis for:
-localise opacities within the eye
-causes of clouding of the cornea
-be able to differentiate between the causes of corneal opacities and initiate further diagnostic steps

Experiments / Demonstrations:
Image material

Lecturer:
C. Buses

Clinic for small animals

0830 Small Animal Diseases Internal Medicine (8th semester)

Mischke, Busse, Nerschbach, Lietz, Rieder, Sehn

8. SW: Neurological gait abnormalities II (1 hour)

Various gait patterns of dogs are shown. The aim is to differentiate between different neurological gait disorders based on various characteristics.

This lecture builds on the lecture on neurological gait disorders (surgery)

Watch the lecture video, try to characterise the gait disturbances in your own words and answer the quiz.

If you have more time to read, take a look at the articles.

If you still have questions, ask them in the discussion forum

Have fun and stay healthy!

Learning objective / basis for:

After the course, students should be able to

to understand which gait disorders are due to which neurological disorders.

identify the main cause of the dog's gait disturbance and apply the five finger rule.

Understand the importance of the clinical examination and relate it to the diagnosis.

Experiments / demonstrations:

Image and video material

Lecturer:

H. Volk

8. SW: Infectious diseases in cats (1 hour)

In the lecture, interesting cases of cats with various clinically relevant viral infections are discussed and the respective clinical picture, targeted diagnostics and treatment options are explained.

In particular, the following viral infections are involved:

-Feline leukaemia virus

-Feline immunodeficiency virus

-Feline viral rhinotracheitis (cat flu)

-Feline Infectious peritonitis

-Orthopox virus

Learning objective / basis for:

Recognising viral infectious diseases in feline patients, initiating the appropriate diagnostic procedures and knowledge of the respective therapeutic options.

Lecturer:

R. Mischke (instead of R. Mischke)

9. SW: Infectious diseases in dogs (1 hour)

The lecture focusses on infectious diseases in dogs. Special attention is paid to regional differences and potential zoonoses in the sense of the "One Health" concept.

Learning objective / basis for:

After the lecture, students should be able to

- in practical work, to decide whether an infectious disease is a possible differential diagnosis

- know for which diseases infection prophylaxis is important.

Experiments / Demonstrations:
Image material

Lecturer:
Rieder

9. SW: Cardiology dog (1 hour)

The lecture deals with the most common, basic acquired heart diseases in dogs.
The pathomechanisms of the diseases are outlined, the echocardiographic and radiographic criteria of the respective diseases are explained, and the specific treatment options are presented.

Learning objective / basis for:
The aim of the course is to teach the first basics of cardiological diseases in dogs. After the lecture, students should recognise and understand criteria that are important for the (suspected) diagnosis of compensated or decompensated cardiomyopathy.

Experiments / Demonstrations:
Image and video material

Lecturer:
Sehn/Lietz

10. SW: Cardiology cat (1 hour)

The lecture deals with the most common, basic acquired heart diseases in cats.
The pathomechanisms of the diseases are outlined, the echocardiographic and radiological criteria of the respective diseases are explained, and the specific therapy options are shown.

Learning objective / basis for:
The aim of the course is to teach the first basics of cardiological diseases in cats. After the lecture, students should recognise and understand criteria that are important for the (suspected) diagnosis of compensated or decompensated cardiomyopathy.

Experiments / Demonstrations:
Image and video material

Lecturer:
Sehn/Lietz

10. SW: Oncology: Tumours of the urogenital tract (1 hour)

Tumours of the urogenital tract

Learning objective / basis for:
1. therapy of breast tumours according to the current state of knowledge.
2. testicular tumours and their special features.
3. prognosis and therapy for prostate tumours and urinary bladder tumours.

Experiments / demonstrations:
Photos and videos

Lecturer:
Nerschbach/ Betz

11. SW: Oncology of haematopoietic tumours (1 h)

Lymphoma
Plasma cell tumours and multiple myeloma

Learning objective / basis for:
1. diagnosis of lymphoma and multiple myeloma.
2. therapy and prognostic factors.
3. plasma cell tumour vs. multiple myeloma

Experiments / demonstrations:
Photos and videos

Co-operation / consultation with:
none

Lecturer:
Nerschbach/Betz

11. SW: Oncology Skin tumours (1 hour)

Skin tumours, in particular:
- Fibrosarcomas
- Mast cell tumours
- Adenomas of the hepatoid glands

Learning objective / basis for:
Which examinations and therapies make sense and when.
Prognosis of mast cell tumours and fibrosarcomas.
Therapeutic approaches.
Special feature of adenomas of the hepatoid glands.

Experiments / demonstrations:
Photos and videos

Lecturer:
Nerschbach/ Betz

12. SW: Pancreatic diseases (1 hour)

Pathophysiology, clinic, diagnostics (clinic, imaging, laboratory diagnostics), prognosis and therapy of major diseases of the exocrine pancreas in dogs and cats.
The discussion is partly case-orientated and covers the following diseases:
-Acute and chronic pancreatitis
-Chronic exocrine pancreatic insufficiency
-Pancreatic tumours

Learning objective / basis for:
-Recognising the pancreas as a potentially affected organ in corresponding clinical symptoms.
-Knowledge about targeted diagnostics or the exclusion of diseases of the exocrine pancreas.
-Correct estimation of the forecast
-Knowledge of suitable therapeutic measures

Lecturer:
R. Mischke (instead of R. Mischke)

12. SW: Diseases of the urinary system/ renal insufficiency (1 hour)

Aetiology, clinical signs, imaging diagnostics and laboratory diagnostics (blood tests, urinalysis) as well as therapeutic principles of acute and chronic kidney disease in dogs and cats.

Learning objective / basis for:
-symptoms that indicate acute and chronic renal insufficiency.
be included in the list of differential diagnoses.
-values of "kidney parameters".
-Possibilities and limitations of the treatment of acute and
chronic renal insufficiencies.

Lecturer:
R. Mischke (instead of R. Mischke)

13. SW: Red blood count (anaemia, polyglobulia)/ white blood count (leukocytosis, leukopenia) (1 hour)

Basics for the interpretation of the red and white blood count in dogs and cats with case studies:
-Anaemic patient
-Patient with polyglobulia
-Patient with leucocytosis
-Patient with leucocytopenia

Learning objective / basis for:
-Know and be able to differentiate between important types of anaemia
-form of polyglobulia
-Know the meaning and mechanisms of leucocytosis
-Know the pathogenesis of leucocytopenia and degrees of severity
be able to interpret

Lecturer:
R. Mischke (instead of R. Mischke)

13. SW: Haemostasis disorders (1 hour)

Case-oriented discussion of the pathophysiology, clinical symptoms, laboratory diagnostics, prognosis and therapy of selected haemostasis disorders in dogs and cats:
-Poisoning with coumarin derivatives
-Haemophilia A and B
-Factor XII deficiency (cat)
-Von Willebrand disease
-thrombocytopenia
-consumption coagulopathy

Learning objective / basis for:
-Recognising the indication for haemostasis diagnostics
-Correct selection of haemostasis tests and interpretation of their results
Results
-Basic principles of therapy for various haemostasis disorders
and assess the prognosis for each individual patient.

Lecturer:
R. Mischke (instead of R. Mischke)

14. SW: Endocrinology (1 hour)

Case-orientated discussion of selected endocrinopathies in dogs and cats. The pathophysiology, clinic, laboratory diagnostics and therapy of the following endocrinopathies are discussed:

-Diabetes mellitus
-insulinoma
-Hypothyroidism

Learning objective / basis for:
-know the clinical pictures of diseases of the endocrine system
Pancreas.
-Recognising a patient with symptoms of hypothyroidism
-Interpretation of laboratory and hormone tests for the diagnosis of
Diabetes mellitus, insulinoma and hypothyroidism
-Knowledge of the basics of the treatment of diabetes mellitus,
Insulinoma and hypothyroidism

Experiments / Demonstrations:
Case demonstrations using visual material

Lecturer:
R. Mischke (instead of R. Mischke)

14. SW: Exciting internal medicine cases (1 hour)

In the lecture we will discuss exciting cases from the small animal clinic!

Learning objective / basis for:
After the lecture, students should be able to
1. to work through clinical cases with selected clinical problems (e.g. pale mucous membranes) in a problem-orientated manner.
2. to decide quickly after the general examination which patients should receive diagnostic work-up first and which should be stabilised.

Experiments / Demonstrations:
Image material

Lecturer:
Rieder

Clinic for pets, reptiles and birds

0831 Clinical training on patients - pets/reptiles

Pees, Reuschel, Hetterich

1. SW: Diseases of pets and reptiles and their diagnosis and therapy (6 hours)

Discussion of clinical cases and common diseases in pets and reptiles, taking into account the clinic, diagnostics, therapy and prophylaxis

Learning objective / basis for:
Physiology and pathophysiology of the individual organ systems, medical and surgical treatment of various diseases, taking into account species-specific characteristics

Experiments / Demonstrations:
Supplemented by clinical case demonstrations (interactive)

Lecturer:
see above.

Clinic for cattle

0841 Clinical training on patients: Physiology and pathology of reproduction

Hoedemaker, Bajcsy, Gundling, Schmicke and research assistants

6. SW: Labour monitoring, early/late asphyxia (2 hours)

Birth monitoring, early and late asphyxia in calves

Learning objective / basis for:
Treated substance is the basis for recognising signs of approaching birth, neonatal lung disease

Experiments / demonstrations:
- Clinical examination of a lactating cow
- Demonstration of early asphyxiated calf

Lecturer:
Heppelmann

Remarks:
For students of group 3

8. SW: Udder diseases (2 hours)

- Mast. cat. chronic, recurrent
- S. uberis as a mastitis pathogen

Learning objective / basis for:
Learning the diagnosis, differential diagnosis of M. cat. chronica including therapy, problems of recurrent mastitis, special features of S. uberis as a mastitis pathogen

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
Hoedemaker

Remarks:
For students of group 1

10. SW: Milk flow disorders (2 hours)

Diagnosis of milk flow disorders, treatment using endoscopy
- Clinical examination
- Ultrasound
- Endoscopy

Learning objective / basis for:
Performance of clinical examination, ultrasound and endoscopy in animals with milk flow disorders

Experiments / Demonstrations:
- Clinical examination and ultrasound of 2 patients with moderate or deep stenosis
- Performing a lateral endoscopy on the specimen

Lecturer:
Gundling

Remarks:
For students in group 2

13. SW: Gynaecological examination as part of herd management (2 hours)

- Puerperal control
- Pregnancy examination
- Cycle determination

Learning objective / basis for:
- Diagnosis and treatment of puerperal diseases of the uterus
- Diagnosis of the stage of pregnancy
- Determining the cycle status of an anoestrous cow

Experiments / Demonstrations:
Demonstration on the patient:
- rectal examination of the uterus and ovaries
- Confirmation of findings using ultrasound
- vaginal examination

Lecturer:
Gundling

Remarks:
- For students of group 3
- External quotas in small groups: Medication application, drenching linseed mucus

14. SW: Gynaecological examination as part of herd management (2 hours)

- Puerperal control
- Pregnancy examination
- Cycle determination

Learning objective / basis for:
- Diagnosis and treatment of puerperal diseases of the uterus
- Diagnosis of the stage of pregnancy
- Determining the cycle status of an anoestrous cow

Experiments / Demonstrations:
Demonstration on the patient:
- rectal examination of the uterus and ovaries
- Confirmation of findings using ultrasound
- vaginal examination

Lecturer:
Gundling

Remarks:
- For students in group 2
- External quotas in small groups: Medication application, Drenchen

14. SW: Farm animal endocrinopathies (2 hours)

- Clinical laboratory diagnostics
- Hypoglycaemia
- Endocrinology of the glucose balance

Learning objective / basis for:
- Development of the carbohydrate metabolism
- Endocrinology of the glucose balance

Experiments / demonstrations:
Case presentation of a patient with insulinoma

Lecturer:
Piechotta

Remarks:
For students of group 1

Reproductive medicine unit of the clinics

0843 Reproductive medicine (dog and cat)

Goericke-Pesch

6. SW: Genital diseases of the non-gravid bitch and cat (1 hour)

Definition, aetiopathogenesis, diagnosis and therapy of congenital and acquired diseases of the vagina, cervix and uterus with regard to health and fitness for breeding, including possible correlations with ovarian dysfunction.

Learning objective / basis for:
for the veterinary care of gynaecological small animal patients with diseases of the genital tract.

Co-operation / consultation with:
Fehr

Lecturer:
Günzel-Apel

7. SW: Contraception, contraception, termination of pregnancy (1 hour)

Medication methods for eliminating the sexual cycle in dogs and cats. Efficiency and side effects/risks. Veterinary care of the miscarried bitch and cat: diagnostic procedure to assess the risk of fertilisation or to prove pregnancy. Therapeutic measures, their efficiency and undesirable side effects or risks (genital diseases, infertility). Animal welfare aspects of abortion.

Learning objective / basis for:
To convey the complexity of the veterinary care of bitches and cats not intended for breeding with regard to 1) undesirable side effects and risks of long-term hormonal therapy for contraception, 2) the individual approach to the miscarried bitch/cat, taking into account the owners, the husbandry conditions and animal welfare.

Co-operation / consultation with:
Fehr

Lecturer:
Günzel-Apel

8. SW: Physiology and pathology of birth in dogs and cats (1 hour)

Physiology and endocrinology of labour. External signs of approaching labour, birth process (opening, expulsion, postpartum discharge) and duration. Location, position and posture of the puppies. Prepartum diagnostics to recognise the proximity of birth. Birth monitoring. Obstetric diagnostics to recognise birth disorders (dystocia). Maternal and foetal birth disorders. Conservative/medical obstetrics. Indications for caesarean section. Induction of labour.

Learning objective / basis for:
To emphasise the urgency of veterinary action for bitches and cats in labour in order to protect the mother and the puppies. Presentation of the diagnostic possibilities for assessing the course of labour and the necessity of obstetric measures.

Experiments / Demonstrations:
Film on physiological birth

Co-operation / consultation with:
Fehr

Lecturer:
Günzel-Apel

10. SW: Physiology and pathology of the postpartum phase (1 hour)

Physiology and endocrine regulation of the postpartum phase with regard to uterine involution (puerperium) and lactation. Pathogenesis, diagnosis and treatment of puerperal and lactation disorders and lactation-associated mammary diseases.

Learning objective / basis for:
Treated material is the basis for the veterinary care of the bitch in the puerperium or lactation phase as well as for the detection and treatment of uterine and mammary diseases post partum.

Co-operation / consultation with:
Fehr

Lecturer:
Günzel-Apel

11. SW: Physiology of dog and cat puppies during the suckling phase (1 h)

Physiological developmental characteristics and clinical parameters for assessing the health status of canine and feline puppies in the neonatal and suckling puppy phase (weight, regulation of body temperature, reflexes, sense of smell, eyes, hearing, respiration, heart rate, faeces and urine output, motor skills). Resuscitation, post natum care. Housing conditions, examination of puppies, red and white blood count

Learning objective / basis for:
Treated substance is the basis for targeted diagnostics in puppies from birth to weaning (8-10 weeks post natum)

Experiments / demonstrations:
Video about movement patterns (motor skills) of suckling puppies

Co-operation / consultation with:
Fehr

Lecturer:
Günzel-Apel

12. SW: Diseases of dog and cat puppies (1 hour)

Regulation of neonatal lung function, neonatal respiratory distress syndrome; hypothermia-hypoglycaemia complex; toxic milk syndrome; swimmer-puppy syndrome; fading-puppy syndrome; bacterial and viral infections

Learning objective / basis for:
Teaching the most important organ dysfunctions in connection with birth and neonatal development. Diagnosis, prophylaxis and treatment of infectious diseases.

Co-operation / consultation with:
Fehr

Lecturer:
Günzel-Apel

Clinic for Cattle; Reproductive Medicine Unit of the clinics

0845 Reproductive medicine (obstetrics and udder diseases in cattle)

Hoedemaker

1. SW: Udder diseases (2 hours)

Udder skin diseases, injuries to the udder and teats

Learning objective / basis for:
Basic knowledge of the diagnosis and treatment of diseases of the udder skin as well as udder and teat injuries

Experiments / demonstrations:
Lecture

Lecturer:
Hoedemaker

3. SW: Gynaecology (2 hours)

Abortions and gynaecological operations in cattle

Learning objective / basis for:
Basic knowledge of the diagnosis and procedure for abortions; basic knowledge of the techniques of gynaecological operations (e.g. birth injuries, vaginal prolapse, ovariectomy, vaginoplasty)

Experiments / Demonstrations:
Lecture

Lecturer:
Heppelmann

Clinic for cattle

0861 Clinical training on patients: Internal medicine and surgery

Höltershinken, Heppelmann, Küskens, Gaude and research assistants

1. SW: Laboratory / musculoskeletal system / nerve paralysis / anaesthesia of the flank (2 hours)

Condition after tibial nerve palsy with fibrillar tearing of the muscles / posterior cheek abscess: risk of nerve palsy / abomasal reflux: acid-base balance, electrolytes / dist. Paravertebral anaesthesia

Learning objective / basis for:
Aetiology, diagnosis and consequences of nerve paralysis / Interpretation of laboratory parameters / Advantages and disadvantages of anaesthesia procedures

Experiments / Demonstrations:
Dist. paravertebral anaesthesia according to Magda / animals with nerve palsies / animal with femoral abscess (risk of nerve palsy) / animal with disloc. abom. sin. (laboratory)

Lecturer:
Kehler

Remarks:
- For students of group 2
- External quotas in small groups: Drenchen, s.c. care, uterine care

2. SW: Anaemia of cattle / calf tympany (2 hours)

Aetiology and diagnosis of various forms of anaemia

Learning objective / basis for:
Approach to differentiate between different forms of anaemia

Experiments / Demonstrations:
- Examination of a patient
- Assessment of laboratory diagnostic results

Lecturer:
Grünberg

Remarks:
For students in group 2

3RD SW: General lameness diagnostics / general nerve paralyses / recid. Tympany / Fracture (2 hrs.)

Buff trocar: recurrent tympany due to bronchopneumonia
Radial nerve palsy + fracture (hallmark)

Learning objective / basis for:
Exclusion of fracture
Recognising and avoiding nerve paralysis
Buff trocar and other temporary rumen fistulas
Advantages and disadvantages of the guzzler

Experiments / Demonstrations:
Demonstration of an animal with Buff trocar
Clinic own animal with (injected) radial paralysis (distal)

Lecturer:
Kehler

Remarks:
- For students of group 1
- External quotas in small groups: Uterine care, ketone bodies, various forms of medication application

4. SW: LEAL / post op. condition / laboratory support (2 hrs.)

Diseases during the transition cow phase; especially LEAL complex = LM disease, endometritis, acetonuria and liver diseases. Occurrence of diseases and use of laboratory diagnostics in preventive detection

Learning objective / basis for:
Recognising the disease complex and using problem-oriented laboratory tests for individual animal and herd problems

Experiments / Demonstrations:
Clinical demonstration on a patient and case studies

Lecturer:
Höltershinken

Remarks:
- For students of group 1
- External quotas in small groups: Pulling stitches, medication application

6 SW: Neonatal diarrhoea (ND) (2 hours)

Etiology and pathogenesis of ND; acid-base balance, infusion therapy

Learning objective / basis for:
Diagnosis, therapy, prevention of ND

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
(instead of Kehler)

Remarks:
- For students of group 1
- External quotas in small groups: Uterine care, metritis, blood sampling, rectal examination, birth monitoring, examination of calves (hereditary defects, premature birth)

9. SW: Pneumonia in calves (2 hours)

Diagnostics incl. blood gas, therapy

Learning objective / basis for:
Recognition and treatment of respiratory diseases

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
Roe deer

Remarks:
- For students of group 2
- Outside quotas in small groups: Uterine care, rectalisation, birth monitoring, examining and treating calves (injecting)

10. SW: Neonatal diarrhoea (2 hours)

Neonatal diarrhoea therapy

Learning objective / basis for:
- Preparation of a therapy plan
- Interpretation of laboratory results
- Understanding the pathophysiology

Experiments / Demonstrations:
Assessment of clinical patients

Lecturer:
Grünberg

Remarks:
- For students in group 3
- External quotas in small groups: Uterine care, Drenschen

11 SW: V. a. Nephrosis (2 hours)

Diseases of the kidney and abdominal cavity; assessment of the main findings in the animal

Learning objective / basis for:
Recognising the disease complex and working out the various differential diagnoses
Assessment of prognosis and treatment options

Experiments / Demonstrations:
Clinic patient R 0620/15

Lecturer:
Höltershinken

Remarks:
- For students of group 3
- External quota in small group: birth monitoring, intertrigo treatment

12TH SW: Spastic paresis / purulent pleurisy (2 hours)

Diagnostics, differential diagnostics and therapy

Learning objective / basis for:
Recognition and treatment of bovine diseases

Experiments / Demonstrations:
Demonstration on the patient

Lecturer:
Roe deer

Remarks:
- For students in group 3
- External quotas in small groups: Medication application, rectal examination, uterine care

Clinic for cattle

0864 Bovine diseases III

Gaude, Heppelmann, Küskens, Schmicke

1. SW: Internal and surgical bovine diseases (14 hours)

Diseases of the respiratory tract, circulatory system, eye and lymphatic system

Learning objective / basis for:
Recognising and treating cattle diseases and teaching prevention strategies

Lecturer:
, Grünberg, Heppelmann, Höltershinken, Kehler

Clinic for Cattle; Reproductive Medicine Unit of the clinics

0881 Reproductive medicine and biotechnology incl. domestic animal insemination and spermatology

Bajcsy, Goericke-Pesch, Heppelmann, Köhne, Körber, Luther, Oldenhof, Sieme, Tönißen, Waberski

1. SW: Spermatology: Advanced course (2 hours)

Indications and methods of advanced spermatology using modern methods. Assessment of spermatological findings. Theory and practice of spermatological examination: sperm morphology and fluorescence-optical assessment of sperm membrane status.

Learning objective / basis for:
Recognising and assessing the diagnostic value of spermatological examination methods for fertility prognosis in pets.

Experiments / Demonstrations:
Practical spermatological examinations carried out by students.

Co-operation / consultation with:
Goericke-Pesch, Sieme

Lecturer:
Waberski

2. SW: Insemination in dogs (semen collection and preservation) (2 hours)

Semen collection and preparation for preservation in liquid, chilled (4-5 °C) and deep-frozen condition (-196 °C). Labelling and documentation requirements in accordance with the regulations of the Animal Breeding Act. Thawing of semen and assessment of thawed frozen semen with regard to suitability for insemination and calculation of the insemination dose (number of straws per insemination). Semen storage and dispatch. Accompanying documents (health certificates, semen tests, thawing recommendations). Preparation of the insemination dose.

Learning objective / basis for:
Presentation of the indications and current status of semen transfer in dogs (in Germany and worldwide) using freshly collected semen, diluted refrigerated semen and thawed frozen semen. Possibilities and limitations of use depending on the reproductive physiology of the dog in comparison with other species, especially cattle.

Co-operation / consultation with:
Sieme, Waberski

Lecturer:
Günzel-Apel

2. SW: Embryo transfer in horses (2 hours)

Lecture and practical demonstration of embryo collection, assessment and transfer in the mare by students. Introductory lecture on the international and national spread of equine ET. Explanation of the factors influencing the embryo recovery rate in the donor mare and the factors influencing the pregnancy outcome of the recipients. Cooling and cryopreservation of horse embryos. Veterinary technical management functions in embryo transfer centres, basics of in-vitro production of embryos in horses (OPU-ICSI-IVP; IVF).

Learning objective / basis for:
Acquisition of knowledge and skills of modern reproductive medicine methods and possibilities of implementation in equine practice (embryo transfer, OPU-ICSI-IVP).

Experiments / Demonstrations:
Exercises on animals

Co-operation / consultation with:
Bajcsy, Goericke-Pesch, Waberski

Lecturer:
Sieme

7. SW: Insemination in pigs (semen collection and preservation) (2 hours)

Theory and practice of semen collection, evaluation and preparation in pigs with active participation of the students. Current status of artificial insemination in pigs. Special features of animal breeding law, animal species and methodology in the production of liquid preserved semen and frozen semen. Key veterinary technical management functions in pig insemination centres.

Learning objective / basis for:
Teaching theoretical and practical knowledge of semen collection, examination and preservation in boars.

Experiments / Demonstrations:
Semen collection, examination and preservation in boars.

Co-operation / consultation with:
Goericke-Pesch, Sieme

Lecturer:
Waberski

9. SW: Semen collection and preservation Bull (2 hours)

Sperm collection (preparation of the jump partners, instruments, sperm collection procedure) and assessment of the ejaculate (method and minimum requirements), preservation (liquid and deep-freeze preservation), handling of liquid nitrogen (dangers, handling of nitrogen containers, thawing of sperm samples, theory of flow cytometric sperm extraction).

Learning objective / basis for:
Imparting knowledge about the importance of artificial insemination in cattle and skills for collecting semen from bulls and the correct handling of frozen semen.

Experiments / Demonstrations:
Demonstration and practice of semen collection on a clinic bull, practice in handling liquid nitrogen and applying sequins.

Co-operation / consultation with:
Goericke-Pesch, Sieme, Waberski

Lecturer:
Heppelmann

Clinic for Cattle; Reproductive Medicine Unit of the clinics

0883 Clinical training on patients - Repro

Goericke-Pesch, Heppelmann, Köhne, Körber, Luther, Oldenhof, Sieme, Tönißen, Waberski

8TH SW: Physiology and Pathology of Reproduction (12 hours)

During this interactive course, students will be trained to take responsibility for their own veterinary actions using the example of a specific patient and will develop maxims for action in the following areas:
Preliminary examination of female animals (horses, cattle, dogs) prior to semen collection and special clinical questions from the gynaecology and obstetrics of horses, cattle and dogs. Andrological examination (examination of the health and sexual fitness for breeding of sire animals - cattle, horses, small ruminants, dogs, pigs).

Learning objective / basis for:
Learning special examination and treatment techniques in the context of gynaecology and andrology as well as sperm transfer and embryo transfer in the various house specialities

Experiments / Demonstrations:
Practical exercises on animals in small groups. A total of three quota rounds: two central events per quota round, so-called main quotas, as well as 8 - 10 secondary quotas

Lecturer:
Goericke-Pesch, Heppelmann, Köhne, Körber, Luther, Oldenhof, Sieme, Tönissen, Waberski

Courses for the 9th/10th semester

Department of General Radiology and Medical Physics

0999 Clinical training on patients

Seifert, Lüpke, Bräuninger

1. SW: Radiation protection in radiology (2 hours)

Physical principles of radiation protection, practical radiation protection, structural radiation protection, equipment-related radiation protection, radiation protection of staff, radiation protection of animal care staff, questions from students on radiation protection

Learning objective / basis for:
- Observance of radiation protection in clinical radiology
- Prerequisite for the acquisition of radiological protection expertise
- Requirements for working as a radiation protection officer

Experiments / Demonstrations:
Demonstrations:
- Radiation protection accessories
- Various personal dosimeters

Co-operation / consultation with:
Lower Saxony Ministry of the Environment
Radiological clinics

Lecturer:
Seifert, Lüpke, Bräuninger

Clinic for poultry

0999 Clinical training on patients

Jung, Lindenwald, Messmer, Wunderl, Rautenschlein

1. SW: Elective practical course in commercial and hobby poultry medicine (240 hours)

Examination, diagnosis, treatment, prophylaxis of diseases of commercial and hobby poultry, co-operation in daily routine activities in the clinic and outpatient clinic, seminars, case discussions, excursions to commercial and hobby poultry flocks.

Learning objective / basis for:
In-depth knowledge of poultry diseases (poultry on site in the flock), learning of practical skills in flock examination, examination of clinical samples in the laboratory and performance of necropsy; basic principles of veterinary integrated flock management are known at the end of the training period and can be put into practice.

Experiments / demonstrations:
Participation in dissections, outpatient trips, carrying out laboratory diagnostic tests, "Journal Club" and "Research Meetings".

Lecturer:
see above (instead of see above)

1. SW: Diseases of farm poultry with a focus on infectious diseases (400 hours)

Examination, diagnosis, treatment, prophylaxis of poultry diseases, co-operation in daily routine activities in the clinic and outpatient clinic, seminars, case discussions, excursions

to poultry flocks, cross-sectional teaching. Collaboration and realisation of a scientific project

Learning objective / basis for:
In-depth understanding of poultry diseases (poultry on site in the flock), learning practical skills in poultry medicine for examining a flock, analysing samples in the laboratory and dissection;
The basic principles of integrated veterinary herd management are known at the end of the learning unit and can be put into practice.
Introduction to the scientific processing of poultry-related research projects and acquisition of the ability to formulate scientific questions and hypotheses.

Experiments / Demonstrations:
Participation in sections, outpatient trips, carrying out laboratory diagnostic tests, "Journal Club" and "Research Meetings". Carrying out experiments, analysing and presenting own data in two seminars.

Lecturer:
see above.

Clinic for Pets, Reptiles and Birds; Reproductive Medicine Unit of the clinics

0999 Clinical training on patients (pets, reptiles, ornamental and wild birds)

Pees, Legler, Reuschel, Hetterich, Beykirch, Hennig, Schwehn, Stelter, Dierig, Krull, Willems, Hein, Kopp, Küper, Wendt, Herth

Practical year, veterinary work on pets, reptiles, ornamental and wild birds (460 hours)

Keeping and feeding, species specifics, medical history, clinical, radiological, blood chemistry, sonographic, parasitological and cytological examinations, performing necropsy, therapy and medication for common diseases, conservative and surgical fracture treatment, soft tissue surgery, dental restoration, conducting polyclinical consultations, telephone consultation and dealing with patient owners of pets, reptiles and birds.

Learning objective / basis for:
Learn about the most common diseases and their therapies, the veterinary options and the special biological and care requirements of pets, reptiles and birds and their practical implementation on patients.

Experiments / Demonstrations:
Seminars with practical exercises on selected diseases, examination methods and treatments, including surgical exercises, assistance in consultations, treatment of hospitalised pet, reptile and bird patients, theoretical seminars on common diseases, exercises to understand and interpret X-rays

Lecturer:
see above.

Branch Office for Epidemiology (Bakum); Clinic for Small Cloven-hoofed Animals and Forensic Medicine and Outpatient Clinic; Clinic for Poultry; Reproductive Medicine Unit of the clinics

0999 Clinical training on patients (practical year)

Ganter, Hennig-Pauka, v. Altrock, Oberheide, Roth, Wagener, Kiene, Schregel, Neubert, Nicolaisen, Bauer, Wilhelm, Rath, Waberski, Luther, große Beilage, Mohr, Rautenschlein, Jung

1. SW: Clinical training on patients (practical semester) (40 hours)

Examination, diagnosis, treatment, prophylaxis of diseases in pigs, sheep and goats, farm and hobby poultry, cooperation in daily routine activities in the clinic and outpatient clinic, allocation of individual patients, exercises on operations and diagnostic measures, seminars, case discussions, excursions to pig, sheep and goat farms and poultry flocks or to pigeon and hobby poultry farmers; cross-sectional teaching

Learning objective / basis for:
In-depth study of the diseases of pigs, sheep, goats and other farm animals (poultry, cattle on site in the herd), learning practical skills;
Basic principles of integrated veterinary herd management

Experiments / Demonstrations:
Participation in and independent performance under supervision of operations, diagnostic procedures (e.g. X-ray, ultrasound, bronchoalveolar lavage), laboratory diagnostics and dissection (poultry), various therapeutic procedures

Co-operation / consultation with:
Clinic for poultry;
Field Centre for Epidemiology, Bakum;
within the framework of cross-sectional teaching with various other higher education institutions

Lecturer:
Ganter, Hennig-Pauka, von Altrock, Wagener, Kiene, Bauer, Schregel, Neubert, Rath, Roth, Oberheide, Wilhelm, Große Beilage, Rautenschlein, Ryll, Petersen, Teske, Waberski

Equine Clinic; Reproductive Medicine Unit of the clinics

0999 Clinical training on patients

Feige, Sieme, Geburek, Ohnesorge, Bienert-Zeit, Delling and employees

1. SW: Practical training in equine medicine (560 hours)

The students pass through the internal medicine, surgery, orthopaedics, anaesthesia and reproductive medicine wards as well as the laboratory and forge. In the internal medicine, surgery and orthopaedics wards, students treat patients at the equine clinic under the guidance of the assistant doctors. The training on patients is carried out by the assistants of the equine clinic and the scientific assistants in the stables under the guidance of the assistants. The students are present or assist during operations and are assigned a patient in the stable departments for permanent care as their patient. The interns present this patient and his illness during the ward round or during the training of the lower clinical semesters with the help of a PowerPoint presentation they have prepared themselves.
In addition to the practical activities in the individual departments, various exercises on animals and specimens are carried out as a two-hour course in small groups. These include performing diagnostic anaesthesia, exercises on the eye, wound surgery, sinuscopy and dental treatment as well as an exercise in taking radiological and ultrasonographic images. Courses on emergency care for acute lameness, acute abdominal complaints, eye diseases,

injuries and gynaecological emergencies are also held to prepare students for their first assignment in practice.

Learning objective / basis for:
Consolidation and expansion of knowledge in equine medicine. Practical training in the basics of diagnosis and treatment of equine diseases. Independent work and literature research.

Experiments / Demonstrations:
Exercises on the subject of imaging procedures, diagnostic anaesthesia
Wound surgery, eyes, trephination/sinuscopy

Co-operation / consultation with:
Interdisciplinary events with the Institutes of Anatomy, Pathology and Pharmacology

Lecturer:
see above.

Institute of Animal Hygiene, Animal Welfare and Farm Animal Ethology; Clinic for Small Animals; Reproductive Medicine Unit of the clinics

0999 Clinical training on patients in internal medicine, surgery, reproductive medicine and X-ray diagnostics

Volk H., Volk A., Kästner, Kramer, Mischke, Tipold, Goericke-Pesch, Busse, Karbe, Nerschbach, Rieder, Sehn.

1. SW: X-ray examination of small animals (10 hours)

Teaching the basics of X-ray examination in small animals; positioning, assessment of technical quality, normal X-ray findings vs. pathological findings, further diagnostics

Learning objective / basis for:
The aim is to learn the basics of X-ray diagnostics and the systematic procedure for assessing X-ray images.

Experiments / Demonstrations:
X-ray image assessment based on case studies

Lecturer:
Merhof, Wang, Raue, Kramer

1. SW: Dermatology (1 hour)

Assisting with dermatological cases in consultation hours and on wards, clarifying current cases, training in dermatological diagnostics and developing differential diagnosis lists, diagnoses and treatment plans. Learning new therapy methods

Learning objective / basis for:
Clinical dermatology, practising the examination procedure, practical work-up of dermatological cases (characteristics of the disease, carrying out special examination methods, drawing up a treatment plan)

Experiments / Demonstrations:
Taking a special medical history, carrying out a dermatological examination including further procedures such as ear examination and irrigation under anaesthetic, taking skin biopsies. Diagnosis and development of a treatment plan

Lecturer:
A.Volk

1. SW: Practical year logbook (1 hour)

During their 10-week internship at the Clinic for Small Animals, students spend time in all departments of the clinic (internal medicine, anaesthesia, emergency medicine, oncology, dermatology, neurology, ophthalmology, dentistry, surgery and imaging).
They work together with the doctors on duty in the consultation hours, on the wards and during operations and are thus expected to complete their practical skills and deepen their knowledge of small animal medicine. In order to deepen their theoretical knowledge, all departments organise additional seminars.

Learning objective / basis for:
Acquisition of basic practical skills. A checklist must be completed for this purpose.
Consolidation of theoretical knowledge in the most important areas of small animal medicine

Experiments / Demonstrations:
Practical work, collaboration in everyday hospital life including emergency services

Co-operation / consultation with:
Physics

Lecturer:
A. Volk

1. SW: Anaesthesia and analgesia (10 hours)

Presentation of important anaesthetics and analgesics for use in small animals.
Explanation of ASA classification, neuroleptanalgesia, ataranalgesia, hypnoanalgesia, total intravenous anaesthesia, inhalation anaesthesia, local and regional anaesthetic techniques, Anaesthesia equipment, monitoring (clinical, pulse oximeter, capnometry, blood pressure, ECG, EEG), intubation, patient preparation, preoxygenation, postoperative pain therapy, chronic pain therapy, intraoperative infusion therapy, resuscitation
Techniques of euthanasia, ethical issues in euthanasia

Learning objective / basis for:
Review of the pharmacological principles of anaesthetics and analgesics
Discussion of various anaesthesia procedures for current, individual patients, patient monitoring, handling the anaesthetised patient, operation of an anaesthesia machine, pain therapy (post-operative, chronic)

Experiments / Demonstrations:
Instructions on the anaesthesia machine
Assignment for 1 week in anaesthesia: independent induction of anaesthesia, intubation, control and monitoring of injection and inhalation anaesthesia

Co-operation / consultation with:
Kunzmann (animal hygiene, animal welfare and farm animal ethology)

Lecturer:
Kästner/Tünsmeyer/Söbbeler

1. SW: Surgery (33 hours)

Collaboration in surgical consultations and in the operating theatre; processing of lameness cases; diagnosis and treatment of patients with surgical diseases, including emergencies; learning bandaging techniques; X-ray image discussion of surgical cases; instrument knowledge; basics of sterility in the operating theatre; active assistance in simple routine operations (e.g. castration, wound care), in special orthopaedic procedures (e.g.

arthroscopy, endoprostheses, cruciate ligament rupture, elbow joint dysplasia), in operations in the field of traumatology (e.g. fracture treatment) and in soft tissue surgery (e.g. arthroscopy, endoprostheses, cruciate ligament rupture, elbow joint dysplasia). arthroscopy, endoprostheses, cruciate ligament rupture, elbow joint dysplasia), in operations in the field of traumatology (e.g. fracture treatment) and soft tissue surgery (e.g. foreign body surgery, perineal hernia, mastectomy); independent performance of selected operations on dead animals as part of the surgical exercises (e.g. castration, enterotomy).e.g. castration, enterotomy, cystotomy, otitis surgery, creation of a urethral fistula, tendon and muscle sutures, etc.) and on artificial bone as part of the osteosynthesis course (e.g. simple fracture treatment, tension strapping, tension and set screws).

Learning objective / basis for:
Learning the practical processing of surgical cases (diagnostics and therapy); carrying out the examination procedure; understanding examination methods; drawing up a therapy plan, learning surgical techniques; understanding sterile work in the operating theatre.

Experiments / demonstrations:
Carrying out various surgical techniques

Co-operation / consultation with:
Other lecturers at the Clinic for Small Animals

Lecturer:
Karbe, Harms, Huels, Verhoeven, Kramer,

1. SW: Ophthalmology (1 hour)

Assisting with ophthalmological cases in consultation hours and on wards, clarifying current cases, training in ophthalmological diagnostics and drawing up differential diagnosis lists, diagnoses and treatment plans. Assisting with ophthalmological operations

Learning objective / basis for:
- eye examination step by step.
- Be able to localise changes in the eye
- Be able to select suitable additional tests
- Be able to create a treatment plan for common eye diseases
- Be able to name and explain relevant eye operations

Experiments / demonstrations:
Taking a special medical history, performing ophthalmological examinations including diagnosis and developing a treatment plan, assisting with ophthalmological procedures

Lecturer:
C. Buses

1. SW: Oncology (1 hour)

Assisting with oncological cases in consultation hours and on wards, clarifying current cases, discussing the results of laboratory tests, imaging procedures and cytological and pathohistological findings, drawing up differential diagnosis lists, diagnoses and treatment plans. Learning new therapeutic procedures.

Learning objective / basis for:
Systematic processing of oncological cases and their therapy

Experiments / Demonstrations:
Examination of patients, discussion of further findings, e.g. laboratory, X-ray or sonography

Lecturer:
Nerschbach

1. SW: Internal Medicine (1 hour)

Collaboration in internal medicine cases in the consultation hours and on the wards, clarification of current cases, training in diagnostics and development of differential diagnosis lists, diagnoses and treatment plans. Assessment of imaging findings, laboratory results and other specialised examinations. Demonstration and assistance with endoscopies of the respiratory and gastrointestinal tract

Learning objective / basis for:
Systemic treatment of internal medicine cases and their therapy

Experiments / Demonstrations:
Examination of patients, discussion of further findings, e.g. laboratory, X-ray or sonography

Lecturer:
Rieder, Mischke

University Library; Institute of Biometry, Epidemiology and Information Processing; Institute of Microbiology; Institute of Pharmacology, Toxicology and Pharmacy; Institute of Physiology and Cell Biology; Institute of Animal Nutrition; Institute of

0999 Clinical training on patients: Practical year

Hoedemaker, Bajcsy, Gundling, Heppelmann, Höltershinken, Bräuninger, Campe, Eisenberg, Gerhauser, Goethe, Kreienbrock, Leonhard-Marek, Lingens, Meißner, Mühlberg, Osigus, Spindler, Schulz, Visscher, Wilken, Wilkens and research assistants

Buiatrics (internal medicine, surgery, reproduction, veterinary medicine) (460 hours)

Diagnostics (including laboratory diagnostics and imaging procedures: Sonography, radiology, endoscopy) and therapy (including surgical manipulations) of health disorders in the field of internal medicine, surgery and reproductive medicine with special emphasis on the prevention of diseases at individual animal, herd and population level. Communication with the owner, practice management. Teaching partly interdisciplinary, partly as POL lessons, behaviour in the event of an animal epidemic, epidemiological investigations and tasks of the veterinary office

Learning objective / basis for:
Teaching and skills on individual patients in diagnostics, therapy and prevention as well as in the field of herd care and herd diagnostics in the areas of internal medicine, surgery and reproduction as well as in the field of animal disease prevention and control

Experiments / Demonstrations:
Surgical exercises, examination techniques, therapy procedures, animal disease exercise

Co-operation / consultation with:
Institute of Animal Nutrition, Physiology, Virology, Microbiology, Animal Breeding, Food Safety and Quality, Biometry, Epidemiology and Information Processing (IBEI), Institute of Animal Hygiene

Lecturer:
Hoedemaker, Schmicke, Bajcsy, Höltershinken, Heppelmann, Gundling and scientific staff. employees

Reproductive medicine unit of the clinics

0999 Clinical training on patients

Goericke-Pesch, Köhne, Körber, Luther, Sieme, Tönißen, Waberski

1. SW: Practical year (0 hours)

small pets (per student 1 week all day):
Teaching and practising gynaecological and andrological examination and diagnostic procedures including sonography in dogs and cats as part of the daily consultation hours and on the clinic's own dogs. Case discussions.
Horse (3 students, four hours, weekly Thurs and Fri, mornings):
Teaching and practising andrological and gynaecological examination and diagnostic procedures in stallions and mares
Pig (six hours per student), theory and practice of insemination management and insemination technique including sonography; handling of preserved sperm.

Learning objective / basis for:
small pets, horse, pig:
Carrying out the clinical examination of breeding animals with careful enquiry and documentation of signalling and anamnesis, independent assessment and documentation of findings, development and adequate formulation of the diagnosis based on this, development of therapy proposals and final assessment and prognosis with regard to the current status of breeding suitability and the success of initiated treatments. Practical exercises on insemination management.

Experiments / Demonstrations:
see above.

Co-operation / consultation with:
Clinic for small animals, clinic for horses, clinic for small cloven-hoofed animals

Lecturer:
Goericke-Pesch, Sieme, Waberski

Branch Office for Epidemiology (Bakum)

0999 Epidemiology and herd diagnostics in pigs

Hennig-Pauka, large supplement

1. SW: Herd medicine, swine diseases (68 hrs.)

The aim of the course is to introduce students to herd analyses. The examination of pig herds is prepared with the students as an example and carried out in practice.

Learning objective / basis for:
Treated substance is the basis for herd testing on pig farms.
Learning objectives are,
-that students are able to assess farm hygiene and management on a farm and their influence on the health status of the farm and animal welfare
-be able to suggest further diagnostic investigations
-be able to name differential diagnoses
-be able to carry out further examinations under supervision in the diagnostic facility
be able to interpret unambiguous under-visit results and derive measures for the company from them.

Experiments / Demonstrations:
Pig herds are clinically examined and the documentation of findings, the creation of sampling schemes and the taking of samples are practised. The clinical and laboratory diagnostic findings are interpreted together.
The pathological-anatomical examination of pigs and the taking of samples are practised in the dissection hall of the branch office. The findings are interpreted taking into account the herd disease. Proper sample preparation, packaging and despatch are demonstrated in the laboratory of the external centre as a prerequisite for successful diagnostics.

Co-operation / consultation with:
Clinic for small cloven-hoofed animals

Lecturer:
Aper, Detlefsen, large supplement, Hennig-Pauka, Nienhaus, Vogels, Wadepohl

Remarks:
10th semester, two-week, continuous course, Mon 10 a.m.-4 p.m., Tue-Thu 8 a.m.-4 p.m.; Fri 8 a.m.-12 p.m.

Institute of Biochemistry

0999 Practical year infection biochemistry

von Köckritz-Blickwede, Nicole de Buhr

1. SW: Practical year in the food sector (40 hours)

You will pass through all departments that deal with microbiological, (residue) analytical, technological or toxicological issues in the area of animal foodstuffs.

Learning objective / basis for:
A wide range of laboratory experiments are designed to familiarise students with the subject area and also to highlight future career opportunities.

Experiments / Demonstrations:
Insight into typical laboratory work in the Institutes of Food Quality and Safety and Food Toxicology and Chemical Analysis

Lecturer:
Abdulmawjood, Grabowski, Kehrenberg, Krischeck, Reich

Institute for Microbiology

0999 Clinical training in microbiology

Goethe, Meens, Rohde, Siesenop, Valentin-Weigand

1. SW: Veterinary Microbiology in Diagnostics and Research (460 hours)

Teaching of basic techniques and knowledge for the identification and differentiation of infectious agents relevant to veterinary medicine. Teaching of techniques and knowledge in microbiological research (microbiological, cell and molecular biological methods) based on a specific question on a topic that is being researched as a project in one of the working groups.

Learning objective / basis for:
The aim of the course is to give students an insight into diagnostic procedures and work steps. Furthermore, they should be familiarised with the working methods in a research laboratory. This serves as a basis for decision-making in later professional orientation after graduation (e.g. doctorate, work in a diagnostic laboratory, etc.).

Experiments / Demonstrations:
As a practical exercise, this course consists mainly of demonstrations and experiments (see course content)

Lecturer:
Goethe, Meens, Rohde, Schaaf (focus on research); Siesenop, Verspohl (focus on diagnostics)

Institute of Pathology

0999 Clinical training on patients

Beineke, Wohlsein, Gerhauser, Puff, Hülskötter, Lombardo, Störk, Stoff, Reineking, Lockow, Leitzen, Michaely, Krüger, Becker, Pahl, Wyst, Moeselaken, Maschmeier;

1. SW: 10 weeks practical year at the Institute of Pathology (460 hours)

As part of the practical year, students will be involved in the various pathological-anatomical and diagnostic activities of the institute, including the dissection hall and the various laboratories, during a 10-week internship.
The internship starts daily at 07:30.
As part of the internship of the practical year, students are given the opportunity to familiarise themselves with pathological-anatomical and histological diagnostics and the associated methods. The aim is to develop a deeper understanding of the derivation of diagnoses with particular consideration of differential diagnoses and to gain initial insights into aetiological and pathogenetic research and diagnostics, taking into account classical and modern examination methods.
In addition to various continuing education events that take place during the semester, such as the Journal Club and AFIP editing seminar, continuing education events on various topics are held on selected days.

Learning objective / basis for:
Deepening the basic pathogenetic understanding of disease development and diagnostics.

Experiments / Demonstrations:
Daily.

Lecturer:
See above

Institute of Parasitology, Department of Fish Diseases and Fish Husbandry

0999 Clinical training on patients

Jung-Schroers, Adamek and colleagues

1. SW: Clinical training in fish diseases (460 hours)

Veterinary care of fish stocks:
Procedure for stock management and clinical examination of fish diseases, clinical findings
Diagnosis including water analysis, laboratory diagnostics, sonography,
Carrying out anaesthesia, blood sampling, injections
Measures for the prevention and treatment of fish diseases,
Critical evaluation of the husbandry/stock
Independent processing of laboratory samples as part of your own research project

Learning objective / basis for:
In-depth knowledge of the health care of fish stocks including diagnosis, therapy and husbandry counselling

Familiarisation with important laboratory methods and evaluation of test results from laboratory tests.

Experiments / Demonstrations:
Assistance with the anaesthesia of fish
Assistance with sampling for microbiological and virological tests on fish
Analysis of samples using biochemical and molecular biological methods

Lecturer:
Jung-Schroers and employees

Institute for Parasitology

0999 Clinical training in parasitology

Strube and research assistants

Clinical training in parasitology (training in the practical year) (460 hours)

Collaboration on a parasitological issue in the context of ongoing projects or in parasitological diagnostics

Learning objective / basis for:
Familiarisation with and application of various techniques of applied and diagnostic and/or molecular parasitology

Experiments / demonstrations:
variable

Co-operation / consultation with:
Not applicable

Lecturer:
Strube, Raulf, Springer

Institute for Food Quality and Safety

0999 "Practical year" food toxicology

Seeger

Alternative and complementary methods to animal experiments (460 hours)

Method development and processing of scientific questions in the field of neurotoxicology and neuroinfectiology on the basis of models derived from human induced pluripotent stem cells

Learning objective / basis for:
Basics for independent scientific work as preparation for a potential dissertation, work in science/industry in the field of cell culture with a focus on pharmacology/toxicology
Learning molecular biological and biochemical methods for analysing the cell culture models used

Experiments / demonstrations:
Independent processing and presentation of a research project within the framework of the projects currently being worked on in the Food Toxicology and Alternative and Complementary Methods working group

Co-operation / consultation with:
other TiHo facilities within the scope of the projects worked on

Lecturer:
Seeger