JLU
NEUE WEGE. SEIT 1607.

JUSTUS-LIEBIG-
UNIVERSITÄT
GIESSEN

Faculty of Veterinary Medicine
Justus-Liebig-Universität Giessen

**APPENDICES** OF THE **SELF EVALUATION REPORT**
FOR THE EUROPEAN ASSOCIATION OF
ESTABLISHMENTS FOR VETERINARY EDUCATION
**FULL VISITATION 24 – 28 JANUARY 2022**

## Contents

# Appendix A: Current academic staff, qualifications, their FTE, teaching responsibilities and departmental affiliations

Reporting date of the following tables is 15.07.2021

**Table 1: Professors and academic staff financed by University (Tp: temporary appointment; TO: teaching obligations in hrs/week, FTE = Full time equivalent)**

| Preclinical Institutes | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| **Institute of Vet.-Anatomy,-Histology and -Embryology** | Professor (W3) | Prof. Dr. | + | Dr. med. vet. Prof. Functional Anatomy | | 1 | 6* |
| | Professor (C3) | Prof. Dr. | + | Dr. med. vet. Prof. Vet. Anatomy, Histol. & Embryol. | | 1 | 8 |
| | Professor (W2) | Prof. Dr. | + | Dr. med. vet. Prof. Vet. Anatomy & Cell Biology | | 1 | 8 |
| | Senior Acad. Staff | Dr. | + | Dr. med. vet. Habilitation | | 1 | 8 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | + | 1 | 4 |
| | Acad. Staff | Dr. | + | Dr. med. vet. (phD) | + | 1 | 4 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| **Institute of Vet.-Physiology and Biochemistry** | Professor (C4) | Prof. Dr. | | Dr. rer. nat. Prof. Vet. Physiology | | 1 | 8 |
| | Professor (W2) | Prof. Dr. | | Dr. med.;Specialist Pharmacol. & Toxiclogy, Prof. Vet. Physiology | | 1 | 6* |
| | Professor (W2) | Prof. Dr. | | Dr. rer.nat. Prof. Vet. Biochem. | | 1 | 8 |
| | Professor (W2/3) open | | | Prof. Biochem. In Veterinary Medicine | | 1 | 8 |
| | Senior Acad. Staff | Prof. Dr. | + | Dr. med vet. Specialist Vet. Physiol. Habilitation Extraordinary Prof. | | 1 | 8 |
| | Senior Acad. Staff | Prof. Dr. | | Dr. rer. nat. Habilitation Extraordinary Prof. | | 1 | 8 |
| | Senior Acad. Staff | Prof. Dr. | | Dr. rer. nat. Habilitation Extraordinary Prof. | | 1 | 8 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | + | 1 | 4 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |

| Preclinical Institutes | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |

| Paraclinical Institutes | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| **Institute of Vet. Pathology**** | Professor (W3) | Prof. Dr. | + | Prof. Vet. Pathology | | 1 | 5.6 |
| | Professor (W2) | Prof. Dr. | + | Dr. med. vet.; Dipl. ECVP; Spec. Vet. Pathology Prof. General and Specific Pathology of Animals | | 1 | 5.6 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet.; Spec. Vet. Pathol. | | 1 | 5.6 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet. Dipl. ECVP; Spec. Vet. Pathol. | | 1 | 5.6 |
| | Sen. Acad. Staff open | | | | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | Dr. med. vet.; Spec. Vet. Pathol. | + | 1 | 2.8 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Institute of Vet. Food Science**** | Professor (W3) | Prof. Dr. | + | PhD; Spec. Vet. Microbiology Prof. Food Safety and Consumer Protection; | | 1 | 5.6 |
| | Professor (C4) | Prof. Dr. | + | Dr. med. vet.; Prof. Milk Sciences | | 1 | 5.6 |
| | Professor (W2) open | | | | | 1 | 5.6 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet. | | 1 | 5.6 |

| Paraclinical Institutes | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet. | | 1 | 5.6 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet.; Specialist Vet. Microbiology, habilitation, extraordinary Prof. | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Institute of Hygiene and Infectious Diseases of Animals**** | Professor (W3) | Prof. Dr. | + | Dr. med. vet.; Specialist Vet. Microbiology; Prof. Vet. Bacterid. and Mycol. nid. Anim. Hyg. | | 1 | 5.6 |
| | Professor (C3) | Prof. Dr. | + | Dr. med. vet.; Specialist Vet. Microbiology; Prof. Epizootic Disease Control and Zoonoses | | 1 | 5.6 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet.; Specialist Vet. Microbiology | | 1 | 5.6 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet.; Specialist Vet. Microbiology | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | | + | 1 | 2.8 |
| | Acad. Staff | | + | | + | 1 | 2.8 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Institute of Virology**** | Professor (W3) | Prof. Dr. | | Dr. rer. nat.; Prof. for Virology | | 1 | 5.6 |
| | Professor (W2) | Prof. Dr. | + | Dr. med. vet. Prof. Clinical and Vet. Virology | | 1 | 5.6 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet. | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | Dr. med. vet | + | 1 | 2.8 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | + | 1 | 2.8 |
| | Acad. Staff | Dr. | | Dr. rer. nat. | + | 1 | 2.8 |

| Paraclinical Institutes | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| **Institute of Parasitology**** | Professor (W3) | Prof. Dr. | + | Dr. med. vet.; Dipl. EVPC; Spec. Vet. Parasitology Prof. Parasitology and Parasite induced Diseases | | 1 | 5.6 |
| | Professor (W3) | Prof. Dr. | | Dr. rer.nat. Prof. Parasitology and Zoonoses | | 1 | 5.6 |
| | Professor (W2) | Prof. Dr. | | Dr. rer.nat. Prof. Parasitology and Parasite induced Diseases | | 1 | 5.6 |
| | Senior Acad. Staff | Prof. Dr. | + | Dr. med. vet.; Habilitation Dipl. EVPC; Extraordinary Prof. | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | Dr. med. vet. Dipl. EVPC | + | 1 | 2.8 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Institute of Pharmacology and Toxicology**** | Professor (W3) | Prof. Dr. | | Dr. rer. nat. Prof. Vet. pharmacology and Toxicology | | 1 | 8 |
| | Professor (W2) | Prof. Dr. | + | Dr. med. vet. Spec. Vet. Pharmacology and Toxicology; Prof. Experimental and Clinical vet. Pharmacology | | 1 | 8 |
| | Sen. Acad. Staff | Dr. | + | Dr. med. vet. | + | 1 | 4 |
| | Acad. Staff | | + | | + | 1 | 4 |
| | Acad. Staff | | + | | + | 1 | 4 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |

| Dept. Veterinary Clinical Sciences (VTH)<br>Acting Director: Prof. Dr. Axel Wehrend | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| **Clinical Unit for Small Animals; Section Internal Medicine and Central Laboratory **** | Professor (W2) | Prof. Dr. | + | Dr. med. vet., Dipl. ECVIM, Assoc. Member ECVCP, Specialist Internal Medicine, Specialist clinical laboratory diagnostic; Prof. Clinical Pathophysiology and Laboratory Diagnostic | + | 1 | 5.6 |
| | Professor (W1/2) | Prof. Dr. | + | Dr. med. vet. Dipl. ECVCN, Spec. Anim. Nutrition and Dietetic; Prof. Basic Sciences in Internal Med. Small Animals | + | 1 | 5.6 |
| | Sen. Acad. Staff Sub-section Cardiology | Prof. Dr. | + | Dr. med. vet.; Habilitation, Dipl. ECVIM (Cardiology); Spec. Internal Med. Small and Pet Animals; Extraordinary Prof. | | 1 | 5.6 |
| | Sen. Acad. Staff Sub-section Clinical Pathology | Dr. | + | Prof. Dr. med. vet. Habilitation, Dipl. ECVCP, Specialist Internal Vet. Medicine Extraordinary Prof. | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | Dipl. ECVIM, Specialist Internal Vet. Medicine | + | 1 | 2.8 |
| | Acad. Staff | Dr. | + | Dipl. ECVIM, Specialist Cardiology | + | 1 | 2.8 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Clinical Unit for Small Animals; Section Surgery**** | Professor (C4) | Prof. Dr. | | Dr. med. vet., Dipl ECVDI, Spec. Small Animal Surgery, Spec. Small- and Pet Animals, Spec. Diagnostic Imaging; Prof. Small Animal Surgery | | 1 | 4* |
| | Professor (W2) Sub-Section Neurology | Prof. Dr. | | Dr. med. vet.; Dipl. ECVN Prof. Vet. Neurosurgery,- Neuroradiology and – clin. Neurology | | 1 | 5.6 |
| | Senior Acad. Staff | Prof. Dr. | + | Dr. med. vet.; Habilitation; Specialist | | 1 | 5.6 |

| Dept. Veterinary Clinical Sciences (VTH)<br>Acting Director: Prof. Dr. Axel Wehrend | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| | Sub-section Anaestheology | | | anaestheology, intensive care and pain medicin; Specialist Vet. Surgery; Extraordinary Prof. | | | |
| | Senior Acad. Staff | Dr. | + | Dr. med. vet.; Dipl. ECVS Specialist Small Anim. Surgery | | 1 | 5.6 |
| | Senior Acad. Staff | Dr. | + | Dr. med. vet.; Habilitation, Dipl. ECVDI Specialist Small Anim. Surgery | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | | + | 1 | 2.8 |
| | Acad. Staff | Dr. | + | | + | 1 | 2.8 |
| | Acad. Staff | Dr. | + | | + | 1 | 2.8 |
| | Acad. Staff Sub-Section Neurology | | + | | + | 0.5 | 1.4 |
| | Acad. Staff Sub-Section Neurology | | + | | + | 0.5 | 1.4 |
| **Equine Clinical Unit; Section Surgery**** | Professor (W3) | Prof. Dr. | + | Dr. med. vet.; Specialist Horse Medicine, Specilist Veterinary Surgery; Professor for Hosrse Surgery | | 1 | 5.6 |
| | Professor (W1/2) Section Orthopaedics | Prof. Dr. | + | Dr. med. vet.;Habilitation in Veterinary Physiology and Specialist in Veterinary Physiology, Head Stem Cell Research; Prof. Equine Orthopaedics; | | 1 | 5.6 |
| | Senior Acad. Staff | Dr. | + | | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | | + | 1 | 2.8 |
| | Acad. Staff | | + | | + | 1 | 2.8 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Equine Clinical Unit; Section Inernal Medicine**** | Professor (W3) | Prof. Dr. | + | Dr. med. vet.; Dipl. ECEIM; Specialist in Veterinary Internal Medicine; Prof. Internal Medicine of Horse | | 1 | 5.6 |
| | Senior Acad. Staff | Dr. | + | Dr. med. vet.; Habilitation; Dipl. | | 1 | 5.6 |

| Dept. Veterinary Clinical Sciences (VTH)<br>Acting Director: Prof. Dr. Axel Wehrend | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| | | | | ECEIM, Specialist Horse Medicine | | | |
| | Acad. Staff | Dr. | + | | + | 1 | 2.8 |
| | Acad. Staff | Dr. | + | | + | 1 | 2.8 |
| **Clinical Unit for Ruminants and Pigs (Internal Medicine and Surgery) Section ruminants**** | Professor (W3) open | Dr. med. vet. | + | | | 1 | 5.6 |
| | Senior Acad. Staff | Dr. | + | Dr. med. vet.; Habilitation, Specialist Bovine Medicine | | 1 | 5.6 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Section pigs**** | Professor (C3) | Prof. Dr. | + | Dr. med. vet.; Dipl. ECPHM; Specialist Pig Medicine, Specialist Biotechnology of Reproduction; Prof. Porcine diseases | | 1 | 5.6 |
| | Senior Acad. Staff | Prof. Dr. | + | Dr. rer. nat.; Habilitation; Extraordinary Prof. | | 1 | 5.6 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Clinical Unit for Obstetrics, Gynaecology and Andrology of Large and Small animals with an Ambulatory Service**** | Professor (W3) Section Clinical Reproductive Medicine | Prof. Dr. | + | Dr. med. vet.; Dipl. ECAR; Specialist Reproductive Medicine; Prof. Clinical Reproductive Medicine | | 1 | 5.6 |
| | Professor (W3) Section Molecular Reproductive Medicine | Prof. Dr. | + | Dr. med. vet.; Specialist Reprod. Medicine; Specialist Molecular Genetics and Gene Technology, Prof. Molecular Reprod. Medicine | | 1 | 5.6 |
| | Senior Acad. Staff | Prof. Dr. | + | Dr. med. vet.; Dipl. ECAR Specialist Breeding Soundnes and Biotechnology of Reproduction; Extraordinary Professor | | 1 | 5.6 |

| Dept. Veterinary Clinical Sciences (VTH)<br>Acting Director: Prof. Dr. Axel Wehrend | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| | Senior Acad. Staff | Dr. | + | Dr. med. vet.; Habilitation; Specialist Breeding Hygiene and Biotechnology of Reproduction | | 1 | 5.6 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | | 0.5 | 1.4 |
| | Acad. Staff | | + | | | 0.5 | 1.4 |
| | Acad. Staff | | + | | | 0.5 | 1.4 |
| **Clinic Unit for Birds, Reptiles, Amphibians and Fish**** | Professor (W3) | Prof. Dr. | + | Dip. ECZM (WPH), Dip. ECPVS, DZooMED (RCVS) Dr. med. Vet.; Dipl. ECPVS; Dipl. ECZool. Med.; Dipl. RCVS, Zool. Med.; Recognized Specialist of the Royal College of Veterinary Surgeons, UK, in Zoo and Wildlife Medicine, Specialist Poultry and Ornamental Birds; Specialist Zoo-, Enclosure- and Wildlife Animals; Specialist Microbiology; Prof. Diseases of Birds and Hygiene in Poultry Management | | 1 | 5.6 |
| | Professor (W2) open | Prof. Dr. | | | | | |
| | Senior Acad. Staff | Dr. | + | Specialist Poultry and Avian Medicine; Specialist Microbiology; | | 1 | 5.6 |

| Dept. Veterinary Clinical Sciences (VTH)<br>Acting Director: Prof. Dr. Axel Wehrend | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Institute** | **Position** | **Title** | **DVM** | **Qualification** | **Tp** | **FTE** | **TO** |
| | | | | HDM Teaching certificate | | | |
| | Acad. Staff | Dr. | + | Specialist Poultry and Avian Medicine | + | 0.5 | 1.4 |
| | Acad. Staff | Dr. | + | Specialist Poultry and Avian Medicine | + | 0.5 | 1.4 |
| | Acad. Staff | | + | Specialist Poultry and Avian Medicine | + | 0.5 | 1.4 |
| | Acad. Staff | | + | Specialist Poultry and Avian Medicine | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| | Acad. Staff | | + | | + | 0.5 | 1.4 |
| **Professor-ship Clinical Anatomy and Exp.l Surgery** | Professor (W2) | Prof. Dr. | + | Dr. med. vet.; Specialist Veterinary Anatomy; Prof. Clin. Anatomy and Exp. Surgery | | 1 | 8 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | | 0.5 | 2 |
| | Acad. Staff | Dr. | + | Dr. med. vet. | | 0.5 | 2 |
| **Professor-ship Lab. Animal Sci., Animal Welfare and 3 R Centre** | Professor (W2) | Prof. Dr. | + | Dr. med. vet.; Prof. Laboratory Anim. Science and Animal Welfare | | 1 | 8 |
| | Acad. Staff | Dr. | | Dr. rer. soc. | | 0.5 | 2 |
| | Acad. Staff | Dr. | + | | + | 0.5 | 2 |
| | Acad. Staff | | + | | + | 0.5 | 2 |
| **Unit for Biomathema tics and Data Processing** | Sen. Acad. Staff | Dr. | | Dr. sc. Agr. | | 1 | 8 |

* Reduction teaching obligations due to the function as dean, vice dean, dean of study affairs

** Institutes and Clinics with obligation to health care; reduction teaching obligations about 30%

## Table 2: Academic staff without official teaching obligations and financed from revenues from research grants

| Institute/ Department | DVM | Title | Tp | FTE |
|---|---|---|---|---|
| **Institute of Vet.-Anatomy,- Histology and -Embryology** | + | | + | 0.65 |
| | + | | + | 0.65 |
| **Institute of Vet.- Physiology and Biochemistry** | + | | + | 0.65 |
| **Institute of Veterinary Pathology** | + | | + | 1.0 |
| | | Dr. rer. nat. | + | 0.75 |

| Institute/ Department | DVM | Title | Tp | FTE |
|---|---|---|---|---|
| Institute of Veterinary Food Science | + | | + | 0.5 |
| | + | | + | 0.5 |
| Institute of Hygiene and Infectious Diseases of Animals | + | | + | 0.5 |
| Institute of Virology | | Dr. rer. nat. | + | 1.0 |
| | | Dr. rer. nat. | + | 1.0 |
| | + | | + | 0.65 |
| | + | | + | 0.65 |
| | + | | + | 0.65 |
| | + | | + | 0.65 |
| | + | | + | 0.5 |
| Institute of Parasitology | | Dr. rer nat. | | 1.0 |
| | | Ph.D. | + | 1.0 |
| | | Ph.D. | + | 1.0 |
| | | Dr. rer. nat. | + | 1.0 |
| | | Dr. rer. nat. | + | 1.0 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| Institute of Pharmacology and Toxicology | + | | + | 0.65 |
| Clinical Unit for Ruminants and Pigs (Internal Medicine and Surgery) | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.3 |
| Clinical Unit for Obstetrics, Gynaecology and Andrology of Large and Small animals with an Ambulatory Service | + | | + | 0.6 |
| | + | | + | 0.6 |
| | + | | + | 0.5 |
| | + | | + | 0.38 |
| | + | | + | 0.12 |
| Clinical Unit for Small Animals (Internal Medicine and Surgery) | + | | + | 0.5 |
| Clinical Unit for Horses (Internal Medicine and Surgery) | + | | + | 0.27 |
| Clinical Unit for Birds, Reptiles, Amphibia and Fish | + | | + | 1.0 |
| | + | | + | 0.75 |
| | + | | + | 0.7 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | | | + | 0.3 |

| Institute/ Department | DVM | Title | Tp | FTE |
|---|---|---|---|---|
| **Professorship Experimental Animal Science, Animal Protection and 3 R Centre** | | | + | 0.5 |

**Table 3: Academic staff of the VTH without official teaching obligations and financed from revenues from clinical and diagnostic services of the faculty**

| Clinical Unit | DVM | Further Qualification | Tp | FTE |
|---|---|---|---|---|
| **Clinic for Small Animals (Internal Medicine and Surgery) Surgery** | + | Dr. med. vet. | | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 0.9 |
| | + | Dr. med. vet. | + | 0.75 |
| | + | Dr. med. vet. | + | 0.75 |
| | + | Dr. med. vet. | + | 0.75 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |
| **Clinic for Small Animals (Internal Medicine and Surgery) Internal Medicine** | + | Dr. med. vet. | | 1.0 |
| | + | Dr. med. vet. | | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | | 0.6 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |
| | + | Dr. med. vet. | + | 0.5 |

| Clinical Unit | DVM | Further Qualification | Tp | FTE |
|---|---|---|---|---|
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.2 |
| **Equine Clinic (Internal Medicine and Surgery)** **Surgery** | + | Dr. med. vet. | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | | + | 1.0 |
| | + | Dr. med. vet. | + | 1.0 |
| | + | | + | 0.75 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.5 |
| | + | | + | 0.25 |
| **Equine Clinic (Internal Medicine and Surgery)** **Internal Medicine** | + | Dr. med. vet. | + | 0.25 |
| **Clinic for Obstetrics, Gynaecology and Andrology of Large and Small animals with an Ambulatory Service** | + | Dr. med. vet. | | 1.0 |

# Appendix B:

## Units of study of the core veterinary program (including clinical rotations, EPT), ECTS value, position in the curriculum (year, semester), whether its compulsory or elective, hours and mode of instruction, learning outcomes and their alignment with the ESEVT Day One Competences (ECTS Catalogue)

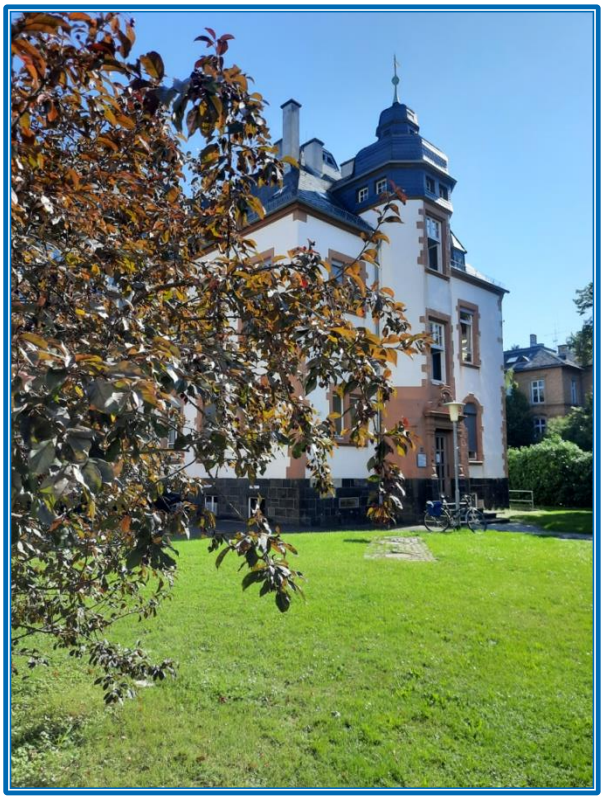
**ECTS Catalogue**

**Faculty of Veterinary Medicine** **13 - 294**

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

# ECTS-Catalogue

## Faculty of Veterinary Medicine



# Contents

# INTRODUCTION

This catalogue is not only to indicate the number of ECTS credit points for each of our courses, but also to ensure comparability and synchronization with other German and International Veterinary Educational Institutions regarding the content of the modules and the learning objectives.

The **ECTS (European Credit Transfer and Accumulation System)** is a credit system that guarantees full academic recognition of academic performance within Europe. The European Union has developed the ECTS to ensure that students will receive full accreditation of points (credits) for the courses they attend and the academic work they accomplish during a period of studying abroad. The system facilitates the assessment and comparison of learning outcomes. Furthermore, it allows the international transfer of credits between universities. Mutual trust and recognition of the participating universities are the fundamental principles of the ECTS. Further, new policies regarding the exchange of information (e.g. of the university calendar), the accreditation of the curriculum of each respective university and the allocation of ECTS credits which define the workload of other universities have been created and implemented to enhance this mutual trust. Within each department of the University of Giessen, ECTS credits are allocated to each and every course. In accordance with the guidelines of the ECTS, these credits reflect the workload of each course in proportion to the workload necessary for the successful completion of one full academic year. Within the ECTS, the credits amount to 60 annually, and accordingly a single semester is given about 30 credits.

For further information, students are welcome to contact the **ECTS Faculty Coordinator (Faculty of Veterinary Medicine)**:

**Katrin Ziegenberg**
Frankfurter Str. 94
35392 Giessen
Tel: +49 (641) 99 38007
Katrin.Ziegenberg@vetmed.uni-giessen.de

We would like to point out that all of the courses listed in the ECTS catalogue are regular courses and will also be attended by the students of Giessen University. Please note that no special courses will be held for ECTS purposes. Credits will only be awarded if the student has attended the complete course for the full semester and has met all further requirements.

# General Information

## Contact and Facilities

### Office of Study Affairs

Katrin Ziegenberg (ERASMUS Faculty Coordinator)
Dr. Meike Kuhlmann
Dr. Birte Pfeiffer-Morhenn (Clinical Rotation, Clinical Skills Lab - PETS)
Frankfurter Str. 94
Tel. +49 (641) 99-38007/-38008
Office hours: Mon, Tue, Thu 9.00 a.m. -12 a.m.
Katrin.Ziegenberg@vetmed.uni-giessen.de
Meike.M.Kuhlmann@vetmed.uni-giessen.de
Birte.Pfeiffer-Morhenn@vetmed.uni-giessen.de

### Student Advisory Service
### Student body Veterinary Medicine

Office hours: during term time
Mon-Fri 1.00 p.m.-2.00 p.m., Wed 8.00 p.m.
Frankfurter Str. 120, above the smithy
Tel. +49 (0641) 99-38010
Fachschaft.Tiermedizin@vetmed.uni-giessen.de

### Advisory Service and support for foreign students and applicants

Patrycja Zakrzewska
Saltanat Langohr
International Office
Goethestr. 58
Tel. +49 (0641) 99-12143
studium-international@uni-giessen.de
https://www.uni-giessen.de/internationales/studierenjlu/index

### BAföG (Bundesausbildungsförderungsgesetz)

Prof. Dr. Rolf Bauerfeind
Inst. f. Hygiene u. Infektionskrankheiten der Tiere
Frankfurter Str. 85-89
Tel. +49 (0641) 99-38303
Rolf.Bauerfeind@vetmed.uni-giessen.de

### representative

Prof. Dr. Christoph Grevelding
Christoph.Grevelding@vetmed.uni-giessen.de

## Doctorate

Legal basis: Promotionsordnung, please refer to the following website

http://www.uni-giessen.de/cms/mug/7/findex4.html

## Head of the Examination Board (Doctorates)
## Dean of the Faculty of Veterinary Medicine

Sabine Baloditis

Frankfurter Str. 94

Tel. (0641) 99-38002

Sprechzeiten: Mo bis Do 9.00 - 12.00 Uhr

## Ph.D. – Doctor of Philosophy

Legal basis: Ph.D – Ordnung, please refer to the following website:

http://www.uni-giessen.de/cms/mug/7/findex45.html

## Deanary

Frankfurter Straße 94

Tel. +49 (0641) 99-38000/-38001, Fax +49 (0641) 99-38009

Dekanat@fb10.uni-giessen.de

## Dean

Prof. Dr. Dr. Stefan Arnhold

Stefan.Arnhold@vetmed.uni-giessen.de

## Vice Dean

Prof. Dr. Martin Diener

Martin.Diener@vetmed.uni-giessen.de

## Dean of Study Affairs

Prof. Dr. Melanie Hamann

Frankfurter Str. 94

Tel. +49(0641) 99 38401

Appointments by individual agreement

Melanie.Hamann@vetmed.uni-giessen.de

## Committee for the Veterinary Intermediate Examination and the Veterinary Medical Examination

Frankfurter Str. 94

Tel. (0641) 99-24540/-24543

https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/pruefamt

### Head (Veterinary Intermediate Examination)

Prof. Dr. Carsten Staszyk
Institut für Veterinär-Anatomie
Frankfurter Str. 98,
Tel. +49 (0641) 99-38102/-38101 (Sekretariat)
Carsten.Staszyk@vetmed.uni-giessen.de

### Head (Veterinary Medical Examination)

Prof. Dr. Andreas Moritz
Klinik für Kleintiere, Innere Medizin
Frankfurter Str. 114
Tel. +49 (0641) 99-31600/-31601 (Sekretariat)
Andreas.Moritz@vetmed.uni-giessen.de

## CLINICS AND INSTITUTES

### Institute for Veterinary Anatomy, Histology and Embryology

Frankfurter Str. 98
Phone: ++49 (641) 99-38101

### Institute for Veterinary Physiology and Biochemistry

Frankfurter Str. 100
Phone: ++49 (641) 99-38151

### Institute for Hygiene and Infectious Diseases of Animals

Frankfurter Str. 85-89
Phone: ++49 (641) 99-38301

### Institute for Veterinary Food Science

Frankfurter Str. 92
Phone: ++49 (641) 99-38251

### Institute for Veterinary Food Science -

Professorship for Dairy Science
Ludwigstr. 21b
Phone: ++49 (641) 99-38951

### Institute for Veterinary-Pathology

Frankfurter Str. 96
Phone: ++49 (641) 99-38201

### Institute for Parasitology
Schubertstr. 81
Phone: ++49 (641) 99-38461

### Professorship for Animal Welfare and Ethology
Frankfurter Str. 110
Phone: ++49 (641) 99-38751

### Institute for Pharmacology and Toxicology
Schubertstr. 81
Phone: ++49 (641) 99-38401

### Institute for Virology
Schubertstr. 81
Phone: ++49 (641) 99-38351

### Clinic for Small Animals (Internal Medicine and Surgery)
Frankfurter Str. 114
Phone: ++49 (641) 99-31601/-31501

### Clinic for Reproduction with veterinary ambulance
Frankfurter Str. 106
Phone: ++49(641) 99-38695/-38771

### Clinic of Bird, Reptile, Amphibian and Fish Medicine
Frankfurter Str. 114
Phone: ++49 (641) 99-31431

### Clinic for Horses
(Internal Medicine and Surgery)
Frankfurter Str. 126 + 108
Phone: ++49 (641) 99-38570/-38650

### Clinic for Farm Animals (Swine and Ruminants)
(Internal Medicine and Surgery)
Frankfurter Str. 110 u. 112
Phone: ++49 (641) 99-388671/38824

Unit for Biomathematics and Data Processing
Frankfurter Straße 95
Phone: ++49 (641) 99-38800

Institute for Animal Nutrition and
Nutrition Physiology [FB 09]
Heinrich-Buff-Ring (IFZ)
Phone: ++49 (641) 99-39230/-39231

Institute for Animal Breeding and Genetics [FB 09]
Ludwigstraße 21 b
Phone: ++49 (641) 99-37621

Clinical Skills Lab – PETS
Frankfurter Straße 110
Phone: ++49 (641) 99-38014

## THE CURRICULUM OF THE FACULTY OF VETERINARY MEDICINE OF JLU GIESSEN

1. The following information relates to section 1, § 1 of the Veterinary Approbation Regulation (TAppV).
The study of Veterinary Medicine comprises:

1. a Scientific-theoretical part taught throughout a period of four and a half years, with a total of 3850 hours (these may not be exceeded) of compulsory and elective courses, for the study of the fundamentals of Veterinary Medicine, at any university or equivalent institute of higher education, with regard to later use in veterinary practice.

2. a Practical part consisting of 1170 hours.

- 70 hours (generally, a period of two weeks) in Agriculture, Animal Breeding and Animal Husbandry (after the 1st semester, at the study and research facility Oberer Hardthof)
- 150 hours (generally, a period of four weeks) in a veterinarian practice or clinic (after the 6th semester)
- 75 hours (generally, a period of two weeks) in Hygiene Control and Food Control/Investigation (extramural during the clinical rotation)
- 100 hours (generally, a period of three weeks) in Ante and Post mortem Meat Inspection and Quality Control (extramural during the clinical rotation)
- 75 hours (generally, a period of two weeks) in Veterinary Public Health Service (extramural in the clinical rotation)
- 700 hours (generally, a period of 16 weeks) in a veterinary practice, clinic or in an internship of choice (extramural during the clinical rotation). The 9th and 10th semester comprise the clinical rotation: 25 groups of approximately 8 students each rotate through individual clinics and institutes of the university (intramural rotation):
    - Clinic of equine medicine (internal medicine and surgery): 4 weeks
    - Clinic for small animals (internal medicine and surgery): 4 weeks
    - Clinic for farm animals (ruminants): 2 weeks
    - Clinic for reproduction: 4 weeks
    - Clinic for bird, reptile, amphibian and fish medicine: 2 weeks
    - Clinic for farm animals (swine): 2 weeks
    - Pathology/Virology/Bacteriology: 2 weeks

3. the following examinations:

The Veterinary Intermediate Examination (Tierärztliche Vorprüfung):

The Veterinary Pre-Intermediate Examination (Vorphysikum) after the 2nd semester (in Botany of Feed Crop, Poisonous and Medicinal Plants, Zoology, Chemistry and Physics including fundamental knowledge concerning physical radiation protection), followed by the Veterinary Intermediate Examination (Physikum) after the 3rd semester (in Anatomy, Histology and

Embryology) and after the 4th semester (in Animal Breeding and Genetics, including Animal Assessment, Physiology, Biochemistry),

### The Veterinary Medical Examination (German Veterinary Licensing Examination = Staatsexamen, Tierärztliche Prüfung):

The examination begins with the first exams after the 5th semester and ends with the final examinations after the 11th semester:

- after the 5th semester in: Virology (written), Bacteriology and Mycology (oral/practical); Clinical Propaedeutics (oral/practical) General Pharmacology and Toxicology (written), General Pathology (written)
- after the 6th semester in: Animal Husbandry and Animal Hygiene (oral), Parasitology (oral/practical), Pharmaceutical and Drug Prohibition Law (oral/practical), Animal Nutrition (written) as well as parts of the exams in: Internal Medicine, Surgery and Reproductive Medicine (written)
- after the 7th semester in: Animal Welfare and Ethology (written), Dairy Science (written), Radiology (written), as well as parts of the exams in: Internal Medicine, Surgery and Reproductive Medicine (written)
- after the 8th semester in: Specific Pharmacology (oral), Epizootic Disease Control and Epidemiology of Infectious Disease (oral), Forensic Medicine/Professional and Ethical Law (written), as well as parts of the exams in: Internal Medicine, Surgery and Reproductive Medicine (written)
- during the 11th semester in: General and Specific Pathology, Pathological Anatomy and Histology (oral/practical), Meat Hygiene (oral/practical/written), Food Science, including Food Hygiene (oral/practical/written), Poultry Diseases (oral/practical) and parts of the exams in Internal Medicine, Surgery and Reproductive Medicine (written).

For each semester, syllabi and timetables will be published timely before the start of the courses. Here students can find information about lectures, tutorials, and seminars; rooms and locations; and instructors and teachers. These are available online at:

http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

Allocation into practical groups is centralised and can be accessed online via Stud-IP:

https://studip.uni-giessen.de

Further information on the curriculum can be found in the Veterinary Approbation Regulation (TAppV) and the Study and Assessments regulation of 2007 of the JLU Giessen (StuPOVet).

https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/Gesetze

## EVALUATION

The evaluation of the academic performance at the Faculty of Veterinary Medicine, JLU-Giessen (TappV § 14) consists of the following grades:

### VERY GOOD (1)
an excellent performance

### GOOD (2)
a performance that exceeds average requirements significantly

### SATISFACTORY (3)
a performance that fulfills the average requirements in every respect

### SUFFICIENT (4)
a performance that despite its deficiencies still meets the requirements

### FAIL (5)
a result that because of its deficiencies does not meet the requirements

Rating within the ECTS-system is according to the following evaluation scale (§ 15 StuPO Vet):

| Grade | Grade span | Definition | Definition (German) |
|---|---|---|---|
| A | 1.0 – 1.5 | Excellent | Hervorragend |
| B | 1.5 – 2.0 | Very good | Sehr gut |
| C | 2.1 – 3.0 | Good | Gut |
| D | 3.1 – 3.5 | Satisfactory | Befriedigend |
| E | 3.6 – 4.0 | Sufficient | Ausreichend |
| FX/F | 4.1 – 5.0 | Fail | Nicht bestanden |

The Department will, on request of the student, add a testimony on results alongside the reference. This includes a rating system based upon the ranking of successfully examined students in the current year and the two previous years.

## SEMESTERWOCHENSTUNDE (SWS) = CONTACT HOUR PER WEEK (CHW)

One contact hour per week (CHW) is calculated based on the number of hours per course (each 45 min.) in a semester divided by the number of weeks in the semester. If a one hour course is given once weekly, the course has an amount of 1 CHW. There will be no differentiation between a winter semester (15 week lecture period) and a summer semester (14 week lecture period); a semester is always calculated with 14 weeks.

## COURSE TYPES

There are different types of courses, which differ in structure and in the degree of commitment they require. The course types are: Lecture (L) (Vorlesung), Seminar (S), Practical (P) (Übung) or Animal Handling (AH) (Übung am Tier). These courses are defined as follows in the appendix of Kapazitätsverordnung (KapVO; Gesetz- und Verordnungsblatt for Land Hessen from the 29.12.1975 and 10. 01.1994):

### L:

Lecture (course type A, k = 1 of the Kapazitätsverordnung of 29/12/1975; unlimited group size) provides and mediates basic scientific and specific knowledge. The instructor speaks and the students act predominantly receptive.

### S:

In seminars (course type B, k = 4 of the Kapazitätsverordnung of 29/12/1975; group size n = 30), the instructor directs the course, provides tasks, monitors the activities of students and chairs discussions. Students practise skills and methods, hold presentations, discuss topics or solve exercises.

### P:

In practicals (course type D, k = 7 of the Kapazitätsverordnung of 29/12/1975; group size n = 15), skills and knowledge are conveyed by solving practical and experimental tasks. The instructor directs and supervises students during the course. Students accomplish practical work and experiments.

### AH:

In a tutorial with animals / animal handling (course type F, k = 12 of the Kapazitätsverordnung of 29/12/1975; group n = 5) medical expertise is systematically explained. Students learn to diagnose conditions and diseases and to propose treatments. The instructor observes and directs the students; the students employ the acquired skills and knowledge.

## COMMITMENT TOWARD LECTURES

### Compulsory courses (CC) (Pflichtveranstaltungen):

Courses that require continuous and successful participation according to the TAppV (seminar and practicals). Lectures do not have compulsory attendance. Regular participation means: presence during at least 85% of the course. This means that courses with 1 contact hour per week (1 CHW) allow a maximum absence of 2 hours.

### Elective courses (EC) (Wahlpflichtveranstaltungen):

Courses in which students must provide a certificate for a particular study section with a minimum number of hours in these particular courses. Students are be able to choose between various topics. Attestation is given in CHW.
One ECTS contact hour per week has a credit point value of 1. There is no set number of elective courses in a semester, because ECs can be chosen freely by the students.

## DAY ONE COMPETENCES

Veterinary faculties should prepare students to master entry-level veterinary care. At the European level, the European Association of Establishments for Veterinary Education (EAEVE) has formulated so-called “Day One Competences” (DOC), i.e. skills that graduates should master after completing their veterinary studies (EAEVE, 2019). The DOC catalog is shown in the appendix. The ECTS catalog therefore not only shows the learning objectives of the individual courses - the DOC to be achieved for the courses are also defined via footnotes.

## SEMESTER SURVEY

### 1ST SEMESTER

| COURSES | CHW | ECTS |
|---|---|---|
| Anatomy **L** | 3 | 3 |
| Anatomy **P** | 4 | 5 |
| Botany **L** | 2 | 2 |
| Chemistry **L** | 4 | 4 |
| Terminology **L** | 2 | 3 |
| Professional Studies: Communication and Ethics | 1 | 1 |
| Cytology/Histology **L** | 2 | 2 |
| Physics **L/P** | 4 | 5 |
| Animal Husbandry **L** | 2 | 2 |
| Zoology **L** (including one seminar) | 4 | 4 |
| Elective courses | | |
| PRACTICAL | | |
| Agriculture, Animal Breeding and Animal Husbandry (two weeks) | | 4 |

*L= lecture, P= practical, S=seminar*
*CHW = contact hour per week (Semesterwochenstunde)*
*ECTS = European Credit Transfer and Accumulation System, Indication of Credit Points*

Please note: further information regarding courses can be found at:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

## ANATOMY I [1]

### Coordinator:
Arnhold

### Instructors:
Arnhold / Staszyk / Wenisch / Kressin / Fietz

### Course Type:
lecture (3 CHW) + practical (4 CHW)

### ECTS:
lecture: 3, practical: 5

### Introduction:
Anatomy of the Locomotor System: bones, joints and muscles of the body, including blood vessels and nerves of the extremities.

### Overall aims and objectives:
Students should be able to:

- describe bones, joints and muscles in domestic mammals and explain differences between the various species
- reproduce and illustrate the course of nerves and blood vessels of the forelimb and hindlimb
- apply the knowledge acquired to the preparation of the object itself

### Reading list:
- Nickel, Schummer, Seiferle, Lehrbuch der Anatomie der Haustiere, Herausgeber: Parey Bei Mvs, 1. Edition (1997), ISBN-13: 978-3830440178
- König/Liebig: Anatomie der Haussäugetiere: Lehrbuch und Farbatlas für Studium und Praxis, Herausgeber: Schattauer, 4. Edition (2008), ISBN-13: 978-3794526505

### Scripts:
lecture notes

### Electronic sources:
see ILIAS:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

[1] 1.28

### Learning recommendations:
see literature, scripts

### Assessment:
three oral exams during the semester and one oral exam after the third semester within the framework of the Veterinary Intermediate Examination in “Anatomy”

## BOTANY

### Coordinator:
Wissemann

### Instructors:
Wissemann

### Course type:
lecture (2 CHW)

### ECTS:
2

### Introduction:
The course “Introduction to Botany” presents the topics of Botany in its full extent tailored to the needs and requirements of the veterinarian profession. Commencing with mechanisms of diversification, such as co-evolution, evolution factors and speciation, reproductive survival strategies (metabolism in the broader sense, photosynthesis, hydration, metabolisms and the basic organs involved in those (sprout, leaf, root)), the variety of flora will be outlined and explained as a result of adaptation to conditions of terrestrial life through natural selection, and, in the case of the evolution of crop plants, through anthropogenic selection.

### Overall aims and objectives:
Students should be able to:

- trace the evolution of the plant world
- deduce basic processes that lead to the diversification of the plant world
- employ knowledge of processes and be able to transfer the meaning and occurrence of poisons to an evolutionary biological context

### Reading list:

- Raven, Evert, Eichhorn, Biologie der Pflanzen: 4. Verlag: Gruyter; 4. Auflage (22. August 2006), ISBN-10: 3110185318, ISBN-13: 978-3110185317

- Wagenitz, Gerhard: Wörterbuch der Botanik (Sav Biologie), Herausgeber: Spektrum Akademischer Verlag, 2. Edition (2003), ISBN-13: 978-3827413987

### Scripts:
electronic scripts will be supplied

### Learning recommendations:
reading, reading, reading...

### Assessment:
a written exam within the framework of the Veterinary Pre-Intermediate Examination in "Botany" after the second semester

## CHEMISTRY

### Coordinators:
Göttlich/Maaß/Spengler

### Instructors:
Göttlich / Maaß

### Course type:
lecture (4 CHW)

### ECTS:
4

### Introduction:
- atomic and molecular structures, periodic table, elements of nature, introduction to specific s- and p-block elements, chemical bonding, chemical equations, stoichiometry
- substance properties, chemical bond, mixtures, osmoses
- acid-base reactions; buffer systems, pH-value
- redox reaction, redox potentials, electro chemistry
- chemical balance/ thermodynamic/ catalyze
- basic ideas of spectroscopy
- organic molecules: chemistry of functional groups and concerning basic reaction mechanisms, alkane, alkene, alkyne, halogen alkane, alcohol, amine, ether, aldehyde and ketene, carbon acids and attached derivates, arenes, selected natural resources (sugar, peptides, alkaloids, carbohydrates, nucleotides, steroids, vitamins)
- organic-chemical reaction mechanisms, basic ideas of stereo-chemistry

### Overall aims and objectives:

Students should be able to:

- explain basic concepts of chemistry, such as the periodic table, formula language, semantics and stoichiometric calculations
- demonstrate the basic principles in inorganic (acids and bases, redox) and organic (functional groups) chemistry
- outline substance properties of specific elements and bonds of the periodic table
- document the basic principles of organic chemistry (functional groups, reactivity, nomenclature)
- demonstrate a profound basic knowledge of important chemical reactions in inorganic and organic chemistry

### Reading list:

- Zeeck, Chemie für Mediziner, Herausgeber: Urban & Fischer Bei Elsevier; 5. Edition 2003), ISBN-13: 978-3437424410)
- Mortimer, Chemie, Herausgeber: Thieme, Stuttgart; 7. Edition (2001), ISBN-13: 978-3134843071

### Electronic sources:

an electronic version of the lecture is currently available online:

https://studip.uni-giessen.de

### Self-assessment:

exercises are available online; voluntary participation in additional tutorials is currently possible

### Assessment:

- an exam at the end of the first semester which needs to be sat in order to qualify for the practical part in the second semester; if passed the grade will be taken into account for the practical exam
- a written exam within the framework of the Veterinary Pre-Intermediate Examination in “Chemistry” after the second semester

## TERMINOLOGY

### Coordinator:

Hospes

### Instructor:

Hospes

### Course type:
lecture (1 CHW) + practical (1 CHW)

### ECTS:
3

### Introduction:
An introduction to:

- the nature, application and history of medical terminology
- characteristics of anatomic and pathologic nomenclature, applied terminology, respectively parts and structuring of these terms
- the relevance of Greek and Latin including the influence of modern foreign languages

On the basis of linguistic content and terms which describe the construction, functions and diseases of the different organ systems, this will, with regard to the varieties of species, serve as an introduction to the complex fields of veterinary medicine.

### Overall aims and objectives:
Students should be able to:

- define the parts of medical technical terms and explain their significance with the help of the acquired vocabulary and the terminological basics
- explain coherences that are specific to veterinary subjects and fields

### Reading list:

- Pschyrembel Klinisches Wörterbuch, Verlag: Walter de Gruyter; 261 neu bearbeitete Edition (2007), ISBN-13: 978-3110185348
- Duden. Wörterbuch medizinischer Fach- begriffe, Herausgeber: Bibliographisches Institut, Mannheim; 8. überarbeitete und aktualisierte Edition (2007), ISBN-13: 978- 3411046188

### Learning recommendations:
a revision of the content of the lecture, the literature and electronic sources recommended during the course

### Assessment:
a written exam at the end of the first semester

## PROFESSIONAL STUDIES: COMMUNICATION AND ETHICS [2]

### Coordinators:
Dilly / Krämer / Tacke

### Instructors:
Dilly / Krämer / Tacke

### Course type:
Lecture (1 CHW)

### ECTS:
1

### Introduction:
Students get first insights into the veterinary profession as well as an introduction to animal welfare ethics. The lecture teaches the basics of veterinary communication (veterinarian-patient-owner relationship), discusses situations of the veterinary dilemma (e.g. killing vs. therapy) and discusses moral and ethical aspects of euthanasia. Furthermore, the students are familiarised with the foundations of euthanasia in terms of animal protection law. The focus is on the reflection of different problem areas in veterinary practice and the consideration of ethical perspectives in this context.

### Overall aims and objectives:
Students should be able to:

- reproduce the basics of veterinary communication
- discuss moral-ethical aspects of killing animals
- reproduce the principles of the animal protection law on euthanasia

### Reading list:
See lecture

### Learning recommendations:
See lecture

[2] 1.1, 1.4, 1.7, 1.10, 1.32

## CYTOLOGY/HISTOLOGY [3]

### Coordinator:
Arnhold

### Instructors:
Arnhold / Staszyk / Wenisch / Kressin / Fietz

### Course type:
lecture (2 CHW)

### ECTS:
2

### Introduction:
histological technology and light microscopy, cell and tissue science (epithelial, connective and supporting tissue, muscles and nerves), microscopy of lymphatic organs

### Overall aims and objectives:
Students should be able to:

- reproduce a basic idea of histological fixation and staining methods and of the physical principles of light microscopy
- define and explain the structure of the cell, its organelles and cell division
- recognise, draw and explain the tissue-specific structures
- recognise, draw and explain the lymphatic organs

### Reading list:
- Liebich: Funktionelle Histologie der Haussäugetiere und Vögel, Publisher: Schattauer, 5th edition (2009), ISBN: 978-3-7945-2692-5
- Eurell/Frappier: Dellmann's Textbook of Veterinary Histology, Publisher: Wiley/Blackwell, 6th edition (2006), ISBN: 978-0-7817-4148-4
- Weyrauch/Smollich: Histologiekurs für Veterinärmediziner, Publisher: Enke (1998), ISBN-13: 978-3432295015

### Electronic learning material:
see StudIP:
https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

[3] 1.28

### Learning recommendations:
see literature and teaching materials

### Assessment:
a written exam during the second semester and an oral exam within the framework of the Veterinary Intermediate Examination in “Histology and Embryology” after the third semester

## EXPERIMENTAL PHYSICS FOR VETERINARIANS

### Coordinator:
Gutz

### Instructors:
Lecturers in the physics department

### Course type:
lecture (2 CHW) and practical (2 CHW)

### ECTS:
5

### Introduction:
- the fundamentals of mechanics, acoustics, thermodynamics, optics, electricity and magnetism
- energy and entropy
- aggregate states, chemical solutions, osmotic pressure, hydrostatics of liquids, gases, gaseous mixtures, diffusion
- structure of matter, of radiation and its interaction with the matter
- radiation protection and application of radiation in medicine
- functionality of diagnostic imaging techniques in medicine

### Overall aims and objectives:
Students should be able to
- explain and apply the fundamental physical values, laws and methods
- understand simple problems in physics to which mathematical techniques were applied
- explain the physical fundamentals of measuring and diagnostic imaging methods in medicine
- evaluate medically relevant aspects of radiation physics and radiation protection

### Reading list:

- W. Hellenthal, Physik für Mediziner und Biologen, Wiss. Verlagsgesellschaft Stuttgart, 8. neu bearbeitete Edition (2007), ISBN-13: 978-3804723115

### Electronic sources:

see StudIP:
https://studip.uni-giessen.de/studip/

### Scripts:

see StudIP:
https://studip.uni-giessen.de/studip/

### Self-assessment:

see StudIP:
https://studip.uni-giessen.de/studip/

### Assessment:

an exam during the first semester and an oral exam within the framework of the Veterinary Pre-Intermediate Examination in "Physics" after the second semester

## ANIMAL HUSBANDRY [4]

### Coordinator:

König

### Instructors:

Engel, Lühken

### Course type:

lecture (2 CHW)

### ECTS:

2

### Introduction:

This lecture will impart the ethical and economical requirements of animal husbandry, including legal parameters, basic husbandry methods and criteria for their evaluation, as well as the connection with cross compliance and the requirements of animal husbandry as compared to organic farming. Students learn about the respective husbandry methods for farm animals such

[4] 1.1, 1.10, 1.20

as cattle, pigs, sheep, goats, horses, poultry and rabbits, with regard to usage and production process, taking into account animal health and product quality, as well as husbandry methods for dogs, taking into account legal requirements.

### Overall aims and objectives:

Students should be able to

- explain the legal parameters of animal husbandry concerning livestock and domestic animals
- describe methods of animal husbandry
- define and explain criteria concerning the evaluation of methods of animal husbandry
- asses negative effects of these methods on the health of animals
- evaluate the effects of these methods on the quality of the foodstuff obtained
- explain the requirements of organic farming in comparison with conventional farming

### Reading list:

- Methling, W., Unshelm, J.: Umwelt- und tiergerechte Haltung von Nutz-, Heim- und Begleittieren, Herausgeber: Parey Bei Mvs; 1. Edition (2002), ISBN-13: 978-3830440000
- Hoy, S., Gauly, M., Krieter, J.: Nutztierhaltung und -hygiene, Herausgeber: UTB; 1. Edition (2006), ISBN-13: 978-3825228019

### Electronic sources:

see StudIP:

https://studip.uni-giessen.de/studip/

### Learning recommendations:

see literature mentioned above

### Assessment:

an oral exam within the framework of the Veterinary Medical Examination in “Animal Husbandry and Hygiene” after the sixth semester

## ZOOLOGY

### Coordinator:

Manzini

### Instructors:

Manzini, Westermann, Hassenklöver

### Course type:
lecture and follow-up seminar (4 CHW)

### ECTS:
4

### Introduction:
The lecture series “Introduction to Zoology for veterinary students” is specially adapted to the study of veterinary medicine. Central aspects of the lecture are the essential systematic, anatomical and evolutionary aspects of the animal kingdom. Commencing with the animal cell, the diverse organisational levels of faunal construction plans will be dealt with, right through to mammals. Special regard is given to the evolutionary development of symbioses and parasitism; further the life cycles of host or intermediate host and symbiont/parasite will be explained.

### Overall aims and objectives:
Students should be able to:

- explain the construction and division of animal cells
- explain the anatomy, physiology and position of organs in invertebrates and vertebrates
- outline the life cycles of symbionts and parasites and explain them within their evolutive contexts
- name morphologic and molecular aspects of the systematic classification of animals
- allocate animals to their ecological niches, based upon their anatomy and physiology

### Reading list:

- Ahne, Liebich, Stohrer & Wolf (2000) Zoologie – Lehrbuch für Studierende der Veterinärmedizin und Agrarwissenschaften, Schattauer, F.K. Verlag (2000), ISBN-13: 978-3794517640
- Clauss & Clauss (2005) Zoologie für Tiermediziner, Enke-Verlag, Edition: 1 (2004), ISBN-13: 978-3830410379

### Electronic sources
a script of the lecture will be uploaded to StudIP as learning aide (but not as a substitute for the literature mentioned above!)
See StudIP:
https://studip.uni-giessen.de/studip/

### Self-assessment:
can be found in the book by Clauss and Clauss

### Learning recommendations:
during the seminar, the students will be advised on learning methods concerning the special field of "Zoology"

### Assessment:
written multiple-choice exam within the framework of the Veterinary Pre-Intermediate Examination in „Zoology "after the second semester

## PRACTICAL IN AGRICULTURE, ANIMAL BREEDING AND ANIMAL HUSBANDRY [5]

### Course duration:
14 days full time after the winter semester, at the "Lehr- und Forschungsstation Oberer Hardthof"

### Coordinator:
König

### Instructors:
Engel and assistants

### Course type:
practical (2 Weeks)

### ECTS:
4

### Introduction:
The students will receive an introduction to the general structures of agriculture as well as to the upstream and downstream fields. They will get to know operational procedures and production factors of the various production facilities at the study and research station "Oberer Hardthof" and other agricultural facilities.

### Overall aims and objectives:
Students should be able to:

- demonstrate knowledge of organisational structures of agriculture and farms
- explain production factors and procedures in farms with animal husbandry and the manufacturing of foodstuff
- discuss the economical importance of animal production

[5] 1.7, 1.28

### Reading list:

- Weiß, J., Pabst, W., Strack, K.E., Granz, S.: Tierproduktion, Herausgeber: Parey Bei Mvs; 13. überarbeitete Edition (2005), ISBN-13: 978-3830441403

### Maximum capacity:

50 students per course, 4 courses will be offered

### Assessment:

students prepare protocols that will be graded after the course

## 2ND SEMESTER

| COURSES | CHW | ECTS |
|---|---|---|
| Agricultural Science **L** | 2 | 2 |
| Anatomy II **L** | 1 | 1.5 |
| Anatomy II **P** | 2 | 4 |
| Biostatistics **P** | 2 | 3 |
| Botany **P** | 2 | 4 |
| Chemistry **S/P** | 5 | 8 |
| Embryology **S** | 1 | 1 |
| Ethology and Animal Welfare I **L** | 2 | 2 |
| Animal Nutritional Sciences **L** | 1 | 1 |
| Animal Nutritional Sciences **P** | 2 | 3 |
| Microscopic Organ Theory **P** | 2 | 4 |
| Elective Courses | | |
| **EXAMINATIONS** | | |
| Exam in Physics (including the fundamentals of physical radiation protection) | | 2 |
| Exam in Chemistry | | 2 |
| Exam in Zoology | | 2 |
| Exam in Botany of feed crops, poisonous and medicinal plants | | 2 |

*L= lecture, P= practicals, S= seminar*
*SWS (CHW)= Semesterwochenstunde (contact hour per week)*
*ECTS = European Credit Transfer and Accumulation System, Indication of Credit Points*

Reference: Further information regarding Courses can be found under:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

## ANATOMY II [6]

### Coordinator:
Arnhold

### Instructors
Arnhold / Staszyk / Wenisch / Kressin / Fietz

### Course type:
lecture (1 CHW) and practical (2 CHW)

### ECTS:
lecture: 1.5; practical: 4

### Introduction:
- Anatomy of the central nervous system (brain and spinal cord) and sensory organs.
- Anatomy of the head: oral and nasal cavity, pharynx, laryngeal; muscles, blood vessels, nerves and lymphatic glands

### Overall aims and objectives:
Students will be able to:
- implement the material read by preparing it on the object and recognise and explain the correlation between structures and function
- recognise and explain differences between animal species

### Reading list:
- Nickel, Schummer, Seiferle, Lehrbuch der Anatomie der Haustiere, Herausgeber: Parey Bei Mvs, 1. Edition (1997), ISBN-13: 978-3830440178
- König/Liebig: Anatomie der Haussäugetiere: Lehrbuch und Farbatlas für Studium und Praxis, Herausgeber: Schattauer, 4. Edition (2008), ISBN-13: 978-3794526505

### Electronic sources
see StudIP and ILIAS:
https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

### Scripts:
a script of the lecture will be available

[6] 1.28

### Learning recommendations:
see the literature and sources mentioned above

### Assessment:
two oral exams during the semester as well as one oral exam within the framework of the Veterinary Intermediate Examination in “Anatomy” after the third semester

## BIOSTATISTICS

### Coordinator:
Büttner

### Instructors
Büttner

### Course type:
practical (2 CHW)

### ECTS:
3

### Requirements:
prior knowledge of the fundamentals of mathematics as taught in school

### Introduction:
The course is divided into four parts:

1. mathematical fundamentals of biostatistics
2. methods of descriptive statistics
3. elementary probability calculation
4. methods of analytical statistics

### Overall aims and objectives:
Students should be able to:

- distinguish between the different types of statistics in relation to their scaling, and, dependent on these, apply the most important methods of descriptive statistics (especially statistic values of one- and two- dimensional statistics, medicinal statistical values, and graphic illustration)
- use the term of probability and apply it to simple veterinary problems. In particular, students will have realised that many procedures of veterinary medicine are of a stochastic rather than a deterministic nature

- use simple methods of analytical statistics to compare dependent and independent samples (Chi-Square-Test, t-Test, Wilcoxon-Mann-Whitney-Test, Wilcoxon-Test)
- explain statistic calculation formulae and acquire further knowledge of statistical methods with the help of an additional textbook

### Reading list:

- Lorenz, R. J.: Grundbegriffe der Biometrie, 4. Edition, Gustav Fischer Verlag, Stuttgart, 1996
- Sachs, L.: Angewandte Statistik –Anwendung statistischer Methoden, Herausgeber: Springer-Verlag GmbH; 11. überarbeitete und aktualisierte Edition 2004 (2003), ISBN-13: 978-3540405559

### Electronic learning material:

Based on the progress in the course material, the sample solutions of the practicals are published in StudIP.

### Scripts:

the student working group Biomathematics and DV will provide a script on Biometrics

### Learning recommendations:

The best way to prepare for the learning tests is to use the script in conjunction with your own practical notes and the sample solutions. It is also recommended to attend the accompanying biometrics seminar as an elective course.

### Assessments:

Four multiple-choice exams during the semester. Alternatively, students can sit one oral exam, which will include all the subject matter covered by the tutorial, at the end of the semester

## BOTANY [7]

### Coordinator:

Wissemann

### Instructors

Wissemann

### Course type:

practical (2 CHW)

[7] 1.28

ECTS:
4

Requirements:
Participation in the basic lecture “Introduction to Botany”

Introduction:
Poisonous plants are numerous and widely spread in the central European flora. The conscious and unconscious introduction of foreign plants has recently increased the amount of poisonous plants in the flora surrounding us significantly, which has an enormous impact on cases of poisonings in animals. However: “Sola dosis facit venenum”, only the dosage determines whether something is poisonous or not. Therefore this course will introduce the fundamentals of applied plant classification. Besides poisonous plants, medicinal and forage plants will be defined, i.e. the botanical diversity of flora. At the end of the course students will be able to define plant species unknown to them and to acquire information concerning their toxicology.

Overall aims and objectives:
Students should be able to

- define unknown plant species and apply the knowledge acquired during the lecture concerning the structure, biology and function of plants to analyse and assess plant structures
- acquire information on plant toxicology
- deduce assertions concerning the possible toxicology of comparable plant species by using models known to them
- describe the diversity of the plant kingdom as well as its benefits and adverse effects
- allocate plants to the different classes of the plant system based on morphological and anatomical features

Reading list:

- Schmeil-Fitschen, Flora von Deutschland und angrenzender Länder, Herausgeber: Quelle & Meyer; 94. unveränderte Edition (2009), ISBN-13: 978-3494014685
- Roth, Daunderer, Kormann: Giftpflanzen, Pflanzengifte, Herausgeber: Nikol Verlags-GmbH; 5. erweiterte Auflage (2008), ISBN-13: 978-3868200096

Scripts:
a script of the lecture will be supplied in electronic form

Self-assessment:
self-assessment questions become redundant because a comparison between the plant at hand, classified by the student, and the illustration found in a standard reference book (e.g.

Haupler/Muer: Bildatlas der Farn- und Blütenpflanzen Deutschlands) will instantly reveal the level of knowledge the student has already acquired...

### Learning recommendations:
practice, practice, practice...

### Assessment:
a written exam within the framework of the Veterinary Pre-Intermediate Examination in "Botany of feed crops, poisonous and medicinal plants" after the second semester

## PRACTICAL INTRODUCTION TO GENERAL CHEMISTRY [8]

### Coordinator:
Göttlich/Maaß

### Instructors:
assistants of the Department of Chemistry

### Course type:
practical (3 CHW) and seminar (2 CHW) in small groups

### ECTS:
8

### Prerequisites:
basic knowledge of chemistry

### Introduction:
- chemical parameters, concentrations and calculations
- acid and bases, pH-value, chemical balance
- titration, salts, buffer
- redox reactions, galvanic element, redox potentials
- Equilibrium constants, solubility products
- complex formations
- organic compound types, molecule models
- stereo chemistry of organic compounds
- isolation methods of organic bonds, chromatography
- analyses of organic compounds

[8] 1.28

- natural resources and macromolecules

### Overall aims and objectives:

Students should be able to:

- demonstrate basic practical laboratory work competence with regard to good laboratory practice
- name chemical parameters and masses including the nomenclature
- demonstrate a general outline of the principles and procedures of redox reactions and acid-base reactions (including titration)
- demonstrate knowledge and skills in analysis of ions of inorganic and organic compounds
- discuss reaction kinetics and catalysis
- explain the structure of organic compounds

### Recommended reading list:

Schindler, Göttlich; Chemisches Grundpraktikum im Nebenfach

### Scripts:

currently supplied in printed form

### Self-assessment:

exercises are available online at:

https://studip.uni-giessen.de

### Assessment:

- a final exam at the end of the practical during the second semester
- a written exam within the framework of the Veterinary Pre-Intermediate Examination in "Chemistry" after the second semester

## GENERAL EMBRYOLOGY [9]

### Coordinator:

Arnhold

### Instructors:

Arnhold and assistants

### Course type:

seminar (1 CHW)

[9] 1.8

## ECTS:
1

## Introduction:
*Predevelopment:*
development and structure of gametes, sexual cycle, fertilization

*Primitive development:*
blastogenesis, germ leaf development, localization of primitive organs, development of cover and attachments

*Placentation:*
general placentation science, placentation of domestic mammals

## Overall aims and objectives:
Students should be able to:

- define and explain the basic patterns of evolutionary theory and comparative aspects of the primitive development and the placentation of domestic mammals

## Reading list:

- Schnorr/Kressin: Embryologie der Haustiere, Herausgeber: Enke; Edition: 5., neu bearbeitete Ausgabe (2006), ISBN-13: 978-3830410614
- Rüsse/Sinowatz: Lehrbuch der Embryologie der Haustiere, Herausgeber: Parey; ISBN-13: 978-3826332685

## Electronic sources:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

## Learning recommendations:
see literature recommended above

## Assessment:
an oral exam within the framework of the Veterinary Intermediate Examination in “Histology and Embryology” after the third semester

## ETHOLOGY AND ANIMAL WELFARE I [10]

### Coordinator:
Krämer

### Instructors:
Krämer, Kuhne, Hornung

### Course type:
Lecture (2 CHW)

### ECTS
2

### Introduction:
introduction to animal welfare legislation and ethology

### Overall aims and objectives:
The students should be able to:

- relate ethological knowledge of different animal species to legal principles and husbandry requirements and place the subject in the complex of veterinary medicine.

### Reading list:
- "Kommentare zum Tierschutzgesetz", Hirtz, Maisack, Moritz, 2016

### Scripts:
are created and made available as a PDF in StudIP
https://studip.uni-giessen.de

### Assessment:
part of the animal welfare examination

## AGRICULTURAL SCIENCE [11]

### Coordinator:
FB09

[10] 1.1, 1.7, 1.10, 1.20

[11] 1.2, 1.7

### Instructors:
Aurbacher, Ströde

### Course type:
lecture (2 CHW), 1 excursion

### ECTS:
2

### Introduction:
The first part of the lecture will focus on agricultural livestock. Animal-orientated production processes will be illustrated. As a part of this, the illustration of animal species, the introduction to organisational structures, including methods of animal husbandry and the presentation of products (meat, milk, wool, etc) will be discussed. The efficiency of production methods will be presented. The syllabus will also include an introduction to legal regulations concerning animal husbandry in agriculture.

The second part of the lecture is part of the studies in functional business management and will deal with the fundamentals of business administration and applied business studies. This will include an introduction to the basic terminology of economics and accounting. The major topics included will be financial management, annual closure, balance-extraction calculation, gain-loss calculation and cash-basis accounting.
The students will get to know methods of cost-benefit calculation as well as investment calculation. The teaching unit practice management will centre on the veterinary surgery as a business model. It will provide an overview on the organisation and legal forms of the veterinary practice, including tariff and tax law and marketing methods.

### Overall aims and objectives:
Students should be able to:

- define and explain the methods of livestock production in agriculture (organisational forms, husbandry methods, etc.)
- evaluate the efficiency of agricultural methods in livestock production
- define basic terms of business studies
- apply methods of controlling (e.g. accounting and finances)
- explain economic calculation methods (e.g. investment calculation)
- apply the methods of practice management

### Reading list:

- Kuhlmann: Einführung in die Betriebswirtschaftslehre für den Agrar- und Ernährungsbereich

### Electronic sources:

see StudIP:

https://studip.uni-giessen.de/studip/

### Assessment:

The topic will be included in the oral exam taken within the framework of the Veterinary Intermediate Examination in "Animal breeding and Genetics including animal evaluation" after the fourth semester.

## ANIMAL NUTRITIONAL SCIENCE [12]

### Coordinator:

Ringseis

### Instructors:

Ringseis

### Course type:

lecture (1 CHW)

### ECTS:

1

### Introduction:

Definition of and introduction to animal nutritional sciences according to origin and usages.
The lecture will deal with the most important animal feed groups (green feed and preserve, straw, tubers and roots, grain and seeds, feed from industrial processing of plants, feed on microbial basis, feed of animal origin, feed lipids, catering waste and by-products of the baking industry, additives and extending ingredients) with regard to chemical (composition, nutritive and anti nutritive ingredients) and physical (structure) properties and applicability (usage recommendations) for mono gastric and ruminant animals.

- Important analyses of feed (Weender Analytics, Van Soest Analytics)
- Feed preservation and storage,
- Feed spoilage
- Feed assessment criteria
- Methods of feed production
- Feed safety and regulations
- The meaning of mixed feeding stuff

[12] 1.10, 1.20, 1.21

### Overall aims and objectives:

Students should be able to:

- demonstrate knowledge of chemical and physical properties of animal feed including its production, conservation and storage
- demonstrate knowledge of the applicability of animal nutrition groups for feeding of agricultural livestock
- explain established laboratory methods used for the evaluation of feed
- demonstrate knowledge of the legal framework for the usage of feed and feed additives
- demonstrate knowledge of rationing regarding the aspect of fulfilment of demand and cost minimization

### Reading list:

- Jeroch, H., Drochner, W., Simon, O.: Ernährung Landwirtschaftlicher Nutztiere; Ulmer-Verlag, Stuttgart 1999, ISBN 3-8252-8180-9
- Jeroch, H., Flachowsky, G., Weissbach, F.: Futtermittelkunde; Gustav-Fischer-Verlag Jena 1993, ISBN 3-334-00384-1

### Electronic sources:

PowerPoint presentations

### Learning recommendations:

We recommend studying the PowerPoint presentation before attending the lecture and acquiring further information concerning the subject matter with the help of the recommended books.

### Assessment:

a written exam within the framework of the Veterinary Medical Examination in "Animal nutrition "after the sixth semester

## PRACTICAL IN ANIMAL NUTRITIONAL SCIENCES [13]

### Coordinator:

Eder

### Instructors:

Eder and assistants

### Course type:

practical (2 CHW)

[13] 1.8, 1.10, 1.20, 1.21, 1.28

## ECTS:
3

## Introduction:
The practical course will accompany the one-hour lecture in “Animal Nutritional Sciences”. Various types of animal feed will be examined with the help of the Weender-Analysis in order to identify nutrient and energy values. Aspects of the quality of the feed, the problematic issue of unwanted and banned supplements, as well as the differentiation of contamination and tampering will be demonstrated by experiments. The evaluation of green feed, straw and hay will be covered during a practical exercise. Microscopic assessments on starch, contamination and the occurrence of animal components in animal nutrition and mixture feeds will be conducted.

## Overall aims and objectives:
Students should be able to

- provide knowledge on processing, preserving and storage of animal feed including relevant legal aspects of feed restrictions
- apply methods to evaluate and characterise animal feed

## Reading list:
- Kamphues, J., Coenen, M., Iben, Chr., Kienzle, E., Pallauf, J., Simon, O., Wanner, M., Zentek, J.: Supplemente zu Vorlesungen und Tutorialen in der Tierernährung; 11. Auflage, Schaper Verlag Alfeld-Hannover 2009, ISBN 978-3-7944-0223-6
- Kirchgessner, M., Roth, F.X., Schwarz, F.J., Stangl, G.I.: Tierernährung; 12. Auflage, DLG-Verlag Frankfurt/Main 2008, ISBN 978-3-7690-0703-9

## Electronic sources:
PowerPoint presentations

## Scripts:
a script and further background information will be supplied via Stud-IP
https://studip.uni-giessen.de

## Learning recommendations:
We recommend to prepare every practical session by reading the script and the background information and to engross the content of the practical subsequently.

## Assessment:
written exam (TAppV preliminary TP certificates) within the framework of the Veterinary Medical Examination in “animal nutrition “after the sixth semester

## MICROSCOPIC ORGAN TTHEORY I [14]

### Coordinator:
Arnhold

### Instructor:
Arnhold / Staszyk / Wenisch / Kressin / Fietz

### Course type:
lecture and practical (2 CHW)

### ECTS:
4

### Introduction:
Microscopic anatomy of all organ systems discussed during the second semester in macroscopic anatomy: central nervous system, sensory organs, head

### Overall aims and objectives:
Students should be able to:

- recognise organ-specific structures, represent them graphically and explain them
- Correlate microscopic and macroscopic anatomy

### Reading list:
- Liebich: Funktionelle Histologie der Haussäugetiere und Vögel, Verlag: Schattauer, 5. Auflage (2009), ISBN: 978-3-7945-2692-5
- Eurell/Frappier: Dellmann's Textbook of Veterinary Histology, Verlag Wiley-Blackwell; 6. Edition (2007), ISBN-13: 978-0781741484
- Weyrauch/Smollich: Histologiekurs für Veterinärmediziner, Herausgeber: Enke (1998), ISBN-13: 978-3432295015

### Electronic sources
see StudIP and ILIAS

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

### Learning recommendations:
see literature and sources indicated above

[14] 1.28

Assessment:

Oral examination as part of the Veterinary Medical Examination in "Animal Husbandry and Animal Hygiene" after the 6th semester

## 3RD SEMESTER

| COURSES | CHW | ECTS |
|---|---|---|
| Anatomy III **L** | 2 | 2 |
| Anatomy III **P** | 4 | 6 |
| Biochemistry **L** | 3 | 3 |
| Ethology and Animal Welfare II | 2 | 2 |
| Microscopic Organ Theory II **P** | 2 | 4 |
| Physiology **L** | 4 | 4 |
| Animal breeding and genetics **L** | 2 | 2 |
| Elective Courses | | |
| **EXAMINATIONS** | | |
| Exam in Anatomy | | 2 |
| Exam in Histology and Embryology | | 2 |

*L= lecture, P= practicals, S= seminar*
*SWS (CHW)= Semesterwochenstunde (contact hour per week)*
*ECTS = European Credit Transfer and Accumulation System, Indication of Credit Points*

Please note: further information regarding courses can be found at:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

## ANATOMY III [15]

### Coordinator:
Arnhold

### Instructor:
Arnhold / Staszyk / Wenisch / Kressin / Fietz

### Course type:
lecture (2 CHW) + practical (4 CHW)

### ECTS:
lecture: 2, practical: 6

### Introduction:
anatomy of the skin including that of the mammary gland, the hoof and claw; of thoracic, abdominal and pelvic organs; furthermore avian anatomy

### Overall aims and objectives:
Students should be able to:

- describe the position of the body cavity organs in situ
- explain the structure and function of the organs and demonstrate on specimens
- explain the structure of the skin and skin appendage organs and demonstrate on specimens
- name important differences between avian anatomy and the anatomy of domestic mammals, as well as implement the material heard in the lecture by dissection on the object

### Reading list:
- Nickel/Schummer/Seiferle: Anatomie der Haustiere, Herausgeber: Parey Bei Mvs; 1. Auflage (1997), ISBN-13: 978-3830440178
- König/Liebig: Anatomie der Haussäugetiere, Herausgeber: Schattauer; 4. Edition (2008), ISBN-13: 978-3794526505

### Electronic sources
see StudIP and ILIAS

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

[15] 1.28

### Learning recommendations:
see the recommended literature and sources

### Assessment:
three oral exams during the semester and one oral exam within the framework of the Veterinary Intermediate Examination in “Anatomy” after the third semester

## BIOCHEMISTRY

### Coordinator:
Mazurek

### Instructor:
Mazurek, Scheiner-Bobis

### Course type:
lecture (3 CHW)

### ECTS:
3

### Introduction:
The first part of this lecture on biochemistry will deal with:

- the biochemistry of the cell organelles
- properties and functions of proteins and enzymes
- reduction and biosynthesis of carbohydrates
- terminal oxidation of catabolites in the citrate cycle of lipid acids
- lipid and cholesterol metabolisms
- protein-turnover and cleansing of ammonium in the uric cycle
- the processes of oxygen and CO2 transport in the blood,
- the biosynthesis and degradation of porphyrins
- finally, the respiratory chain in ATP-production or thermogenesis in brown fat tissue of young and hibernating animals

### Overall aims and objectives:
Students should be able to:

- describe the metabolic pathways discussed.
- establish connections between the discussed metabolic pathways and diseases.
- explain the relevance of metabolites and enzymes of these metabolic pathways for diagnosis and therapy

### Reading list:
No special recommendation. All commercially available books on biochemistry.

### Electronic sources:
see StudIP:
https://studip.uni-giessen.de/studip/

see ILIAS:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

### Self-assessment:
Stud IP / ILIAS

### Assessment:
an oral or written exam within the framework of the Veterinary Intermediate Examination in "Biochemistry" after the fourth semester

## ETHOLOGY AND ANIMAL WELFARE II [16]

### Coordinator:
Krämer

### Instructors:
Krämer, Kuhne, Hornung

### Course type:
Lecture (2 CHW)

### ECTS
2

### Introduction:
introduction to animal welfare legislation and ethology

### Overall aims and objectives:
Students should be able to:

- relate ethological knowledge of different animal species to legal principles and husbandry requirements and classify the subject in the complex of veterinary medicine.

[16] 1.1, 1.7, 1.10, 1.20

### Reading list:

- "Kommentare zum Tierschutzgesetz", Hirtz, Maisack, Moritz, 2016

### Scripts:

are created and made available as PDF in StudIP

### Assessment:

part of the exam "Ethology and Animal Welfare" after the seventh semester

## MICROSCOPIC ORGAN THEORY II [17]

### Coordinator:

Arnhold

### Instructors:

Arnhold / Staszyk / Wenisch / Kressin / Fietz

### Course type:

practical (2 CHW)

### ECTS:

4

### Introduction:

microscopic anatomy of the organ systems discussed during the third semester in macroscopic anatomy: skin, mammary gland, hoof, clutch and claw and organs of the thoracic, abdominal and pelvic cavities

### Overall aims and objectives:

Students should be able to:

- recognise organ-specific structures, represent them graphically and explain them, as well as
- establish the link between macroscopic and microscopic anatomy and derive and list correlations between structure and function by linking macroscopic and microscopic anatomy

[17] 1.28

### Reading list:

- Eurell/Frappier: Dellmann's Textbook of Veterinary Histology, Verlag Wiley-Blackwell; 6. Edition (2007), ISBN-13: 978-0781741484
- Weyrauch/Smollich: Histologiekurs für Veterinärmediziner, Herausgeber: Enke (1998), ISBN-13: 978-3432295015

### Electronic sources:

see StudIP and ILIAS:

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

### Learning recommendations:

see recommended literature and sources

### Assessment:

a written exam during the semester and an oral exam within the framework of the Veterinary Intermediate Examination in "Histology and Embryology" after the third semester

## PHYSIOLOGY

### Coordinator:

Diener, Gerstberger

### Instructors:

Diener, Gerstberger, Pouokam, Roth, Rummel

### Course type:

lecture (3 CHW) + additions to the lecture (1 CHW)

### ECTS:

4

### Introduction:

Physiologic fundamentals of important bodily functions in domestic animals (especially mammals) will be covered in this lecture of the 3rd semester (3 + 1 CHW). The following organ and functional systems will be dealt with in detail:

- fundamentals of cell physiology: transport systems, intracellular signal transduction
- neurophysiology; membrane potentials, excitation and transmission; neurotransmitters and receptors
- physiology of muscles; (supra-)spinal control of movement; proprio-receptors, pathophysiology

- the vegetative nervous system: sympathetic nervous system, parasympathetic nervous system and enteric nervous system
- physiology of senses: general basics; sensory modalities of skin; eye, hearing and vestibular organ; taste and smell; pathophysiology
- physicochemistry of blood, physicochemistry of erythrocytes; leucocytes; blood clotting; pathophysiology
- immunology: the system of cellular and humoral specific and unspecific defence
- cardiaovascular: excitation and mechanics of the heart; artery and venous system; microcirculation; peripheries and central circulatory regulation; pathophysiology
- physiology of kidney function: glomerular function; tubular resorption and secretion; hormonal control; acid and base management; pathophysiology
- salt and water regulation: fluid compartments; hypothalamic control

### Overall aims and objectives:

Students should be able to:

- understand the physiology of single organ systems, including their cellular and biochemical fundamentals, as well as certain physical laws
- deduct and recognize integrative correlations: i.e. understand the cross-linking of organ systems by the superior control of the nervous system, the immune system and the endocrine system
- receive a first insight into cellular and systematic mechanisms of pathophysiological developments in animal organisms

### Reading list:

- v. Engelhardt, Breves: Physiologie der Haustiere, Verlag: Enke; 3. vollständig überarbeitete Auflage 2010 (2009), ISBN-13: 978-3830410782
- Speckmann, Hescheler, Köhling: Physiologie, Urban & Fischer Verlag; 5. Auflage (2008), ISBN-13: 978-3437413186
- Klinke, Silbernagel: Lehrbuch der Physiologie, Verlag: Thieme, Stuttgart; 5. Auflage (2005), ISBN-13: 978-3137960058

### Electronic sources:

see StudIP and ILIAS:

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

Haschke, Diener (2007). Multimedia Physiologie – Ein interaktives Lernprogramm für Veterinärmediziner Version 3.2. Enke Verlag im MVS Medizinverlag, Stuttgart

### Scripts:
An extensive script containing numerous slides of the lecture can be bought at the beginning of the semester.

### Self-assessments:
Haschke, Diener (2007). Multimedia Physiologie – Ein interaktives Lernprogramm für Veterinärmediziner Version 3.2. Enke Verlag im MVS Medizinverlag, Stuttgart

### Learning recommendations:
see the preceding four bullets

### Assessment:
an oral exam within the framework of the Veterinary Intermediate Examination in "Physiology" after the fourth semester

## ANIMAL BREEDING AND GENETICS [18]

### Coordinator:
König

### Instructors:
König and scientific staff

### Course type:
Lecture (2 CHW)

### ECTS
2

### Introduction:
The lecture will cover the general basics of animal breeding and genetics as well as legal basics.

### Overall aims and objectives:
- contents and principles of animal breeding
- laws in animal breeding
- genes, genetic markers, epigenetics, gene editing
- quantitative and qualitative genetics
- reproduction of different livestock species and horses

[18] 1.1, 1.10

- inbreeding, kinship, hereditary defects
- effective population size, genetic diversity

### Reading list:

- William, A.; Simianer, H.: Tierzucht, Publisher: Eugen Ulmer Stuttgart (2011), ISBN 978-3-8252-3526-0

### Electronic learning material:

see StudIP:
https://studip.uni-giessen.de/studip/

### Learning recommendations:

see literature

### Assessment:

an oral and a practical exam within the framework of the Veterinary Intermediate Examination in “Animal breeding and genetics” after the fourth semester

## 4TH SEMESTER

| COURSES | CHW | ECTS |
|---|---|---|
| General Bacteriology and Mycology **L** | 1 | 1 |
| Biochemistry **L** | 3 | 3 |
| Biochemistry **P/S** | 4 | 6 |
| Physiology **L** | 4 | 4 |
| Physiology **P/S** | 5 | 6 |
| Propaedeutics **L** | 2 | 2 |
| Skills Lab-Propaedeutics **P** | 1 | 1 |
| Animal Breeding **L** | 2 | 2 |
| Animal Breeding **P** | 2 | 3 |
| General Virology **L** | 1 | 1 |
| Elective Courses | | |
| **EXAMINATIONS** | | |
| Exam in Physiology | | 2 |
| Exam in Biochemistry | | 2 |
| Exam in Animal Breeding and Genetics including the assessment of animals | | 2 |

*L= lecture, P= Practical, S= seminar*
*CHW= Semesterwochenstunde (contact hour per week)*
*ECTS = European Credit Transfer and Accumulation System, Indication of Credit Points*

## General Bacteriology And Mycology [19]

### Coordinator:
Ewers

### Instructors:
Ewers, Bauerfeind

### Course type:
lecture (1 CHW)

### ECTS:
1

### Introduction:
The lecture will cover the fundamentals of bacteriology and mycology, infection and epidemic studies including infection immunology.

### Overall aims and objectives:
Students should be able to:

- explain the structure of bacteria and fungi
- define and correctly apply basic terms of microbiology, epidemiology and immunology
- explain mechanisms of the pathogenesis of microorganisms
- meaningfully apply anti-infectives
- interpret the causes of epidemics
- explain the pathogeneses of infective diseases
- rate the protective results of vaccinations

### Reading list:
- Rolle, Mayr: Mikrobiologie, Infektions- und Seuchenlehre, Enke-Verlag, 8. überarbeitete Auflage (2006), ISBN-13: 978-3830410607

### Electronic sources:
see StudIP:
https://studip.uni-giessen.de/studip/

### Scripts:
the script „Allgemeine Infektions- und Seuchenlehre “of the student body

[19] 1.10, 1.21, 1.24, 1.29

### Self-assessments:

self-assessment questions can be found on the website of the Department of Animal Hygiene and Diseases:

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/ihit/lehre/fragenkataloge

### Learning recommendations:

Students are advised to rework their own lecture notes with the help of textbooks and the "catalogue of topics" for the examination subject. Division of labour and joint discussions with fellow students can be helpful. Start the learning phase in good time before the exam.

### Assessment:

An oral, theoretical exam within the framework of the Veterinary Medical Examination in "Bacteriology and Mycology". The grade achieved in the theoretical part of the examination is to be credited as a partial grade (80 %) in this examination subject. The examination usually takes place after the 5th semester.

## BIOCHEMISTRY

### Coordinator:

Mazurek

### Instructors:

Mazurek, Scheiner-Bobis

### Course type:

Lecture (3 CHW)

### ECTS

3

### Introduction:

The second part of the biochemistry lecture deals with:

- Amino acids as starting material of important biosynthetic pathways, folic acid
- Nucleic acids Biosynthesis, structure of DNA, RNA
- Replication, transcription, translation
- Molecular biology methods relevant to veterinary medicine, also taking into account transgenic animals,
- Cell cycle, apoptosis, cancer
- Signal transmission between cells and organs,
- Hormones and hormone-controlled regulatory circuits

- Metabolic interaction of organs in normal, pathological or extreme physiological conditions

### Overall aims and objectives:

Students should be able to:

- record and describe the metabolic pathways discussed
- establish correlations between the discussed metabolic pathways and diseases
- explain the relevance of metabolites and enzymes of these metabolic pathways for diagnostics

### Reading list:

No special recommendation. All commercially available books on biochemistry.

### Electronic learning material:

see StudIP and ILIAS:

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

### Self-assessment questions:

Stud IP / ILIAS

### Assessment:

an oral exam within the framework of the Veterinary Medical Examination in "Biochemistry" after the fourth semester

## BIOCHEMISTRY PRACTICAL [20]

### Coordinator:

Mazurek

### Instructors:

Scheiner-Bobis, Mazurek, et al.

### Course type:

seminar with practicals (5 CHW)

### ECTS:

6

[20] 1.28

## Introduction:

The course will provide an introduction to practical biochemistry for students of veterinary medicine. The course topics include a theoretical and an experimental part.
They deal with:

- the meaning of phosphate for cell biology
- the meaning of biological buffers
- the properties of proteins
- enzymes and their properties
- nucleic acids and protein biosynthesis
- protein- and nitrogen-oxygen-interchange
- carbohydrate metabolism
- lipids and energy metabolism

The approach to the topics is accompanied by a demonstration and application of established biochemical and molecular biological methods, e.g. photometry, methods of determination for various metabolites, electrophoretic fractionation of proteins or DNA, restriction analysis of DNA etc.

## Overall aims and objectives:

Students should be able to:

- explain and demonstrate biochemical procedures and methods combined with knowledge of metabolisms, furthermore demonstrate cell functions with basic methods of analysis
- demonstrate an understanding of biochemical processes

## Scripts:

practical biochemistry for veterinarians

## Self-assessments:

can be found online at:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

## Assessment:

- ten written exams after the seminars during the semester, weekly retrials for written exams; written protocols of the experiments with option for corrections two retrials for experimental assignments
- oral or written and practical exam within the framework of the Veterinary Intermediate Examination in “Biochemistry” after the fourth semester

## PHYSIOLOGY

### Coordinator:
Diener, Gerstberger

### Instructors:
Diener, Gerstberger, Pouokam, Roth, Rummel

### Course type:
lecture (4 CHW)

### ECTS:
4

### Introduction:
The lecture of the fourth semester (4 CHW) will convey the physiologic fundamentals of important bodily functions of domestic animals (especially mammals). The following organ and functional systems will be dealt with in detail:

- physiology of respiration: basics; respiration mechanisms; diffusion and gas transport; regulation of respiration; pathophysiology
- acid-base control: fundamentals of physical chemistry; acidosis and alkalosis; compensatory mechanisms; kidney and lung as target organs
- physiology of digestion: nutrition absorption and function of the salivary glands, proventricular digestion in ruminants, secretion, resorption and motor activity of the gastrointestinal tract; enteric nerve and hormone system; pathophysiology
- energy and thermal control: closed circuits; temperature cessions and production; calorimetric science and basal metabolic rate; pathophysiology
- endocrinology: basics; hormones of thyroid gland and parathyroid, adrenal, gonadal, heart and kidney, pituitary and hypothalamus; pathophysiology
- lactation: milk production and hormonal control; colostrum

### Overall aims and objectives:
Students should be able to:

- understand the physiology of particular organ systems including their cellular and biochemical fundamentals as well as some physical regularities
- deduce and recognize integrative correlations, i.e. the interconnection of the various organ systems due to the control of the nervous system; understand the immune system and, partially, the endocrine system

- receive first insights into the cellular and systematic mechanisms which cause pathophysiological changes of the animal organism

**Reading list:**

- v. Engelhardt, Breves: Physiologie der Haustiere, Verlag: Enke; 3. vollständig überarbeitete Auflage 2010 (2009), ISBN-13: 978-3830410782
- Speckmann, Hescheler, Köhling: Physiologie, Urban & Fischer Verlag; 5. Auflage (2008), ISBN-13: 978-3437413186

**Electronic sources:**

see StudIP and ILIAS:

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

Haschke, Diener (2007). Multimedia Physiologie –Ein interaktives Lernprogramm für Veterinärmediziner Version 3.2. Enke Verlag im MVS Medizinverlag, Stuttgart

**Scripts**:

A detailed script that includes numerous slides of the lecture can be bought at the beginning of the semester.

**Self-assessments:**

Haschke, Diener (2007). Multimedia Physiologie –Ein interaktives Lernprogramm für Veterinärmediziner Version 3.2. Enke Verlag im MVS Medizinverlag, Stuttgart

**Learning recommendations:**

see the four bullets above

**Assessment:**

an oral exam within the framework of the Veterinary Intermedite Examination in “Physiology" after the fourth semester

## PHYSIOLOGY PRACTICAL [21]

**Coordinator:**

Diener, Gerstberger

**Instructors:**

Diener, Gerstberger, Roth, Rummel et al.

[21] 1.28

### Course type:
seminar with practicals (5 CHW)

### ECTS:
6

### Introduction:
During the “Physiological practical with seminar “, which consists of 10 course units of 4 hours each, the subject matter of, for example, one organ system will be discussed in condensed form. The students (in small groups at a maximum of 11 each) will prepare a topic and will subsequently be questioned on this. The seminar will be followed by practical exercises (in small groups of 2-3 students) on human and/or animal specimens, to characterize the organ system mechanically or diagnostically.
The content of the lecture, mostly of the 3rd but also of the 4th semester, will be engrossed with the help of the condensed seminar, the oral assessment and the matching practical.

The seminars/practicals will deal with:

- the physiology and physical chemistry of the red blood cell
- the physiology of the white blood cells; blood clotting
- neurophysiology: nerves and reflexes
- muscle physiology
- the physiology of the heart
- the physiology of the circulation
- respiratory physiology
- sensory physiology
- energy and thermal reception balance
- digestive physiology: resorption
- Renal physiology

### Overall aims and objectives:
Students should be able to:

- apply and understand comprehension-based or simple diagnostic methods of assessment

### Reading list:

- v. Engelhardt, Breves: Physiologie der Haustiere, Verlag: Enke; 3. vollständig überarbeitete Auflage 2010 (2009), ISBN- 13: 978-3830410782
- Speckmann, Hescheler, Köhling: Physiologie, Urban & Fischer Verlag; 5. Auflage (2008), ISBN-13: 978-3437413186 Klinke, Silbernagel: Lehrbuch der Physiologie, Verlag: Thieme, Stuttgart; 5. Auflage (2005), ISBN-13: 978-3137960058

### Electronic sources:

see StudIP and ILIAS:
https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

Haschke, Diener (2007). Multimedia Physiologie – Ein interaktives Lernprogramm für Veterinärmediziner Version 3.2. Enke Verlag im MVS Medizinverlag, Stuttgart

### Scripts:
A detailed manual that introduces the practical exercises can be bought at the beginning of the semester.

### Self-assessments:
Haschke, Diener (2007). Multimedia Physiologie – Ein interaktives Lernprogramm für Veterinärmediziner Version 3.2. Enke Verlag im MVS Medizinverlag, Stuttgart

### Learning recommendations:
see the four bullets above

### Assessment:
- oral preliminary test on tutorial days
- an oral exam within the framework of the Preliminary Intermediate Examination in “Physiology" after the fourth semester

## PROPAEDEUTICS [22]

### Coordinator:
Moritz

### Instructors:
Moritz, Kramer, Fey, Röcken, Lierz, Wehrend, Sickinger, Reiner, Wrenzycki

### Course type:
lecture (2 CHW)

### ECTS:
2

### Introduction:

[22] 1.3, 1.15, 1.16, 1.17, 1.20

The lecture of the 4th semester will deal with the clinical assessment methods of all relevant species and their differences. Normal results are important to recognize changes; therefore, these will be covered in propaedeutics.

### Overall aims and objectives:

Students should be able to:

- describe normal findings concerning all species they have been introduced to
- list a complete examination scheme in internal medicine, surgery and reproductive medicine
- work problem-oriented
- apply evidence-based medicine

### Reading list:

- Baumgartner, Walter: Klinische Propädeutik der Haus- und Heimtiere, Verlag: Parey Bei Mvs; 7. vollständig überarbeitete und erweiterte Auflage (2009), ISBN-13: 978-3830441755
- Kramer (Hrsg.): Kompendium der Allgemeinen Veterinärchirurgie, VET-Kolleg, Verlag: Schlütersche; 1. Auflage (2003), ISBN-13: 978-3877067437

### Electronic sources:

See StudIP and ILIAS:

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

### Learning recommendations:

a revision of the theoretical subject matter before the tutorial in the fifth semester

### Assessment:

a practical exam within the framework of the Veterinary Medical examination in “Clinical Propaedeutics” of one animal species after the fifth semester

## PROPAEDEUTICS – MEDICAL TRAINING

### Coordinator:

Katja Frey, Alexis Wagner

### Instructors:

Katja Frey, Alexis Wagner

### Course type:

lecture

## Introduction:

Medical training, which is based on the knowledge of applied learning theory, is about using classic and operant conditioning within practical training to make the animal's visit to the vet as pleasant as possible and to actively generate a patient, who shows cooperative behavior, even during an uncomfortable treatment.
Medical training makes it possible to reduce sedation and anesthesia to an absolutely necessary minimum and to sustainably reduce the associated risks. Knowing about the right timing and the various training systems plays an important role here and enables the vet to guarantee the greatest possible safety for themselves and the assisting staff while handling the patients.

In the associated elective continuation course, the students can test different medical training behaviors on dogs and therefore practice the creation of a reliable training plan. Here the focus is on the observation of submissive behavior and so-called calming signals.

## Overall aims and objectives:

The students can

- recognize and reduce stress symptoms
- define and apply classical and operant conditioning
- describe and use relevant training systems
- create a training plan
- carry out short-term training in practical application

## Reading list:

- Blut abnehmen beim Hund trainieren: Mit Medical Training entspannt zum Tierarzt (Dr. Dorothea Johnen, Easy Dogs Hundebuch-VERLAG)
- Medical Training für Hunde: Körperpflege und Tierarztbehandlungen vertrauensvoll meistern (Anna Oblasser-Mirtl, Cadmos Hundepraxis)
- Medical Training für Pferde: Entspannt bei Tierarzt, Hufschmied & Co (Nina Steigerwald, Müller Rüschlikon Verlag)
- Verhaltensmedizin bei der Katze: Leitsymptome, Diagnostik, Therapie und Prävention (Sabine Schroll; Kleintier konkret)
- Verstärker verstehen: Über den Einsatz von Belohnungen im Hundetraining (Viviane Theby; Kynos Verlag)

## Electronic sources:

See StudIP:
https://studip.uni-giessen.de/studip/

## Assessment:

None

## SKILLS LAB – PROPAEDEUTICS [23]

### Coordinator:
Arnhold

### Instructors:
Student tutors

### Course type:
practical (1 CHW)

### ECTS: 1

### Introduction:
The Skills Lab is a learning and training centre where students can train practical veterinary skills stress-free on simulators. During the 4th semester practice, clinical examination methods in different animal species are presented. Topics such as general examination, gynaecological examination, medication application techniques, handling, communication with the animal owner and surgical dressing techniques are covered.

### Overall aims and objectives:
Students should be able to:

- list theoretically a general examination procedure for small animals, horses and cattle
- list different types of medication application in small animals, horses, cattle, birds and pigs and demonstrate them practically on a model
- demonstrate different radiographic positioning techniques in small animals on a model and name the grading of equine limb radiographs
- list rectal and gynaecological examinations in horses and cattle in theory and demonstrate them in practice on a simulator
- demonstrate restraint measures on different animal species on a model and gain knowledge in handling
- reproduce a cardiovascular examination in theory and master the use of the stethoscope; demonstrate auscultation of heart and lungs on the simulator in practice and recognise physiological and selected pathological findings
- apply a toe pad dressing on a horse leg model
- conduct an anamnesis interview

[23] 1.3, 1.14, 1.15, 1.16, 1.17, 1.23

### Reading list:

- Baumgartner, Walter, Klinische Propädeutik der Haus- und Heimtiere, Publisher: Parey Bei Mvs; 7th completely revised and expanded 9th edition (2018).
- Reiner G., Krankes Schwein - kranker Bestand, 2015
- Von Pückler, Kerstin, Röntgen Hund und Katze - Thorax und Abdomen, Publishers: Thieme, 2018

### Electronic learning materials:

see StudIP:
https://studip.uni-giessen.de/studip/

### Learning recommendations:

Using the electronically provided teaching material to prepare and follow up the practical exercise.

### Assessment:

none

## ANIMAL BREEDING AND GENETICS [24]

### Coordinator:

König

### Instructors:

König and scientific staff

### Course type:

Lecture (2 CHW)

### ECTS:

2

### Introduction:

Students will get to know the specific requirements and prerequisites as well as the implications concerning the breeding of agricultural livestock, as well as horses, dogs and cats.

### Overall aims and objectives:

[24] 1.1, 1.10

- Methods of breeding value estimation
- Determinants of breeding progress
- Reproductive biotechnologies
- Methods of crossbreeding
- Breeds, performance testing and breeding programmes, genetic peculiarities in different livestock species as well as in the horse

### Reading list:

- William, A.; Simianer, H.: Tierzucht, Publisher: Eugen Ulmer Stuttgart (2011), ISBN 978-3-8252-3526-0

### Scripts:

see StudIP
https://studip.uni-giessen.de/studip/

### Learning recommendations:

see literature

### Assessment:

a written and practical exam within the framework of the Veterinary Medical Examination in "Animal Breeding and Genetics" after the fourth semester

## Practical In Animal Breeding And Genetics [25]

### Coordinator:

König

### Instructors:

König, Engel and scientific staff

### Course type:

practical (2 CHW)

### ECTS:

3

### Introduction:

[25] 1.20, 1.28

The general and specific fundamentals of animal rating and evaluation will be explained; students practice these on various animal species.

### Overall aims and objectives:

Students should be able to:

- assess agricultural livestock on the basis of age, weight and appearance with regard to usage and breeding value.

### Reading list:

- Sambraus, H.H.: Atlas der Nutztierrassen, Verlag: Ulmer Eugen Verlag; 5. Auflage (2000), ISBN-13: 978-3800173488
- Brem, G.: Exterieurbeurteilung Landwirtschaftlicher Nutztiere, Verlag: Ulmer (Eugen) (1998), ISBN-13: 978-3800143726

### Learning recommendations:

see reading list

### Assessment:

a written exam at the end of the practical, as well as oral and practical exams within the framework of the Veterinary Intermediate Examination in "Animal breeding and genetics including animal rating" at the end of the fourth semester

## General Virology [26]

### Coordinators:

Weber, Lamp, König

### Instructors:

Weber, Lamp, König, Bank-Wolf

### Course type:

Lecture (1 CHW)

### ECTS:

1

### Prerequisites:

Pre-Physics

[26] 1.10, 1.21, 1.24

### Introduction:

Basics of the structure and taxonomy of viruses as well as the molecular biology and immunobiology of viruses are explained. General aspects of immunology, pathogenesis, prophylaxis and epidemiology are discussed with regard to virus-related diseases.

### Overall aims and objectives:

Students should be able to:

- explain the fundamentals of virology, such as the properties of viruses and the causation and development of diseases through viruses

### Reading list:

- Tiermedizinische Mikrobiologie, Infektions- und Seuchenlehre, Enke-Verlag, 10th revised edition 2010, ISBN-10: 3-8304-1262-2, ISBN-13: 978-3-8304-1262-5

### Electronic learning material:

see StudIP:

https://studip.uni-giessen.de/studip/

### Learning recommendations:

lecture notes with the help of textbooks (see above), given literature recommendations

### Assessment:

a written exam within the framework of the Veterinary Medical Examination in “Virology" after the fifth semester

## 5TH SEMESTER

| COURSES | CHW | ECTS |
|---|---|---|
| Bacteriology, specific **L** | 2 | 2 |
| Bacteriology/Virology **P** | 2 | 3.5 |
| Parasitology **L** | 3 | 3 |
| Parasitology **P** | 2 | 3.5 |
| Pathology, general **L** | 3 | 3 |
| Pathology, general **S** | 1 | 1 |
| Pharmacology and Toxicology, general **L** | 2 | 2 |
| Toxicology, specific | 1 | 1 |
| Propaedeutics **P** | 4 | 5 |
| Animal Nutrition **L** | 2 | 2 |
| Animal Hygiene **L** | 2 | 2 |
| Virology, specific **L** | 2 | 2 |
| Elective Courses | | |
| **EXAMINATIONS** | | |
| Exam in Bacteriology and Mycology | | 2 |
| Exam in Virology | | 2 |
| Exam in Clinical Propaedeutics | | 2 |
| Exam in Pharmacology and Toxicology | | 1 |

*L= lecture, P= practical, S= seminar*
*CHW = contact hour per week (Semesterwochenstunde)*
*ECTS = European Credit Transfer and Accumulation System, Indication of Credit Points*

Please note: further information regarding courses can be found at:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

## SPECIFIC BACTERIOLOGY AND MYCOLOGY [27]

### Coordinator:
Ewers

### Instructors:
Ewers, Bauerfeind

### Course type:
lecture (2 CHW)

### ECTS:
2

### Prerequisites:
participation in the lecture "Bacteriology and Mycology (general)"in the 4th semester

### Introduction:
The most relevant bacterial and fungal infections of animals will be discussed in the lecture. The content of the lecture is divided into pathogen characteristics, taxonomy, epidemiology, pathogenesis and clinical diagnoses, as well as therapy and prophylaxis.

### Overall aims and objectives:
Students will be able to:

- identify important bacterial and mycotic infectious diseases of animals and...
- name their pathogens and explain their characteristics and taxonomy
- explain the clinical and pathological-anatomical as well as histopathological signs of disease
- explain the danger of bacteria and fungi
- define the habitats of the pathogens
- list the possibilities of laboratory-based infection diagnostics
- give specific recommendations on therapy and prophylaxis
- explain epidemiological characteristics (reservoirs, prevalences, transmission routes, etc.)

### Reading list:

- Selbitz, Truyen, Valentin-Weigand: Tiermedizinische Mikrobiologie, Infektions- und Seuchenlehre, Enke-Verlag, 10., vollständig überarbeitete Auflage (2015), ISBN: 978-3830410805

[27] 1.10, 1.21, 1.24

- Songer, Post: Veterinary Microbiology (2005), Verlag Saunders, ISBN: 978-1416054047
- Hirsh, MacLachlan, Walker: Veterinary Microbiology (2004), Blackwell Publishing, ISBN: 978-0813803791

### Electronic sources:

see StudIP:
https://studip.uni-giessen.de/studip/

### Scripts:

the student body will provide the script „Spezielle Bakteriologie und Mykologie “.

### Self-assessments:

a questionnaire can be found online at the homepage of the department

### Learning recommendations:

Students are advised to extend the script during the lecture; to revise the syllabus with the help of the books mentioned above and to prepare for the exam in time.

### Assessment:

an oral exam (60%) within the framework of the Veterinary Medical Examination in “Bacteriology and Mycology" after the fifth semester

## MICROBIOLOGICAL PRACTICAL IN BACTERIOLOGY, MYCOLOGY AND IMMUNOLOGY [28]

### Coordinator:

Bauerfeind, Ewers

### Instructors:

Ewers, Bauerfeind and scientific staff (Heydel, Prenger-Berninghoff et al.)

### Course type

practical (2 CHW)

### ECTS:

2,5

### Prerequisites:

participation in the lecture "Bacteriology and Mycology" (general and specific part).

[28] 1.10, 1.21, 1.24, 1.28

### Introduction:

Students receive training in dealing with pathogenic bacteria and fungi; in particular, they will learn simple methods to diagnose infections caused by bacteria and fungi. These methods will comprise microscopic, cultivational, biochemical and serological test methods.

### Overall aims and objectives:

Students should be able to:

- carry out and evaluate simple microbiological and serological working methods
- correctly perform complex laboratory diagnostic procedures and identify the pathogens of important microbially caused diseases in animals
- master hygienic safety measures in microbiological laboratory work and safely handle pathogenic microorganisms

### Reading list:

- Rolle, Mayr: Mikrobiologie, Infektions- und Seuchenlehre, Enke-Verlag 8. überarbeitete Auflage (2006), ISBN-13: 978-830410607
- Quinn et al: Clinical Veterinary Microbiology, Verlag: Elsevier Ltd, Oxford; Auflage: 2Rev ed. (2010), ISBN-13: 978-0723432371

### Electronic learning materials:

Accredited participants can download the script for the exercise as well as a selection of the PowerPoint slides presented from the internet platform "Stud.IP".

### Self-assessments:

*Answer the following questions:*

- Which culture media are used in microbiology?
- Which criteria are used to assess microbial cultures?
- Do I know the microscopic methods of assessment?
- How are bacteria stained (e.g. staining according to Gram, Köster, Ziehl-Neelsen) and evaluated?
- How to read a coursed row (Bunte Reihe)?
- How is the OSA Colour System applied?
- Which direct and indirect verification methods esist and how are they evaluated?

### Learning recommendations:

Students are advised to extend the script during the practical and to read it before the exam; the script may be used during the exam.

### Assessment:

Students in the examination subject "Bacteriology and Mycology" have to prepare, examine and explain a microbiological preparation in the so-called practical part of the examination (§ 37 TAppV). The grade achieved is to be credited as a partial grade (20 %) in this examination subject. The examination usually takes place after the 5th semester. On application, the practical part of the examination can already be taken during the course of study at the end of the corresponding practical dissection (during the 5th semester, usually in mid-January).

## MICROBIOLOGICAL PRACTICAL (VIROLOGICAL PART) [29]

### Coordinator:

F. Weber

### Instructors:

B. Bank-Wolf, M. König, B. Lamp, S. Schmid, F. Weber

### Course Type:

Exercise (8 h per student)

### ECTS:

1

### Prerequisites:

Participation in the lecture Virology (general and special part)

### Introduction:

Students will gain a practical insight into virological working methods and learn how to deal with viruses and cell cultures. Practically carried out are virus cultivation, serum neutralization assay, hemagglutination inhibition test, agar-gel immunoprecipitation and ELISA procedures. Additional methods are demonstrated (e.g. electron microscopy and PCR techniques). The practical exercises are embedded in case examples from the diagnostics. In addition, the theoretical background to the working methods as well as to other aspects of virological laboratory diagnostics will be presented.

### Overall aims and objectives:

Students carry out virological and serological tests by themselves and make appropriate diagnoses. Students learn how to deal with pathogenic viruses as well as the necessary hygiene and protective measures.

[29] 1.10, 1.21, 1.24, 1.28

### Reading list:

- Selbitz, Truyen, Valentin-Weigand: Veterinary Microbiology, Infection and Disease Theory, Enke-Verlag, 10th, updated edition (2015), ISBN: 978-3-8304-1262-5
- N. James MacLachlan and Edward J. Dubovi (Ed.) Fenner's Veterinary Virology. 5th Edition (2015). Academic Press, ISBN 978-0-12-800946-8

### Electronic sources:

Students can download the practice script and a selection of the presented PowerPoint slides from the Stud.IP Internet platform.

### Self-assessments:

- What are the prerequisites for the cultivation of viruses in cell cultures?
- How can infection of cells be detected?
- What is a cytopathic effect and how does it manifest itself?
- How do I interpret virological laboratory findings?
- Which ELISA techniques are suitable for virological diagnostics?
- How is hemagglutination inhibition carried out and evaluated?
- What direct and indirect virological detection methods are available and where are they used?
- What statements can be made with the help of the serum neutralization test?
- Learning recommendations:
- In addition to the script, work manuals and log sheets are distributed and filled in during the course. Together with the script, own transcripts and textbooks, the topics can be elaborated in a comprehensive way.

### Assessment:

The course contents are part of the curriculum of Virology checked in the state exam.

## PARASITOLOGY [30]

### Coordinator:

Taubert, Grevelding

### Instructors:

Taubert, Grevelding, Hermosilla, Falcone

### Course type

lecture (3 CHW)

[30] 1.10, 1.21, 1.24

## ECTS:

3

## Introduction:

The lecture will provide an overview of endoparasites and ectoparasites (arthropods, helminths, protozoans) with specific regard to their relevance for veterinary medicine. Students will be introduced to basic principles of morphology and the evolutionary biology of important parasitic organisms, as well as immune reactions to parasitic diseases. Information on epidemiology, the meaning, development, clinical/pathological appearances, the diagnosis and treatment of parasitic diseases of animals will be covered. Concerning parasitic diseases that apply to several hosts, those aspects that apply to human medicine will be discussed as well.

## Overall aims and objectives:

Students should be able to:

- explain parasitic relations
- describe the biology of parasites and the disease patterns they cause
- explain diagnostic procedures and develop treatment methods

## Reading list:

- Eckert, Friedhoff, Zahner, Deplazes: Lehrbuch der Parasitologie, Verlag: Enke; 2. vollständig überarbeitete Auflage (2008), ISBN-13: 978-3830410720
- Schnieder (Hrsg.): Veterinärmedizinische Parasitologie, Verlag: Parey im MVS Medizinverlag Stuttgart, 6. vollständig überarbeitete und erweiterte Auflage (2006), ISBN-13: 978-3-8304-4135-9

## Electronic sources:

If needed, those will be provided online in the form of downloadable word-documents and PDF-files.

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/parasitologie/lehre/down

## Scripts:

an overview of the syllabus will be provided at the beginning of the lecture

## Self-assessments:

will be provided in the form of short tests during the parallel course Practical Parasitology.

## Learning recommendations:

reading list, lecture and tutorial sources

### Assessment:
a practical and an oral exam within the framework of the Veterinary Medical Examination in “Parasitology" after the sixth semester

## PRACTICAL PARASITOLOGY [31]

### Coordinator:
Taubert, Grevelding

### Instructors:
Taubert, Grevelding, Quack, Hermosilla, Falcone

### Course type
practical (2 CHW)

### ECTS:
3,5

### Prerequisites:
- Participation in the lecture “Parasitology” during the fifth semester
- Knowledge of general health and safety guidelines, of the correct conduct in the laboratory and the handling of potentially (human) infectious material
- Basic knowledge of the use of a microscope
- Preparation in advance of the topic that is to be discussed (see below)

### Introduction:
After an introduction to general procedures, students will examine prepared objects of parasites macroscopically and microscopically. Furthermore, simple assessments methods to prove parasitic development stages are conducted.

The tutorials consist of 3 units with a total of 12 topics:
(I) “General Parasitology “; examples will show the morphology of parasitic protozoa und helminths/helminthes and arthropods including their developmental stages;
(II) “Specific Parasitology “; important endoparasites and ectoparasites including
their agents will be explained with regard to different hosts and, with the help of numerous case studies, the parasitic diagnostics, treatments and preventive procedures will be explained;
(III)” Diagnostic Tutorials “; important topics and specimens are revised in order to engross knowledge and prepare students for the exam

[31] 1.10, 1.21, 1.24, 1.28

## Overall aims and objectives:

Students should be able to:

- apply the fundamentals that have been theoretically acquired during the lecture on morphology, development cycles and ways of infection; on (sub)clinical, pathologic-anatomical and economical effects of faunal parasites, their zoonotic meaning, (direct and/or indirect) diagnostics as well as the fight against the disease
- explain and apply parasitic and epidemiological nomenclature
- systematically distinguish animal phylum
- recognize and describe parasitic protozoa (flagellates, apicomplexa), adult helminths (trematodes, zestodes, nematodes) and arthropods (acari, insecta) by means of morphologic characteristics
- use basic dichotomous keys
- describe and recognize developmental stages of parasitic protozoa, helminths and arthropods
- define endoparasites and ectoparasites according to their tissue/organ localization in hosts (ruminants, equids, pigs, carnivores, poultry, bees) and to name their host specificity
- name, describe and apply direct and/or indirect (serologic) diagnostic methods
- explain and rate the indication and efficiency of various licensed antiparasitics

## Reading list:

- Eckert, Friedhoff, Zahner, Deplazes: Lehrbuch der Parasitologie, Verlag: Enke; 2. vollständig überarbeitete Auflage (2008), ISBN-13: 978-3830410720
- Schnieder (Hrsg,): Veterinärmedizinische Parasitologie, Verlag: Parey im MVS Medizinverlage Stuttgart, 6. vollständig überarbeitete und erweiterte Auflage (2006), ISBN-13: 978-3-8304-4135-9

## Electronic sources:

the Homepage of the Department of Parasitology contains links to picture and text files:
http://www.uni-giessen.de/cms/fbz/fb10/institute_klinikum/institute/parasitologie/links/paraweb

## Scripts:

Bauer: Praktikum der veterinärmedizinischen Parasitologie. Verlag Ferber´sche Uni-Buchhandlung Gießen (second-hand)

## Self-assessments:

The learning success will be assessed during the course of the practical in the form of four written multiple choice tests.

### Learning recommendations:
see the above

### Assessment:
Multiple-choice tests during the semester and one practical, written
and oral exam within the framework of the Veterinary Medical Examination in "Parasitology" after the sixth semester

## GENERAL PATHOLOGY [32]

### Coordinator:
Herden

### Instructors:
Herden, Köhler, Henrich

### Course type:
lecture (3 CHW)

### ECTS:
3

### Introduction:
A systematic description of pathological conditions and processes in organisms. An explanation of the nomenclature and definitions of pathological conditions and processes.

### Overall aims and objectives:
Students should be able to:

- define and explain principles and mechanisms
- name and describe of the systematic classification of pathological processes and conditions of the organism

### Reading list:

- McGavin, Zachary: Pathologie der Haustiere; Allgemeine, spezielle und funktionelle Veterinärpathologie, Verlag: Elsevier, München (2009), 1. Auflage 2009, ISBN-13:978-3437582509

[32] 1.21, 1.24, 1.33

### Electronic sources:

see StudIP and ILIAS:

https://studip.uni-giessen.de/studip/
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

### Scripts:

a script of “Allgemeine Pathologie“ will be provided by the student body.

### Learning recommendations:

Students are advised to complement the outlines of the lecture with the most important content of teaching and compare this to the script and books. Question all vague matters and ask the instructors for explanations.

### Assessment:

- a written examination after the 5th semester (30% of the final grade)
- a practical and an oral exam within the framework of the Veterinary Medical Examination in “General Pathology and Specific Pathological Anatomy and Histology" in the eleventh semester

## SEMINAR GENERAL PATHOLOGY [33]

### Coordinator:

Herden

### Instructors:

Herden, Köhler, Henrich, Hirz, NN

### Course type:

Seminar (1 CHW)

### ECTS

1

### Introduction:

Important aspects of essential topics of general pathology are elaborated and deepened in discourse.

### Overall aims and objectives:

Students should be able to:

[33] 1.21, 1.24, 1.33

- define and classify the conditions discussed, recognise and explain diseases and possible aetiologies and pathogenesis

### Reading list:

- Zachary: Pathologic Basis of Veterinary Disease Verlag: Academic Press, 6th edition (7 July 2016), ISBN-13: 978-0323357753
- Baumgärtner/Gruber: Allgemeine Pathologie für die Tiermedizin, Publisher: Enke; Edition: 2 (28 January 2015), ISBN-13: 978-3830412854

### Electronic learning material:

see StudIP:
https://studip.uni-giessen.de/studip/

### Learning recommendations:

topic preparation before the respective seminar

### Assessment:

- a written exam after the 5th semester (30% of the final grade)
- an oral and practical exam as part of the Veterinary Medical Examination in "General Pathology and Specific Pathological Anatomy and Histology" in the eleventh semester.

## General Pharmacology [34]

### Coordinator:

Geyer

### Instructors:

Geyer

### Course Type:

lecture (2 CHW)

### ECTS:

2

### Introduction:

- Fundamentals of drug and toxin effects on the basis of the principles of receptor-drug interaction (agonists, antagonists, partial and inverse antagonists), tissue- and ligand-

[34] 1.10, 1.18, 1.25, 1.27

specific receptor equipment, dose-response profiles, intracellular signal processing and the diversity of effector systems; toxicity and detoxification reactions, distribution and elimination, transport and storage, drug interactions, animal-specific peculiarities of pharmacokinetics, significance of polymorphisms and genetic defects in proteins, basics of organotoxic effects; molecular causes of diseases and their correction in the context of drug therapy; fundamentals of the biological and toxicological mechanisms of carcinogenesis, tumour promoters, full carcinogens as well as onco- and tumour suppressor genes

- Special therapeutic directions in the Medicines Act such as homeopathy, phytotherapy and anthroposophic medicinal therapy; placebo effect.

### Overall aims and objectives:

Students should be able to:

- name the difference between specific and unspecific reactions to pharmaceutical substances
- explain the causality of pharmaceutical substance and effects caused in terms of specific receptor interactions
- carry out the selection of therapeutic methods with regard to clinical applicability
- explain on a molecular basis the interaction of antidotes in poisonings
- define the groups of receptors and give examples of receptor specific drugs

### Reading list:

- Lehrbuch der Pharmakologie und Toxikologie für die Veterinärmedizin (Löscher/Richter), aktuelle Auflage;
- Verschiedene Lehrbücher der Pharmakologie und Toxikologie aus der Humanmedizin

### Electronic sources:

see StudIP:

https://studip.uni-giessen.de/studip/

### Scripts:

none of the institute; existing student scripts are faulty and often insufficient

### Learning recommendations:

attending the lectures; preparation with the help of the lecture notes (slides on StudIP); learning the material with the help of the textbooks

### Assessment:

A written single-choice test in "General Pharmacology and Toxicology" at the end of the 5th semester. Grade is 20% partial grade for the Veterinary Medical Examination in "Pharmacology and Toxicology" after the 8th semester.

## SPECIFIC TOXICOLOGY [35]

### Coordinator:

Geyer

### Instructors:

Geyer, Hamann

### Course type

lecture (1 CHW)

### ECTS:

1

### Introduction:

- a lecture on specific natural poisons as well as those of anthropogenic origin, their mode of action, their risk potential and the rates of success in therapy
- bacteria toxins, mildew toxins, plant toxins, animal toxins, fungicides, herbicides, insecticides and other pesticides
- halogen cyclic hydrocarbon substances, environmental toxins, solvents and gases including radon
- heavy metals as well as asbestos
- a discussion of the latest examples of toxins according to current news reports

### Overall aims and objectives:

Students should be able to:

- name causal antidote therapies on the basis of a thorough knowledge of toxin effects
- undertake a rating of toxins with regard to risk potential and exposition
- explain the meaning of acute as well as chronic exposure to toxins with reference to examples
- define symptoms of and identification methods for animal reactions to toxins

[35] 1.10

### Reading list:
Lehrbuch der Pharmakologie und Toxikologie für die Veterinärmedizin (Löscher/Richter), aktuelle Auflage; verschiedene Lehrbücher der Pharmakologie und Toxikologie aus der Humanmedizin.

### Electronic sources:
see StudIP:
https://studip.uni-giessen.de/studip/

### Learning recommendations:
attending the lectures; preparation with the help of the lecture notes (slides on Stud.IP); learning the material with the help of the textbooks

### Assessment:
a multiple-choice test in specific toxicology at the end of the fifth semester (20%) as part of the Veterinary Medical Examination in "Pharmacology and Toxicology" after the eighth semester

## PRACTICAL IN PROPAEDEUTICS [36]

### Coordinator:
Moritz, Kramer, Lierz, Fey, Wehrend, Sickinger, Reiner, Röcken, Wrenzycki

### Instructors:
many

### Course type:
practical with animals (4 CHW)

### ECTS:
5

### Prerequisites:
attendance of the lecture Propaedeutics in the 4th semester

### Introduction:
By working in small groups directly with the animals, students will apply the fundamental theoretical knowledge they acquired during the lectures of the 4th semester.

[36] 1.3, 1.15, 1.16, 1.17, 1.20, 1.28

### Overall aims and objectives:

Students should be able to:

- conduct an entire examination of a normal patient (cattle, pig, horse, dog, cat, bird)
- name and apply adequate coercive measures.
- recognize a deviation from the normal findings
- list the most important normal and abnormal examination data
- define the nomenclature of clinical diagnoses

### Reading list:

- Baumgartner, Walter, Klinische Propädeutik der Haus- und Heimtiere, Verlag: Parey Bei Mvs; 7. vollständig überarbeitete und erweiterte Auflage (2009), ISBN-13: 978- 3830441755
- Kramer (Hrsg.): Kompendium der Allgemeinen Veterinärchirurgie, VET-Kolleg, Verlag: Schlütersche; 1. Auflage (2003), ISBN-13: 978-3877067437

### Electronic sources:

see StudIP:

https://studip.uni-giessen.de/studip/

### Learning recommendations:

Students are advised to revise the theoretical fundamental knowledge before the tutorial in the fifth semester.

### Assessment:

a practical examination within the framework of the Veterinary Medical Examination in “Clinical Propaedeutics" after the fifth semester (animal species will selected at random on the day of the examination)

## ANIMAL NUTRITION [37]

### Coordinator:

Ringseis

### Instructor:

Ringseis

### Course type:

Lecture (2 CHW)

[37] 1.10, 1.20

## ECTS:

2

## Introduction:

Nutritional physiology of farm and companion animals:

- Comparative digestive physiology; functions of the different segments of the digestive tract; functions of digestive secretions; digestibility vs. absorbability; methods for determining digestibility; factors influencing nutrient digestibility

Nutritional physiology of macronutrients:

- Digestion and absorption of water; functions of water; regulation of water balance; water requirements
- Digestion and absorption of carbohydrates; functions of carbohydrates; metabolic pathways in carbohydrate metabolism (glycolysis, gluconeogenesis, hexose monophosphate pathway, glycogen synthesis/degradation); regulation of carbohydrate metabolism
- Digestion and absorption of fats; functions of fats (triglycerides, cholesterol, fatty acids); metabolic pathways of lipid metabolism (fatty acid synthesis, desaturation and elongation of fatty acids; synthesis of eicosanoids); cholesterol synthesis, bile acid synthesis, steroid hormone synthesis); regulation of lipid metabolism; essentiality of fatty acids
- Digestion and absorption of proteins; functions of proteins and amino acids; metabolic pathways of amino acids (transamination, deamination, decarboxylation, urea synthesis) and proteins (protein synthesis, protein degradation); non-protein nitrogen; ruminohepatic cycle; urea recycling; concept of ideal protein; essentiality of amino acids; determination of protein/amino acid requirements

Nutritional physiology of micronutrients:

- Minerals: digestion, absorption, retention and excretion of bulk and trace elements; functions of bulk and trace elements; determination of mineral requirements.
- Vitamins: Stages of vitamin supply; functions of water-soluble and fat-soluble vitamins; determination of vitamin requirements; animal species-specific features of vitamin requirements.

## Overall aims and objectives:

Students should be able to:

- have knowledge of the nutritional physiology of farm and companion animals

## Reading list:

- Kirchgessner, M., Roth, F.X., Schwarz, F.J., Stangl, G.I.: Tierernährung; 12th edition, DLG-Verlag Frankfurt/Main 2008, ISBN 978-3-7690-0703-9

- Kamphues, J., Coenen, M., Iben, Chr., Kienzle, E., Pallauf, J., Simon, O., Wanner, M., Zentek, J.: Supplemente zu Vorlesungen und Übungen in der Tierernährung; 11th edition, Schaper Verlag Alfeld-Hannover 2009, ISBN 978-3-7944-0223-6

### Electronic learning materials:
PowerPoint presentations

### Learning recommendations:
We recommend that you watch the PowerPoint presentation before the lecture and that you consolidate the material in the follow-up using the textbooks listed.

### Assessment:
a written exam within the framework of the Veterinary Medical Examination in "Animal Nutrition" after the sixth semester

## ANIMAL HYGIENE [38]

### Coordinator:
Ewers

### Instructors:
Bauerfeind, Ewers and assistants

### Course type:
lecture (2 CHW)

### ECTS:
2

### Prerequisites:
attendance of the lecture “Animal Husbandry” in the 2nd semester

### Introduction:
This lecture will deal with the significance of abiotic environmental influences for the health and performance as well as the well-being of animals. This course also deals with the impact of animal husbandry on the environment. The focus is on hygienic measures to protect animals from biotic and abiotic causes of disease.

[38] 1.1, 1.10, 1.32, 1.36

### Overall aims and objectives:

Students should be able to:

- explain technopathics
- measure and optimize environmental factors
- list and rate methods and substances for disinfection, sterilization and disinfestation
- create hygiene plans for animal husbandry
- rate risks of waste disposal
- name hygienic risks of animal husbandry

### Reading list:

- Methlin, Unshelm: Umwelt- und tiergerechte Haltung, Verlag: Parey Bei Mvs; 1. Auflage (2002), ISBN-13: 978-3830440000
- Sommer/Greuel/Müller: Hygiene der Rinder- und Schweineproduktion, ISBN-13:978-3825205140

### Scripts:

„Tierhygiene“, a script provided by the student body

### Self-assessments:

an elaborate questionnaire can be found on the homepage of the department:
https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/ihit/lehre/fragenkataloge

### Learning recommendations:

the script, extended with notes of the lecture and excerpts from the books of the reading list

### Assessment:

an oral exam within the framework of the Veterinary Medical Examination in “Animal husbandry and animal hygiene" after the sixth semester

## VIROLOGY [39]

### Coordinator:

Weber, König

### Instructors:

Weber, König

[39] 1.10, 1.21, 1.24

### Course type:
lecture (2 CHW)

### ECTS:
2

### Prerequisites:
knowledge of general virology from courses during the 4th semester

### Introduction:
The lecture will deal with those virus infections that are relevant for veterinary medicine; in general, the following aspects will be discussed:

- Virus system and taxonomy
- Clinic
- Pathogeneses
- Epidemiology
- Diagnostic
- Treatment

In particular, the diseases of domestic mammals will be discussed.

### Overall aims and objectives:
Students should be able to:

- classify viruses and understand their characteristics
- describe diseases that are caused by viruses and correlate these to the respective virus
- explain important aspects of virus infections like pathogenesis, diagnoses and treatment

### Reading list:
- Michael Rolle/Anton Mayr, Medizinische Mikrobiologie, Infektions- und Seuchenlehre. Enke Verlag Stuttgart, 8. Auflage (2007), ISBN-13: 978-3830410607
- Bernd Liess/Oskar-Rüger Kaaden, Virusinfektionen bei Haus- und Nutztieren, Verlag: Schlütersche, Hannover, 2. Auflage, aktualisierte und erweiterte Auflage (2009), ISBN-13: 978-3877067451

### Electronic sources:
see StudIP:
https://studip.uni-giessen.de/studip/

### Scripts:
a script will be provided by the Institute of Virology

Self-assessments:
a questionnaire is available

Learning recommendations:
lecture, script, reading list, virus poster

Assessment:
a written assessment (multiple-choice test) within the framework of the Veterinary Medical Examination in “Virology" after the sixth semester

## 6TH SEMESTER

| BLOCKS | WEEKS | ECTS |
|---|---|---|
| General | 1 | 1 |
| Lymphoreticular system | 3 | 3 |
| Dermatology | 3 | 3 |
| Anaesthesiology | 1 | 1 |
| Locomotor System | 6 | 6 |
| **REGULAR COURSES** | CHW | ECTS |
| Pharmaceutical and Drug Prohibition Law **L** | 1.071 | 1 |
| Pharmaceutical and Drug Prohibition Law **P/S** | 1,572 | 3 |
| Meat Hygiene and Food Science **L** | 2 | 2 |
| Animal Nutrition **P** | 2 | 3 |
| Dairy Science **L** | 1 | 1 |
| Elective Courses | | |
| **EXAMINATIONS** | | |
| Pharmaceutical and Drug Prohibition Law | | 2 |
| Animal Nutrition | | 2 |
| Animal Husbandry and Hygiene | | 2 |
| Parasitology | | 2 |
| Partial Examination MCQ Internal Medicine | | |
| Partial Examination MCQ Surgery and Anaesthesiology | | |
| Partial Examination MCQ Reproductive Medicine | | |
| **PRACTICAL** | | |
| 4 week practical (extramural) | | |

*L= lecture, P= practical, S= seminar*
*CHW = contact hour per week (Semesterwochenstunde)*
*ECTS = European Credit Transfer and Accumulation System, Indication of Credit Points*

Please note: further information regarding courses can be found at:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

Duration of block courses is given in “h =hours”, 1h =45 min

## BLOCKS

## GENERAL

### Summary:

In the first organ block, the fundamentals of specific pharmacology and some selected porcine diseases will be presented. In addition, the basic terminology of disinfection will be discussed from a clinical point of view.

Further details (e.g. reading list) regarding individual courses can be found online:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium

### Courses in detail:

### *INSTITUTE OF PHARMACOLOGY AND TOXICOLOGY (GEYER)*

#### AUTONOMIC NERVOUS SYSTEM L (5H) [40]

**Students should be able to:**

- demonstrate a critical understanding of the particular characteristics and effects of the drug groups in question,
- distinguish between different ways of effectiveness,
- distinguish between possible applications with regards to their effect,
- comment on misuse of drugs (doping, addictive potential)
- explain the importance of structure-function-relations for pharmacokinetics and pharmacodynamics
- reflect upon necessary applications of the drug groups in question
- make use of individual drugs during treatment and as an antidote

#### DISINFECTION PHARMACOLOGY L (1H) [41]

**Students should be able to:**

[40] 1.18
[41] 1.29

- assign and reproduce terms from the field of disinfection and classify disinfectants into different classes and assess them with regard to their mode of action, application possibilities and toxicity
- know the specifics of (veterinary) wound, skin and hand disinfection
- have knowledge of disinfectant lists and recommendations of the DVG, the VAH and the RKI

### CENTRAL AND PERIPHERAL MUSCLE RELAXANTS L (1H) [42]

**Students should be able to:**

- explain the mode of action of the substances
- derive the possible uses of the substances
- explain the risks and ADRs
- justify the countermeasures

## *CLINIC FOR PIGS (INTERNAL MEDICINE AND SURGERY) (REINER ET AL.)*

### AUJESZKY'S DISEASE L (1H) [43]

**Students should be able to:**

- provide a structured overview on the major diseases of the CNS of the pig and compare and rate the individual diseases clinically, therapeutically and economicall
- explain the aetiology and pathogenesis of diseases and list all disease-specific facts
- name the clinical, pathologic-anatomical and histological symptoms and apply these to the development of the disease and the prognosi
- list possible and important differential diagnosis for the diseases, rate their probability and name diagnostic approaches to their differentiation
- initiate a disease- and case-related diagnostic plan and discuss possible results
- demonstrate suitable therapeutic measures for meta- and prophylaxis
- rate the economic relevance of the diseases

### PORCINE ERYSIPELAS L (1H) [44]

**Students should be able to:**

- discuss the aetiology and pathogenesis of erysipelas and define the specific characteristics of this disease

[42] 1.18, 1.30

[43] 1.1, 1.18, 1.21, 1.24

[44] 1.1, 1.18, 1.21, 1.24

- name the clinical, pathologic-anatomical and histological symptoms and apply these to the development of the disease and the prognosis
- list possible and important differential diagnoses concerning erysipelas and name diagnostic approaches to their differentiation
- initiate a disease- and case-related diagnostic plan and discuss possible results
- demonstrate suitable therapeutic measures for meta-and prophylaxis
- rate the economic relevance of the disease

### European and African Swine Fever L (1h) [45]

Students should be able to:

- explain the aetiology and pathogenesis of European and African swine fever, highlighting the disease-specific feature
- name the clinical as well as the pathological anatomical and histological symptoms and apply these with regard to the course of the disease and prognosis
- list possible and important differential diagnoses of European and African swine fever, evaluate their probability and name diagnostic approaches for their differentiation
- initiate a disease- and case-related diagnosis and discuss possible results
- identify suitable therapeutic measures as well as meta- and prophylactic measures and weigh their suitability against each other
- evaluate the economic relevance of the diseases

## *Miscellaneous*

### Clinical demonstrations S (2h) [46]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### Disinfection, movement in the OR (Cross Sectional Subject) (2h) [47]

Students should be able to:

- list and apply necessary hygienic steps in the field of surgery
- Identify all definitions relevant to hygiene

[45] 1.1, 1.18, 1.21, 1.24

[46] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[47] 1.29

### General Surgery (Cross Sectional Subject) (1h) [48]

**Students should be able to:**

- describe the different phases of wound healing and the systemic inflammatory response of the body and recognise the manifestation of different surgical diseases (abscess, haematoma, etc.)
- explain the different techniques of tissue and instrument handling as well as the basic information about suture material and the most important suturing techniques
- name different possibilities of haemostasis

### Suture Material Suturing Techniques (Cross Sectional Subject) (1h)

Students should be able to:

- list the different suture materials
- relate the suturing techniques for specific indications

## Lymphoreticular System

**Summary:**

The organ block "lymphoreticular system " will provide an overview of its organs such as spleen, bone marrow, blood, etc. and then compare specific diseases (anaemia, clotting disorders) an discuss selected tumours (lymphoma, haemangiosarcoma). In addition, clinical immunology will be discussed in collaboration with the paraclinical institutes.

Further details (e.g. reading list) concerning the courses can be found online:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium

**Courses in detail:**

### *Institute of Pharmacology and Toxicology (Geyer et al.)*

### Pharmacology Blood L (2h) [49]

**Students should be able to:**

- classify anaemias and blood coagulation disorders into different forms and recognise their significance

[48] 1.29

[49] 1.18

- demonstrate knowledge of the causes and development of anaemia and blood coagulation disorders
- differentiate between various substances used for the therapy of anaemia or blood coagulation disorders with regard to their effects, indications and ADRs and evaluate them for therapeutic use

### CYTOTOXIC DRUGS L (1H) [50]

**Students should be able to:**

- weigh different therapeutic approaches based on various modes of action of the active pharmaceutical ingredient
- argue about the usage of the mentioned drugs based on the pathological and patho-physiological conditions of tumour diseases

## *INSTITUTE OF VETERINARY PATHOLOGY (HERDEN, ET AL.)*

### PATHOLOGY OF BONE MARROW, THYMUS, SPLEEN, LYMPH NODES, LEUKAEMIA L (2H) [51]

**Students should be able to:**

- identify the pathological processes and developments in domestic animals
- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in connection with the clinical appearance
- explain the aetiology and pathogenesis of these developments, as well as confirm the correct morphological diagnoses and discuss differential diagnoses

## *CLINIC FOR SMALL ANIMALS (INTERNAL MEDICINE AND SURGERY) (KRAMER, PEPPLER, THIEL, MORITZ, ET AL.)*

### HAEMATOPOIETIC SYSTEM L (1H) [52]

**Students should be able to:**

- describe indications and the procedure of a bone marrow aspiration
- describe specification of kinetics in various blood cells
- classify haematopoietic neoplasm

[50] 1.18

[51] 1.21, 1.24, 1.33

[52] 1.21

## ANAEMIA L (1H) [53]

### Students should be able to:

- discuss in a problem-oriented way patients with pale mucous membranes,
- recognize the requirement of a blood analysis, perform and interpret a blood smear (semi quantitative evaluation)
- classify the causes of anaemia
- name the patho-mechanisms that cause the different types of anaemia and classify them according to these causes
- transfer the changes in blood counts given as examples to real cases and thereby interpret them

## BLOOD CLOTTING OF ALL SPECIES L (2H) [54]

### Students should be able to:

- define and explain the stages of blood clotting (primary and secondary haemostasis fibrinolysis / coagulation inhibitors)
- define and explain the main tests of blood clotting (platelet number / function tests in particular mucosal bleeding time / APTT, PT, D-Dimer, fibrinogen, anti thrombin),
- interpret clinical findings of coagulopathies / thrombosis
- interpret the results of the tests mentioned above
- list the main causes of inherent and acquired disorders in haemostasis (decreased / increased coagulant activity)
- deduce the main therapeutic approaches for patients with clotting disorders

## BLOOD TRANSFUSION L (2H) [55]

### Students should be able to:

- adduce a conceptual definition of the term “blood transfusion” and list indications and contraindications to carry out a blood transfusion
- define the different forms of anaemia in terms of their frequency of occurrence and create an adequate therapy schedule
- list the different blood transfusion components (whole blood, blood components, blood substitutes), name their active substances, and list indications for the choice of each substance

[53] 1.21

[54] 1.18, 1.21

[55] 1.18

- define the fundamentals of obtaining a blood sample for the purposes of a blood transfusion and describe the procedure of a blood transfusion itself
- list the different blood group systems of dogs and cats and discuss various methods for blood typing including their advantages and disadvantages
- classify transfusion reactions with regard to their causes (immunological, non-immunological), describe the clinical symptoms of a transfusion reaction and list measures that have to be taken in case of intolerance

### LYMPHORETICULAR SURGERY L (1H) [56]

**Students should be able to:**

- derive and assess diseases of the lymphoreticular system
- name the most important surgical options

### FELV + FIV L (1H) [57]

**Students should be able to:**

- explain the aetiology, transmission and clinical symptoms of FeLV infection and differentiate between the various types of infection
- explain the tricks in the diagnostics of FeLV infection
- discuss the therapeutic options and prophylaxis against FeLV
- explain the aetiology, transmission and clinical symptoms of FIV infection as well as diagnostics
- discuss the interpretation of titre results
- discuss management and treatment options for the FIV-positive cat

### FIP L (1H) [58]

**Students should be able to:**

- discuss the epidemiology and clinic of feline coronavirus (FCoV)
- discuss the diagnostic possibilities for FCoV and FIP
- discuss the significance of positive and negative coronavirus titres and their interpretation in healthy cats and cats with FIP
- discuss therapeutic approaches to FIP and prevention

[56] 1.18

[57] 1.18, 1.21

[58] 1.18, 1.21

## IMPORTED INFECTIOUS DISEASES L (2H) [59]

### Students should be able to:

- inform the owners about possible diseases in foreign countries. In particular, this requires knowledge of endemic areas, showing the owners infectious pathways and strategies in the prevention of imported diseases
- name drugs for the prevention of diseases transmitted by blood-sucking vectors
- (acaricides, repellents), discuss indications for available blood test and perform and interpret a blood smear (semi quantitative analysis)
- describe the vectors, the pathogens and the clinical symptoms of imported diseases,
- explain the diagnosis and treatment of leishmaniasis, ehrlichiosis, dirofilariosis and hepatozoonosis
- allocate haematological examples (e.g. hyperglobulinaemia) to various imported infectious diseases

## THROMBOCYTES L (1H) [60]

### Students should be able to:

- explain thrombopoiesis
- explain the causes and the pathophysiology of thrombocytopenia
- describe the symptoms of immune-mediated thrombocytopenia and recommend treatment methods
- name the differential diagnosis for a bleeding tendency
- name the various causes of thrombocytopathy
- describe platelet function tests

## ONCOLOGY L (4H) [61]

### a) Fundamentals of tumour biology and chemotherapy

Learning objectives:

- Understanding of tumour biology (oncogenes, carcinogenesis, tumour models, acquired properties of tumour cells)
- Fundamentals of understanding "multi-step" oncogenesis (tumour genes, promoters, growth factors, tumour milieu)
- Fundamentals of chemotherapy (Gompertzian growth kinetics, hypothesis of fractional cell killing, therapeutic index, "ideal" therapy, chemotherapy resistance)

[59] 1.18, 1.21

[60] 1.18, 1.21

[61] 1.18, 1.21

### b) Clinical work-up of the tumour patient

Learning objectives:

- Anamnesis, staging
- General principles in the diagnosis of skin tumours
- Biopsy techniques as a basis for tissue diagnosis
- Cytology and histology
- Paraneoplastic syndromes

### c) Malignant lymphoma of the dog

Learning objectives:

- Understanding the tumour biology of a haematopoietic (systemic) tumour
- Clinical manifestations of malignant lymphoma in dogs
- Diagnostic procedure, staging and chemotherapy

### d) Mast cell tumour

Learning objectives:

- Clinical manifestations and diagnostics of mast cell tumours
- Significance of the classification into "tumour grades
- Importance of staging a tumour that is treatable with different modalities (surgery, radiation, chemotherapy, TK inhibitors) depending on the grade, location and tumour stage
- Understanding of multimodality therapy

## SHOCK L (2H) [62]

### Students should be able to:

- diagnose shock and recognise the form it takes
- initiate the initial care of the patient

## REANIMATION L (1H) [63]

### Students should be able to:

- have knowledge of basic and advanced life support in cardiovascular arrest
- initiate first aid for the patient

[62] 1.18, 1.19

[63] 1.19

## *Clinic for Horses (Internal Medicine and Surgery) (Fey, Roscher, Röcken et al.)*

### Special haematology horse L (2h) [64]

**Students should be able to:**

- explain haematological and inflammatory changes in the clinical chemistry of the horse
- name the most important causes of anaemia in the adult horse, elucidate the pathogenetic background and list the basics of therapy

## *Clinic for Ruminants (Internal Medicine and Surgery) (Sickinger et al.)*

### Lymphoreticular system Cattle L (1h) [65]

**Students should be able to:**

- describe the causes and main symptoms of BLAD and enzootic leucosis
- name possible methods of differential diagnostics, treatment and prevention of the two diseases in question

## *Clinic for Pigs (Internal Medicine and Surgery) (Reiner et al.)*

### PMWS L (1h) [66]

**Students should be able to:**

- explain the aetiology and pathogenesis of the porcine multi systemic wasting syndrome (PMWS) and point out the particularities of the disease
- name the clinical as well as the pathologic-anatomical and histological symptoms and to apply these with regard to the development of the disease and the prognosis
- list potential and important differential diagnoses of PMWS, rate the occurence and give diagnostic approaches to their classification
- initiate a disease- and case-related diagnostic plan and discuss possible results
- define and rate appropriate therapeutic measures as well as measures for meta- and prophylaxis and weigh the suitability of methods
- rate the economic relevance of the disease

[64] 1.18, 1.21, 1.24

[65] 1.1, 1.18, 1.21, 1.24

[66] 1.1, 1.18, 1.21

### PDNS L (1H) [67]

**Students should be able to:**

- explain the aetiology and pathogenesis of porcine dermatitis and nephropathy syndrome (PDNS), highlighting the disease-specific features
- name the clinical as well as the pathological anatomical and histological symptoms and apply these with regard to the course of the disease and prognosis
- list possible and important differential diagnoses of PDNS, evaluate their probability and name diagnostic approaches to differentiate between them
- initiate a disease- and case-related diagnosis and discuss possible results
- identify suitable therapeutic measures as well as meta- and prophylactic measures and weigh their suitability against each other
- evaluate the economic relevance of the diseases

## *Clinic for Reproduction (Wehrend et al.)*

### Immunology of newborns L (1H) [68]

Students should be able to:

- describe immunological conditions of foetuses and newborns and explain their importance for the development of diseases
- list, define and explain diagnosis, treatment and prevention of disorders of the immune system in newborns

## *Miscellaneous*

### Clinical demonstrations S (6H) [69]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### Blood smears and blood parasites (Cross Sectional Subject) (5H) [70]

**Students should be able to:**

- perform a blood smears and stain rapidly by Diff-Quik

[67] 1.1, 1.18, 1.21

[68] 1.18, 1.21

[69] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[70] 1.18, 1.21

- name the main stains of blood smears to create a differential cell image or a reticulocyte coun
- evaluate blood cells (erythrocytes, platelets, leucocyte populations)
- list the most important haematological characteristics that are specific to dogs, cats, horses, cattle and swine
- name therapeutic concepts for babesiosis, leishmaniasis and dirofilariasis,
- list possibilities of prophylaxis
- name the most important blood parasites of the dog and cat and describe their pathways of transmission
- describe the epidemiological situation (endemic, non-endemic regions
- recognize blood parasites in blood smears, and fine needle aspirates of bone marrow or lymph nodes

### LYMPHOMA HORSE (CROSS SECTIONAL SUBJECT) (1H) [71]

Students should be able to:

- know the particularities of the clinical expression of malignant lymphoma in horses and can list the diagnostic possibilities
- know the pathological-anatomical and -histological peculiarities of malignant lymphoma in horses and the relevant differential diagnoses
- apply the classifications of malignant lymphomas of domestic animals in equid
- place the typical organ changes in malignant lymphomas in horses in the clinical context
- know the possibilities of immunohistological differentiation of tumour cells

### LYMPHOMA SMALL ANIMAL (CROSS SECTIONAL SUBJECT) (1H) [72]

Students should be able to:

- list the clinical symptoms and possible differential diagnoses for dogs with lymphoma
- list the different forms of canine lymphoma based on clinical localisation of development
- list the differences in the most common localisation of the neoplastic developments of dogs and horses
- list and explain the most important examinations for establishing the diagnosis
- list the most important immune-histochemical classifications of lymphoma subtype
- list the most important factors that influence the prognosis
- list possible therapeutic measures for dogs and explain them together with their advantages and disadvantages (median survival rate, side effects, costs)

[71] 1.18, 1.21

[72] 1.18, 1.21

- explain the differences in therapeutic measures concerning horses in comparison with small animals

### Lymphoma Large Animal (Cross Sectional Subject) (1h) [73]

Students should be able to:

- discuss the epidemiology of bovine leucosis
- discuss the course of the disease (incl. clinic) of bovine leukosis
- know the differences between bovine leucosis and lymphoma in other species
- list the prophylactic measures of enzootic leucosis
- know the pathological-anatomical and -histological features of leukosis in ruminants and the relevant differential diagnoses
- apply the classifications of malignant lymphomas of domestic animals in ruminants
- place the typical organ changes in the clinical context

### Clinical Pathology (Cross Sectional Subject) (4h) [74]

Students should be able to:

- describe and explain the benefits and application of clinical pathological tests when examining healthy and sick animals for diagnosis, prognosis and development monitoring,
- apply the terminology and appropriate units
- identify pre-analytical, analytical and post-analytical errors
- describe the morphology and function of erythrocytes, leucocytes, and platelets
- identify and discuss the main haematological changes
- list and explain the most relevant coagulation tests
- perform, stain and evaluate a blood smear

### Vaccination Horse (Cross Sectional Subject) (1h) [75]

Students should be able to:

- list the "core" vaccinations in horses and describe the associated diseases
- name the "non-core" vaccinations in horses
- name the vaccinations required by the German Equestrian Federation for participation in competitions
- receive current information on vaccines and vaccination recommendations

[73] 1.18, 1.21, 1.24

[74] 1.21

[75] 1.36

## VACCINATION SMALL ANIMAL (CROSS SECTIONAL SUBJECT) (1H) [76]

### Students should be able to:

- conduct a vaccination discussion with a cat or dog owner
- list core and non-core vaccinations and explain them
- explain the difference between basic immunisation and booster shots
- explain the benefits and side-effects of vaccinations
- educate the owner about vaccination in chronically ill or immunosuppressed animals and know the advantages and disadvantages of titre determinations as an alternative to regular repeat vaccination

## IMMUNOLOGY (CROSS SECTIONAL SUBJECT) (6H)

The aim of the course is the presentation of the processes on the molecular level that take place in the context of an inflammatory reaction, in particular the function of neutrophil granulocytes in the inflammatory process. At the centre of interest is leucocyte migration (rolling, adhesion, diapedesis migration) with its underlying mechanisms and messenger substances (integrins, selectins, chemokines etc.) as well as the description of the phagocytic qualities of neutrophil granulocytes. Furthermore, there is a short excursus on bovine leucocyte adhesion deficiency (BLAD), a genetic mutation with the effects of immunodeficiency.

### Students should be able to:

- describe the different steps of leucocyte migration in the course of an inflammatory event, and explain the underlying molecular mechanisms
- define the functions of neutrophil granulocytes, in particular the phagocytosis activity of these cells and describe the individual steps of phagocytosis
- discuss non-specific, antimicrobial effector mechanisms in addition to the phagocytosis properties of neutrophil granulocytes
- classify the disease of bovine leucocyte adhesion deficiency (BLAD) and explain it with regard to its genesis and effects

[76] 1.36

## DERMATOLOGY

**Summary:**
Dermatological diseases are among the most common reasons for animals being taken to a vet. These also include skin wounds and their treatment. The understanding of the clinical findings (primary and secondary skin lesions) is a prerequisite for the initiation of further diagnostic steps. Pathological findings, in combination with clinical findings, are in some cases necessary to initiate the correct treatment. In pharmacology of dermatological products, important knowledge concerning the medication used will be given.

Further details (e.g. reading list) concerning the courses can be found online:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium

**Courses in detail:**

### *INSTITUTE OF PHARMACOLOGY AND TOXICOLOGY (GEYER ET AL.)*

#### ANTIFUNGALS L (1H) [77]

**Students should be able to:**

- derive the possible uses of the drugs
- define the areas of application
- explain risks of application
- explain the specifications of the drugs
- apply the fundamentals of pharmacokinetics

### *INSTITUTE OF VETERINARY PATHOLOGY (HERDEN, ET AL.)*

#### PATHOLOGY SKIN L (5H) [78]

**Students should be able to:**

- identify the pathological processes and developments in domestic animals
- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in connection with the clinical appearance
- explain the aetiology and pathogenesis of these developments, as well as confirm the correct morphological diagnoses and discuss differential diagnoses

[77] 1.18

[78] 1.21, 1.24, 1.33

## *Clinic for Small Animals (Internal Medicine and Surgery) (Kramer, Moritz, Bauer, Thom, Peppler, Thiel et al.)*

### Dermatological Examination L (1h) [79]

**Students should be able to:**

- perform a systematic clinical examination including history and dermatological examination
- differentiate between, classify and assess primary and secondary skin lesions
- on the basis of the knowledge acquired, discuss differential diagnoses
- list diagnostic tests available

### Parasitic skin diseases seen from a clinical perspective, L (2h) [80]

**Students should be able to:**

- recognize the most important ectoparasites of dogs and cats and their clinical symptoms,
- demonstrate testing methods that can be used in order to prove certain ectoparasites,
- transfer fundamental knowledge from parasitology concerning life cycles to therapeutic and prophylactic measures.

### Otitis - Internal Medicine L (2h) [81]

**Students should be able to:**

- take a good history and perform a general and dermatological investigation of the "ear-patient", as well as recognize the necessity of diagnosing possible underlying dermatological diseases
- describe the theoretical otoscopic examination and interpret its findings
- decide which cases demand further examination, and what kind of examination is most suitable
- interpret the results of the microscopic examination of the cerumen
- decide how to treat the various cases

### Alopecia L (2h) [82]

**Students should be able to:**

- conduct the examination of a patient with non-inflammatory alopecia
- identify differential diagnoses of bilateral symmetric alopecia

[79] 1.17, 1.21

[80] 1.18, 1.21, 1.24

[81] 1.15, 1.17, 1.18, 1.21

[82] 1.18, 1.21

- list clinical developments of hypothyroidism and hyperadrenocorticis
- define and explain hypothyroidism and hyperadrenocorticism as well as follicular dysplasia

### DERMATOLOGY- SMALL MAMMALS L (1H) [83]

**Students should be able to:**

- by means of an clinical image, derive and classify possible causes of diseases and determine which disease is more or less common in which animal species
- convey similarities in diagnosis and therapy that concern more than one species
- correctly interpret physiologic dermatological features of individual species

### DERMATOMYCOSES - SMALL ANIMALS L (1H) [84]

**Students should be able to:**

- explain the most important dermatophytoses of cats and dogs
- define and describe clinical lesions associated with dermatophytes
- interpret and apply appropriate diagnostic tests
- compile treatment plans
- list subcutaneous and systemic mycoses
- describe the clinical signs of a yeast infection, apply and interpret appropriate diagnostic tests

### ALLERGIES I L (1H) [85]

**Students should be able to:**

- explain the clinical signs of allergic skin diseases in dogs and cats
- identify miliary dermatitis in a cat
- list and recognise the forms of eosinophilic reaction in the cat
- list three causes of symmetric alopecia in a cat
- list the various components of the skin immune system and explain their function in the skin's defence response
- list examples of allergies and describe clinical and histological changes (atopic dermatitis, flea bite allergy, food intolerance)
- explain the diagnostic pathway and differential diagnoses of atopic dermatitis in dogs

[83] 1.18, 1.21

[84] 1.18, 1.21

[85] 1.21

### ALLERGIES II L (1H) [86]

Students should be able to:

- list the major and minor criteria for the diagnosis of atopic dermatitis in a dog (Willemse, Prelaud, Favrot criteria)
- list diagnostic methods for the diagnosis of atopic dermatitis and food intolerance and present their indications, advantages and disadvantages
- explain the principle of desensitisation
- name indications and different options for the treatment of atopy
- describe the principle of treatment of flea bite allergy

### BACTERIAL AND VIRAL SKIN DISEASES L (3H) [87]

Students should be able to:

- explain the different forms of pyoderma (surface, superficial and deep pyoderma)
- define and explain specific types of bacterial pyoderma (folliculitis, imdomestic animaligo, intertrigo, pyotraumatic dermatitis, chin-acne)
- list the most commonly involved bacteria, and explain the significance of opportunistic bacteria
- discuss the diagnosis (which tests and questions are helpful) and treatment of bacterial infections in general (when systemic treatment, when local treatment)
- asses, rate and interpret cytologic samples obtained by different methods (impression smear, FNA, cellotape)
- evaluate the relevance of different treatments (local creams, shampoos, systemic therapy) with regard to their advantages and disadvantages
- list symptoms of bacterial pyoderma in dogs and cats, as well as several potential primary diseases
- discuss the diagnosis and significance of multi-resistant and zoonotic bacteria (MRSA, MRSP, pseudomonas spp., mycobacteria) and comprehensively explain to the owners
- discuss the diagnosis and significance of viral pathogens (canine and feline papillomaviruses, poxviruses, distemper viruses, feline herpes virus, calicivirus, leukaemia virus)

### NEOPLASTIC AND METABOLIC SKIN DISEASES L (1H) [88]

Students should get an overview of the different diseases. They will be familiar with the typical clinical picture and be able to address the respective disease as a differential diagnosis

[86] 1.18, 1.21

[87] 1.18, 1.21, 1.24

[88] 1.21

### Immune-related Dermatoses L (2h)[89]

**Students should be able to:**

- discuss the treatment of pemphigus and discoid lupus erythematosus (DLE)
- assess/interpret laboratory findings for monitoring azathioprine and chlorambucil
- list symptoms of pemphigus foliaceus (PF) and DLE and their therapies
- define and explain the pathogenesis of pemphigus and DLE

### Surgery Skin Wounds I Wounds in General L (1h) [90]

**Students should be able to:**

- name the different aetiologies
- classify wounds according to their degree of infection
- list the main points of primary wound care

### Surgery of skin wounds II - Bite wounds L (1h) [91]

**Students should be able to:**

- explain the pathophysiology of a bite wound
- explain main features of a surgical treatment of a bite wound

### Surgery Skin Wounds III Special Wounds L (1h) [92]

**Students should be able to:**

- name the different diagnostic possibilities for acute and chronic stick injuries
- describe the therapy of the injury

### Otitis - Surgery L (1h) [93]

**Students should be able to:**

- list and match anatomical structures
- discuss the principles of surgery concerning the external ear canal and the middle ear
- list the main diseases of the external ear canal and the middle ear

[89] 1.18, 1.21

[90] 1.18, 1.29

[91] 1.18

[92] 1.18

[93] 1.18

### SKIN CYTOLOGY L (1H) [94]

**Students should be able to:**

- name the indications and limitations of a cytological examination
- explain techniques and performance of a fine needle aspirate depending on site and size of the abnormality
- list staining procedures for cytological specimens including their advantages and disadvantages
- list and explain physiological structures in a skin impression smears
- list and discuss inflammatory cells and types (purulent, granulomatous etc.) and the most important etiological reasons for their occurrence
- name and interpret recognizable microorganisms in cytological assessments
- classify and interpret recognizable microorganisms of cytological examinations
- list cytological characteristics of a pemphigus foliaceus
- list the main criteria for malignancy
- name cytological characteristics of epithelial, mesenchymal and round cell tumours
- list examples for benign and malignant epithelial skin tumours
- recognize and describe the main types of round cells (mast cells, lymphoid blasts, histiocytes and melanocytes)

## *CLINIC FOR HORSES (FEY, ROSCHER, RÖCKEN ET AL.)*

### DERMATOLOGY - HORSES I L (1H) [95]

**Students should be able to:**

- work up the anamneses of equine skin diseases
- list the diagnostic possibilities
- name basic therapeutic options

### DERMATOLOGY - HORSES II L (1H) [96]

**Students should be able to:**

- recognise important infectious skin diseases of the horse on the basis of the clinical picture or know which diagnostic steps have to be taken for clarification
- name the most important specific active substances for the therapy of equine skin diseases of infectious origin

[94] 1.21

[95] 1.15, 1.18, 1.21

[96] 1.18, 1.21

- list additive therapy measures

## DERMATOLOGY - HORSES III L (1H) [97]

Students should be able to:

- name important immunologically caused skin diseases of the horse and explain the underlying pathomechanisms
- list the differential diagnostic steps to clarify immune-related skin diseases
- name the most important therapeutic agents for the treatment of immunologically caused skin diseases in horses

## DERMATOLOGY – HORSES IV L (1H) [98]

Students should be able to:

- assess the pathogenicity of neoplastic changes (e.g. equine sarcoid, melanoma, squamous cell carcinoma, mast cell tumour)
- name diagnostic measures
- name and evaluate rare but impressive disease patterns manifesting on the skin

## WOUND CARE - HORSES L (2H) [99]

Students should be able to:

- explain the systematic diagnostic procedure for wounds and injuries
- describe essential aspects of wound healing in horses
- name the topical wound treatments in horses based on these aspects
- know the most important dressing materials and describe dressing techniques
- name the suture materials and drains required for wound closure in horses
- describe general and specific suturing techniques
- describe the most important aspects of reconstructive wound surgery and skin grafting
- explain relevant complications of wound healing

## NEOPLASIA SKIN - HORSES L (1H) [100]

Students should be able to:

- recognise the different forms of skin tumours in horses

[97] 1.18, 1.21

[98] 1.21

[99] 1.18, 1.29

[100] 1.18, 1.21

- explain the systematic procedure for the diagnostic examination of horses with skin tumours
- name the different therapeutic options for skin tumours in horses

## *Clinic for Pigs (Internal Medicine and Surgery) (Reiner et al.)*

### FMD L (1h) [101]

**Students should be able to:**

- explain the aetiology and pathogenesis of foot and mouth disease (FMD) and identify the special features of this disease
- name the clinical and pathological, anatomical and histological symptoms and apply these with regard to the development and the prognosis of the disease
- list possible and important differential diagnoses of FMD, rate their probability and list possible approaches to their classification
- induce a disease- and case-related diagnostic plan and discuss possible results,
- weigh appropriate therapeutic measures and measures for meta-and prophylaxis and the suitability of the methods
- rate the economic relevance of the diseases

### Exudative Epidermitis L (1h) [102]

**Students should be able to:**

- explain the aetiology and pathogenesis of the disease and point out the special features of this disease
- name the clinical and pathological, anatomical and histological symptoms and apply these with regard to the development and the prognosis of the disease
- induce a disease- and case-related diagnostic and discuss possible results
- weigh appropriate therapeutic measures and measures for meta-and prophylaxis and the suitability of the methods
- rate the economic relevance of the diseases

### Scabies L(1h) [103]

**Students should be able to:**

[101] 1.1, 1.18, 1.21, 1.24

[102] 1.1, 1.18, 1.21

[103] 1.1, 1.18, 1.21, 1.24

- explain the aetiology and pathogenesis of scabies and point out the special features of this disease
- name the clinical and pathological, anatomical and histological symptoms and apply these with regard to the development and the prognosis of the disease
- list possible and important differential diagnoses of scabies, rate their probability and list possible approaches to their classification
- induce a disease- and case-related diagnostic and discuss possible results
- weigh appropriate therapeutic measures and measures for meta-and prophylaxis and the suitability of the methods
- rate the economic relevance of the diseases

### DERMATOLOGY - MISCELLANEOUS L (1H) [104]

**Students should be able to:**

- explain the aetiology and pathogenesis of important dermatological diseases in pigs and point out the special features of these diseases
- name the clinical and pathological, anatomical and histological symptoms and apply these with regard to the development and the prognosis of the disease
- list possible and important differential diagnoses of dermatoses, rate their probability and list possible approaches to their classification
- induce a disease- and case-related diagnostic and discuss possible results
- weigh appropriate therapeutic measures and measures for meta-and prophylaxis and the suitability of the methods
- rate the economic relevance of the diseases

## *CLINIC FOR RUMINANTS (SURGERY AND INTERNAL) (SICKINGER ET AL.)*

### DERMATOLOGY - RUMINANTS: GENERAL INFORMATION L (1H) [105]

**Students should be able to:**

- rate the importance of bovine skin as an industrial natural resource (leather, gelatine)
- recognize the symptoms and causes of technopathics (husbandry or transport related skin alterations)
- describe the causes, characteristics, treatment and prophylaxis of the following diseases: depigmentation of hair (copper deficiency), hair loss and photosensitive reactions

[104] 1.1, 1.18, 1.21

[105] 1.1, 1.18, 1.21, 1.24

## DERMATOLOGY - RUMINANTS: PARASITES L (1H) [106]

Students should be able to:

- name the clinic, economic impact, diagnosis, differential diagnosis, therapy and prophylaxis of the following parasite-induced skin diseases in ruminants:
    - mallophaga and lice infestation
    - sarcoptes mange, psoroptes mange and chorioptes mange
    - demodicosis
    - myiasis

## DERMATOLOGY RUMINANTS- VIRUSES/BACTERIA L (1H) [107]

Students should be able to:

- name the clinic, economic impact, diagnosis, differential diagnosis, therapy and prophylaxis of the following viral and bacterial skin lesions in ruminants:
    - Papillomatosis
    - Stomatitis papulosa
    - Ecthyma contagiosum
    - Lumpy skin
    - Udder-thigh dermatitis
    - Dermatitis digitalis

## DERMATOLOGY - RUMINANTS: ACTINOBACILLOSIS /ACTINOMYCOSIS AND TRICHOPHYTIA [108]

Students should be able to:

- name the causes, types and localisation and possibilities of differential diagnosis of actinobacillosis and actinomycosis in cattle and small ruminants
- provide a prognosis of both diseases and the various treatment methods
- name the causes, clinical features, differential diagnosis and methods to diagnose trichophytoses
- describe the zoonotic potential of these diseases
- describe the prognosis, treatment measures and prophylactic measures, including vaccination

[106] 1.1, 1.18, 1.21, 1.24

[107] 1.1, 1.18, 1.21, 1.24

[108] 1.1, 1.18, 1.21, 1.24

### DERMATOLOGY - RUMINANTS: TAIL TIP NECROSIS L (1H) [109]

Students should be able to:

- describe the causes, symptoms and prognosis of tail tip necrosis in cattle
- describe possible conservative and surgical treatment methods
- identify measures of prophylaxis for this disease, with special regard to the relevant animal protection law

## *MISCELLANEOUS*

### CLINICAL DEMONSTRATIONS S (6H) [110]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### CYTOLOGY (CROSS SECTIONAL SUBJECT) (3H) [111]

Students should be able to:

- name the indications and limits of cytological examinations
- explain the preparation and staining of cytological specimens
- list and discuss inflammatory cell types and types of infection (purulent, granulomatous etc.) and the most important etiological causes for their occurrence
- name cytological characteristics of epithelial, mesenchymal tumours and round cell tumours
- recognize and describe the cytological characteristics of important skin tumours in dogs (lipoma, mast cell, dermal connection cyst)
- identify and describe the cytological characteristics of pemphigus foliaceus in dogs
- recognize and describe the most important round cell types (mast cells, lymphoid blasts, histiocytes and melanocytes)

[109] 1.1, 1.18, 1.21, 1.24

[110] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[111] 1.21

## ANAESTHESIOLOGY

### Summary:

Operations on animals can only be performed under sufficient anaesthesia. Pharmacology conveys an understanding of the application of anaesthetics, hypnotics, sedatives and analgesia. To ensure that anaesthesia can take place without complications, the various types and techniques of anaesthesia and monitoring will be illustrated. For dogs, cats, horses and cattle species-specific differences of anaesthesia will be discussed.

### Courses in detail:

#### *INSTITUTE OF PHARMACOLOGY AND TOXICOLOGY (GEYER ET AL.)*

#### LOCAL ANAESTHETICS L (1H) [112]

**Students should be able to:**

- elucidate the particular structures of pain fibres for the selective effect of local anaesthetics in sensible as compared to motoric nerve fibres
- explain the importance of the voltage dependent sodium channel for therapy and toxicology
- undertake a clinical and conceptual distinction of peripheral pain elimination, central analgesia in spinal marrow and loss of consciousness seizure (hypnosis, narcosis) via different substance classes
- recognize the therapeutic relevance of pharmacokinetics, metabolisation and lipophilicity in local anaesthetics

#### NARCOTICS: INHALATION + INJECTION L (1H) [113]

**Students should be able to:**

- demonstrate understanding of the effects and side effects of injectable and inhalable narcotics; recognise differences in effects
- develop possible uses based on effects
- critically assess the dangers of uncritical use
- learn the importance of pharmacokinetics
- reflect on the necessary and possible use
- assess co-medication and antagonization

[112] 1.31

[113] 1.30

## Opioid Analgesics L (1h) [114]

### Students should be able to:

- derive and delimit the possible uses of opioids
- define areas of application
- explain differences in effect due to pharmacodynamic and pharmacokinetic peculiarities
- explain addiction and abuse potential and apply antagonisation

## Barbiturates, Anticonvulsants L (1h) [115]

### Students should be able to:

- describe the pharmacology of the GABA(A) receptor
- explain the differences between hypnosis and anaesthesia
- derive the use of barbiturates
- assess and explain the potential for dependence
- explain the areas of application including euthanasia

## Minor Tranquilizers, Ataractics L (1h) [116]

### Students should be able to:

- demonstrate a critical understanding of the specifics of the effect of minor tranquilizer
- explain the meaning of the term ataraxia
- describe differences in effects between ataraxia and sedation
- name possible uses based on the effects
- criticise misuse (addictive potential)
- reflect the necessary use of benzodiazepines

## Major Tranquilizers, Neuroleptics L (1h) [117]

### Students should be able to:

- derive and delimit the (veterinary) possible uses of neuroleptics
- define areas of application
- explain the differences in effect of the different classes of substances due to pharmacodynamic and pharmacokinetic characteristics
- explain addiction and abuse potential and apply antagonization

[114] 1.30, 1.31

[115] 1.30, 1.32

[116] 1.30

[117] 1.30

### SMALL ANALGESICS, ALPHA2- AGONISTS L (1H) [118]

**Students should be able to:**

- explain the mode of action and differences between the various classes of substances on the basis of pharmacokinetic and pharmacodynamic properties and differentiate them from other analgesics
- define areas of application, veterinary uses and adverse drug reactions including animal species specifics
- antagonise the effect of alpha2-agonists

## *CLINIC FOR SMALL ANIMALS (INTERNAL MEDICINE AND SURGERY) (TACKE ET AL.)*

### ANAESTHESIA - SMALL ANIMALS: BASICS OF ANAESTHESIA L (1H) [119]

**Students should be able to:**

- explain the terms sedation, hypnosis, narcosis, analgesia and anaesthesia
- define the stages of anaesthesia, perform a pre-anaesthetic examination and carry out an ASA classification

### ANAESTHESIA - SMALL ANIMALS: LOCAL ANAESTHESIA L (1H) [120]

**Students should be able to:**

- explain the term local anaesthesia
- choose the suitable medication and dosages and know how to combine local anaesthetics with opioids or alpha 2 agonists
- choose the appropriate local anaesthesia for particular surgical procedures
- explain the differences of surface and infiltration anaesthesia and peripheral and central nerve blockage
- explain the effects and side effects of local anaesthetics and analgesics

### ANAESTHESIA - SMALL ANIMALS: INHALATION ANAESTHESIA L (1H) [121]

**Students should be able to:**

- explain advantages and disadvantages of inhalation anaesthesia

[118] 1.30, 1.31

[119] 1.30

[120] 1.30, 1.31

[121] 1.30

- describe the concept of MAC and know the legal pharmaceutical prerequisites of the use of volatile anaesthetics
- describe the protection of the respiratory passages
- describe the various anaesthetic systems and their advantages and disadvantages

### ANAESTHESIA - SMALL ANIMALS: VENTILATION, MONITORING L (1H) [122]

Students should be able to:

- explain the indications, advantages and disadvantages of ventilation
- explain the different forms of ventilation (IPPV, PEEP, CPAP, SIMV)
- explain the different forms of monitoring (pulse palpation, auscultation, capnography, electrocardiography, blood pressure, pulse oximetry, pulse plethysmography, blood gas analysis)
- describe the various forms of invasive and non-invasive monitoring
- interpret the readings that were obtained
- interpret a capnogram

### ANAESTHESIA - DOG L (1H) [123]

Students should be able to:

- choose the anaesthesia, anaesthetics and monitoring that is suitable for the patient in question with regard to different symptoms in dogs
- calculate the required dosage and interpret the course of the anaesthesia

### ANAESTHESIA - CAT L (1H) [124]

Students should be able to:

- choose the anaesthesia, anaesthetics and monitoring that is suitable for the patient in question with regard to different symptoms in cat
- calculate the required dosage and interpret the course of the anaesthesia

### ANAESTHESIA - RISK PATIENT L (1H) [125]

Students should be able to:

- choose suitable forms of anaesthesia and anaesthetics for patients at risk

[122] 1.30

[123] 1.30

[124] 1.30

[125] 1.30

- calculate the required dosage and choose the necessary monitoring of the patient

### *Clinic for Horses (Fey, Roscher, Röcken et al.)*

#### Anaesthesia - Horses L (2h) [126]

Students should be able to:

- explain the preparation and performance of general anaesthesia in horses
- name different sedation and general anaesthesia protocols
- name the standard equipment used for anaesthesia monitoring and explain the corresponding functions
- name the most common complications during anaesthesia and explain treatment options

### *Clinic for Ruminants (Surgery and Internal) (Sickinger et al.)*

#### Anaesthesia - cattle L (1h) [127]

Students should be able to:

- name the various procedures of local anaesthesia such as surface, conduction, infiltration and intravenous congestion anaesthesia as well as the general anaesthetic of ruminants and the indications
- describe appropriate methods of anaesthesia for the following surgical procedures:
    - surgery of the head; dehorning, evisceration of the orbit, tongue operations
    - surgery in the field of distal limbs
    - laparotomy
    - navel operations
    - tail amputation

### *Miscellaneous*

#### Clinical demonstrations S (2h)[128]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

[126] 1.30

[127] 1.30, 1.31

[128] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

**Summary:**
Diseases of the musculoskeletal system are among the most common reasons for examinations of small animals and horses. At the beginning of the block anatomical and physiological basics are rehearsed and deepened. The general and specific clinical examination of the locomoter system are prerequisites for an appropriate therapy. They are the basis for further diagnostic steps such as imaging procedures and laboratory examinations. Obtaining a thorough knowledge of common diseases of the musculoskeletal system in domestic animal species, but also their diagnostics and therapy are the focus in this course.

Further details regarding courses (e.g. reading list) can be found online at:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium

## Courses in detail:

### *INSTITUTE OF PHARMACOLOGY AND TOXICOLOGY (GEYER ET AL.)*

#### NSAID L (1H) [129]

**Students should be able to:**

- derive and define the usefulness of these substances
- evaluate and justify the risks of the application
- name the major differences of the substance classes
- apply the fundamentals of pharmacokinetics

#### PHARMACOLOGY IMMUNOSUPPRESSANTS L (1H) [130]

**Students should be able to:**

- explain the differences between the four different types of allergy
- explain the drug-specific sites of action of immunosuppressants
- state specific indications for individual immunosuppressants

[129] 1.18, 1.31
[130] 1.18

### GLUCOCORTICOIDS L (1H) [131]

Students should be able to:

- classify the substances pharmacologically and outline their usefulness
- define the fields of application and the benefits of glucocorticoids
- assess the potential risks in the case of an overdose
- explain the so-called non-steroidal effects of steroid hormones
- evaluate alternatives to a glucocorticoid therapy

## *INSTITUTE OF VETERINARY PATHOLOGY (HERDEN, ET AL.)*

### PATHOLOGY MUSCULAR SKELETAL AND LOCOMOTOR SYSTEM (3H) [132]

Students should be able to:

- identify the pathological processes and developments in domestic animals
- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in connection with the clinical appearance
- explain the aetiology and pathogenesis of these developments, as well as confirm the correct morphological diagnoses and discuss differential diagnoses

### CNS / PNS L (5H) [133]

Students should be able to:

- identify the pathological processes and developments in domestic animals
- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in connection with the clinical appearance
- explain the aetiology and pathogenesis of these developments, as well as confirm the correct morphological diagnoses and discuss differential diagnoses

[131] 1.18, 1.31

[132] 1.21, 1.24, 1.33

[133] 1.21, 1.24, 1.33

## *Clinic for Small Animals (Internal Medicine and Surgery) (Kramer, Moritz, Peppler, Thiel, Schmidt et al.)*

### Orthopaedic examination of small animals L (1h) [134]

**Students should be able to:**

- perform a clinical orthopaedic examination
- relate certain orthopaedic diseases to appropriate methods of investigation
- deduce the significance of lameness

### X-ray fundamentals L (1h) [135]

**Students should be able to:**

- define standard examinations
- define normal findings

### X-ray - small animal L (1h) [136]

**Students should be able to:**

- recognize and define different types of fractures in radiographs
- name the different levels of fraction healing

### Further diagnostics locomotor system - small animals L (1h) [137]

**Students should be able to:**

- assess and evaluate possible diagnostic methods
- define and explain diagnostic possibilities

### Sectional imaging basics L (1h) [138]

**Students should be able to:**

- describe the basics of CT and MRI and name common areas of application

[134] 1.17
[135] 1.23
[136] 1.23
[137] 1.23
[138] 1.23

### MRI / CT SCINTIGRAPHY L (1H) [139]

Students should be able to:

- define the general physical fundamentals of CT, MRI and scintigraphy
- deduce and list indications for the individual methods

### PAIN THERAPY L (2H) [140]

Students should be able to:

- assess and define pain in dogs, cats and other pets
- perform an analgesia that is adapted to the patient

### JOINT DISEASES - SMALL ANIMAL L (1H) [141]

Students should be able to:

- describe and evaluate the different forms of dislocations
- list possible therapeutic measures
- list the most important disorders of the hip joint and demonstrate therapeutic measures

### HIP AND ELBOW JOINT DYSPLASIA HD/ED L (1H) [142]

Students should be able to:

- name the diagnostic steps of HD and ED
- explain different therapeutic approaches

### ARTHRITIS / DEGENERATIVE JOINT DISEASE (DJD) L (1H) [143]

Students should be able to:

- define rheumatoid and non-rheumatoid arthritis
- list the types of arthritis and name possibilities for their differentiation
- define the terms “DJD” and “arthritis”
- explain the significance of arthritis of the different joints with regard to the symptoms
- list and assess different therapeutic options

[139] 1.23

[140] 1.18, 1.31

[141] 1.18, 1.23

[142] 1.18, 1.23

[143] 1.18, 1.23

### KNEE - SMALL ANIMAL L (1H) [144]

Students should be able to:

- depict the aetiology of the cruciate ligament rupture and name various therapeutic methods
- describe the nature and scale of patella luxation and list possible surgical forms of therapy

### LIGAMENT INJURIES CARPUS/TARSUS - SMALL ANIMAL L (1H) [145]

Students should be able to:

- differentiate between various injuries in the carpal / tarsal joint area and name therapeutic options
- name the basics of arthrodesis

### PAW - SMALL ANIMALS L (1H) [146]

Students should be able to:

- enumerate the most common inflammatory and neoplastic diseases of the paw
- name the special characteristics of fracture treatment, as well as the treatment of dislocations

### TENDONS, MUSCLES - SMALL ANIMAL L (1H) [147]

Students should be able to:

- derive the different forms and localisations of the various muscle and tendon diseases
- name the possibilities of surgical therapy
- define the terms "contracture", "tendinosis", "tendovaginitis"

### BANDAGE THEORY L (1H) [148]

Students should be able to:

- define, describe and perform various bandage techniques and types in the different species

[144] 1.18, 1.23

[145] 1.18, 1.23

[146] 1.18, 1.23

[147] 1.18, 1.23

[148] 1.18

## FRACTURES L (1H) [149]

### Students should be able to:

- describe and classify fractures
- deduce the principles of primary and secondary bone healing
- assess the boundaries and possibilities of conservative fracture treatment
- name implants and list indications for their application
- define and explain the terms “biological” and “stable” osteosynthesis

## FRACTURE TREATMENT - SMALL ANIMALS L (2H) [150]

### Students should be able to:

- differentiate between those forms of fracture that are classified as “difficult” and those that are considered “simple”
- match individual types of fractures to the possible forms of osteosynthesis

## METABOLIC BONE DISEASES L (1H) [151]

### Students should be able to:

- name different metabolic bone diseases
- explain the different therapies of each metabolic diseases

## SMALL MAMMALS I + II LOCOMOTOR SYSTEM L (2H) [152]

### Students should be able to:

- name the principles of the locomotor system examination in small mammals
- list the most common diseases of the locomotor system in small mammals and explain individual forms in further detail
- name methods of further diagnostics in small mammals
- list possible forms of therapy for the individual diseases mentioned

## PHYSIOTHERAPY L (4H) [153]

### Students should be able to:

- define and explain the term "physiotherapy"

[149] 1.18, 1.23

[150] 1.18, 1.23

[151] 1.18, 1.21, 1.23

[152] 1.18, 1.23

[153] 1.18

- state its main applications in orthopaedics and neurology
- create a treatment programme involving physiotherapy
- perform a physiotherapeutic examination
- list indications for physiotherapy

### Neurology- Small Animal: Functional Anatomy of the CNS, Neurolocalisation L (1h)[154]

Students should be able to:

- list the breed predispositions of the most important neurological diseases
- distinguish between UMN and OMN
- list all reflexes and explain their physiology

### Neurology - Small Animal: Gait Analysis Ataxia vs. Paresis L (2h) [155]

Students should be able to:

- make a neurolocalisation on the basis of analyses of the gait and neurological disorders

### Neurology - Small Animal: Vestibular Syndrome L (1h) [156]

Students should be able to:

- present findings for central and peripheral vestibular syndrome
- list differential diagnoses for VS
- interpret the findings of diagnostic imaging procedures

### Neurology - Small Animal: Epilepsy L (3h) [157]

Students should be able to:

- recognise the different manifestations of epilepsy
- list the possible differential diagnoses for epileptic seizures
- explain the necessary diagnostic measures
- know the medicinal treatment of epilepsy

[154] 1.18

[155] 1.17

[156] 1.18, 1.23

[157] 1.18, 1.23

## NEUROLOGY - SMALL ANIMAL: INFLAMMATORY BRAIN DISORDERS L (1H) [158]

### Students should be able to:

- list breed predispositions of the most important inflammatory conditions
- list the relevant medication
- explain effects and side effects of these drugs

## NEUROLOGY - SMALL ANIMAL: TREATMENT OF INTERNAL HYDROCEPHALUS L (1H) [159]

### Students should be able to:

- present the symptoms for hydrocephalus
- recommend an appropriate treatment option
- explain the procedure for a ventriculo-peritoneal shunt
- assess prognosis and complications

## NEUROLOGY - SMALL ANIMAL: WOBBLER SYNDROME/ATLANTOAXIAL MALFORMATION L (1H) [160]

### Students should be able to:

- explain the different morphological changes of the spine that can lead to the Wobbler syndrome

## NEUROLOGY - SMALL ANIMAL: INTERVERTEBRAL DISC DISEASES L (1H)[161]

### Students should be able to:

- explain the different diseases caused by disc degeneration
- explain the diagnosis of cervical, thoracolumbar and lumbosacral disc diseases
- explain the basic principles of decompressive interventions
- explain the basic techniques of spondylodesis
- relate the different surgical techniques to the pathophysiological changes

## NEUROLOGY - SMALL ANIMAL: BRAIN TUMOURS L (1H) [162]

### Students should be able to:

- name the different forms of brain tumours

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[158] 1.18, 1.23

[159] 1.18, 1.23

[160] 1.23

[161] 1.18, 1,23

[162] 1.18, 1,23

- assess the biological behaviour of brain tumours
- rate the treatability of brain tumours

### NEUROLOGY - SMALL ANIMAL: CAUDA EQUINA COMPRESSION SYNDROME L (1H) [163]

**Students should be able to:**

- name imaging findings in cauda equina problems
- name the classic symptoms of diseased dogs and distinguish them from differential diagnoses
- explain the principle of dorsal laminectomy

### NEUROLOGY - SMALL ANIMAL: FRACTURES SPINE L (1H) [164]

**Students should be able to:**

- explain the basic principles and the advantages and disadvantages of neurosurgical stabilisation techniques

### OPHTHALMOLOGY - SMALL ANIMAL: EYELID, CONJUNCTIVA, CORNEA L (3H) [165]

**Students should be able to:**

- list and define diseases of the eyelids, the conjunctiva and nictitating membrane as well as those of the cornea
- list characteristic findings of the specific diseases and suggest the appropriate therapeutic measures
- define the basic principles of diseases of the eyelid and adnexa
- name the diagnostic agent of choice as well as the appropriate therapy regarding diseases of the eyelid

### OPHTHALMOLOGY - SMALL ANIMAL: CORNEAL DISEASE L (1H) [166]

**Students should be able to:**

- name the most important corneal diseases in dogs and cats
- list the necessary diagnostic steps and possible therapies

[163] 1.18, 1,23

[164] 1.18, 1,23

[165] 1.18, 1.21

[166] 1.18, 1.21

### OPHTHALMOLOGY - SMALL ANIMAL: TUMOURS, KCS L (1H) [167]

**Students should be able to:**

- list the most common tumours in the area of the eye
- name the treatment options for a KCS

### OPHTHALMOLOGY - SMALL ANIMAL: METHODS L (1H) [168]

**Students should be able to:**

- name the different methods of diagnostics

### OPHTHALMOLOGY - SMALL ANIMAL: LENS, ANTERIOR CHAMBER, RETINA L (1H) [169]

**Students should be able to:**

- name the most important diseases of the lens, anterior chamber and retina in dogs and cats
- list the necessary diagnostic steps for these diseases and possible therapie

## *CLINIC FOR HORSES (FEY, ROSCHER, RÖCKEN ET AL.)*

### OSTEOARTHRITIS - HORSES L (1H) [170]

**Students should be able to:**

classify the term osteoarthritis
name the different elements of pathogenesis
describe clinical symptoms and diagnostic procedures
name and weigh up therapeutic options

### OCD - HORSES L (1H) [171]

**Students should be able to:**

- explain the genesis and diagnostic procedure of equine OCD
- describe the essential clinical and imaging findings of the disease
- describe the therapeutic measures resulting from these findings

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[167] 1.18, 1.21
[168] 1.21
[169] 1.18, 1.21
[170] 1.18, 1.21, 1.23
[171] 1.18, 1.21, 1.23

## Subchondral Bone Cysts - Horses L (1h) [172]

Students should be able to:

- explain the genesis and the diagnostic procedure of equine subchondral bone cysts
- describe the essential clinical and imaging findings of the disease
- describe the resulting therapeutic options

## Tendopathies and Desmopathies - Horses L (1h) [173]

Students should be able to:

- classify the terms tendinopathy and desmopathy
- name the different elements of pathogenesis
- describe clinical symptoms and diagnostic procedures
- name and weigh up therapeutic options

## Fractures - Horses L (1h) [174]

Students should be able to:

- explain the key points in the initial treatment of horses with fractures
- explain the particularities of the immobilisation of the individual limb dissections to be observed
- explain the structure and application of an immobilising limb bandage (cast bandage; splint bandage)
- describe the procedure for the appropriate transport of a horse with a fracture
- explain the basic principles of osteosynthesis: lag screw, plating, wire cerclage
- explain the basic principle of the locking plate
- name the special challenges of fracture care and osteosynthesis in the horse species

## Hoof Diseases - Horses L (2h) [175]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the hoof
- recognise important clinical findings in equine hoof diseases
- name the most important diseases of the hoof in horses
- describe the therapeutic measures based on these findings

[172] 1.18, 1.21, 1.23

[173] 1.18, 1.21, 1.23

[174] 1.18, 1.21, 1.23

[175] 1.18, 1.21, 1.23

## TOE - HORSES L (1H) [176]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the toe and explain
- recognise important clinical findings in equine diseases of the toe
- name the most important diseases of the toe in horses
- describe the therapeutic measures based on these findings

## METACARPUS/METATARSUS - HORSE L (2H) [177]

Students should be able to:

- differentiate the diseases of the metatarsus
- explain the most important principles of fracture treatment in the metatarsal region
- list the diagnostic criteria and the frequency of occurrence of the tendopathies/ desmopathies
- describe the therapeutic measures based on these criteria

## CARPUS, ELBOW JOINT, SHOULDER - HORSE L (1H) [178]

Students should be able to:

- explain the systematic diagnostic procedures for diseases of the carpus, elbow joint and shoulder in horses
- describe essential clinical and imaging findings in diseases of the carpus, elbow joint and shoulder in horses
- name the most important diseases of the carpus, elbow joint and shoulder in horses
- recognise the nerve damage (radial and suprascapular nerve)
- describe the therapeutic measures based on these findings

## TARSUS, KNEE - HORSES L (1H) [179]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the tarsus and knee in horses
- describe the most important clinical and imaging findings in equine tarsus and knee diseases
- name the most important diseases of the tarsus and knee in horses

[176] 1.18, 1.21, 1.23

[177] 1.18, 1.21, 1.23

[178] 1.18, 1.21, 1.23

[179] 1.18, 1.21, 1.23

- describe the therapeutic measures based on these findings

### Hip Joint, Sacrum, Pelvis - HorsesL (1h) [180]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the hip joint, the sacroiliac joint and the pelvis in horses
- describe essential clinical and imaging findings in diseases of the hip joint, the sacroiliac joint and the pelvis in horses
- name the most important diseases of the hip joint, the sacroiliac joint and the pelvis in horses
- describe the therapeutic measures based on these findings

### Neck, Back - Horse L (1h) [181]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the neck and back in horses
- describe the most important clinical and imaging findings in equine neck and back diseases
- name the most important diseases of the neck and back in horses
- describe the therapeutic measures based on them

### Myopathy - Horses L (1h) [182]

Students should be able to:

- name the diagnostic possibilities for muscular diseases of the horse and the most important, internally relevant load-induced and non-load-induced muscular diseases of the horse, examine pathogenetic backgrounds and list basic therapeutic options

### Neurology - Horses L(2h) [183]

Students should be able to:

- name the most important, internally relevant CNS diseases of the horse, highlight pathogenetic correlations and therapeutic options and give a prognostic assessment

[180] 1.18, 1.21, 1.23

[181] 1.18, 1.21, 1.23

[182] 1.18, 1.21

[183] 1.18

### OPHTHALMOLOGY - HORSE L(1H) [184]

Students should be able to:

- explain the systematic procedure for clinical eye examination in horses
- describe the most important clinical and imaging findings in diseases of the equine eye
- name the most important diseases of the equine eye
- describe the therapeutic measures based on these findings

## *CLINIC FOR RUMINANTS (INTERNAL MEDICINE AND SURGERY) (SICKINGER ET AL.)*

### ORTHOPAEDIC EXAMINATION OF CATTLE L (1H) [185]

Students should be able to:

- recognise lameness on the basis of characteristic features and name the degrees or forms of lameness
- undertake an assessment and examination of the claw
- palpatorically assess joints and synovial tendon sheaths
- describe the findings of normal and abnormal synovial fluid

### TENDONS, MUSCLES - RUMINANTS L (1H) [186]

Students should be able to:

- name the causes, clinical symptoms, further diagnostic methods, therapy and prophylaxis of the following disorders of tendons and muscles in cattle and small ruminants:
  - Neuromyodysplasia congenita
  - Spastic paresis
  - Spinal muscle atrophy
  - Spinal dysmyelogenesis
  - Weaver Syndrome
  - Myodystrophy caused by vitamine E and selenium deficiency

### HOOF INFECTION - RUMINANTS L (1H) [187]

Students should be able to:

[184] 1.17, 1.18, 1.23

[185] 1.1, 1.17, 1.21

[186] 1.1, 1.18, 1.21, 1.23

[187] 1.1, 1.18, 1.23

- discuss the meaning of claw/hoof diseases, as well as recognize the following claw/hoof diseases, describe their causes and name possible measures for their therapy and prophylaxis:
    - Laminitis
    - Dermatitis digitalis, Dermatitis interdigitalis
    - Interdigital phlegmon
    - Whiteline disease
    - Limax
    - Rusterholz ulcer

### NEUROLOGY / OPHTHALMOLOGY - RUMINANTS L (1H) [188]

**Students should be able to:**

- diagnose the following diseases of the CNS and sensory organ and discuss their respective therapy and prophylaxis based on the clinical finding:
    - BEF
    - Rabies
    - Visna
    - CAE
    - BSE
    - Scrapie
    - Infectious bovine keratoconjunctivitis
    - Cancer eye
    - Otitis media

## *CLINIC FOR PIGS (INTERNAL MEDICINE AND SURGERY) (REINER ET AL.)*

### PORCINE CLAWS AND JOINTS L (1H) [189]

**Students should be able to:**

- provide a structured overview of the major diseases of the locomotor system of pigs and evaluate the individual diseases clinically, therapeutically and economically
- explain the aetiology and pathogenesis of these diseases and point out their characteristic features
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis

[188] 1.1, 1.18, 1.21, 1.24

[189] 1.1, 1.18, 1.21

- list possible and important differential diagnoses for these diseases, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of these methods
- rate the economic relevance of the diseases

### GLASSER'S DISEASE L (1H) [190]

Students should be able to:

- explain the aetiology and pathogenesis of Glasser's disease and identify the special features of this disease
- name the clinical and pathological, anatomical and histological symptoms and apply these with regard to the development and the prognosis of the disease
- list possible and important differential diagnoses of Glasser's disease, rate their probability and list possible approaches to their classification
- induce a disease- and case-related diagnostic and discuss possible results
- weigh appropriate therapeutic measures and measures for meta-and prophylaxis and the suitability of the methods
- rate the economic relevance of the diseases

### PORCINE MUSCLES L (1H) [191]

Students should be able to:

- provide a structured overview of the most important myopathies of pigs,
- and evaluate individual diseases clinically, therapeutically and economically
- explain the aetiology and pathogenesis of these diseases and identify their special features
- name the clinical and pathological, anatomical and histological symptoms and apply these with regard to the development and the prognosis of the disease
- list possible and important differential diagnoses for the diseases, rate their probability and list possible approaches to their classification
- initiate diagnostics for this specific disease and case and discuss possible results
- weigh appropriate therapeutic measures and measures for meta-and prophylaxis and the suitability of the methods
- rate the economic relevance of the diseases

[190] 1.1, 1.18, 1.21

[191] 1.1, 1.18, 1.21

### PORCINE CNS L (1H) [192]

**Students should be able to:**

- provide a structured overview of the most important diseases of the CNS of pigs and evaluate individual diseases clinically, therapeutically and economically
- explain the aetiology and pathogenesis of these diseases and identify their special features
- name the clinical and pathological, anatomical and histological symptoms and apply these with regard to the development and the prognosis of the disease
- list possible and important differential diagnoses for the diseases, rate their probability and list possible approaches to their classification
- initiate diagnostics for this specific disease and case and discuss possible results
- weigh appropriate therapeutic measures and measures for meta-and prophylaxis and the suitability of the methods
- rate the economic relevance of the diseases

## *MISCELLANEOUS*

### CLINICAL DEMONSTRATIONS S (12H) [193]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### REPETITORIUM PHYSIOLOGY MUSCULOSKELETAL SYSTEM AND SYNOVIA (CROSS SECTIONAL SUBJECT) (1H) [194]

**Students should be able to:**

- define the physiological structure of joints and the composition and function of synovia
- describe the main inflammatory and non-inflammatory joint diseases
- explain the laboratory diagnostic examination of synovia

### REPETITORIUM ANATOMY AND PHYSIOLOGY EYE (CROSS SECTIONAL SUBJECT) (2H)

**Students should be able to:**

- understand the functional anatomy of the eye
- understand the functioning of the dioptric apparatus
- define the formation of aqueous humour and the pathophysiology of glaucoma

[192] 1.1, 1.18, 1.21, 1.24

[193] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[194] 1.21

### Imaging Diagnostics Musculoskeletal System - Large Animal (Cross Sectional Subject) (2h) [195]

Students should be able to:

- evaluate the quality and diagnostic value of radiographs
- correctly diagnose fractures on the basis of radiographs and discuss possibilities of therapy
- reproduce the principles of plate osteosynthesis
- make statements on healing time and prognosis

### Bone Substitute Materials (Cross Sectional Subject) (2h) - Use of bone substitute materials, anatomy and surgery

Students should be able to:

- explain the different terms such as osteoinduction, osteoconduction
- name different scaffold materials for bone substitution

### Fracture Treatment (Cross Sectional Subject) (2h)[196]

Students should be able to:

- define, classify and explain fractures
- assess and diagnose fractures
- describe the imaging findings of a fracture and the fracture conformation
- explain the principles of fracture treatment
- discuss the therapy and prognosis of fractures

### Bandaging techniques small animals, ruminants, horses (Cross Sectional Subject) (3h)[197]

Students should be able to:

- define, describe and perform specific bandaging techniques and
- types concerning different species

[195] 1.18, 1.23

[196] 1.18, 1.23

[197] 1.18

## PHARMACEUTICAL AND DRUG PROHIBITION LAW [198]

### Coordinator:
Hamann

### Instructor:
Hamann

### Course type:
lecture (1,071 CHW)

### ECTS:
1

### Introduction:
- the right to dispense pharmaceutical drugs by the veterinarian; the requirements for running a pharmacy: the tierärztliche Hausapothekenverordnung (TÄHAV)
- the German drug law: what are medicinal products (mp)? Definitions, real/fictional drugs, authorisation of mp, registration of homeopathic drugs
- the application/dispensation of mp: marketability of mp, how to dispense drugs only available on prescription (so called “rezeptieren”)
- critical mp, deception, report of unexpected adverse drug reactions, “Stufenplanverfahren”, pharmacovigilance
- shortage of mp, shortage of therapy and redeployment of pharmacy-only mp
- the use of mp for animals that are used for food production: EU Regulation 470/2009: Rückstandshöchstmengen-VO, latency period
- the effects of EU-regulations on the veterinary practice ( "Rosa Liste"), medicated foodstuff, documentation for veterinary drugs
- the use of mp on horses, the equine pass, the "positive list"
- legal regulations that are relevant for the veterinarian when using narcotics (Betäubungsmittelgesetz (German Narcotics Act)), the regulations concerning the prescription of narcotics
- BTM-Binnenhandelsverordnung (the narcotic internal trade regulation), BTM-Außenhandelsverordnung (the narcotic foreign trade regulation)
- hazardous substances in the veterinary pharmacy/practice

[198] 1.3, 1.10, 1.25, 1.26, 1.27

- the requirements for the production of mp in the veterinary pharmacy: knowledge in labelling (package insert, expert information), pricing, storage, disposal of medicines
- the requirements for the production of medicines in the veterinary pharmacy: knowledge in galenics
- the use of medical devices in the veterinary practice

### Overall aims and objectives:

Students should be able to:

- assess mp with regard to current laws and regulations, discuss the possibilities of authorisation or registration
- define certain terms (e.g., mp, medicated foodstuff, pre-mixtures of medicine, rededication, shortage of therapy, etc.)
- explain the channels of distribution for mp/narcotics
- classify mp regarding their marketability
- enumerate and explain the requirements for the registration and running of a veterinary pharmacy (TÄHA) according to the tierärztliche Hausapothekenverordnung
- name and assess the requirements for the purchase, storage, release, and application of veterinary mp (including narcotics) in accordance with current laws and regulations
- rate and evaluate the different legal situations when treating food-producing animals and pets with mp
- list documentation of the purchase, dispensation, application and, where applicable, the appropriate disposal of mp and narcotics, respectively
- explain the necessary measures that have to be taken in order to report unexpected adverse drug reactions to the appropriate authority
- explain the obligation to inform (such as indication on waiting periods) to animal holders
- name the requirements for the production of mp in the veterinary pharmacy (TÄHA)
- choose appropriate mp for their respective disease patterns and prescribe according to the current laws and regulations
- recognize substances as hazardous and handle these according to current laws and regulations
- recognize medical products and handle these according to current laws and regulations

### Reading List:

- Zrenner, Paintner, Bert: Arzneimittelrechtliche Vorschriften für Tierärzte und einschlägige Vorschriften anderer Rechtsreiche, Deutscher Apotheker Verlag, ISBN-13: 9783769243192

### Electronic sources:

Veterinary information service on the use of medicinal products, toxicology and pharmaceutical regulations:

www.vetidata.de

### Scripts:

See StudIP:

https://studip.uni-giessen.de

### Learning recommendations:

attending the lectures; preparation with the help of the lecture notes (slides on Stud.IP); learning the material with the help of the textbooks

### Assessment:

a written or oral exam in the subject of medicinal products and narcotics law after the 6th semester; partial exam; practical exam: production of medicinal products (galenics) 6th semester

## Prescribing of Medicines: Preparation of Medicines[199]

### Coordinator:

Hamann

### Instructor:

Hamann

### Course type:

Practical (1,572)

### ECTS

3

### Prerequisites:

Attendance of the lecture in pharmacopoeia

### Introduction:

- Discussion of the legal requirements for the manufacture of medicinal products
- Packaging, labelling, price calculation, testing, disposal of mp
- Introduction to common activities in drug production (e.g. weighing techniques, mortaring, dissolving, filtering, sterilising)
- Safety instruction according to the Ordinance on Hazardous Substances
- Production of sterile solutions

[199] 1.3, 1.10, 1.25, 1.26, 1.27, 128

- Production of powders, divided powders, powders in capsules
- Production of suspensions, suspension ointments
- Production of solution ointments, creams and gels
- Examination: Production of 2 medicinal products according to prescription, labelling, production control, calculation of price of medicinal products according to applicable regulations, questions on galenics

### Overall aims and objectives:

Students should be able to:

- carry out pharmaceutical work techniques (e.g. weighing, mortaring, sterilising)
- prepare certain dosage forms (e.g. liquid dosage forms, solid dosage forms, spreadable dermatics) and package them
- label medicinal products in accordance with legal requirements
- calculate the price of medicinal products in accordance with the legal requirements
- test medicinal products in accordance with the legal requirements
- dispose of medicinal products in accordance with legal requirements
- correctly issue normal prescriptions, narcotic prescriptions, feeding drug prescriptions and application and dispensing documentation

### Reading list:

- Schöffling, Ursula; Arzneiformenlehre Ein Lehrbuch der Galenik, Publisher: Deutscher Apotheker Verlag 2009, 5th revised and expanded edition, ISBN-10: 3769240936, ISBN-13: 9783769240931
- Wurm, Gisela; Galenische Übungen für das technologische Praktikum und die pharmazeutische Praxis, Publisher: Govi-Verlag, 17th revised edition (2001), ISBN-10: 3774109044, ISBN-13: 978-3774109049

### Scripts:

On the homepage of the institute 2 scripts are provided for download:

1. practical course instructions for the production of medicinal products.
2. information on the substances and dosage forms used in the course

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/pharmatox/lehre

### Learning recommendations:

- elaboration and consolidation of the contents of the practicals (scripts)
- attendance of the lectures
- preparation with the help of the slides presented in the practicals (Stud.IP)
- learning the material with the help of the textbooks

### Assessment:
a written and practical exam (20%) during the sixth semester as part of the Veterinary Medical Examination in "Pharmaceutical and Narcotics Law"

## PRESCRIPTION THEORY: PRESCRIBING[200]

### Coordinator:
Hamann

### Instructor:
Hamann

### Prerequisites:
attendance of the lecture in pharmacopoeia

### Introduction:
- formal criteria for the prescription of medicinal products for use in pets and food-producing animals
- criteria for the selection of medicinal products
- redesignation and dose conversion of human medicinal product - veterinary medicinal product
- prescription of anaesthetics
- prescription of medicated feedingstuffs
- records in accordance with the Veterinary Home Pharmacy Ordinance (e.g. §13 Obligation to Provide Evidence) and the Medicinal Products Act - Medicinal product application and dispensing documentation

### Overall aims and objectives:
Students should be able to:
- select medicinal products for the corresponding animal species and the corresponding clinical picture and to prescribe them according to the legal requirements
- keep records on the acquisition, testing, dispensing and use of medicinal products and anaesthetics
- apply acquired knowledge on drug selection when prescribing drugs for animals
- convert the dose of a human medicinal product for a specific animal body weight in the case of a required redesignation
- correctly issue normal prescriptions, narcotic prescriptions, medicated feeding prescriptions and application and dispensing documentation

[200] 1.3, 1.10, 1.25, 1.26, 1.27

**Reading list:**
Medicines Act, Narcotics Act, Ordinance on Veterinary Home Pharmacies, Medicines Prescription Ordinance, Narcotics Prescription Ordinance, Vetidata, Rote Liste Online

**Learning recommendations:**
elaboration and consolidation of the contents of the exercises (scripts), attendance of the lectures; preparation with the help of the slides presented in the exercises (Stud.IP)

**Assessment:**
a written and practical exam (20%) during the sixth semester as part of the Veterinary Medical Examination in "Pharmaceutical and Narcotics Law"

## MEAT AND FOOD HYGIENE [201]

**Coordinator:**
Kehrenberg

**Instructors**:
Kehrenberg, Zens and scientific staff

**Course type:**
lecture (2 CHW)
**ECTS**:
2

**Requirements**:
none

**Introduction**:
The course serves:

- as an introduction to the topic of meat and food hygiene
- as a continuation of the curriculum of “Bacteriology, Mycology and Virology”
- as a preparation for the practical “Ante mortem and post mortem inspection" and "Food safety evaluation and technology"

**Overall aims and objectives:**
Students should be able to:

[201] 1.1, 1.3, 1.10, 1.21, 1.24, 1.29, 1.34, 1.35

- explain the principles of food safety (risk analysis and HACCP concept)
- explain the hygiene and technology of meat production (Schlachtlinien)
- give an overview on the horizontal and vertical meat and food hygiene law (EU-regulation and national laws and regulation types)
- explain the fundamentals of official food control (structure and functions of the official veterinarian)
- explain the fundamentals of food microbiology (influence on survival and neutralisation of microorganisms)
- give an overview of the damage to health caused by foodstuff (dangers, including substances that form residues and contaminants)
- explain the fundamentals of food spoilage (of a microbial as well as non-bacterial nature)
- explain the possibilities of the preservation of foodstuff of animal origin (production and storage)
- give an overview of the commodities of foodstuff of animal origin (definitions, classification and systematics)

Reading List:

- K. Fehlhaber, J. Kleer, F. Kley (Hrsg.): Handbuch Lebensmittelhygiene (2007), Behr‘s Verlag, ISBN: 978-3-89947-194-6
- H.-J. Sinell (Hrsg.): Einführung in die Lebensmittelhygiene (2003), Parey Verlag, ISBN: 3830440952

Electronic sources:

see StudIP:

https://studip.uni-giessen.de

Scripts:

"Handouts / Downloads" for each lecture block are available on the homepage of the IFTN. Scripts for meat and food evaluation can be obtained at the IFTN

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

Self-assessment:

A questionnaire is available on the homepage of the IFTN.

Learning recommendations:

Students are advised to prepare and revise the content with the help of the respective handouts and in-depth reading of the relevant literature.

Assessment:

an oral examination within the framework of the Veterinary Medical examination in "Meat hygiene" after the eleventh semester

## DAIRY SCIENCE [202]

### Coordinator:
Usleber

### Instructors:
Usleber, Akineden

### Course Type:
lecture (1 CHW)

### ECTS:
1

### Introduction:
Economic framework conditions of the dairy industry, the relevance of milk and dairy products for human nutrition, anatomical and physiological fundamentals of milk production, ingredients of milk, milk intolerance, fundamental of milk production and milk hygiene, quality of raw milk, legal requirements for primary production, milk quality assessment

### Overall aims and objectives:
Students should be able to:

- explain the national and international relevance of milk and dairy products for human nutrition and assess the national economic relevance of the dairy industry,
- explain the development of milk constituents of the most important species and define the normal values,
- explain the most important milk constituents and assess them with regard to physical-chemical, technological and nutritional properties of milk,
- deduce the fundamentals of agricultural milk production, discuss those with regard to the production of high-quality and completely hygienic raw milk as well as the relevant regulations.

### Electronic sources:
Presentations of the course contents as well as the texts of the corresponding legal regulations are available for download in StudIP as "pdf files" with self-explanatory file names. Title of the course: "Lecture: presentations of the lecture content are available in PDF-format on Stud.IP
https://studip.uni-giessen.de

[202] 1.3, 1.10, 1.21, 1.24, 1.35

### Assessment:
a written examination after the 7th semester (together with the contents of the courses "Milk Science II" and "Milk Examination Course" of the 7th semester)

## ANIMAL NUTRITION PRACTICAL [203]

### Coordinator:
Ringseis

### Instructor:
Ringseis

### Course type:
Practical (2 CHW)

### ECTS:
3

### Prerequisites:
Successful completion of the veterinary preliminary examination and attendance of the courses on animal feed science and animal nutrition in the 2nd and 5th semester.

### Introduction:
The "Practicals in animal nutrition" build on the one-hour lecture on feed science (2nd semester) and the two-hour lecture on animal nutrition (5th semester).
In terms of content, the focus of the course is on animal species-specific nutritional requirements (energy and nutrient requirements) and animal species-specific feeding practices (ration design, feeding methods, feeding techniques, dietetics in nutrition-associated diseases).
Animal species discussed are: dogs, cats, rabbits, guinea pigs, pigs (sows, piglets, fattening pigs), cattle (dairy cows, calves, fattening cattle), horses, poultry.

### Overall aims and objectives:
Students should be able to:

- explain the nutritional requirements (energy and nutrient requirements) of dogs, cats, rabbits, guinea pigs, pigs, cattle, horses and poultry

[203] 1.10, 1.20, 1.28

- explain the digestive and metabolic characteristics of dogs, cats, rabbits, guinea pigs, pigs, cattle, horses and poultry
- explain the feeding of dogs, cats, rabbits, guinea pigs, pigs, cattle, horses and poultry
- explain dietary strategies for the treatment of nutritionally associated diseases in dogs, cats, rabbits, guinea pigs, pigs, cattle, horses and poultry

### Reading list:

- Kamphues, J., Coenen, M., Kienzle, E., Pallauf, J., Simon, O., Zentek, J.: Supplemente zu Vorlesungen und Übungen in der Tierernährung
- Kirchgessner, M.: Tierernährung

### Electronic learning materials:

Power Point presentations in Stud.IP

https://studip.uni-giessen.de

### Assessment:

- TAppV Prerequisite TP certificates “Practicals in animal nutrition” at the end of the 6$^{th}$ semester: written examination
- part of the Veterinary medical Examination in animal nutrition: written exam

## 7TH SEMESTER

| BLOCKS | WEEKS | ECTS |
|---|---|---|
| Respiration | 4 | 4 |
| Cardiovascular | 3 | 3 |
| Gastrointestinaltract | 8 | 8 |
| **REGULAR COURSES** | CHW | ECTS |
| Forensic Veterinary Medicine, Professional and ethical law **L** | 1 | 1 |
| Diseases of Fish, Reptiles and Amphibians **L** | 1 | 1 |
| Meat Hygiene and Food Science **L** | 4 | 4 |
| Poultry Diseases **L** | 1 | 1 |
| Dairy Science **L** | 1 | 1 |
| Milk Examination **S/P** | 1 | 2 |
| Pathological-anatomical Demonstrations **P** | 1 | 1.5 |
| Radiology **L** | 2 | 2 |
| Inspection Of Animals For Slaughter And Meat Inspection **P** | 2 | 2 |
| Animal Welfare **L** | 2 | 2 |
| Elective Courses | | |
| **EXAMINATIONS** | | ECTS |
| Examination Radiology | | 2 |
| Examination Animal Welfare and Ethology | | 2 |
| Examination “Dairy science” | | 2 |
| Partial Examination MCQ Internal Medicine | | |
| Partial Examination MCQ Surgery and Anaesthesiology | | |

| | | |
|---|---|---|
| Partial Examination MCQ Reproductive Medicine | | |

L= lecture, P= practical, S= seminar
CHW= contact hour per week (Semesterwochenstunde)
ECTS= European Credit Transfer and Accumulation System, Indication of Credit Points

Please note: further information regarding courses can be found at:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

Duration of block courses is given in "h =hours", 1h =45 min

## BLOCKS

### RESPIRATION

**Summary:**
Diseases of the nose (including paranasal sinuses), nasopharynx, larynx, trachea, bronchi and lung and the pleura (thorax) will be discussed in a problem-oriented manner and with regard to different species including the respective treatments. During the clinical demonstration individual patients will be presented.

Further details (e.g. reading list) on the individual courses can be found online:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

**Courses in detail:**

*Institute of Pharmacology and Toxicology (Geyer et al.)*

#### ANTI-INFECTIVES 1 - INTRODUCTION AND FUNDAMENTALS OF ANTI-INFECTIOUS THERAPY AND RESISTANCE L (1H)[204]

**Students should be able to:**

- know important definitions and terms related to anti-infectives
- know the names of the classes of antibiotics relevant to veterinary medicine
- can explain the basic principles for the selection/application of antibiotics
- can assess the problem of the development of resistance and know the basics of the development and spread of resistant bacteria

[204] 1.10, 1.18

- know national strategies for reducing the use of antibiotics and preventing the emergence and spread of resistance

### ANTI-INFECTIVES 2 - Β-LACTAM ANTIBIOTICS, POLYPEPTIDES L (1H) [205]

Students should be able to:

- name the structure, mechanism of action, type, spectrum, oral bioavailability, distribution/mobility, PK/PD parameters, therapeutic range and adverse drug reactions of the antibiotic classes of β-lactams (penicillins, cephalosporins, monobactams; carbapenems) and polypeptides
- reproduce the currently available preparations with indications and the current resistance situation

### ANTI-INFECTIVES 3 - TETRACYCLINES, AMINOGLYCOSIDES L (1H) [206]

Students should be able to:

- name the structure, mechanism of action, type and spectrum of action, oral bioavailability, tissue distribution/mobility, PK/PD parameters, therapeutic range and adverse drug reactions of the antibiotic classes of tetracyclines and aminoglycosides
- describe the currently available preparations with indications and the current resistance situation

### ANTI-INFECTIVES 4 - SULFONAMIDES, TRIMETHOPRIM, ANSAMYCINS L (1H) [207]

Students should be able to:

- name the structure, mechanism of action, type, spectrum, oral bioavailability, distribution/mobility, PK/PD parameters, therapeutic range and adverse drug reactions of the antibiotic classes of the thrimethoprimes and the ansamycins
- describe the currently available preparations with indications and the current resistance situation

### ANTI-INFECTIVES 5 - FLUOROQUINOLONES, NITROFURANS, NITROIMIDAZOLES L (1H) [208]

Students should be able to:

[205] 1.10, 1.18, 1.25, 1.27

[206] 1.10, 1.18, 1.25, 1.27

[207] 1.10, 1.18, 1.25, 1.27

[208] 1.10, 1.18, 1.25, 1.27

- name the structure, mechanism of action, type and spectrum of action, oral bioavailability, tissue distribution/mobility, PK/PD parameters, therapeutic range and adverse drug reactions of the antibiotic classes of fluoroquinolones, nitrofurans and nitroimidazoles
- describe the currently available preparations with indications and the current resistance situation

### PHARMACOLOGY OF RESPIRATION L (1H) [209]

**Students should be able to:**

- explain several causes and symptoms of respiratory problems
- explain respiratory processes
- demonstrate knowledge of the patho-physiology and therapy of the bronchial muscles,
- assess the numerous possibilities of therapeutic intervention, including potential unwanted side effects outside the respiratory tract
- assess inflammatory and non-inflammatory pathological processes of the respiratory tract when selecting therapeutics
- explain the special measures that have to be taken in the case of asthma and "chronic obstructive pulmonary disease" (COPD)

*Institute of Veterinary Pathology (Herden, et al.)*

### PATHOLOGY RESPIRATION L (4H) [210]

**Students should be able to:**

- identify the pathological processes and developments in domestic animals
- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in connection with the clinical appearance
- explain the aetiology and pathogenesis of these developments, as well as confirm the correct morphological diagnoses and discuss differential diagnoses

[209] 1.18

[210] 1.21, 1.24, 1.33

*Clinic for Small Animals (Internal Medicine and Surgery) (Moritz, Schneider, Kramer, Peppler, Thiel, Bauer et al.)*

### EXAMINATION RESPIRATORY TRACT - SMALL ANIMALS L (1H) [211]

Students should be able to:

- discuss the anatomy and physiology of the respiratory tract (including protective mechanisms)
- recognize patients with respiratory diseases by way of their typical symptoms
- plan examination procedures for affected animals
- summarize the main causes for cough, stridor and dyspnoea

### DIAGNOSTIC IMAGING RESPIRATION L (3H) [212]

Students should be able to:

- define normal findings in radiographic images of the thorax
- describe the most important thoracic radiographic patterns
- classify the different imaging methods of the thorax with regard to indications
- identify the radiographic signs of major thoracic disorders

### NASAL DISCHARGE - SMALL ANIMALS L (1H) [213]

Students should be able to:

- list the different qualities of nasal discharge and define key evaluation criteria of the symptoms and their anamnestic relevance
- list symptoms associated with nasal discharge and interpret them causally
- describe several diseases associated with the symptom of nasal discharge and discuss with regard to possible differential diagnoses (systemic and local causes)
- list suitable methods for further diagnostics and evaluate them
- provide a plan for the problem-oriented approach of the treatment of nasal discharge and demonstrate its application with the help of case studies
- provide suggestions for the therapeutic treatment of diseases associated with nasal discharge

[211] 1.17

[212] 1.23

[213] 1.18, 1.21

## SURGERY UPPER RESPIRATORY TRACT - SMALL ANIMALS L (2H) [214]

### Students should be able to:

- discuss and define the brachycephalic syndrome
- describe surgically important anatomical structures
- define larynx paralyses

## DYSPNOEA - SMALL ANIMALS L (1H) [215]

### Students should be able to:

- provide a definition of the term "dyspnoea" and differentiate the term from other respiratory abnormalities
- list the different forms of dyspnoea, describe and discuss them with regard to their causes
- explain the patho-mechanism and the consequences of an existing breathing difficulty
- enumerate different diseases located in or outside the respiratory tract that may lead to an apparent dyspnoea

## STRIDOR - SMALL ANIMALS L (1H) [216]

### Students should be able to:

- list the different types of stridor and describe the tonality of pathological respiratory sounds in relation to the localisation
- provide several differential diagnoses for the occurrence of stridor and deduce therapeutic measures for the individual diseases

## COUGH - SMALL ANIMALS L (1H) [217]

### Students should be able to:

- on the basis of the history and the results of a clinical examination group the symptom “cough” to the respiratory tract or a cardiovascular disease
- develop a plan for further examination
- interpret the results of further examinations in a case-related manner and eventually provide a diagnosis

[214] 1.18

[215] 1.18

[216] 1.18

[217] 1.18, 1.21

### ENDOSCOPY AND BAL - SMALL ANIMALS L (1H) [218]

Students should be able to:

- give the indications for an endoscopic examination of the respiratory tract
- describe the procedure of a rhinoscopy and a laryngo-tracheo-bronchoscopy
- describe the procedure of a bronchoalveolar lavage (BAL)
- describe and interpret the results of the endoscopic examination
- describe and interpret the results of the BAL

### SURGERY PLEURA/THORAX - SMALL ANIMAL L (1H) [219]

Students should be able to:

- explain the anatomical basics of the lower respiratory tract
- name the various surgically relevant diseases of the lung and derive their therapy
- explain the various closure options
- work up complex cases of thoracic surgery
- draw up a diagnostic and a therapy plan

### SURGERY LOWER RESPIRATORY TRACT - SMALL ANIMAL L (1H)[220]

Students should be able to:

- list the various surgically relevant diseases in the area of the pleura and the lung
- name the important diagnostic and therapeutic steps

*Clinic for Horses (Internal Medicine and Surgery) (Fey, Roscher, Röcken et al.)*

### EXAMINATION RESPIRATORY TRACT - HORSES L (1H) [221]

Students should be able to:

- assess the sensitivity of the findings of their clinical examinations
- name suitable further examination methods with regard to their clinical findings
- provide and interpret arterial blood gas parameters

[218] 1.21, 1.23

[219] 1.18

[220] 1.18, 1.23

[221] 1.17, 1.21, 1.23

## Upper Respiratory Tract - Horses L (2h) [222]

Students should be able to:

- name the most important diseases of the upper respiratory tract of the horse
- describe the symptoms typically associated with each of them
- assess the respective relevance for the individual or the livestock

## Surgery Upper Respiratory Tract: Pharynx - Horses L (1h) [223]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the pharynx in horses
- name the most important diseases of the pharynx in horses
- describe the therapeutic measures based on these findings

## Surgery Upper Respiratory Tract: Larynx - Horses L (1h) [224]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the larynx in horses
- name the most important diseases of the larynx in horses
- describe the therapeutic measures based on these findings

## Surgery Upper Respiratory Tract/Paranasal Sinuses - Horses L (1h) [225]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the paranasal sinuses in horses
- describe essential clinical and imaging findings in diseases of the paranasal sinuses in horses
- name the most important diseases of the paranasal sinuses in horses and describe the therapeutic measures based on these findings

## Deep Respiratory Tract - Horses L (3h) [226]

Students should be able to:

[222] 1.18, 1.21

[223] 1.18, 1.23

[224] 1.18, 1.23

[225] 1.18, 1.23

[226] 1.18, 1.21, 1.23

- list the national and international terminology for equine chronic bronchitis and explain the respective terms
- name the most important differential diagnoses of COB
- list the diagnostic criteria that lead to the exclusion of COB
- explain the pathomechanisms of COB
- describe the therapeutic measures based on these criteria

### INHALATIVE THERAPY - HORSES L (1H) [227]

Students should be able to:

- list measures for the management of COB patients
- name active substances or groups of active substances that can be used to influence the most important pathomechanisms in COB
- justify the "step-by-step therapy" of COB
- name the most important possibilities of aerosol production
- explain the legal problems associated with the administration of inhaled medicinal products

*Clinic for Ruminants (Internal Medicine and Surgery) (Sickinger et al.)*

### RESPIRATORY PROBLEMS - RUMINANTS: GENERAL L (4H) [228]

Students should be able to:

- recognise the respiratory diseases listed below on the basis of their clinical symptoms and make recommendations for therapy and prophylaxis.
- explain which further investigations are appropriate for the aetiological clarification of these diseases: BRSV infection, pulmonary emphysema incl. pasture emphysema, verminous bronchopneumonia, Maedi, pulmonary adenomatosis.

### RESPIRATORY PROBLEMS - RUMINANTS: INFECTIOUS BOVINE RHINOTRACHEITIS L (1H) [229]

Students should be able to:

- list the most important aspects of the development of bovine enzootic bronchopneumonia (EBP) and name viral, bacterial and mycotic pathogens

[227] 1.18

[228] 1.1, 1.18, 1.21, 1.24

[229] 1.1, 1.18, 1.21, 1.24

- name the anatomical features of the bovine lung and explain the pathophysiological correlations of EBP
- name the diagnostic measures
- describe and explain therapeutic options and prophylactic measures

### RESPIRATORY PROBLEMS - RUMINANTS: SMALL RUMINANTS L (1H) [230]

Students should be able to:

- name the most important respiratory diseases in small ruminants (Schafrotz, Maedi, pulmonary adenomatosis, lung worms, nasal invertebrates)
- make suggestions for useful diagnostics on the individual animal as well as in the livestock
- make suggestions for therapy and prophylactic measures, including suitable vaccination strategies

*Clinic for Pigs (Internal Medicine and Surgery) (Reiner et al.)*

### PRRS - SWINE L (1H) [231]

Students should be able to:

- give a structured overview of the forms of respiratory diseases in pigs
- explain the etiology and pathogenesis of "porcine reproductive and respiratory syndrome (PRRS)" and point out the special characteristics of the disease
- name the clinical as well as the pathological-anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for PRRS, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of PRRS

### INFLUENZA A L (1H) [232]

Students should be able to:

- explain the etiology and pathogenesis of swine influenza and point out the special characteristics of the disease

[230] 1.1, 1.18, 1.21, 1.24

[231] 1.1, 1.18, 1.21

[232] 1.1, 1.18, 1.21

- name the clinical as well as the pathological-anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for these diseases, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the diseases

### ATROPHIC RHINITIS L (1H) [233]

**Students should be able to:**

- explain the etiology and pathogenesis of atrophic rhinitis and pneumonia caused by pasteurellae and bordetellae and point out the special characteristics of the disease
- name the clinical as well as the pathological-anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for Atrophic rhinitis pneumonia caused by pasteurellae and bordetellae, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the diseases

### MYCOPLASMA L (1H) [234]

**Students should be able to:**

- explain the etiology and pathogenesis of infections of mycoplasma hyopneumonia and point out the special characteristics of the disease
- name the clinical as well as the pathological-anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for infections of mycoplasma hyopneumonia, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods

[233] 1.1, 1.18, 1.21

[234] 1.1, 1.18, 1.21

- rate the economic relevance of the disease

### APP L (1H) [235]

**Students should be able to:**

- explain the etiology and pathogenesis of actinobacillus pleuropneumonia and point out the special characteristics of the disease
- name the clinical as well as the pathological-anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for actinobacillus pleuropneumonia, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease

### RESPIRATION - SWINE: MISCELLANEOUS L (1H) [236]

**Students should be able to:**

- explain the etiology and pathogenesis of respiratory disorders in pigs (e.g. lung worms) and point out the special characteristics of the disease
- name the clinical as well as the pathological-anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for respiratory disorders in pigs (e.g. lung worms), assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the diseases

### RESPIRATION THERAPY - SWINE L (1H) [237]

**Students should be able to:**

- discuss the characteristics of the therapy and prophylaxis of respiratory diseases in pigs and provide examples

[235] 1.1, 1.18, 1.21

[236] 1.1, 1.18, 1.21

[237] 1.1, 1.18

*Miscellaneous*

### CLINICAL DEMONSTRATIONS S (8H) [238]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### APPLIED PHYSIOLOGY RESPIRATORY TRACT (CROSS SECTIONAL SUBJECT) (1H)

**Students should be able to:**

- comprehend the functional anatomy of the air-conducting and gas-exchanging regions of the lungs
- define the biophysics of gas transport and diffusion processes in the alveoli.
- understand the importance of perfusion, ventilation, distribution and convection for gas exchange
- differentiate the causes and diagnostics of obstructive and restrictive pulmonary dysfunctions
- define the importance of medullary structures and the *glomera aortica and carotica* for the regulation of respiration

### MYCOLOGY RESPIRATION (CROSS SECTIONAL SUBJECT) (1H) [239]

**Students should be able to:**

- provide epidemiological knowledge on the *Aspergillus* infection in dogs and describe the possible symptoms of a systemic or local *Aspergillus* infection
- develop a therapeutic plan for mycotic rhinitis and list diagnostic measures
- describe and discuss therapeutic measures in the case of a mycotic rhinitis
- list different eligible species of *Aspergillus* and consider other mycoses differential-diagnostically
- name important sources of an *Aspergillus* infection

### IMAGING DIAGNOSTICS RESPIRATORY TRACT - HORSES AND SMALL ANIMAL (CROSS SECTIONAL SUBJECT) L (3H) [240]

**Students should be able to:**

[238] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[239] 1.18, 1.21

[240] 1.23

- present the anatomical features of the upper and lower respiratory tract and distinguish pathological from physiological conditions on the basis of radiological or endoscopic image examples
- assess radiographs of the thorax and evaluate them for differential diagnosis
- assess endoscopic images and evaluate them for differential diagnosis
- describe the procedure of an endoscopic examination of the upper respiratory tract
- recognise the signs of common cardiovascular diseases on X-ray
- explain cardiovascular changes on radiographs using case studies

### RESPIRATORY TRACT - VIROLOGY (CROSS SECTIONAL SUBJECT) (1H) [241]

**Students should be able to:**

- describe the structure and the pathogenic mechanisms resulting from influenza A and list various viral subtypes
- describe direct and indirect detection methods for influenza A virus and provide knowledge on the therapy and prophylaxis of possible infections
- present in detail the epidemiology of an infection of feline calicivirus as well as methods of virus diagnostics
- describe methods of passive and active immunization for feline calicivirus and comparatively evaluate their effectiveness
- discuss the epidemiology, clinical manifestations, diagnostics and therapy of the most common viral diseases of the equine respiratory tract (influenza, EVA, para-influenza, herpes)
- list preventative measures for viral respiratory diseases

### BACTERIOLOGY RESPIRATORY TRACT - SMALL ANIMALS / HORSES (CROSS SECTIONAL SUBJECT) (2H) [242]

**Students should be able to:**

- list frequent infectious diseases of the respiratory tract of dogs, cats and horses, including their viral and bacteriological causes and their pathogenicity
- provide knowledge on the epidemiology of canine infectious tracheo-bronchitis
- and describe the clinical symptoms of the disease
- describe the patho-mechanisms of the bacterium *Bordetella bronchiseptica* that causes the kennel cough complex and the resulting clinic
- discuss the leading symptoms of the cat flu complex with regard to the pathogens involved
- depict the symptoms of the so-called "new disease" (Hemorrhagic-like Fever) with regard to the infection with a highly virulent strain of feline calicivirus

[241] 1.18, 1.21, 1.24

[242] 1.18, 1.21, 1.24

- list therapeutic and prophylactic measures with regard to infectious respiratory diseases
- describe procedures for the diagnosis and list therapeutic measures in the case of a positive test result
- describe the indications of a therapy with anti-infectives
- discuss the epidemiology, clinical manifestations, diagnostics and treatment of strangles
- describe the relevance of streptococci with regard to equine strangles

### PARASITES RESPIRATORY TRACT - SMALL ANIMALS (CROSS SECTIONAL SUBJECT) (2H) [243]

Students should be able to:

- list the characteristic symptoms of a parasitic infestation of the respiratory tract
- describe procedures for the diagnosis of a possible parasitic infestation and list therapeutic measures in the case of a positive test result
- describe the most common parasites of the respiratory tract and their preferred localisation in dogs and cats and describe possible ways of infection

### PARASITOLOGY RESPIRATION - CATTLE (CROSS SECTIONAL SUBJECT) (1H) [244]

Students should be able to:

- develop diagnostic strategies on the basis of livestock data, which enable the assessment of livestock problems with a parasitological background (lungworm infestation, nasal woodlouse)
- identify the significance of lungworm infestation in a herd that is not yet endemic and suggest appropriate therapeutic measures
- name prophylactic measure

[243] 1.18, 1.21, 1.24

[244] 1.18, 1.21, 1.24

Summary:
Diseases of the cardiovascular system will be dealt with systematically. Based upon patho-physiological developments, the symptoms, diagnostics and treatment of acquired and congenital disorders will be discussed with regard to the different species. The respective clinical demonstrations will provide further insight into cases of cardiovascular diseases.

Further details (e.g. reading list) concerning the individual courses can be found online:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium

## Courses in detail:

*Institute of Pharmacology and Toxicology (Geyer et al.)*

### HYPOTENSION AND SHOCK L (1H) [245]

Students should be able to:

- explain the development of hypotension and the corresponding compensatory mechanisms
- define the different forms of shock
- point out different therapeutic approaches on the basis of the site of action of the medication applied
- treat hypotension as well as different types of shock
- justify and differentiate the application of the drugs selected on the basis of physiological and patho-physiological circumstances

### HYPERTENSION L (1H) [246]

Students should be able to:

- explain the development of hypertension and the corresponding compensatory mechanisms
- point out different therapeutic approaches on the basis of the site of action of the medication applied
- treat hypertension as well as a hypertensive crisis
- justify and differentiate the application of the medication selected on the basis of physiological and patho-physiological circumstances

[245] 1.18, 1.19
[246] 1.18, 1.27

- explain and differentiate between unwanted effects of medication during the therapy with the substances selected

### CARDIAC INSUFFICIENCY L (1H) [247]

Students should be able to:

- explain the development of heart failure and the corresponding compensatory mechanisms
- point out different therapeutic approaches on the basis of the site of action of the medication applied
- treat cardiac insufficiency
- justify and differentiate the application of the medication selected on the basis of physiological and patho-physiological circumstances
- explain and differentiate between unwanted effects of medication during the therapy with the substances selected

### ANTI-ARRHYTHMIA L (1H) [248]

Students should be able to:

- differentiate between ionic currents and working myocardium in pacemaker cells,
- explain the causes and classification of cardiac arrhythmia
- name anti-arrhythmic drugs of the classes I-IV that are used in therapy and explain different therapeutic approaches on the basis of the site of action of the medication applied
- treat cardiac arrhythmia
- justify and differentiate the application of the medication selected on the basis of physiological and patho-physiological circumstances
- explain and differentiate between unwanted effects of medication during the therapy with the substances selected and outline countermeasures

*Institute of Veterinary Pathology (Herden, et al.)*

### CARDIOVASCULAR PATHOLOGY L (3H) [249]

Students should be able to:

- identify the pathological processes and developments in domestic animals

[247] 1.18, 1.19, 1.27

[248] 1.18, 1.19, 1.27

[249] 1.21, 1.24, 1.33

- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in connection with the clinical appearance
- explain the aetiology and pathogenesis of these developments, as well as confirm the correct morphological diagnoses and discuss differential diagnoses

*Clinic for Small Animals (Internal Medicine and Surgery) (Moritz, Schneider, Kramer, Peppler, Thiel Bauer et al.)*

### CARDIAC AUSCULTATION L (1H) [250]

**Students should be able to:**

- conduct an auscultation
- assess a cardiac auscultation and in particular heart murmurs
- list differential diagnoses for different heart murmurs

### THORACIC RADIOGRAPHY L (2H) [251]

**Students should be able to:**

- explain the procedure and technique of a radiograph of the thorax
- assign individual radiographic images to certain diseases

### ECG L (2H) [252]

**Students should be able to:**

- explain the way an electrocardiogram is produced
- explain the evaluation process of an ECG
- assess important ECG findings

### ECHOCARDIOGRAPHY L (2H) [253]

**Students should be able to:**

- list the various methods of echocardiography
- explain the depictions in the B-and M-mode
- explain the depictions of the colour and spectral doppler

[250] 1.17

[251] 1.23

[252] 1.21

[253] 1.23

- explain the collection of measurement parameters
- classify the developments in the echocardiographical measurement parameters correctly

### MYOCARD - SMALL ANIMALS L (2H) [254]

Students should be able to:

- explain the causes of a systolic function disorder
- list the historical and clinical symptoms of a degenerative mitral valve insufficiency
- list the findings of secondary medical examination (radiography, ECG, echocardiography) in case of a degenerative mitral valve insufficiency
- discuss the treatment of various clinical stages of dilated cardiomyopathy
- explain the causes of a diastolic function disorder
- list the historical and clinical symptoms of various forms of cardiomyopathy in cats
- list the findings of secondary medical examinations (radiography, ECG, echocardiography) of cats
- discuss the treatment of different forms of cardiomyopathy in cats

### BLOOD PRESSURE L (1H) [255]

Students should be able to:

- define and explain the terms systolic, diastolic and mean blood pressure
- list different methods of blood pressure measurement and assess their advantages and disadvantages
- discuss the impact of the choice of the blood-pressure cuff on non-invasive measurements
- assess the results of blood pressure measurement
- list the indications for blood pressure measurement
- describe the basic therapeutic strategies to influence blood pressure

### VASCULAR - SMALL ANIMALS: CONGENITAL HEART DISEASES L (1H) [256]

Students should be able to:

- classify congenital and vascular heart diseases
- list the main medical findings (history, clinical, ECG, radiography, echocardiography) of common congenital heart diseases

[254] 1.18, 1.21, 1.23

[255] 1.18, 1.21

[256] 1.18, 1.21, 1.23

- discuss the medical, surgical and interventional therapy of the most common congenital heart diseases

### ENDOCARD - SMALL ANIMALS L (1H) [257]

Students should be able to:

- list the causes of a mitral regurgitation
- list the historical and clinical symptoms of a degenerative mitral regurgitation
- list the findings of secondary medical examinations (radiography, ECG, echocardiography) in degenerative mitral regurgitation
- discuss the different clinical degrees of mitral regurgitation

### PERICARD - SMALL ANIMALS L (1H) [258]

Students should be able to:

- list several pericardial diseases
- list the historical and clinical symptoms of a pericardial effusion
- list the findings of secondary medical examinations (radiography, ECG, echocardiography) in pericardial effusions
- discuss the treatment of a pericardial effusion

### CARDIOVASCULAR SURGERY L (2H) [259]

Students should be able to:

- explain indications and basic features of surgical procedures on the heart in small animals
- explain the indications and procedure for pericardiectomy
- derive the basic principles of a pacemaker

*Clinic for Horses (Internal Medicine and Surgery) (Fey, Roscher, Röcken et al.)*

### CARDIAC ARRHYTHMIA IN THE HORSE L (1H) [260]

Students should be able to:

- give the indication for an ECG in the horse

[257] 1.18, 1.21, 1.23

[258] 1.18, 1.21, 1.23

[259] 1.18

[260] 1.18, 1.21

- describe the clinical findings of the most important physiological cardiac arrhythmias of the horse and recognise them in the ECG
- recognise the two most important pathological cardiac arrhythmias in horses (atrial fibrillation and ventricular extrasystole) on ECG
- name criteria for assessing the clinical relevance of atrial fibrillation.
- explain therapeutic options in atrial fibrillation
- name therapeutic options for ventricular extrasystole

### MORPHOLOGICALLY TANGIBLE HEART DEFECTS - HORSES L (1H) [261]

Students should be able to:

- indicate when an equine echocardiography is necessary
- describe the most important changes in equine valvular diseases and give their functional effects
- describe the most important innate equine heart disorders
- name therapeutic options that can be taken in the case of heart insufficiency

### OTHER CARDIOVASCULAR DISEASES OF THE HORSE L (1H) [262]

Students should be able to:

- name the causes and effects of myocarditis and pericarditis in the horse
- name changes in the equine arteries
- differentiate between thrombophlebitis and periphlebitis of the jugular veins in the horse.
- describe the therapy of thrombophlebitis
- name the causes and effects of thrombo-embolism in the horse

*Clinic for Ruminants (Internal Medicine and Surgery) (Sickinger et al.)*

### ENDOCARD, MYOCARD - RUMINANTS L (1H) [263]

Students should be able to:

- describe the symptoms of the heart diseases in question
- point out measures for differential diagnosis
- classify these diseases prognostically and suggest possible treatments

[261] 1.18, 1.23

[262] 1.18

[263] 1.1, 1.18, 1.21

### VASCULAR - CATTLE L (1H) [264]

Students should be able to:

- describe the following measures: Technique of blood collection in cattle and venous access for injections and infusions
- describe the performance of a blood transfusion in cattle
- name the diseases which have a significant effect on the vascular system

### PERICARD - RUMINANTS L (1H) [265]

Students should be able to:

- list the most common causes of diseases of the pericardium in cattle
- describe the symptoms and the diagnostic, differential diagnostic and therapeutic possibilities
- assess these prognostically

*Clinic for Pigs (Internal Medicine and Surgery) (Reiner et al.)*

### CARDIOVASCULAR - PIG L (1H) [266]

Students should be able to:

- explain the aetiology and pathogenesis of cardiovascular diseases, highlighting disease-specific features
- name the clinical as well as the pathological-anatomical and histological symptoms and apply these with regard to the course of the disease and prognosis
- list possible and important differential diagnoses, evaluate their probability and name diagnostic approaches for their differentiation
- initiate a disease- and case-related diagnosis and discuss possible results
- identify suitable therapeutic measures as well as metaphylactic and prophylactic measures and weigh their suitability against each other
- evaluate the economic relevance of the diseases

[264] 1.1, 1.18, 1.21

[265] 1.1, 1.18, 1.21

[266] 1.1, 1.18, 1.21

*Miscellaneous*

### CLINICAL DEMONSTRATIONS S (6H) [267]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### PATHO-PHYSIOLOGY HEART (CROSS SECTIONAL SUBJECT) (2H)

**Students should be able to:**

- explain the basic mechanisms of cardiovascular regulation
- explain the relationship between preload, afterload, contraction and blood pressure
- classify the different types of cardiac insufficiency
- list the symptoms of cardiac insufficiency
- discuss the different categories of heart insufficiency

### ECG, X-RAY, AUSCULTATION: CARDIOVASCULAR SYSTEM (CROSS SECTIONAL SUBJECT) (3H) [268]

**Students should be able to:**

- match the heart sounds to the mechanical heart actions
- match the heart sounds to the electrocardiographic heart actions
- name the causes of heart murmurs
- explain the significance of the puncta maxima of heart murmurs
- evaluate an X-ray of the heart
- evaluate an ECG

### BACTERIAL HEART DISEASES (CROSS SECTIONAL SUBJECT) (1H) [269]

**Students should be able to:**

- list the most important bacterial cardiovascular diseases
- list the clinic and symptoms of endocarditis
- explain the therapy of endocarditis

[267] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[268] 1.21, 1.23

[269] 1.18, 1.24

## PARASITOLOGY CARDIAC/VASCULAR (CROSS SECTIONAL SUBJECT) (1H) [270]

### Students should be able to:

- list the main causes of pulmonary hypertension
- explain the clinical and further findings in pulmonary hypertension
- explain the parasitic diseases of the pulmonary arteries
- explain the basic mechanisms of cardiac mechanics (working diagram of the myocardium; heart sounds incl. vitia; valve plane mechanism)
- understand the (patho-)physiology of the autonomic innervation of the heart
- derive the relationship between preload, afterload, contraction and arterial blood pressure
- classify the different cardiac insufficiencies and list their symptoms
- understand and discuss the basics of concentric and eccentric dilated cardiomyopathies

## BLOOD PRESSURE DEMONSTRATION (CROSS SECTIONAL SUBJECT) (2H) [271]

### Students should be able to:

- define and explain the terms systolic, diastolic and mean blood pressure
- list different methods of blood pressure measurement and assess their advantages and disadvantages
- discuss the impact of the choice of the blood-pressure cuff on non-invasive measurements
- assess the results of blood pressure measurement
- list indications for the taking of blood pressure
- describe the fundamental therapeutic strategies influencing blood pressure

## ECG INTERPRETATION (CROSS SECTIONAL SUBJECT) (2H) [272]

### Students should be able to:

- explain the way an electrocardiogram is produced
- explain the evaluation process of an ECG examination
- assess important ECG findings
- recognize ventricular arrhythmias
- recognize supraventricular arrhythmias
- recognize atrioventricular (AV) blocks
- recognize bundle branch blocks

[270] 1.18, 1.24

[271] 1.18, 1.21

[272] 1.21

Summary:
Diseases of the mouth (including teeth), oesophagus, stomach (including proventriculus), intestinal tract and the gastrointestinal accessory glands (liver, pancreas) are discussed in a problem-oriented manner with regard to the different species. The respective clinical demonstrations will provide an insight into individual cases.

Courses in detail:

*Institute of Pharmacology and Toxicology (Geyer et al.)*

## ANTIEMETICS L (1H) [273]

Students should be able to:

- recognize vomiting as a symptom indicating several causes,
- suggest therapeutic methods based upon the causes present
- assess whether there is a universal-antiemetic
- assess the suitability of the different substances, to some extent as single therapy (in the case of cinetoses) or in combination with multiple antiemetics

## PHARMACOLOGY ULCER L (1H) [274]

Students should be able to:

- explain the structure of gastric mucosa
- explain the different stimulatory and inhibitory mechanisms of acid secretion (parietal cell; including the ECL-cells involved (histamine, gastrin) and the vegetative nervous system
- explain the patho-physiology of ulcerative gastropathy
- discuss the numerous methods of therapeutic intervention, also with regard to pharmacokinetics (effect duration) of the different active substances, including possible side effects that may occur
- apply different therapeutic approaches on the basis of the selective targets of ulcer therapeutics
- develop the biochemistry of acidification as an approach to a long-lasting blocking caused by prazoles and the further development by means of non-irreversible proton pump inhibitors of the prazane-type

[273] 1.18
[274] 1.18

### LAXATIVES, STYPTICA L (1H) [275]

Students should be able to:

- explain diarrhoea and constipation as a disorder of the intestinal water balance (intestines as H2O-receptive organs), rather than an intestinal motility disorder
- define therapeutic aims of intervention for the treatment of diarrhoea and constipation
- explain the relevance of oral re-hydration in cases of enterotoxin-induced secretory diarrhoea

*Institute of Veterinary Pathology (Herden, et al.)*

### PATHOLOGY – ORAL CAVITY AND PHARYNX, TONSILS, OESOPHAGUS, RUMEN, STOMACH, INTESTINE, LIVER, PANCREAS AND ABDOMEN (TOTAL 12H) [276]

Students should be able to:

- identify the pathological processes and conditions of domestic animals
- explain the entities that concern individual organ systems
- define and classify the diseases and explain them comprehensively in context to the clinical image
- explain the aetiology and pathogenesis of the alterations as well as make the correct morphological diagnosis and discuss differential diagnoses

*Clinic for Small Animals (Internal Medicine and Surgery) (Moritz, Schneider, Kramer, Peppler, Thiel, Bauer et al.)*

### SURGERY ORAL CAVITY L (1H) [277]

Students should be able to:

- deduce and define the different surgical methods that can be used in the oral cavity
- discuss surgical limits and complications of surgery in the oral cavity
- list the different surgically relevant diseases

### SURGICAL DISEASES STOMACH - SMALL ANIMAL L (2H) [278]

Students should be able to:

[275] 1.18

[276] 1.21, 1.24, 1.33

[277] 1.18

[278] 1.18, 1.21, 1.23

- recognise torsio ventriculi in dogs, initiate the first treatment steps and derive the operation at least theoretically
- define the different types of gastropexy
- evaluate the complications and prognosis

### Problem-oriented Processing of a Case, Stomach Diseases L (1h) [279]

**Students should be able to:**

- take a medical history and draw up a problem list according to leading symptoms and importance, using the example of a patient with gastrointestinal symptoms
- list differential diagnoses
- develop a diagnostic plan based on a prioritised problem list
- develop a therapeutic plan

### Small intestine I-III - Small Animal L (3h) [280]

**Students should be able to:**

- identify and name symptoms of small intestine disease and list diagnostic measures
- explain the function and interaction of the microbiome and the immune system as well as the consequences of dysfunction
- elaborate chronic enteropathies of the small intestine on the basis of knowledge of causes and differential diagnoses as well as develop a step-by-step plan for the diagnostic work-up and implementation of therapeutic measures of selected diseases of the small intestine

### Imaging gastrointestinal tract L (2h) [281]

**Students should be able to:**

- perform and explain a contrast study
- recognize and discuss radiographic symptoms of characteristic GI diseases (e.g. ileus, gastric torsion, intussusceptions, etc.)
- interpret ultrasound images of the GI-tract

[279] 1.18, 1.21, 1.23

[280] 1.18, 1.21, 1.23

[281] 1.23

## LARGE INTESTINE L (2H) [282]

Students should be able to:

- explain the basics of the functions of the colon, microbiome, immune system and the consequences of dysfunctions
- name typical colon symptoms as well as differential diagnoses
- elaborate on patients with chronic diseases of the large intestine
- name the causes and differential diagnoses of diseases in the anorectal region and develop a diagnostic and therapeutic plan

## SURGERY INTESTINAL TRACT - SMALL ANIMALS L (2H)[283]

Students should be able to:

- define and apply the surgical terms that refer to the small intestine
- explain surgical diseases of the small bowel
- theoretically explain small bowel surgery
- explain the anatomical differences between the small and large intestines
- explain the surgical measures of the large intestine and their special characteristics
- define the most important surgical measures that are used during surgery of the large intestine

## GASTROINTESTINAL TRACT DISEASES - CAT L(1H) [284]

Students should be able to:

- make diagnoses of typical cat diseases of the GIT and name therapy and potential causes
- discuss differential diagnoses, diagnostic plan, therapeutic measures and prophylaxis with the owner

## ENDOSCOPY GASTROINTESTINAL TRACT L (1H) [285]

Students should be able to:

- recognize the indications for an endoscopy
- describe the procedure of a normal endoscopy
- discuss the complications and contraindications of an endoscopy

[282] 1.18, 1.21, 1.23

[283] 1.18

[284] 1.18, 1.21

[285] 1.23

## LIVER DISEASES - SMALL ANIMALS L (3H) [286]

### Students should be able to:

- recognize the symptoms of a hepatopathy
- discuss the laboratory findings of liver disease
- enumerate aetiopathogenetic diagnoses of liver diseases in dogs and cats
- discuss the patho-physiology and clinic of hepatoenzephalopathy
- explain possible treatments of liver diseases

## SURGERY ANUS - SMALL ANIMALS L (1H) [287]

### Students should be able to:

- recognize and address the basic anatomical structures in the anal area
- list, classify and define diseases of the anal and peri-anal area

## IMAGING LIVER / PANCREAS L (2H) [288]

### Students should be able to:

- assign characteristic radiographic and ultrasonographic images to certain diseases of the liver and pancreas
- name and evaluate the different imaging techniques in order of importance

## CYTOLOGY OF LIVER AND PANCREAS L (2H) [289]

### Students should be able to:

- list indications and contraindications for taking a liver cytology specimen
- list and explain the collection techniques and the techniques for preparing cytological preparations from liver and pancreas
- list the cytological characteristics of hepatocytes
- list the types of inflammation based on the dominant cell population
- list degenerative changes of hepatocytes recognisable in the cytological preparation and explain their possible aetiology
- list primary and secondary liver tumours
- list cytologically recognisable pigmentary changes of the hepatocytes

[286] 1.18, 1.21

[287] 1.18

[288] 1.23

[289] 1.21

### SURGERY LIVER AND PANCREAS - SMALL ANIMALS L (3H)[290]

**Students should be able to:**

- define diseases in the area of the liver, gall bladder, pancreas and explain their therapeutic possibilities
- explain the theoretical fundamentals of surgical interventions
- explain the use of staplers

### PANCREAS - SMALL ANIMALS L (1H) [291]

**Students should be able to:**

- discuss the anatomy and physiology of the pancreas (including the protective mechanisms that prevent auto-digestion)
- discuss laboratory tests that can be used to diagnose a pancreatic disease
- explain therapeutic measures that can be taken in the case of pancreatitis and exocrine pancreatic insufficiency

### SURGERY HERNIA - SMALL ANIMALS L (1H) [292]

**Students should be able to:**

- define the term hernia
- explain the aetiology, aetio-pathogenesis, clinics, diagnostics and treatment of various hernias
- define and explain the difference between hernia diaphragmatica and diaphragmatic rupture

*Clinic for Horses (Internal Medicine and Surgery) (Fey, Roscher, Röcken et al.)*

### COLIC - HORSES I AND II L (2H) [293]

**Students should be able to:**

- define the term "colic" in horses
- name forensic aspects when taking over colic patients
- list the examinations required in colic patients
- evaluate medications commonly used in colic

[290] 1.18

[291] 1.18, 1.21

[292] 1.18

[293] 1.18, 1.21

- list the most common forms of colic
- list the most important further examinations
- evaluate blood parameters with regard to their prognostic significance
- explain how to perform a paracentesis
- evaluate laboratory diagnostic parameters in abdominal punctate

## ORAL CAVITY AND TEETH HORSE L (1H) [294]

Students should be able to:

- describe the patho-physiological characteristics of horses' teeth
- identify and document the most common dental problems of the horse
- name the most important differential diagnoses of oral and pharyngeal dysphagia

## TEETH AND JAW FRACTURES - HORSES L (1H) [295]

Students should be able to:

- explain the systematic diagnostic procedures for fractures of the skull in horses
- describe the main clinical and imaging findings in equine skull fractures
- name the most important therapeutic options and principles

## OESOPHAGUS AND STOMACH - HORSES L (1H) [296]

Students should be able to:

- recognise the symptoms of pharyngeal obstruction and name treatment measures
- list complications of pharyngeal obstruction
- differentiate between primary and secondary gastric congestion
- recognise and treat parasites of the horse's stomach

## EGUS L (1H) [297]

Students should be able to:

- name the symptoms of gastritis in horses
- explain the differences in diseases of the cutaneous versus the glandular mucosa of the horse's stomach
- name the therapeutic options for EGUS and its subgroups

[294] 1.18

[295] 1.18, 1.23

[296] 1.18

[297] 1.18

### Small Intestine - Horses L (1h) [298]

Students should be able to:

- describe symptoms of diseases of the small intestine in horses
- name the parasites of the small intestine in horses
- name the causes of inflammations of the small intestine, especially in foals and young horses
- describe the functional tests of the small intestine
- explain the most important diseases leading to carbohydrate malabsorption in horses

### Surgery Upper Digestive Tract - Horses L (1h) [299]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the upper digestive tract in horses
- name the most important diseases of the upper digestive tract in horses
- describe the therapeutic measures based on these findings

### Abdominal Surgery - Horses: Small Intestine L (1h) [300]

Students should be able to:

- name the most important diseases of the small intestine in horses
- describe the surgical interventions based on them

### Abdominal Surgery - Horses: Large Intestine L (1h) [301]

Students should be able to:

- name the most important diseases of the large intestine in horses
- describe the surgical interventions based on them

### Abdominal Surgery - Horses: Laparoscopy L (1h) [302]

Students should be able to:

- name the most important indications for laparoscopy in horses

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[298] 1.18, 1.21

[299] 1.18

[300] 1.18

[301] 1.18

[302] 1.18, 1.23

- describe the procedure and principles of laparoscopic therapies

### LARGE INTESTINE (COLON) - HORSES L (1H) [303]

Students should be able to:

- list the possibilities concerning the diagnostics of diseases of the equine colon
- define and explain the main physiological and patho-physiological mechanisms of the function of the colon
- describe the disease pattern of specific diseases of the equine colon
- name the fundamental principles of the therapy of diseases of the equine colon

### EMACIATION AND DIARRHOEA - HORSES L (1H) [304]

Students should be able to:

- name suitable further methods of examination in the case of emaciation and diarrhoea
- explain the main causes of chronic emaciation of the horse
- provide examples of diseases that have these symptoms

### INTENSIVE THERAPY GASTROINTESTINAL TRACT - HORSES L (1H) [305]

Students should be able to:

- list the diagnostic possibilities for assessing fluid, acid-base and electrolyte balance in the adult horse
- name the substances/infusion solutions that can be used for therapy and calculate the quantities to be administered depending on the deviation
- list suitable substances for anti-inflammatory and antithrombotic therapy in adult equine intensive care patients

### LIVER - HORSES L (1H) [306]

Students should be able to:

- list the possibilities concerning the diagnostics of equine liver diseases
- define and explain the main physiological and patho-physiological mechanisms of the function of the equine liver
- describe the disease pattern of specific diseases of the equine liver
- name the fundamental therapeutic principles of equine liver diseases

[303] 1.18, 1.21

[304] 1.18, 1.21

[305] 1.18

[306] 1.18, 1.21

## OTHER DISEASES GASTROINTESTINAL TRACT - HORSES L (1H) [307]

Students should be able to:

- take the opportunity to study in depth the disease patterns that have not yet been sufficiently addressed in the respective year
- look at recommended publications in order to work through them in self-study
- explain further diagnostic measures that are used to clarify emaciation in particular
- name diseases that are particularly the cause of emaciation

*Clinic for Ruminants (Internal Medicine and Surgery) (Sickinger et al.)*

## MOUTH AND TONGUE - RUMINANTS L (1H) [308]

Students should be able to:

- point out the causes previously discussed of changes in the areas of mouth and tongue
- diagnose these changes based upon their symptoms
- propose options of differential diagnostic clarification
- classify these diseases prognostically and, if necessary, propose a suitable treatment

## OESOPHAGUS - RUMINANTS L (1H) [309]

Students should be able to:

- name the causes of throat diseases discussed, diagnose these changes and, if the disease can be treated, suggest suitable treatment methods

## RUMEN FLUID L (1H)[310]

Students should be able to:

- understand the importance of the proventicular digestion for the feeding of ruminants
- explain its underlying influences
- explain how rumen fluid can be obtained for examination, which insights can be gained from its analysis and how such an examination can be held under practical conditions

[307] 1.8, 1.18, 1.21

[308] 1.1, 1.18, 1.21, 1.24

[309] 1.1, 1.18

[310] 1.1, 1.21

## PROVENTRICULUS DISEASES L (2H) [311]

Students should be able to:

- explain the significance of the proventriculus system for the health and productivity of cattle
- name the factors that influence the state of the proventriculus system
- diagnose such disorders
- name suitable treatment methods that may prevent or therapeutically treat these disorders

## ABOMASUM - CATTLE L (1H) [312]

Students should be able to:

- name the most important diseases of the abomasum and their diagnostics
- describe the currently possible surgical therapy procedures for abomasal displacement
- describe and explain conservative therapy options, concomitant therapies and prophylactic measures

## DIARRHOEA CALVES / CATTLE L (1H) [313]

Students should be able to:

- explain the causes, symptoms and pathological effects of the types of diarrhoea discussed
- classify these diseases diagnostically and, if the disease can be treated, suggest suitable treatment methods
- name concepts of prophylaxis

## INTESTINE- RUMINANTS L (1H) [314]

Students should be able to:

- explain the bovine intestinal diseases previousl
- describe the symptoms, the diagnostic approach and possible therapeutic measures

[311] 1.1, 1.18

[312] 1.1, 1.18

[313] 1.1, 1.18, 1.21, 1.24

[314] 1.1, 1.18, 1.21, 1.24

### LIVER - RUMINANTS L (2H) [315]

Students should be able to:

- describe the occurrence, causes and symptoms (including diagnosis and differential diagnostics) of liver diseases
- classify the diseases prognostically
- name adequate methods of treatment and prophylaxis

*Clinic for Pigs (Internal and Surgery) (Reiner et al.)*

### CLOSTRIDIA- SWINE L (1H) [316]

Students should be able to:

- explain the aetiology and pathogenesis of clostridia diarrhoea and point out the special characteristics of the disease
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for clostridial diarrhoea, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease.

### GASTROINTESTINAL TRACT - SWINE: COCCIDIA L (1H) [317]

Students should be able to:

- explain the etiology and pathogenesis of *Isospora suis* and point out the special characteristics of the disease
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for *Isospora suis*, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods

[315] 1.1, 1.18, 1.21

[316] 1.1, 1.18, 1.21

[317] 1.1, 1.18, 1.21

- rate the economic relevance of the disease

### GASTROINTESTINAL TRACT - SWINE: DYSENTERY L (1H) [318]

Students should be able to:

- explain the etiology and pathogenesis of dysentery in pigs and point out the special characteristics of the disease
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for dysentery in pigs, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease

### GASTROINTESTINAL TRACT - SWINE: *E.COLI*-DYSENTERY L (1H) [319]

Students should be able to:

- explain the aetiology and pathogenesis of coli-dysentery in lactating piglets, and point out the special characteristics of the disease
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for coli-dysentery in lactating piglets, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease

### GASTROINTESTINAL TRACT - SWINE: COLI ENTEROTOXAEMIA L (1H) [320]

Students should be able to:

- explain the aetiology and pathogenesis of coli enterotoxaemia and point out the special characteristics of the disease

[318] 1.1, 1.18, 1.21

[319] 1.1, 1.18, 1.21

[320] 1.1, 1.18, 1.21

- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for coli enterotoxaemia, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease

### GASTROINTESTINAL TRACT - SWINE: ILEITIS L (1H) [321]

Students should be able to:

- explain the aetiology and pathogenesis of ileitis and point out the special characteristics of the disease
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for ileitis and assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease

### GASTROINTESTINAL TRACT - SWINE: NEMATODES L (1H) [322]

Students should be able to:

- explain the aetiology and pathogenesis of gastrointestinal nematodes in pigs and point out the special characteristics of the disease
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for gastrointestinal nematodes in pigs and assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease

[321] 1.1, 1.18, 1.21

[322] 1.1, 1.18, 1.21, 1.24

## FEED AND FEEDING - PIG L (1H) [323]

### Students should be able to:

- explain the aetiology and pathogenesis of feed and feeding errors, highlighting the special features
- name the clinical as well as the pathological-anatomical and histological symptoms and apply these with regard to the course of the disease and prognosis
- list possible and important differential diagnoses, evaluate their probability and name diagnostic approaches to differentiate between them
- initiate a disease- and case-related diagnosis and discuss possible results
- identify suitable therapeutic measures as well as metaphylactic and prophylactic measures and weigh their suitability against each other
- evaluate the economic relevance of the diseases

## ROTA AND CORONAVIRUSES - PIG L (1H) [324]

### Students should be able to:

- explain the aetiology and pathogenesis of diseases caused by rota and corona viruses of pigs and highlight the disease-specific features
- name the clinical as well as the pathological anatomical and histological symptoms and apply these with regard to the course of the disease and prognosis
- list possible and important differential diagnoses of diseases caused by rotaviruses and corona viruses of pigs, evaluate their probability and name diagnostic approaches for their differentiation
- initiate a disease- and case-related diagnosis and discuss possible results
- identify suitable therapeutic measures as well as metaphylactic and prophylactic measures and weigh their suitability against each other
- evaluate the economic relevance of the diseases

## SALMONELLOSIS L (1H) [325]

### Students should be able to:

- explain the aetiology and pathogenesis of salmonellosis and point out the special characteristics of the disease
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis

[323] 1.1, 1.18, 1.21, 1.35

[324] 1.1, 1.18, 1.21, 1.24

[325] 1.1, 1.18, 1.21, 1.24

- list possible and important differential diagnoses for salmonelloses, assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the disease

### MYCOTOXINS - SWINE L (1H) [326]

Students should be able to:

- explain the aetiology and pathogenesis of mycotoxicoses, especially DON and zearalenone, and point out the special characteristics of the diseases
- name the clinical as well as the pathological, anatomical and histological symptoms and apply them with regard to the development of the disease and its prognosis
- list possible and important differential diagnoses for mycotoxicoses and assess them with regard to their probability and name diagnostic approaches for their differentiation
- initiate diagnostics for this specific disease and case and discuss possible results
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis and rate the suitability of methods
- rate the economic relevance of the diseases

### DIARRHOEA ACCORDING TO AGE L (1H) [327]

Students should be able to:

- explain the aetiology and pathogenesis of suckling piglet diarrhoea, highlighting the disease-specific features
- name the clinical as well as the pathological-anatomical and histological symptoms and apply these with regard to the course of the disease and prognosis
- list possible and important differential diagnoses of suckling piglet diarrhoea, evaluate their probability and name diagnostic approaches to differentiate between them
- initiate a disease- and case-related diagnostic and discuss possible results
- identify suitable therapeutic measures as well as metaphylactic and prophylactic measures and weigh their suitability against each other
- evaluate the economic relevance of the diseases

[326] 1.1, 1.18, 1.21

[327] 1.1, 1.18, 1.21

### Gastric Ulcer EHS - Pig L (1h) [328]

Students should be able to:

- explain the aetiology and pathogenesis of gastric ulcers and enterohaemorrhagic syndrome in pigs, highlighting the disease-specific features
- name clinical as well as pathological-anatomical and histological symptoms and apply these with regard to the course of the disease and prognosis
- list possible and important differential diagnoses to gastric ulcer and enterohaemorrhagic syndrome in pigs, evaluate their probability and name diagnostic approaches to differentiate them
- initiate a disease- and case-related diagnosis and to discuss possible results
- identify suitable therapeutic measures as well as metaphylactic and prophylactic measures and weigh their suitability against each other
- evaluate the economic relevance of the diseases

*Miscellaneous*

### Clinical demonstrations S (16h) [329]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### Physiology of swallowing and mastication (Cross Sectional Subject) (1h)

Students should be able to:

- discuss the mechanisms of mastication and the production of saliva in different species
- describe the physiology of swallowing from mouth to stomach
- understand the physiology and control of saliva production and its importance for oral predigestion and immune defence

### Teeth - Fundamentals and Anatomy (Cross Sectional Subject) (2h)

Students should be able to:

- name the dental formulas for dogs and cats
- name the structure of the periodontium

[328] 1.1, 1.18, 1.21

[329] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

### TEETH- SMALL ANIMALS: (CROSS SECTIONAL SUBJECT) (1H) [330]

Students should be able to:

- recognise and classify the most important stomatological diseases of dogs and cats and name possible therapies
- theoretically take intraoral radiographs and perform tooth extractions of single and multi-rooted teeth

### TEETH - HORSES: (CROSS SECTIONAL SUBJECT) (1H) [331]

Students should be able to:

- explain the systematic diagnostic procedure for diseases of the teeth
- identify the most important clinical findings in equine dental diseases
- name the most important diseases of the teeth in horses
- describe the therapeutic measures based on these findings

### PHYSIOLOGY STOMACH (CROSS SECTIONAL SUBJECT) (1H)

Students should be able to:

- describe the physiology of the normal vomiting reflex
- discuss the production of stomach acid and other digestive products of the stomach
- explain the normal motor function of the stomach

### PHYSIOLOGY SMALL INTESTINE (CROSS SECTIONAL SUBJECT) (1H)

Students should be able to:

- describe the normal physiology of digestion within the small intestine
- discuss issues that influence the digestion

### PARASITES GASTROINTESTINAL TRACT - SMALL ANIMALS (CROSS SECTIONAL SUBJECT) (2H) [332]

Students should be able to:

- discuss clinically relevant aspects of the treatment of and prophylaxis against gastrointestinal parasites
- discuss common parasites of the gastrointestinal tract of dogs and cats including their life cycles and transmission paths

[330] 1.18, 1.23

[331] 1.18, 1.23

[332] 1.18, 1.21

### VIROLOGY GASTROINTESTINAL TRACT - SMALL ANIMALS (CROSS SECTIONAL SUBJECT) (1H) [333]

Students should be able to:

- name the individual diseases caused by viruses in the gastrointestinal tract in small animals and differentiate between them according to different criteria
- explain measures that can clarify the diagnosis

### BACTERIOLOGY GASTROINTESTINAL TRACT (CROSS SECTIONAL SUBJECT) (1H) [334]

Students should be able to:

- explain the aetiology and pathogenesis of diarrhoea and point out the special features of the pathogens
- classify the different pathogens of diarrhoea and assess their clinical relevance
- explain common gastrointestinal bacteria and their spreading
- demonstrate suitable therapeutic measures and measures of meta- and prophylaxis
- assess the zoonotic potential of the pathogens and the risk of infection for humans

### PHYSIOLOGY LARGE INTESTINE/COLON (CROSS SECTIONAL SUBJECT) (1H)

Students should be able to:

- discuss the mechanisms of water re-absorption from the colon
- explain the ordinary defecation
- describe the ordinary digestive processes and immunological processes of the large intestine

### PARASITES GASTROINTESTINAL TRACT - HORSES (CROSS SECTIONAL SUBJECT) (1H) [335]

Students should be able to:

- specify the typical clinical symptoms of the most important equine endoparasites
- list suitable measures to reduce the rate of parasitic infections of a stock
- explain which specific features of the small strongylids make it the moment the most important parasite

[333] 1.18, 1.21

[334] 1.18, 1.21, 1.24

[335] 1.18, 1.21

### Parasitology Gastrointestinal Tract - Cattle (Cross Sectional Subject) (1h)[336]

Students should be able to:

- correctly diagnose a livestock with rumen fluke and liver fluke infestation on the basis of given livestock data
- recommend therapy and prophylactic measures

### Antibiotics in Horses (Cross Sectional Subject) (1h)[337]

Students should be able to:

- name antibiotics (groups) that are intolerable for horses
- list reasons for a rational use of antibiotics
- name clinical pictures in horses that allow the use of antibiotics even without evidence of germs

### Physiology Liver (Cross Sectional Subject) (1h)

Students should be able to:

- understand the complex histology and blood supply of the liver
- recognise the importance of the liver for glucose metabolism as well as the production of plasma proteins with significance for acute phase reaction, blood coagulation as well as hormone and electrolyte transport
- understand the importance of the liver for fat digestion (through bile acids) and the transport of lipids in the bloodstream
- assess and understand the endobiotic and xenobiotic metabolic capacity of the liver

### Physiology Pancreas (Cross Sectional Subject) (1h)

Students should be able to:

- understand the importance of the exocrine pancreas for the intestinal digestion of proteins, fats, carbohydrates and nucleic acids
- understand the classification of pancreatic diseases into acute and chronic pancreatitis, adenocarcinoma and pancreatic insufficiency
- know diagnostic tests for the detection of these pancreatic diseases

[336] 1.18, 1.21, 1.24

[337] 1.10, 1.18

## DIETETICS SMALL ANIMAL (CROSS SECTIONAL SUBJECT) (1H) [338]

Students should be able to:

- develop awareness of the requirements and dietary differences between dogs and cats as carnivorous and obligatory carnivorous patients
- calculate calorie requirements in disease and health
- discuss with the owner the importance, advantages and disadvantages of specific diets as a therapeutic component/measure
- discuss the advantages and disadvantages or risks of modern nutritional concepts such as BARF

## CYTOLOGY LIVER/PANCREAS (CROSS SECTIONAL SUBJECT) (3H) [339]

Students should be able to:

- list and explain the techniques for taking and preparing cytological preparations from liver and pancreas
- explain the techniques of preparing and staining preparations from liver and pancreas.
- explain the microscopic examination of cytological specimens
- list the cytological characteristics of hepatocytes
- list the types of inflammation on the basis of the dominant cell population.
- identify the most important changes on images of cytological preparations (e.g. hepatic lipidosis, purulent inflammation, evidence of regeneration, intracanalicular cholestasis, tumour cell populations)

[338] 1.18

[339] 1.21

## FORENSIC VETERINARY MEDICINE, PROFESSIONAL AND ETHICAL LAW [340]

### Coordinator:
Fey

### Instructors:
Fey, Roscher

### Type of course:
lecture (1 CHW)

### ECTS:
1

### Introduction:
- knowledge of the law of obligation and its impact on purchase law
- requirements of due diligence of the veterinarian
- issues of liability that are important for the veterinary practice
- criminal aspects that may be of importance for the veterinary practice

### Overall aims and objectives:
Students should be able to:
- reproduce the rules on the law of sales laid down in the Civil Code
- explain the legal differences between sales to end consumers and sales to others
- name the rules for warranty periods for different sales contracts
- name the rules for warranty periods for service contracts
- apply their knowledge of those articles that regulate the law of obligation, in particular its impact on purchase law
- list the general and specific requirements of due diligence of the veterinarian and describe the consequences in the case of a breach of these requirements
- enumerate issues of liability that are important for the veterinary practice and know ways to financially safeguard themselves against possible risks
- explain aspects of penal law that may be of importance for the veterinary practice

[340] 1.1, 1.2

### Reading list:

- Althaus J., Ries, H.P., Schnieder K.-H.,Großbölting, R. (Hrsg.): Praxishandbuch Tierarztrecht. Schlütersche Verlagsgesellschaft 2006, 1. Auflage (2006), ISBN-13: 978-3899930207
- Brennecke D., Münow, F.: Existenzgründung kompakt. Veterinärspiegel Verlag 2008, ISBN: 978-3-86542-012-1

### Electronic sources:

see StudIP:

https://studip.uni-giessen.de

### Assessment:

a written examination (MCQ) within the framework of the Veterinary Medical Examination in "Forensic Veterinary Medicine, professional and ethical law" after the eighth semester

## HUSBANDRY AND DISEASES OF FARMED FISH AND REPTILES/AMPHIBIANS [341]

### Coordinator:

Lierz

### Instructors:

Flamm

### Course type:

Lecture (1 CHW)

### ECTS

1

### Prerequisites:

Veterinary Medical Examination

### Introduction:

*Farmed Fish:*

Apart from parasitic, bacterial and viral infectious diseases, diseases caused by husbandry and the environment play an important role in farmed fish.

The husbandry and environmental conditions required for the various species of farmed fish as well as diseases resulting from husbandry errors are presented. Furthermore, the aetiology,

[341] 1.1, 1.18, 1.21, 1.23, 1.24, 1.33

pathogenesis, epidemiology, clinic, pathology, diagnosis and therapy as well as, in particular, prophylaxis of the most important viral, bacterial, mycotic and parasitic diseases are shown.

*Reptiles/Amphibians:*
The most important viral, bacterial, mycological and parasitic infectious diseases for reptiles and amphibians as well as important husbandry- and management-related diseases are discussed with regard to aetiology, epidemiology, pathogenesis, clinic, pathology, diagnostics, therapy and prophylaxis. In this context, aspects of analgesia and anaesthesia as well as surgery in reptiles and amphibians are also explained in more detail.

## Overall aims and objectives:

*Farmed Fish:*
Students should be able to:

- name the husbandry conditions required for farmed fish, recognise common husbandry errors, discuss differential diagnoses and derive solution proposals
- know the technical requirements and socialisation problems of different fish species, evaluate them and derive solution strategies
- describe a complete examination procedure for an individual animal as well as for a fish livestock

*Reptiles/Amphibians:*
Students should be able to:

- name the most important infectious diseases of reptiles and amphibians, explain their aetiology and classify the respective significance of a disease outbreak for the individual animal, the livestock and humans
- recognise and describe the clinic and pathology of these infectious diseases in reptiles and amphibians and differentiate between them
- name the direct and indirect detection methods suitable for the respective pathogens and interpret examination results
- assess and decide whether or which therapeutic measures (including surgical and medicinal measures) are suitable for the treatment of the various diseases in reptiles and amphibians
- define and explain the possibilities of prophylaxis for the various infectious diseases as well as for important husbandry and management-related diseases of reptiles and amphibians

## Reading list:

- "FISH DISEASE: Diagnosis and Treatment, Edward J. Noga, Mosby-Year Book, Inc, 367 pp. , ISBN 8138 2558 X, 2nd edition, published 2000

- BSAVA Manuel of Ornamental Fish, by William H. Wildgoose, 304 p., 2nd edition, published by Blackwell Pub ProfessionalMader, Reptile Medicine and Surgery, W.b. Saunders Company Jun 2007, ISBN: 1416053913, ISBN-13: 9781416053910
- Pees: Leitsymptome bei Reptilien: diagnostischer Leitfaden und Therapie. Publisher: Enke (2015), ISBN: 978-3-8304-1227-4 or e-Book: eISBN: 978-3-8304-1228-1
- Mader: Reptile Medicine and Surgery, Publisher: W.b. Saunders (2007), ISBN: 9781416053910
- Scheller, Pantchev: Parasitologie in Schlangen, Lizern und Schildkröten, Publisher: Chimaira (2008), ISBN: 978-3-89973-472-0

### Assessment:
an oral exam within the framework of the Veterinary Medical Examination in "Poultry diseases" in the eleventh semester

## DISEASES OF ORNAMENTAL/WILD AND DOMESTIC POULTRY [342]

### Coordinator:
Lierz

### Instructors:
Lierz, Möller, Heffels-Redmann

### Course type:
Lecture (1 CHW)

### ECTS
1

### Prerequisites:
Veterinary Medical Examination

### Introduction:
Infectious diseases are of great importance, especially in domestic poultry, but also in flocks of ornamental birds and in the wild bird population. The aetiology, pathogenesis, epidemiology, clinic, pathology, diagnosis and therapy, and especially prophylaxis of the most important viral, bacterial, mycotic and parasitic diseases are presented. In addition, common diseases caused by husbandry and management are discussed.

[342] 1.1, 1.18, 1.21, 1.23, 1.24, 1.33

### Overall aims and objectives:

Students should be able to:

- describe the functioning of the poultry industry and the different ways of keeping poultry
- name the most important infectious diseases of ornamental, wild and domestic poultry, explain their aetiology and classify the respective significance of a disease outbreak for the individual animal, the livestock, the population and for humans
- recognise and describe the clinic and pathology of these infectious diseases and differentiate between them
- name the direct and indirect detection methods suitable for the respective pathogens and interpret examination results
- decide whether or which therapeutic measures are suitable for the treatment of the different infectious diseases and define and explain the possibilities of general and special prophylaxis, especially by vaccination, for the different infectious diseases
- name the most important diseases caused by husbandry and management, recognise, describe and differentiate their clinical and pathological picture and name therapeutic and prophylactic measures

### Reading list:

- Siegmann, Neumann: Kompendium der Geflügelkrankheiten, Publisher: Schlütersche, 7th edition (2012), ISBN-13: 978-3-89993-083-2
- Rautenschlein, Ryll: Erkrankungen des Nutzgeflügels, publisher: utb, 1st edition (2014), ISBN 978-3-8252-8568-5 or e-book: https://hds.hebis.de/ubgi/Record/HEB368953955
- Chitty, Lierz: BSAVA Manual of Raptors, Pigeons and Passerine Birds, 1st edition (2008), BSAVA Company, ISBN: 978-1-905319046
- Pees: Leitsymptome bei Papageien und Sittichen: diagnostischer Leitfaden und Therapie. Publisher: Enke, 2nd edition (2011), ISBN: 9783830410843

### Electronic learning materials:

see StudIP: Course "Anleitung zum selbstständigen wissenschaftlichen Arbeiten: Clinic for birds, reptiles, amphibians and fish (teaching material)"

### Assessment:

an oral examination within the framework of the Veterinary Medical Examination in "Poultry Diseases" (TAppV § 42)

## MEAT HYGIENE AND FOOD SCIENCE [343]

### Coordinator:
Kehrenberg, Zens

### Instructors:
Kehrenberg, Zens and assistants

### Type of course:
lecture (4 CHW)

### ECTS:
4

### Introduction:
The course will serve to:

- obtain further knowledge on the topic of meat hygiene on the level of meat production and the placing on the market
- give information concerning the duties of the official veterinarian in the field of meat hygiene
- give information concerning the legal rules and regulations regarding the official inspections and the placing on the market of meat

### Overall aims and objectives:
Students should be able to:

- give an insight into the historical development of meat hygiene and the Meat Hygiene Law (FRG and EU)
- explain the individual processes of meat production (including the laws and regulations)
- explain the principles and legal requirements regarding the official ante and post mortem inspection of animals for slaughter and (including laboratory tests) of domestic mammals (including poultry and game)
- describe the decisions and measures of labelling concerning this matter
- explain the principles and legal requirements regarding the placing on the market (including the microbiological criteria) of meat
- discuss the regulations regarding the import, export and transit of foodstuff of animal origin
- explain the legal requirements regarding the disposal of confiscates

[343] 1.1, 1.3, 1.7, 1.10, 1.21, 1.24, 1.34, 1.35

### Reading list:

- D. M. Beutling: Lehrbuch der Schlachttier- und Fleischuntersuchung (2003), Verlag: Parey Bei Mvs; 1. Auflage (2003), ISBN-13: 978-3830440987 (exkl. der veralteten Rechtsmaterie)
- Verordnungen zum „EU-Hygienepaket“ (2004), inkl. der Verordnung zur Durchführung von Vorschriften zum gemeinschaftlichen Lebensmittelhygienerecht (BRD 2007)

### Electronic sources:

are available at the homepage of the Institute of Veterinary Food Science (IFTN)
https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

see StudIP:
https://studip.uni-giessen.de

### Scripts:

"Handouts/downloads" for each lecture block can be found on the homepage of the IFTN,
https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

### Self-assessment:

a questionnaire is available on the homepage of the Institute of Veterinary Food Science (IFTN)
https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

### Learning recommendations:

Students are advised to prepare themselves with the help of the respective handouts and a thorough reading of the relevant literature.

### Assessment:

an oral and a practical examination within the framework of the Veterinary Medical Examination in “Meat hygiene” in the eleventh semester

## INSPECTION OF ANIMALS FOR SLAUGHTER AND MEAT INSPECTION [344]

### Coordinators:

Kehrenberg, Zens

### Instructors:

Kehrenberg, Zens (+ assistants)

### Type of course:

practical (2 CHW)

[344] 1.1, 1.3, 1.7, 1.10, 1.21, 1.24, 1.28, 1.34, 1.35

## ECTS:

2

## Introduction:

The practical (of a total of 30 hours per group) will serve to:

- present technological procedures of a slaughterhouse
- reason and demonstrate of the official inspection of animals for slaughter and meat (in particular concerning pigs and cattle) including the rules and regulations of meat hygiene control
- carry out a bacteriological examination and other laboratory tests
- give an expert opinion on post-mortem inspections

## Overall aims and objectives:

Students should be able to:

- explain the principles and legal requirements of the official inspection of ante and post mortem meat inspection
- independently undertake an official meat inspection (including further examinations)
- write a certificate giving the result of the official meat inspection
- give an insight into the individual processes of meat production

## Reading list:

- Vallant: Farbatlas der Schlachttierkörper-Pathologie bei Rind und Schwein (2004), Verlag: Enke; 1. Auflage (2003), ISBN-13: 978-3830410171
- Verordnung (EU) Nr. 2017/625, inkl. der Verordnung zur Durchführung von Vorschriften zum gemeinschaftlichen Lebensmittelhygienerecht (BRD 2007)

## Electronic sources:

are available on the homepage of the Institute of Veterinary Food Science (IFTN)

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

see StudIP:

https://studip.uni-giessen.de

## Scripts:

"Handouts /downloads" for each lecture block can be found on the homepage of the IFTN

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

## Self-assessment:

a questionnaire is available at the homepage of the IFTN

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

### Learning recommendations:
Students are advised to prepare themselves with the help of the respective handouts and a thorough reading of the relevant literature.

### Maximum of participants:
4 groups of 60 students (or 12 subgroups of 20 students)

### Assessment:
during the practical, pre-examinations at the beginning of each day; an oral and a practical examination within the framework of the Veterinary Medical Examination in “Meat hygiene” in the eleventh semester

## DAIRY SCIENCE II [345]

### Coordinator:
Usleber

### Instructors:
Usleber, Akineden

### Type of course:
lecture (1 CHW)

### ECTS:
1

### Introduction:
- The hygiene of milk production, in particular milking technology and milking hygiene, industrial hygiene
- milk quality regulations
- the transport of delivered milk
- the production of drinking milk and dairy products (fermented milk products, dry milk products, cheese, butter, mixed milk products)
- the microbiology of milk and dairy products, in particular starter cultures
- probiotics
- spoilage organisms
- milk hygiene regulations

[345] 1.3, 1.10, 1.21, 1.24, 1.35

### Overall aims and objectives:

Students should be able to:

- explain the relevance of the factors describing the quality and hygienic valence of milk during the primary production, as well as measures that guarantee the quality of dairy products and exclude any health hazards for human consumption, and assess the respective factors that have an influence on this
- explain the microbiological correlations that are important for milk and dairy products and define micro-organisms that can be found in milk with regard to their occurrence, relevance and detection
- explain the production of the most important dairy products and assess them with regard to aspects of hygiene and nutrition
- explain the basic principles that underlie the respective legal regulations concerning the above mentioned aspects

### Electronic sources:

presentations of the content of the course are available as .pdf-files at StudIP

https://studip.uni-giessen.de

### Assessment:

a written examination within the framework of the Veterinary Medical Examination in "Dairy science" after the eighth semester

## COURSE IN MILK EXAMINATION [346]

### Coordinator:

Usleber

### Instructors:

Usleber, Akineden

### Type of course:

seminar with practicals (1 CHW)

### ECTS:

2

### Introduction:

- A discussion of concrete aspects of milk hygiene and demonstrations respectively the carrying out of practical exercises under supervision

[346] 1.3, 1.10, 1.21, 1.24, 1.28, 1.35

- The taking of milk samples, cell count, bacteriological analysis of milking samples of each udder quarter, inhibitor test, physical quality parameters, verification of pasteurization, casein precipitation, starter cultures, methods of a colony count in milk, detection of pathogens in milk and dairy products

### Overall aims and objectives:

Students should be able to:

- describe the method of analysis for raw milk within the framework of the milk quality examination and explain reasons for a deviation from standard values
- explain factors that affect the taking of samples as well as cytological and bacteriological findings in connection with sub-clinical mastitis, and further, explain the characteristics of important pathogens with regard to industrial hygiene
- describe methods for determining the physical-chemical quality parameters of milk and dairy products and interpret the findings with regard to set values
- describe the methods and principles of producing dairy products and name causes that can lead to problems in milk processing
- recognize important tools for the microbiological analysis of dairy products and interpret typical findings in context

### Electronic sources:

the complete presentations of the content of the course are available as .pdf-files at StudIP
https://studip.uni-giessen.de

### Assessment:

a written examination within the framework of the Veterinary Medical Examination in "Diary scinece" after the eighth semester

## PATHOLOGICAL-ANATOMICAL DEMONSTRATIONS [347]

### Coordinator:

Herden

### Instructors:

Herden, Köhler, Henrich, Hirz

### Type of course:

practical and seminar each lasting one hour (1 contact hour per week, every two weeks for two hours, in 2 alternating groups/over the period of 2 semesters)

[347] 1.24, 1.28, 1.33

## ECTS:
1.5

## Requirements:
Students must have attended the lecture on “General pathology” and the seminar on “General pathology”.

## Introduction:
The participants of the course will work with material taken from routine necropsies of the Institute, archived material and material of slaughtered animals. The abnormalities of organs will be discussed in groups with an assistant. The pathological-anatomical and differential diagnoses will be collected and discussed. Each case will be discussed epicritically, referring to its possible etiologies, pathogenesis and clinical relevance.

## Overall aims and objectives:
Students should be able to produce a forensically applicable organ report. This will include a complete description of the abnormalities of the organs, the formulation of the pathological-anatomical diagnoses, the differential diagnoses and the epicrisis.

## Reading list:
- Dahme/Weiss: Grundriss der speziellen pathologischen Anatomie der Haustiere, Verlag: Enke; 6. völlig neu bearb. Auflage (2007), ISBN-13: 978-3830410485
- McGavin/Zachary: Pathologic Basis of Veterinary Disease, Verlag: Mosby; 4th ed. (2006), ISBN-13: 978-0323028707
- respectively the translated version: Pathologie der Haustiere: Allgemeine, spezielle und funktionelle Veterinärpathologie- mit Zugang zum Elsevier-Portal, Verlag: Elsevier, München (2009), ISBN-13: 978-3437582509 A

## Electronic sources:
see StudIP:
https://studip.uni-giessen.de

## Assessment:
final discussion/attestation at the end of the eighth semester; an oral and a practical examination within the framework of the Veterinary Medical Examination in “General pathology and Special pathological anatomy and histology in the eleventh semester

## RADIOLOGY [348]

### Coordinator:
Eley, von Pückler

### Instructors:
Eley, von Pückler, Kehrenberg, Kost, Müller

### Type of course:
lecture (2 CHW)

### ECTS:
2

### Introduction:
The course will cover the following fundamental issues:

- the properties and effects of ionising radiation
- the fundamentals of radiation biology
- the effects of ionising radiation on humans, animals, foodstuff, animal feed and the environment
- methods for the detection of the effects of radiation, and to determine the amount of radiation that employees and the animal owners may receive
- methods for the detection of a contamination with radioactive substances
- the physical-technical principles and principles of application of diagnostic imaging methods, including the alternatives to the application of ionising radiation
- the fundamental principles of radiation therapy,
- the statutory, practical and technical radiation protection of employees and animals owners (the examination will cover: numbers 4-8 of the basic course in radiation protection, according to the Appendix 1 of the directive "Radiation Protection in Veterinary Medicine"; GMBl 2005 p. 666)
- radiographic technology, the biologic effect of radiation, ultrasonic technology, computer tomography, magnetic resonance imaging, scintigraphy, PET/SPECT, food radiology

### Overall aims and objectives:
Students should be able to name and explain the following aspects:

- the fundamental principles of the properties and effects of ionising radiation
- the fundamental principles of radiation biology

[348] 1.23

- the effects of ionising radiation on humans, animals, foodstuff, animal feed and the environment
- methods for the detection of the effects of radiation, and to determine the amount of radiation that employees and animal owners may receive
- methods for the detection of a contamination with radioactive substances
- the physical-technical principles and principles of application of diagnostic imaging methods, including the alternatives to the application of ionising radiation
- the fundamental principles of radiation therapy
- the statutory, practical and technical radiation protection of employees and carers of animals (the examination will cover: numbers 4-8 of the basic course in radiation protection, according to the Appendix 1 of the directive “Radiation Protection in Veterinary Medicine”; GMBl 2005 p. 666)

### Reading list:

see StudIP:

https://studip.uni-giessen.de

Here, the appropriate and relevant legal texts and documents can be found.

### Electronic sources:

lectures are available at StudIP

### Learning recommendations:

the respective legislation, lectures available at StudIP

### Assessment:

According to § 43 of the TAppV:

(2) Recognition of the successfully completed examination (according to paragraph 1) as basic course in radiation protection according to Appendix 1 of the directive “Radiation Protection in Veterinary Medicine”, if the respective authority has previously determined that the requirements (the content of Appendix 1 of the directive “Radiation Protection in Veterinary Medicine”) have been met.

(3) Students can only begin the acquisition of expertise required in the field of diagnostic radiology once they have successfully passed the examination in the examination subject “Radiology” during their clinical training. The content is based on the guidelines of the directive “Radiation Protection in Veterinary Medicine”.

A written examination within the framework of the Veterinary Medical Examination in “Radiology” after the seventh semester

## ANIMAL WELFARE [349]

### Coordinator:
Krämer

### Instructors:
Krämer, Kuhne, Hornung

### Course type:
Lecture (2 CHW)

### ECTS
2

### Introduction:
introduction to animal welfare legislation and ethology

### Overall aims and objectives:
Students should be able to:

- relate ethological knowledge of different animal species to legal principles and husbandry requirements and place the subject in the complex of veterinary medicine

### Reading list:
- "Kommentare zum Tierschutzgesetz", Hirtz, Maisack, Moritz, 2016

### Scripts:
are created and made available as PDF in StudIP
https://studip.uni-giessen.de

### Assessment:
part of the Animal Welfare exam

[349] 1.1, 1.7, 1.10, 1.20

## 8TH SEMESTER

| BLOCKS | WEEKS | ECTS |
|---|---|---|
| Block Urinary Tract | 3 | 3 |
| Block Endocrinology | 1 | 1 |
| Block Laboratory Animals and Small Mammalian Patients | 1 | 1 |
| Block Reproduction | 7 | 7 |
| Block Livestock management | 2 | 2 |
| **REGULAR COURSES** | **CHW** | **ECTS** |
| Forensic Veterinary Medicine, Professional and ethical law **L** | 1 | 1 |
| Fish Diseases and Reptiles **L** | 1 | 1 |
| Functional Pathology **S** | 1 | 1 |
| Poultry Diseases **L** | 1 | 1 |
| Histopathology **P** | 2 | 3 |
| Food Science **L** | 4 | 4 |
| Food examination **P** | 2 | 3 |
| Pathological-anatomical Demonstrations **P** | 1 | 1.5 |
| Specific Pathology **S** | 1 | 1 |
| Epizootic Disease Control and Epidemiology of Infectious Diseases **L** | 3 | 3 |
| Elective Courses | | |
| **EXAMINATIONS** | | **ECTS** |
| Examination “Pharmacology and Toxicology” | | 1 |
| Examination “Epizootic Disease Control and Epidemiology of Infectious Diseases” | | 2 |

| | | |
|---|---|---|
| Examination “Forensic Veterinary Medicine, Professional and ethical law” | | 2 |
| Module-component Examination: “MCQ Internal Medicine” (20% Veterinary Medical Examination) | | 0.5 |
| Module-component Examination: “MCQ Surgery and Anaesthesiology” (20% Veterinary Medical Examination) | | 0.5 |
| Module-component Examination: “MCQ Reproductive Medicine” (20% Veterinary Medical Examination) | | 0.5 |

L= lecture, P= practical, S= seminar
CHW= contact hour per week (Semesterwochenstunde)
ECTS= European Credit Transfer and Accumulation System, Indication of Credit Points

Please note: further information regarding courses can be found at:
http://www.uni-giessen.de/cms/fbz/fb10/studium-und-prufungen/studium

Duration of block courses is given in “h =hours”, 1h =45 min

## URINARY TRACT

**Summary:**
Along with polyuria with a resulting polydipsia, it is primarily a urinary incontinence, a urinary obstruction or a change in urinary colour which indicates a disease of the urinary tract. For this reason, it is very important being able to carry out and interpret the complete urinalysis. Imagining techniques are the other important methods to diagnose diseases of the urinary tract.

**Courses in detail:**

*Institute of Pharmacology and Toxicology (Geyer et al.)*

### DIURETICS, ANTIDIURETICS L (2H)[350]

**Students should be able to:**

- classify and describe the differences in the effects of diuretics
- derive justifications for individually selected diuretics for the different indication
- weigh up necessary applications and contraindications (dehydration, potassium losses, etc.)

*Institute of Veterinary Pathology (Herden, et al.)*

### PATHOLOGY URINARY TRACT L (4H) [351]

**Students should be able to:**

- identify the pathological processes and conditions of domestic animals
- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in context to the clinical image
- explain the etiology and pathogenesis of the alterations as well as make the correct morphological diagnoses and discuss differential diagnoses

[350] 1.18

[351] 1.21, 1.24, 1.33

*Clinic for Small Animals (Internal Medicine and Surgery) (Kramer, Moritz, Peppler, Thiel et al.)*

## URINALYSIS L (1H) [352]

### Students should be able to:

- explain the most important steps of the urinalysis (macroscopic, specific gravity, dipstick, sediment) and the respective findings
- interpret possible findings of the most important tests (macroscopic, dipstick, sediment)
- define and interpret the terms “isosthenuria”, “hyposthenuria”, “hypersthenuryia”
- assess the main components of the sediment (cells, crystals, cylinder, microorganisms) and interpret their clinical relevance

## IMAGING KIDNEY L (2H) [353]

### Students should be able to:

- assess with radiographic means the position, size and shape of the kidneys in dogs and cats
- identify essential pathological alterations

## ACUTE RENAL INSUFFICIENCY L (1H) [354]

### Students should be able to:

- distinguish between acute and chronic renal insufficiency
- list the most common causes of an acute renal failure
- recognize and interpret the problems of an acute renal failure (electrolyte imbalance, acid-base- shift, oliguria)
- discuss therapeutic methods in a case of oliguric renal insufficiency

## FLUID THERAPY L (1H) [355]

### Students should be able to:

- quantify dehydration and arrange a fluid therapy for one patient
- depending on the indication, choose between the different infusion solutions and calculate the amounts required

[352] 1.21

[353] 1.23

[354] 1.18, 1.21

[355] 1.18

### Chronic Kidney Disease L (2h) [356]

Students should be able to:

- name possible causes of chronic kidney disease
- discuss the consequences of chronic kidney disease
- differentiate chronic kidney disease from acute kidney disease
- explain therapy options for chronic kidney disease
- name the prognosis in different stages of chronic kidney disease

### Electrolytes L (1h) [357]

Students should be able to:

- deduce the most important differential diagnoses of mechanisms of hyper/hypo-natraemia, -chloraemia, -phosphataemia and -magnesaemia
- interpret the findings of patients suffering from electrolyte disorders

### Urinary Stones - Dog L (1h) [358]

Students should be able to:

- discuss the theories of urolithiasis formation
- explain the pathomechanisms of specific uroliths
- describe the possibilities of imaging diagnostics, the problems present in this, as well as the racial predispositions and the milieu present in the urinary tract for specific uroliths
- describe the therapeutic options and prophylactic measures for the various uroliths

### Acid-base balance L (1h) [359]

Students should be able to:

- define and interpret the terms "acidaemia", "acidosis" "alkaliaemie", "alkalosis"; "hypoxaemia" "hypoxia", "hypercapnia" and "hypocapnia"
- list and explain the most important regulatory mechanisms of the acid-base balance,
- explain the requirements for a blood gas analysis (sample material, equipment)
- interpret patient findings with the help of [HCO3-] pH-value and CO2 partial pressure and explain which type of deviation from the acid-base balance is the case

[356] 1.18, 1.21

[357] 1.21

[358] 1.18, 1.21, 1.23

[359] 1.18, 1.21

(respiratory/metabolic acidosis or alkalosis) and whether the patient shows signs of compensation
- list and explain possible differential diagnoses for respiratory/metabolic acidosis or alkalosis

### FLUTD- Internal Medicine L (1h) [360]

**Students should be able to:**

- name clinical symptoms of lower urinary tract disease
- Describe the progression of a pure lower urinary tract disease (Feline lower urinary tract disease) to a systemic disease (Pandora's syndrome)
- list predisposing factors for lower urinary tract disease
- name possible causes of lower urinary tract disease in the cat
- describe the diagnostic and therapeutic procedures for cats with lower urinary tract disease

### Urinary surgery L (2h) [361]

**Students should be able to:**

- list and define the different surgical diseases of the urinary tract of small animals
- give the indications for surgical intervention in diseases of the urinary tract

### Surgery urinary tract prostate L (2h) [362]

**Students should be able to:**

- name surgical diseases of the urinary tract and the prostate and explain their etiology and diagnostics
- explain and discuss possibilities of surgical intervention in diseases of the prostate

### Surgical & Neurological Urinary Disorders L (3h) [363]

**Students should be able to:**

- name the definitions of neurological urinary disorders
- explain the diagnostic and therapeutic steps of incontinence and lack of urine output

[360] 1.18, 1.21

[361] 1.18

[362] 1.18

[363] 1.18, 1.21

### URINARY TRACT INFECTIONS - SMALL ANIMAL L (1H) [364]

Students should be able to:

- name the most important bacterial pathogens of urinary tract infections
- describe the differences between persistent and recurrent urinary tract infections
- list predisposing factors for urinary tract infections
- list therapeutic options for bacterial urinary tract infections

*Clinic for Horses (Internal Medicine and Surgery) (Fey, Roscher, Röcken et al.)*

### DISEASES OF THE EQUINE URINARY TRACT - CLINICAL AND FURTHER DIAGNOSTICS L (1H) [365]

Students should be able to:

- list possibilities of the diagnostics for diseases of the equine urinary organs
- define and explain the most important physiological and patho-physiological mechanisms of the function of the urinary organs

### EQUINE URINARY DISEASES - RENAL DISEASES L (1H) [366]

Students should be able to:

- define the most important etiological causes of a renal disease in horses
- name and apply the fundamentals of the therapy of equine renal diseases

### EQUINE URINARY DISEASES - DISEASES OF THE BLADDER AND URINARY TRACT L (1H) [367]

Students should be able to:

- define the most important etiological causes of a disease of the bladder and the urinary tract in horses
- name and apply the fundamentals of the therapy of the bladder and the urinary tract in horses

[364] 1.18

[365] 1.21

[366] 1.18

[367] 1.18

*Clinic for Ruminants (Internal Medicine and Surgery) (Sickinger et al.)*

## DISEASES OF THE URINARY TRACT - RUMINANTS: GENERAL L (2H) [368]

### Students should be able to:

- name the different indications for a urinalysis in ruminants, carry out a urinary sampling and an examination of ruminants
- explain specific clinical and laboratory-diagnostic findings in the case of diseases of the urinary organ

## KIDNEY - RUMINANTS L (1H) [369]

### Students should be able to:

- explain the causes and symptoms, as well as the prognosis and treatment of the following diseases of the kidney:
    - chromo-proteinamic nephroses
    - amyloidnephrosis
    - nephritis
    - pyelonephritis
    - clostridial disease of small ruminants

## DISEASES OF THE URINARY TRACT - CALF L (1H) [370]

### Students should be able to:

- explain the causes and symptoms, as well as the prognosis and treatment of the following diseases:
    - omphalourachitis
    - cystitis
    - injury and obstruction of the urethra
    - nephritis
    - Malformations (e.g. ectopic ureter)

[368] 1.1, 1.21

[369] 1.1, 1.18

[370] 1.1, 1.18

*Miscellaneous*

### Clinical Demonstrations S (6h) [371]

The content of the clinical demonstrations will refer to the patients currently treated at the clinic and can therefore not be given beforehand.

### Physiology - Kidney (Cross Sectional Subject) (1h)

**Students should be able to:**

- know the comparative anatomical structure of the kidney in different species
- describe the structure and function of the *glomerulum*, its filter and its regulation (macula densa) and understand primary urine formation
- understand diagnostic tests to determine kidney function
- understand the importance of the kidney in the reabsorption of important molecules and electrolytes, the excretion of urinary substances, the concentration of the final urine and the production of numerous renal hormones
- discuss the basics of glomerulonephritis

### Radiography, urine, blood (Cross Sectional Subject) (3h) [372]

**Students should be able to:**

- carry out the preparation and microscopic examination of specimens of urine sediment
- list and assess the main components of urine sediment (cells, cylinders, crystals)
- list the special features of the urine of different species (horses, dogs, cats)
- carry out and evaluate a measurement of specific gravity (iso-, hypo-, hypersthenuria
- interpret clinical, laboratory-diagnostic and radiological patient findings and deduce possible differential diagnoses

### Bacteriology Urinary Tract (Cross Sectional Subject) (1h)[373]

**Students should be able to:**

- discuss virulence factors of different pathogens
- explain the symptoms of lower and upper urinary tract infections
- name the most common bacterial pathogens that cause urinary tract infections

[371] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[372] 1.21, 1.23

[373] 1.21

## ENDOCRYNOLOGY

**Summary**:
Endocrine disorders, which mainly occur in small animals, are of particular relevance. The most important representatives of these problems are diseases of the thyroid gland, adrenal gland, endocrine pancreas and pituitary gland. Most cases respond well to therapy and a good outcome is common. Knowledge of regulatory pathways of hormone systems is essential to understand the various diagnostic tests employed (stimulatory and suppression tests)

**Courses in detail:**

*Institute of Pharmacology and Toxicology (Geyer et al.)*

### PHARMACOLOGY DIABETES MELLITUS L (2H) [374]

**Students should be able to:**

- explain the metabolisms of carbohydrate and aliphatic acid, including dysfunctions in the case of insulin insufficiency diabetes (type 1) and disrupted insulin secretion with insulin resistance (type 2)
- explain the regulation of insulin secretion and the effects of insulin on tissue that is sensitive to insulin (muscle, liver, fat)
- give the classification and relevance of diabetes, including the different etiologies of type 1 and type 2
- assess various possibilities for therapeutic intervention using insulin and oral anti-diabetics
- explain the varying duration of the effects of insulin, (ultra) rapid-acting insulin analogues, insulin formulations, and long-acting insulin analogues (basal-insulin), including possible unwanted effects and emergency measures in the case of hypoglycaemia

*Institute of Veterinary Pathology (Herden, et al.)*

### ENDOCRINE PATHOLOGY L (2H) [375]

**Students should be able to:**

- identify pathological processes and conditions of domestic animals
- explain the entities that concern individual organ systems

[374] 1.18

[375] 1.21, 1.24, 1.33

- define and classify the diseases and explain them comprehensively in context to the clinical image
- explain the etiology and pathogenesis of the alterations as well as make the correct morphological diagnoses and discuss differential diagnoses

*Clinic for Small Animals (Internal Medicine and Surgery) (Kramer, Moritz, Schneider, Peppler, Thiel et al.)*

### PU/PD L (1H) [376]

Students should be able to:

- understand water homeostasis
- differentiate the clinical picture of PU/PD from other symptoms with altered urine output (pollakiuria, incontinence)
- discuss the various differential diagnoses for PU/PD and the underlying mechanisms
- discuss the possibilities of diagnostics for PU/PD

### HYPERADRENOCORTICISM L (1H) [377]

Students should be able to:

- discuss the pathogenesis and patho-physiology of the production of steroid hormones and their potential dysregulation
- discuss the epidemiology, clinic and complications of canine (and feline) hyperadrenocorticism
- induce appropriate diagnostic measures and correctly interpret the results in connection with the clinic
- list possible therapeutic measures for hyperadrenocorticism and monitor them

### HYPOADRENOCORTICISM L (1H) [378]

Students should be able to:

- discuss the pathogenesis and patho-physiology of the production of steroid hormones and their potential dysregulation
- discuss the epidemiology, clinic and complications of canine hypoadrenocorticism
- list possible causes of hypoadrenocorticism and induce the necessary steps to arrive at a diagnosis

[376] 1.21

[377] 1.18, 1.21

[378] 1.18, 1.21

- discuss the correct treatment during a hypoadrenergic crisis as well as with regard to the long-term consequences

### HYPOTHYROIDISM L (1H) [379]

Students should be able to:

- discuss the physiology of the production of thyroid hormones
- explain the causes of a hypothyroidism in dogs
- discuss the epidemiology, clinic and complications of hypothyroidism in dogs
- carry out diagnostic tests and interpret the results correctly
- explain the treatment of hypothyroidism

### HYPERTHYROIDISM L (1H) [380]

Students should be able to:

- discuss the physiology of the production of thyroid hormones
- recognize the causes of feline hyperthyroidism, its complications and clinic
- induce diagnostic measures and correctly interpret their results
- list possible therapeutic measures and their advantages and disadvantages

### DIABETES MELLITUS - DOG L (1H) [381]

Students should be able to:

- explain the patho-physiology of the glucose metabolism for the different types of diabetes
- discuss the clinic and potential complications
- explain all the diagnostic tests that are necessary for diabetic patients
- explain how to correctly treat a dog suffering from diabetes mellitus (insulin, diet)

### DIABETES MELLITUS - CAT L (1H) [382]

Students should be able to:

- explain the patho-physiology of the glucose metabolism for the different types of diabetes
- discuss the clinic and potential complications
- explain all the diagnostic tests that are necessary for diabetic patients
- explain how to correctly treat a cat suffering from diabetes mellitus (insulin, diet)

[379] 1.18, 1.21

[380] 1.18, 1.21

[381] 1.18, 1.21

[382] 1.18, 1.21

### Diabetic Ketoacidosis - Small Animal L (1h) [383]

Students should be able to:

- discuss the pathophysiology, symptoms and diagnosis of diabetic derailment
- discuss the complications to be expected
- discuss therapy with differences between DK and DKA
- discuss the prevention of the derailment

### Hypercalcaemia L (1h) [384]

Students should be able to:

- explain the physiology and pathophysiology of calcium regulation
- list the differential diagnoses of hypercalcaemia
- name the diagnostic measures in the presence of hypercalcaemia
- list the specific and non-specific therapeutic measures in the presence of hypercalcaemia
- list the sequelae of hypercalcaemia

### Rare Endocrinopathies L (1h) [385]

Students should be able to:

- name the hormones of the adrenal gland and assign them to the corresponding production site within the adrenal gland
- describe the diagnostics and therapeutic measures for phaeochromocytoma, hyperaldosteronism and insulinoma
- list the diagnostic options for detecting dysregulation of growth hormones

### Surgery Endocrinology L (1h) [386]

Students should be able to:

- assess surgical diseases of the adrenal gland, pancreas, and the thyroid gland and create a therapeutic plan
- discuss and define the surgical fundamental principles of adrenal surgery
- discuss the surgical fundamental principles of thyroid surgery
- deduce the underlying diseases of the adrenal glands and thyroidea

[383] 1.18, 1.21

[384] 1.18, 1.21

[385] 1.18, 1.21

[386] 1.18

*Equine Clinic (Internal Medicine and Surgery) (Fey, Roscher, Röcken et al.)*

### EQUINE METABOLIC SYNDROME (EMS) - HORSES L (1H) [387]

Students should be able to:

- name the criteria for diagnosing equine metabolic syndrome
- explain the difference between obesity and EMS worthy of treatment
- list causes of this metabolic disease
- name diagnostic tests for the determination of insulin resistance
- explain management measures, feeding and possible medication of EMS patients

### DYSFUNCTION EQUINE HYPOPHYSISE (PPID) - HOURSES L (1H) [388]

Students should be able to:

- indicate the aetiology of PPID
- name pathophysiological correlations and special features of PPID in comparison to Cushing's syndrome in dogs and humans
- list typical clinical and laboratory diagnostic findings, - name and evaluate laboratory diagnostic tests
- name the therapy of choice
- explain further therapeutic measures

*Clinic for Ruminants (Internal Medicine and Surgery) (Sickinger et al.)*

### BOVINE KETOSIS L (1H) [389]

Students should be able to:

- explain the relevance of this metabolic disorder for modern dairy farming
- name and assess the factors which encourage a development of ketoses
- list the methods that can be used to diagnose metabolic disorders
- point out appropriate measures of treatment and prophylaxis

[387] 1.18, 1.21

[388] 1.18, 1.21

[389] 1.1, 1.18, 1.21

*Miscellaneous*

### Clinical Demonstrations (2h) [390]

The content of the clinical demonstrations will refer to the patients currently treated at the clinic and can therefore not be given beforehand.

### Refresher course in physiology of hormones (Cross Sectional Subject) (1h)

Students should be able to:

- discuss the normal control circuits of hormone regulation
- describe influences on hormone production
- describe important laboratory-diagnostic procedures

## Laboratory And Small Mammalian Patients

**Summary:**

Laboratory animals (rodents, lagomorphs, guinea pigs) are commonly used in research. These animals require special attention concerning their keeping and have to be treated in a special manner – in accordance with the animal protection act – also to ensure the conclusiveness of experiments. Usually, examination methods for laboratory animals differ from those used for other animal species. These differences, as well as frequent problems in the keeping of laboratory animals will be discussed. This block will furthermore thoroughly deal with small mammalian patients, an increasingly relevant part of the small animal practice.

Further details (e.g. reading list) on the individual courses can be found online at:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium

**Courses in detail:**

*Clinic for Small Animals - Pets (Göbel et al.)*

### Clinical examination and diagnostics of diseases in small mammalian patients L (1h) [391]

**Students should be able to:**

- ask most important questions during history taking
- describe the particularities of the clinical examination

[390] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[391] 1.15, 1.17, 1.21, 1.23

- give special methods how to palpate and auscultate small mammels
- prove the importance of radiographic examinations by illustrating the differences in species and parts of the body
- assess the importance of ultrasound, whereupon the topography of organs is repeated, in the individual body cavities,
- describe the application of the ECG for small mammal patients

### FRACTURES IN SMALL MAMMALS - CAUSES AND DIAGNOSTICS L (1H) [392]

**Students should be able to:**

- enumerate the causes of fractures of the limbs in small mammal patients
- specify the essential requirements for the obtaining of radiographic images for precise diagnostics with regard to the regulations for radiation protection
- assess radiographic images
- point out possibilities of conservative and surgical treatments of limb fractures

### SURGICAL TREATMENT OF FRACTURES IN SMALL MAMMALS L (1H) [393]

**Students should be able to:**

- point out problems that may arise in the surgical treatment of front- or hind-limbs (especially the tibia fracture)
- explain how these can be prevented respectively treated
- explain the indications for surgical treatment
- discuss the administration of analgesics and antibiotics following surgical care

### DIABETES MELLITUS IN SMALL MAMMALS L (1H) [394]

**Students should be able to:**

- explain the etiology, typical symptoms, diagnosis and treatment of the disease
- describe the differences in treatment according to the different species

### INFECTIOUS DISEASES IN FERRETS L (1H) [395]

**Students should be able to:**

- list the numerous known viral and bacterial diseases in ferrets

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[392] 1.18, 1.23

[393] 1.18, 1.31

[394] 1.18, 1.21

[395] 1.18, 1.21

- discuss the symptoms, the diagnosis and possible treatment measures

## ANAESTHESIA FOR SMALL MAMMALS L (1H) [396]

Students should be able to:

- explain the surgical preparation, injective anaesthesia, inhalative anaesthesia, intubation, and the monitoring of anaesthesia
- assess the importance of the general examination, the period of feeding restrictions, the pre-medication and the shock prophylaxis and analgesia
- present a simple sedation
- explain the advantages and disadvantages of injective anaesthesia, while taking into account the different types of injective methods
- present the injective narcotics and their antagonists
- discuss the fields of application as well as the advantages and disadvantages of mere inhalative anaesthesia
- describe the technical equipment necessary for mere inhalative anaesthesia and carry out the inhalative anaesthesia
- explain the monitoring of anaesthesia, the surgical preparation as well as the post-surgical care

## ENDOCRINE DISORDERS IN SMALL MAMMALS L (1H) [397]

Students should be able to:

- explain the etiology, symptoms, diagnosis, and forms of treatment, as well as the prognosis for the insulinoma in ferrets
- describe the cause, symptoms, diagnosis, treatment, and in particular, the effect of the drug
- leuprolidacetat in cases of hyperadrenocorticism in ferrets
- explain the symptoms and the treatment of hyperoestrogenism in ferrets
- name the symptoms, diagnosis and treatment of ovarian cysts in guinea pigs
- name thyroid diseases in the small mammalian patient

[396] 1.30

[397] 1.18, 1.21

### INTENSIVE CARE OF SMALL MAMMALS L (1H) [398]

**Students should be able to:**

- explain the anatomy of the veins with regard to the administration of fluids, taking into account the differences of the various species, and the intraperitoneal and intraosseous administration of fluids
- calculate amounts and dosages for the administration of fluid
- discuss the advantages and disadvantages of manual force-feeding and force-feeding via the feeding tube
- name preparations for the force-feeding of different species
- recognize pain and point out the common drugs used for pain therapy
- explain problems in the administration of antibiotics for small mammals, including the advantages and disadvantages of the different antibiotics

### ENZEPHALITOZOON CUNICULI- PET RABBIT DISEASE L (1H) [399]

**Students should be able to:**

- explain cause, clinic, diagnosis and therapy of the disease
- identify differential diagnoses

*Professorship for Laboratory Animal Welfare and Ethology*

### LABORATORY ANIMAL SCIENCE L (11H) [400]

**Coordinator:**
Krämer

**Instructor:**
Krämer

**Course type:**
Lecture (1CHW)

**ECTS:**
1

[398] 1.18, 1.31

[399] 1.18, 1.21, 1.24

[400] 1.1, 1.7, 1.10

## Introduction:

The lecture Laboratory Animal Science deals with the legal basis required by the authorities in dealing with laboratory animals. The European animal protection regulations and their implementation in and significance for national legislation form the basis. In addition, the historical development of the concept of animal protection, the status of animal protection in the EU and in Europe as well as the history of laboratory animal science are discussed. The lecture discusses replacement and supplementary methods to animal experiments on the basis of the 3R concept of Russell and Burch (refinement, replacement, reduction) and explains the recognition and evaluation of burdens in animal experiments and possibilities of burden reduction. Students are taught the basics of animal ethics and the ethical justifiability of animal experimentation, as well as the procedure of approval procedures at authorities and areas of responsibility and competences around animal experimentation. Passing the written exam at the end of the lecture certifies successful participation in the lecture.

## Overall aims and objectives:

Students should be able to:

- describe the European and national legal basis for animal experiments and name the most important laws and regulations
- discuss replacement and supplementary methods of animal experiments, especially with regard to the 3Rs (replacement, reduction, refinement)
- assess the stress caused by an experiment and explain possibilities for minimising the stress
- explain the procedure of an authorisation procedure and the involved authorities
- explain the basics of animal ethics
- discuss the ethical justifiability of an animal experiment and weigh up the burdens arising from the experiment against possible benefits

## Reading list:

see lecture

## Electronic sources:

https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/e-learning

## Learning recommendations:

see lecture

*Miscellaneous*

### CLINICAL DEMONSTRATIONS S (2H) [401]

The content of the clinical demonstrations will refer to the patients currently treated at the clinic and can therefore not be given beforehand.

## REPRODUCTION

**Summary:**

This block will deal with the physiology and pathology of the reproductive organs, the mammary gland and the reproductive function, as well as with biotechnological procedures used for domestic mammals. The focus will be on the species cat, dog, pig, sheep, goat, cow and horse. Furthermore, those domestic animals and small mammels that are most common in Germany will be discussed.

Further details (e.g. reading list) on the individual courses can be found online at:
https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium

**Courses in detail:**

*Institute of Pharmacology and Toxicology (Geyer et al.)*

### ANTI-INFECTIVES 6 - MACROLIDES, LINCOSAMIDES AND FENICOLS L (1H) [402]

**Students should be able to:**

- name the structure, mechanism of action, type and spectrum of action, oral bioavailability, distribution/mobility, PK/PD parameters, therapeutic range and adverse drug reactions of the antibiotic classes macrolides, lincosamides and fenicols
- describe the currently available preparations with indications and the current resistance situation

### ANTI-INFECTIVES 7 - PLEUROMUTILINS, IONOPHORES AND FUSIDANS L (1H) [403]

**Students should be able to:**

[401] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28
[402] 1.10, 1.18, 1.25, 1.27
[403] 1.10, 1.18, 1.25, 1.27

- name the antibiotic classes of pleuromutilins, ionophores and fusidans structure, mechanism of action, type, spectrum, oral bioavailability, distribution/mobility, PK/PD parameters, therapeutic range and adverse drug reactions
- reflect the currently available preparations with indications and the current resistance situation

### ANTI-INFECTIVES 8 - ANTIBIOTIC GUIDELINES: ASPECTS OF THE USE OF ANTIBIOTICS L (1H) [404]

The students are able to reproduce the contents of the antibiotics guidelines and they are equipped with their knowledge from the previous antibiotics lectures to implement the theoretical knowledge in the later application in veterinary practice.

*Institute of Veterinary Pathology (Herden, et al.)*

### PATHOLOGY REPRODUCTIVE ORGANS I L (3H) [405]

Students should be able to:

- identify the pathological processes and conditions of domestic animals
- explain the entities relating to the individual organ systems
- define and classify the diseases and explain them comprehensively in connection with the clinical picture
- explain the aetiology and pathogenesis of these developments, as well as confirm the correct morphological diagnoses and discuss differential diagnoses

*Clinic for Reproduction (Wehrend, Wrenzycki et al.)*

### FEMALE REPRODUCTIVE ORGANS L (1H)

Students should be able to:

- explain the function and anatomy of the female sexual organs from a clinical perspective

### SEX DETERMINATION L (1H)

Students should be able to:

- list the factors of the determination of the sex of domestic mammals and point out their properties and functions (as far as known)
- explain the procedure of male and female sex determination

[404] 1.10, 1.18, 1.26

[405] 1.21, 1.24, 1.33

- explain the concept of basic femaleness
- explain the conversion of indifferent predispositions into the respective dimorphic organs or structures existent in the male or female sex
- give an outline of the mechanisms of sex determination of birds, reptiles and fish
- list important disruptions of sex determination of domestic mammals and explain their causes

### FEMALE ENDOCRINE REGULATORY CIRCUITS L (1H)

Students should be able to:

- explain the basic principles of hormonal effects
- describe the structure of the regulatory circuit that controls the female sexual functions and the components and factors involved
- explain the structure of the following hormones and list their properties and most important effects concerning the regulation of the ovarian cycle: GnRH, FSH, LH, Inhibin, Estradiol-17β, progesterone, PGF2α, melatonine
- explain the biosynthesis of sexual steroids

### CYCLE - HORSES L (1H)

Students should be able to:

- describe the cycle of the mare and its regulation, as well as explain possible methods of the diagnostics of the cycle

### CYCLE - DOG L (1H)

Students should be able to:

- describe the cycle of the bitch and its regulation, as well as explain possible methods of the diagnostics of the cycle

### CYCLE - CAT L (1H)

Students should be able to:

- describe the cycle of the cat and its regulation, as well as explain possible methods of the diagnostics of the cycle

### CYCLE - SWINE L (1H)

Students should be able to:

- describe the cycle of the sow and its regulation, as well as explain possible methods of the diagnostics of the cycle

### CYCLE - RUMINANTS L (1H)

Students should be able to:

- describe the cycle of the cow, sheep and goat and its regulation, as well as explain possible methods of the diagnostics of the cycle

### APPLICATION OF HORMONES - CATTLE/PIGS L (3H) [406]

**Students should be able to:**

- explain, respectively list, the structure and effects (and, where applicable, the unwanted side-effects) of the following hormones (and, where applicable, their synthetic analogues): GnRH, LH, FSH, hCG, eCG, progesterone, estrogens, PGF2α
- list the fields of application of the hormones mentioned above, respectively active substances with regard to the treatment of fertility disorders in female cattle and pigs
- discuss the methods and limitations of conventional hormonal treatments of reproductive disorders in cattle and pigs

### BIOTECHNOLOGY FEMALE 1+2 L (2H)

**Students should be able to:**

- explain the basic principles of the biotechnologies mentioned above, as well as discuss the advantages and disadvantages and possible problems of these procedures
- discuss the possibilities, limitations and risks of modern biotechnologies

### MALE ENDOCRINE REGULATORY CIRCUIT L (1H)

**Students should be able to:**

- explain the structure of the regulatory circuit that controls the sexual functions of male domestic mammals
- list the effects of the hormones involved in the regulatory circuit of male domestic mammals
- explain the changes in the area of the regulatory circuit during puberty
- explain seasonal influences on the endocrine system of male mammals

### APPLICATION OF HORMONES - HORSES L (1H) [407]

**Students should be able to:**

[406] 1.18

[407] 1.18

- describe the characteristics of the cyclic regulation of the mare and its impact on the possibilities of manipulation by means of hormone administrations
- explain the basic principles of the aforementioned applications of hormones in mares and list their indications
- discuss the relevance, possibilities and risks of the aforementioned therapeutic measures

### APPLICATION OF HORMONES - SMALL ANIMALS L (1H) [408]

Students should be able to:

- describe the active substances and compounds commonly used in Germany for the treatment of dogs and cats and explain their field of indication and their unwanted side-effects

### OOGENESIS AND FOLLICULOGENESIS L (1H)

Students should be able to:

- explain, respectively define, the following terms: oogenesis, folliculogenesis, primordial-/ primary/ secondary/ tertiary-/ Graaf 's follicle, recruitment, selection, dominance, ovulation, luteinisation, granulose cells, pellucid zone, theca, Hohlweg-effect
- illustrate the process of oogenesis and folliculogenesis
- explain the mechanisms leading to ovulation
- list the functions of FSH, LH, estradiol.17ß and inhibin with regard to oogenesis and folliculogenesis
- describe essential differences between the species with regard to ovarian activity

### MALE REPRODUCTIVE PHYSIOLOGY L (1H)

Students should be able to:

- explain the aforementioned male reproductive functions respectively processes and describe essential differences between the species

### BIOTECHNOLOGY MALE 1 +2 L (2H)

Students should be able to:

- list the “milestones” in the history of the development of instrumental insemination,
- explain the extraction and assessment of ejaculates
- explain the methodology of cryo-preservation of ejaculates

[408] 1.18

- describe the types of confectioning of sperm and insemination boxes for the most important domestic species
- explain the methodology for the preparation of sexed sperm

### DISEASES OF THE MALE REPRODUCTIVE ORGANS 1 - 4 L (4H) [409]

Students should be able to:

- describe the causes, symptoms, prognosis and treatment for disorders in the area of the penis and prepuce
- describe the causes, symptoms, prognosis and treatment for the previously discussed disorders in the area of the scrotum, the testes, epididymis and accessory sex glands
- describe current views on the etiology of cryptorchidism and its different forms,
- explain methods for the diagnosis of cryptorchidism
- explain how to proceed in of cases of cryptorchidism with regard to the species, age and findings

### MATING INFECTIONS L (1H) [410]

Students should be able to:

- list the most important mating infections in native domestic animals
- describe measures for the prevention of mating infections

### DISEASES OF THE VAGINA, CERVIX L (1H) [411]

Students should be able to:

- describe the most important diseases of the vagina and cervix and explain the appropriate therapeutic measures

### SUPPRESSION OF FEMALE REPRODUCTION L (1H) [412]

Students should be able to:

- list the indications and starting points for the suppression of the female reproductive functions
- explain the methods and risks of a suppression of the female reproductive functions

[409] 1.18, 1.21

[410] 1.18, 1.24

[411] 1.18

[412] 1.18

## DISEASES OF THE OVARY + FALLOPIAN TUBE L (2H) [413]

Students should be able to:

- list clinically significant diseases of the ovary and fallopian tube and explain their causes and pathogenesis

## DISEASES OF THE UTERUS IN RUMINANTS AND PIGS L (1H) [414]

Students should be able to:

- list clinically significant diseases of the uterus in cattle and pigs and explain their causes and pathogenesis
- develop concepts for the therapy and prophylaxis of clinically significant diseases of the uterus in cattle and pigs

## DISEASES OF THE UTERUS - HORSES L (2H) [415]

Students should be able to:

- describe the most important diseases of the uterus in mares and explain the respective therapeutic measures

## INSTRUMENTAL INSEMINATION L (2H)

Students should be able to:

- describe the theoretical basic principles of the artificial insemination of horses, cattle, pigs, sheep, goats and dogs
- give a list of the most important legal regulations that result from the animal breeding regulations concerning artificial insemination

## FERTILITY DISORDERS - SMALL ANIMALS L (2H) [416]

Students should be able to:

- describe the diagnostic procedures for the leading symptoms discussed and explain the underlying patho-physiological mechanisms that cause these disorders

[413] 1.18

[414] 1.18

[415] 1.18

[416] 1.18, 1.21

### ENDOCRINE REGULATION OF GESTATION L (1H)

**Students should be able to:**

- explain the maternal recognition of gestation (if known for the different species)
- outline the most important hormonal alterations associated with gestation with regard to the species and explain their physiological significance (if known)
- explain animal species differences in placentation

### BIRTH PUERPERIUM - SMALL ANIMALS L (3H) [417]

**Students should be able to:**

- describe the process of a normal birth and the course of puerperium in dogs and cats, as well as the obstetrical examination
- explain the course of a caesarean section and the resuscitation of pups

### GESTATION OF RUMINANTS L (1H) [418]

**Students should be able to:**

- describe significant features of the gestation of cattle, sheep and goat that are specific to the different species
- explain possible methods of the clinical and hormonal diagnostics of gestation
- list possibilities of the induction of abortion and birth for cattle, sheep and goat and explain their functions

### GESTATION OF PIGS L (1H) [419]

**Students should be able to:**

- describe significant features of the gestation of pigs that are specific to the species
- explain possible methods of the clinical and hormonal diagnostics of gestation
- list possibilities of the induction of abortion and birth for pigs and explain their functions

### GESTATION OF HORSES L (1H) [420]

**Students should be able to:**

- describe significant features of the gestation of horses that are specific to the species

[417] 1.17, 1.18, 1.19

[418] 1.18, 1.21, 1.23

[419] 1.18, 1.21, 1.23

[420] 1.18, 1.21, 1.23

- explain possible methods of the clinical and hormonal diagnostics of gestation
- list possibilities of the induction of abortion and birth for horses and explain their functions

### GESTATION OF SMALL ANIMALS L (1H) [421]

Students should be able to:

- describe significant features of the gestation of dogs and cats that are specific to the different species
- explain possible methods of the clinical and hormonal diagnostics of gestation
- list possibilities of the induction of abortion and birth for dogs and cats and explain their functions

### GESTATION DISORDERS L (3H)

Students should be able to:

- describe the systematic of gestation disorders and describe the underlying patho-physiological mechanisms

### DYSTOCIA - HORSES 1 +2 L (2H) [422]

Students should be able to

- explain the physiological birth process of mares, the detection of possible deviations and their causes, as well as the carrying out of the obstetric examination and conservative obstetrics
- describe measures to treat dystocia and explain the indication, preparation and carrying out of surgical obstetrics

### DYSTOCIA - SWINE L (1H) [423]

Students should be able to

- explain the physiological birth process of pigs, the detection of possible deviations and their causes, as well as the carrying out of the obstetric examination and conservative obstetrics, and explain the indication, preparation and carrying out of surgical obstetrics

[421] 1.18, 1.21, 1.23

[422] 1.17, 1.18

[423] 1.17, 1.18

### DYSTOCIA - SMALL RUMINANTS L (1H) [424]

**Students should be able to:**

- explain the physiological birth process of small ruminants, the detection of possible deviations and their causes, as well as the carrying out of the obstetric examination and conservative obstetrics, and explain the indication, preparation and carrying out of surgical obstetrics

### BIRTH AND PUERPERIUM L (1H)

**Students should be able to:**

- explain the significant processes during birth and the underlying control mechanisms,
- explain the processes that happen on the uterine, ovarian and pituitary level during the puerperium

### DYSTOCIA - CATTLE 1 +2 L (2H) [425]

**Students should be able to:**

- explain the physiological birth process of cattle, the detection of possible deviations and their causes, as well as the carrying out of the obstetric examination and conservative obstetrics
- describe measures to treat dystocia and explain the indication, preparation and carrying out of surgical obstetrics

### PUERPERIUM - RUMINANTS L (1H) [426]

**Students should be able to:**

- describe the course of the puerperium of cattle, sheep and goats and its disruptions and explain the possibilities of veterinary intervention

### PUERPERIUM - HORSES L (1H) [427]

**Students should be able to:**

- describe the course of the equine puerperium and its disruptions and explain the possibilities of veterinary intervention

[424] 1.17, 1.18

[425] 1.17, 1.18

[426] 1.18

[427] 1.18

## PUERPERIUM AND DISEASES OF THE TEATS - SWINE L (1H) [428]

### Students should be able to:

- describe the physiological and anatomical characteristics of the puerperium of pigs and explain the pathogenesis of the diseases that are presented
- describe the diseases of the teats that are presented and explain the possibilities of veterinary intervention

## GENERAL NEONATOLOGY L (2H) [429]

### Students should be able to:

- describe the anatomical and physiological principles of the shift from intrauterine to extra uterine life and perform a neonate examination

## NEONATOLOGY - SMALL ANIMALS L (1H) [430]

### Students should be able to:

- describe the physiological and anatomical characteristics of neonatal pups and explain the pathogenesis of the diseases that are presented

## NEONATAL FOALS L (4H) [431]

### Students should be able to:

- explain the characteristics of the adaptation of newborn foals to the environment, and explain the primary care
- explain the aetiology of Neonatales Atemnotsyndrom, as well as its treatment and correlation with pre-maturity; Lebensschwächesyndrom and equine NMD
- describe the most common diseases of foals during their first days of life with regard to diagnostics, treatment and prognosis

## NEONATAL PIGLET L (1H) [432]

### Students should be able to:

- explain the diseases that are presented and explain the possibilities of veterinary intervention

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[428] 1.18

[429] 1.18

[430] 1.18

[431] 1.18, 1.21

[432] 1.18

## NEONATAL CALF I + II L (3H) [433]

Students should be able to:

- explain the adaptation of the newborn calf to the environment and describe primary care and the diseases of the umbilicus with regard to aetiology, diagnostics, treatment and prognosis
- describe frequent diseases of calves during the first days of life with regard to diagnostics, treatment and prognosis

## NEONATAL LAMB L (2H) [434]

Students should be able to:

- describe the most frequent diseases of lambs during the first days of life with regard to diagnostics, treatment and prognosis

## REPRODUCTION SPECIFIC ANIMAL SPECIES L (3H)

Students should be able to:

- describe the reproductive cycle, gestation and birth of the animal species discussed and explain the pathogenesis of the diseases that are presented

## MOTHERLESS REARING L (1H)

Students should be able to:

- describe motherless rearing of pups and foals

## DISEASES OF THE TEATS - SMALL ANIMALS L (2H) [435]

Students should be able to:

- describe the diseases in question (mammary tumour, mastitis, fibroadenomatosis) and explain the possibilities of veterinary intervention

## DISEASES OF THE UDDER - HORSES L (1H) [436]

Students should be able to:

[433] 1.18, 1.21

[434] 1.18, 1.21

[435] 1.18, 1.21

[436] 1.18, 1.21

- explain the aetiology, diagnostics and treatment of mastitis in mares and describe further diseases of the udder

### DISEASES OF TEATS - SMALL RUMINANTS L (1H) [437]

**Students should be able to:**

- describe the diseases presented and explain the possibilities of veterinary intervention
- explain the pathogenesis of the diseases and develop a prevention plan from this knowledge

### MASTITIS - CATTLE L (2H) [438]

**Students should be able to:**

- explain the aetiology and the forms of mastitis, as well as their diagnostics

### APPLICATION OF ANTIBIOTICS MASTITIS L (1H) [439]

**Students should be able to:**

- explain the target-oriented application of antibiotics in the treatment of mastitis with regard to effectivity, consequences for food regulation and practical application

### INJURIES OF THE TEATS - CATTLE L (1H) [440]

**Students should be able to:**

- differentially explain the aetiology and diagnostics of injuries of the teats and describe therapeutic measures, including surgical procedures

*Miscellaneous*

### CLINICAL DEMONSTRATIONS S (14H) [441]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

[437] 1.18, 1.21

[438] 1.21

[439] 1.10, 1.18

[440] 1.18, 1.21

[441] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

### ANIMAL BREEDING LEGISLATION (CROSS SECTIONAL SUBJECT) (1H)[442]

Students should be able to:

- describe the current EU legislation for the health surveillance and for the running of a semen collection centre and explain the duties of the veterinarian when monitoring a semen collection centre

## LIVESTOCK MANAGEMENT

Summary:

The students will get to know the basic principles livestock management of agricultural livestock (pigs, cattle, small ruminants) and horses. Major emphasis will be placed on the training of the students in systemic thinking, in the sense of integrated supervision and the classification of veterinary measures into process chains. Diseases will be discussed with regard to their economic relevance and their prevention on stock level.

Courses in detail:

*Clinic for Reproduction (Wehrend, Wrenzycki)*

### APPROACHES REGARDING LIVESTOCK SUFFERING FROM FERTILITY DISORDERS L (3H) [443]

Students should be able to:

- explain how to approach the problems in question that occur in the livestock and explain the basic principles of the respective preventative measures
- explain the following leading symptoms of the livestock, “repeated cycles”, “deficient rutting severity” and “high incidence of placenta retentions”

### HORMONAL PROGRAMMES - CATTLE L (1H) [444]

Students should be able to:

- explain the hormonal programmes in question

[442] 1.1

[443] 1.1, 1.21, 1.36

[444] 1.18

### SUPERVISION OF HORSE BREEDING FARMS L (1H) [445]

Students should be able to:

- explain the duties of the veterinarian concerning the different forms of the supervision of horse breeding farms

### KEY PERFORMANCE INDICATORS OF FERTILITY - SWINE L (1H)

Students should be able to:

- explain and interpret the key performance indicators of fertility in question

### KEY PERFORMANCE INDICATORS OF FERTILITY - CATTLE L (1H)

Students should be able to:

- explain and interpret the key performance indicators of fertility in question

### THE PROBLEM OF MASTITIS IN LIVESTOCK L (2H) [446]

Students should be able to:

- explain the causes that may lead to inadequate health conditions of the udders in herds and the respective measures to prevent diseases of the udder

*Clinic for Birds, Reptiles, Amphibians and Fish (Lierz et al.)*

### LIVESTOCK MANAGEMENT - POULTRY L (3H) [447]

Students should be able to:

- reproduce the organisation, including different husbandry systems, of poultry
- explain the tasks of a veterinarian in the livestock management of poultry
- reproduce the most important causes of performance losses caused by poultry husbandry
- interpret key performance data of a flock
- explain the diagnostic procedure and immunoprophylaxis in case of livestock problems

[445] 1.1, 1.3

[446] 1.1, 1.36

[447] 1.1, 1.3, 1.18, 1.21, 1.24, 1.36

*Clinic for Ruminants (Internal Medicine and Surgery) (Sickinger et al.)*

### LIVESTOCK MANAGEMENT OF CATTLE L (5H) [448]

Students should be able to:

- list the production processes in the fields of dairy farming, suckling cow husbandry and bull fattening
- describe the disease complexes that occur in the individual husbandry and production forms, age groups and levels of efficiency
- describe diagnostic methods for their early detection on livestock level
- point out appropriate concepts for prophylaxis and treatment

*Clinic for Swine (Internal and Surgery) (Reiner et al.)*

### LIVESTOCK MANAGEMENT - PIG L (4H) [449]

Students should be able to:

- name and classify the elements of livestock management in pigs
- explain and apply the diagnostic procedure in the context of livestock inspections
- understand and apply measures of livestock health
- identify the main livestock diseases and problems
- identify and evaluate ways to improve animal welfare, consumer protection and production efficiency
- evaluate the economic relevance of livestock problems

*Unit for Biomathematics and Data Processing (Büttner)*

### EPIDEMIOLOGY IN LIVESTOCK MANAGEMENT L (2H) [450]

Students should be able to:

- explain epidemiological measures, e.g. forms of prevalence, incidence, key figures of diagnostic tests
- carry out case number estimation considerations
- explain the use of statistical methods in livestock management

[448] 1.1, 1.3, 1.18, 1.21, 1.24, 1.36

[449] 1.1, 1.3, 1.18, 1.21, 1.24, 1.36

[450] 1.21

*Miscellaneous*

### CLINICAL DEMONSTRATIONS S (4H) [451]

The content of the clinical demonstrations will refer to the patients currently treated in the clinics and thus are unknown in advance.

### FUNDAMENTALS OF LIVESTOCK MANAGEMENT (CROSS SECTIONAL SUBJECT) (2H) [452]

**Students should be able to:**

- name and classify the elements of livestock management
- explain and apply the diagnostic procedure in the context of livestock inspections
- understand and apply measures of livestock health
- identify the main livestock diseases and problems
- identify and evaluate ways to improve animal welfare, consumer protection and production efficiency
- evaluate the economic relevance of livestock problems

## REGULAR COURSES

### FORENSIC VETERINARY MEDICINE, PROFESSIONAL AND ETHICAL LAW [453]

**Coordinator**
Fey

**Instructors:**
Roscher, Tacke, Adolphsen, et al.

**Type of course:**
lecture (1 CHW)

**ECTS:**
1

[451] 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.28

[452] 1.1, 1.3, 1.18, 1.21, 1.24, 1.36

[453] 1.1, 1.2, 1.7

Introduction:

- knowledge of the law of obligation and its impact on purchase law
- requirements of due diligence of the veterinarian
- issues of liability that are important for the veterinary practice
- aspects of penal law that may be of importance for the veterinary practice

Overall aims and objectives:

Students should be able to:

- reproduce the rules on the law of sales laid down in the Civil Code
- explain the legal differences between sales to end consumers and sales to others
- name the rules for warranty periods for different sales contracts
- name the rules for warranty periods for service contracts
- apply their knowledge of those articles that regulate the law of obligation, in particular its impact on purchase law, in case studies
- list the general and specific requirements of due diligence of the veterinarian and describe the consequences in the case of a breach of these requirements
- enumerate issues of liability that are important for the veterinary practice and know ways to financially safeguard themselves against possible risks
- explain aspects of penal law that may be of importance for the veterinary practice

Reading list:

- Althaus J., Ries, H.P., Schnieder K.-H.,Großbölting, R. (Hrsg.): Praxishandbuch Tierarztrecht. Schlütersche Verlagsgesellschaft 2006, 1. Auflage (2006), ISBN-13: 978-3899930207
- Brennecke D., Münow, F.: Existenzgründung kompakt. Veterinärspiegel Verlag 2008, ISBN: 978-3-86542-012-1

Electronic sources:

see StudIP:

https://studip.uni-giessen.de

Assessment:

a written examination (MCQ) within the framework of the Veterinary Medical Examination in “Forensic veterinary medicine, professional and ethical law” after the eighth semester

## Husbandry And Diseases Of Ornamental And Farmed Fish And Reptiles/ Amphibians [454]

### Coordinator:
Lierz

### Instructors:
Flamm, Möller

### Type of course:
lecture (1 CHW)

### ECTS:
1

### Introduction:
*Farmed and ornamental fish:*
The most important parasitic, bacterial and viral infectious diseases that occur in ornamental and farmed fish will be explained. The aetiology, pathogenesis, epidemiology, clinic, pathology, diagnosis and treatment as well as the prophylaxis will be discussed.

*Reptiles / amphibians:*
The most important viral, bacterial, mycological and parasitic infectious diseases for reptiles and amphibians as well as important husbandry and management-related diseases are discussed with regard to aetiology, epidemiology, pathogenesis, clinic, pathology, diagnostics, therapy and prophylaxis. Aspects of analgesia and anaesthesia as well as surgery in reptiles and amphibians are also explained in more detail in this context.

### Overall aims and objectives:
*Farmed /ornamental fish:*
Students should be able to:

- describe the most important infectious diseases of ornamental and farmed fish and classify the respective importance of an outbreak of A disease for the individual animal and the stock
- describe the clinics and pathology of these infectious diseases and distinguish between them
- give direct and indirect detection methods that are appropriate for the respective pathogens and interpret the results of the examination
- assess whether, and if so, which therapeutics are suitable for the treatment of the different infectious diseases

[454] 1.1, 1.18, 1.21, 1.23, 1.24, 1.29, 1.30, 1.31, 1.33

- define and explain the possibilities of prophylaxis for the different infectious diseases.
- explain anaesthesia and the most important minor surgical procedures on fish

*Reptiles / Amphibians:*
Students should be able to:

- describe the most important infectious diseases of reptiles and amphibians and classify the according to importance of an outbreak of the disease for the individual animal and the stock
- describe the clinics and pathology of these infectious diseases and distinguish between them
- give direct and indirect detection methods that are appropriate for the respective pathogens and interpret the results of the examination
- assess whether, and if so, which therapeutics are suitable for the treatment of the different infectious diseases
- define and explain the possibilities of prophylaxis for the different infectious diseases

Reading list:

- „FISH DISEASE“: Diagnosis and Treatment, Edward J. Noga, Mosby-Year Book, Inc., 367 S., ISBN 8138 2558 X, 2. Auflage, erschienen 2000
- BSAVA Manuel of Ornamental Fish, von William H. Wildgoose, 304 S., 2. Auflage, erschienen bei Blackwell Pub Professional, ISBN: 978-0-905214-57-3
- Mader, Reptile Medicine and Surgery, W.b. Saunders Company Jun 2007, ISBN-13: 9781416053910
- Scheller und Pantchev: Parasitologie bei Schlangen, Echsen und Schildkröten, Chimaira 2008, ISBN-13: 978-3-89973-472-0
- R. Riehl und H. Baensch, „Aquarien Atlas“, Mergus Verlag (verschiedene Bände), z.B. 15. Auflage: (2006), ISBN-13: 978- 3882442274
- „Fischkrankheiten“, Rudolf W. Hoffmann, Verlag Eugen Ulmer
- Sandra Lechleiter und Dirk Willem Kleingeld, „Krankheiten der Koi und anderer Gartenteichfische“, Verlag: Ulmer (Eugen); 3.aktualisierte und erweiterte Auflage (2005), ISBN-13: 978-3800174980

Assessment:
an oral exam within the framework of the Veterinary Medical Examination in “Poultry diseases” in the eleventh semester

## Diseases of Pet Birds, Wildfowl and Poultry [455]

### Coordinator:
Lierz

### Instructors:
Lierz, Möller

### Type of course:
lecture (1 CHW)

### ECTS:
1

### Introduction:
Infectious diseases are of particular relevance to poultry, but also pet birds and wildfowl populations. The following aspects will be discussed: etiology, pathogenesis, epidemiology, clinic, pathology, diagnostics and treatment with particular attention being paid to the prophylaxis of viral, bacterial, mycotic and parasitic diseases. Additionally, common postural and management-related diseases are discussed.

### Overall aims and objectives:
Students should be able to:

- list the most important infectious diseases of pet birds, wildfowl and poultry and assess the relevance of an outbreak of disease for the individual animal, the stock, the population as well as for humans
- describe the clinics and pathology of these infectious diseases and define them
- name direct and indirect methods of detection for the respective pathogens and interpret the results of the examination
- decide whether, and if so which, therapeutic methods are suitable for the treatment of the different infectious diseases
- define and explain the possibilities of general and specific prophylaxis, in particular in the form of vaccinations, for the different infectious diseases
- describe and explain the most important surgical interventions concerning pet birds,
- describe the causes of behavioural disorders in parrots
- describe the functioning of the poultry industry and the different ways of keeping poultry

[455] 1.1, 1.18, 1.21, 1.23, 1.24, 1.29, 1.30, 1.31, 1.33

- decide whether or which therapeutic measures are suitable for the treatment of the different infectious diseases and define and explain the possibilities of general and special prophylaxis, especially by vaccination, for the different infectious diseases
- name the most important diseases caused by husbandry and management, recognise, describe and differentiate their clinical and pathological picture, and name therapeutic and prophylactic measures

### Reading list:

- Siegmann, Neumann: Kompendium der Geflügelkrankheiten, Verlag: Schlütersche, 6. aktualisierte und erweiterte Auflage (2005), ISBN-13: 978-3877067444
- Kaleta, Krautwald-Junghanns: Kompendium der Ziervogelkrankheiten, Verlag: Schlütersche, 3. überarbeitete Auflage (2007), ISBN-13: 9783899930221
- Pees: Leitsymptome bei Papageien und Sittichen, Verlag: Enke, 1. Auflage, ISBN: 3-8304-1023-9
- Chitty und Lierz: BSAVA Manual of Raptors, Pigeons and Passerine Birds, BSAVA
- Company, ISBN: 978-1-905319046

### Electronic sources:

see StudIP:
https://studip.uni-giessen.de

### Self-assessment:

See questionnaire (available at the Office of the Clinic for Bird, Reptile, Amphibian and Fish Medicine)

### Assessment:

an oral exam within the framework of the Veterinary Medical Examination in “Poultry diseases” in the eleventh semester

## SEMINAR FUNCTIONAL PATHOLOGY [456]

### Coordinator:

Herden

### Instructors:

Employees of the Klinikum, Henrich, Herden, Köhler, Hirz

[456] 1.21, 1.24, 1.33

### Type of course:
seminar (1 CHW)

### ECTS:
1

### Requirements:
Students must have attended the lecture on “General Pathology”, the seminar on “General Pathology” and the seminar on “Specific Pathology”.

### Introduction:
Case analysis as an integrated course with the participation of clinical or paraclinical facilities. The students will discuss a clinical case, including its history and symptoms, clinical and laboratory diagnostic findings, its development and patho-morphological alterations. Further topics of discussion will be the differential diagnoses, the aetiology and pathogenesis of the disease and the final epicritic assessment.

### Overall aims and objectives:
Students should be able to:

- discuss a clinical case and assign the symptoms to the clinical, patho-morphological and laboratory diagnostic findings

### Reading list:
- Dahme/Weiss: Grundriss der speziellen pathologischen Anatomie der Haustiere, Verlag: Enke; 6. völlig neu bearb. Auflage (2007), ISBN-13: 978-3830410485
- McGavin/Zachary: Pathologic Basis of Veterinary Disease, Verlag: Mosby; 4th ed.
- (2006), ISBN-13: 978-0323028707
- respectively the translated version: Pathologie der Haustiere: Allgemeine, spezielle und funktionelle Veterinärpathologie- mit Zugang zum Elsevier-Portal, Verlag: Elsevier, München (2009), ISBN-13: 978-3437582509 A

### Electronic sources:
see StudIP:
https://studip.uni-giessen.de
The documents required will be available on StudIP.

### Assessment:
an oral and a practical examination within the framework of the Veterinary Medical Examination in “General pathology and specific pathological anatomy and histology” in the eleventh semester

## HISTOPATHOLOGY-PATHOLOGICAL-HISTOLOGICAL COURSE [457]

### Coordinator:
Herden

### Instructors:
Henrich, Herden, Köhler, Hirz

### Type of course:
practical (2 CHW)

### ECTS:
3

### Requirements:
Students must have attended the lecture on “General pathology”, the seminar on “General pathology” and the seminar on “Specific pathology”.

### Introduction:
- an explanation of the methods, options and limitations of histopathology
- a discussion of selected histopathological specimens
- an explanation of aetiology and pathogenesis based upon the histomorphological alterations
- a discussion of possible differential diagnoses

Among others, the following topics / specimens will be discussed: the histopathology of inflammation, the alterations of the cardiovascular system, the lungs, the digestive system, the urinary and sexual organs, the locomotor system, the skin and nervous tissue, as well the histopathology of selected neoplasia.

### Overall aims and objectives:
Students should be able to:
- identify histological specimens
- describe and explain the alterations
- make histopathological diagnoses and discuss possible differential diagnoses

A detailed list of specimens is accessible via StudIP.

[457] 1.21, 1.24, 1.28, 1.33

### Reading list:

- Dahme/Weiss: Grundriss der speziellen pathologischen Anatomie der Haustiere, Verlag: Enke; 6. völlig neu bearb. Auflage (2007), ISBN-13: 978-3830410485
- Baumgärtner: Pathohistologie für die Tiermedizin, Verlag: Enke; 1. Auflage (2007), ISBN-13: 978-38304105464

### Electronic sources:

see StudIP:
https://studip.uni-giessen.de

### Scripts:

script provided by the student representatives

### Learning recommendations:

Students are advised to improve their histological basic knowledge of the organs and tissues, to examine the specimens during the course, to compare them with the script and text books and complete them. All further questions should be directed at the instructor.

### Assessment:

an oral and a practical examination within the framework of the Veterinary Medical Examination in "General and Specific pathology, pathological anatomy and histology" in the eleventh semester

## FOOD SCIENCE [458]

### Coordinator:

Kehrenberg

### Instructors:

Kehrenberg, Zens, scientific staff

### Type of course:

lecture (4 CHW)

### ECTS:

4

### Introduction:

The lecture (a total of 56 hours) will serve to:

[458] 1.3, 1.10, 1.21, 1.24, 1.35

- increase the students' knowledge within the topic of food hygiene in the field of food production (products of animal origin) and its placing on the market
- impart knowledge of the duties of the official veterinarian in the field of food hygiene
- impart knowledge of the legal rules and regulations, respectively the official inspections as well as the placing on the market of foods of animal origin

### Overall aims and objectives:

Students should be able to:

- give an overview of the expertise in food of animal origin (meat products including poultry, as well as eggs, fish, crustaceans and molluscs, mussels and honey)
- give an overview of the horizontal and vertical legal regulations on a national and European level
- explain classic and modern methods of product manufacturing (including novel/functional food and GMO) and explain the legal requirements
- point out the criteria of preservability of foods of animal origin
- describe the possible negative influences (including microbiology, residues and storage pests) and the legal assessment
- discuss specific micro-organisms with regard to risks for human health
- convey the legal principles and requirements with regard to food supervision and control
- explain the legal principles and requirements regarding their placing on the market (including specific forms of marketing) of products

### Reading list:

- K. Fehlhaber, J. Kleer, F. Kley (Hrsg.): Handbuch Lebensmittelhygiene (2007), Behr's Verlag,
- Horizontal and vertical regulations of the Foodstuff Hygiene Ordinance.

### Electronic sources:

Homepage of the Department of Veterinary Food Science (IFTN)

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium

Stud.IP JLU Giessen

https://studip.uni-giessen.de

### Scripts:

"Handouts / Downloads" for each lecture block are available on the homepage of the IFTN; scripts on food inspection and technology on the homepage of the IFTN.

### Self-assessment:

questions on the homepage of the IFTN

### Learning recommendations:

- preparation and revision of the respective handouts
- in-depth reading of the relevant scripts / literature

### Assessment:

an oral and a practical examination within the framework of the Veterinary Medical Examination in “Food science, including food hygiene "in the eleventh semester

## FOOD EXAMINATION AND TECHNOLOGY (“FOOD PRACTICAL”) [459]

### Coordinator:

Kehrenberg

### Instructors:

Kehrenberg, Zens (+ assistants)

### Type of course:

practical (2 CHW)

### ECTS:

3

### Introduction:

The practical will serve to:

- demonstrate meat production
- demonstrate the official food examination including a legal assessment of the hygienic condition
- carry out a general and specific inspections
- complete a food inspection report

### Overall aims and objectives:

Students should be able to:

- explain the legal principles and requirements of official food inspections
- develop, under guidance, the independent practical implementation of the official food examination (incl. sensory, bacteriological, histological and chemical-physical examinations)
- carry out independently (while under supervision) the practical official inspection of food (including the sensory, bacteriological, histological and chemical-physical inspection)

[459] 1.3, 1.10, 1.21, 1.28, 1.35

- complete a report within the framework of the legislation of the official food inspection
- give a practical outline of product manufacturing (the group of raw, broiled- and
- cooked sausages)

### Reading list:

- K. Fehlhaber, J. Kleer, F. Kley (Hrsg.): Handbuch Lebensmittelhygiene (2007), Behr‘s Verlag,
- Horizontal and vertical regulations the Foodstuff Hygiene Ordinance

### Electronic sources:

Homepage of the Institute of Veterinary Food Science (IFTN)
https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/nahrungsmittelkunde/institut/studium
Stud.IP JLU Giessen
https://studip.uni-giessen.de

### Scripts:

“Handouts / downloads” for each lecture block are available on the homepage of the IFTN
Scripts on food inspection and technology on the homepage of the IFTN.

### Self-assessment:

questions on the homepage of the IFTN

### Learning recommendations:

- preparation and revision of the respective topic
- in-depth reading of the relevant scripts /literature

### Assessment:

an oral and a practical examination within the framework of the Veterinary Medical Examination in “Food Science, including food hygiene” in the eleventh semester

## PATHOLOGICAL-ANATOMICAL DEMONSTRATIONS [460]

### Coordinator:

Herden

### Instructors:

Herden, Köhler, Henrich, Hirz

[460] 1.24, 1.28, 1.33

### Type of course:
one hour practical and one hour seminar per week, every two weeks in 2 alternating groups over the period of 2 semesters

### ECTS:
1.5

### Requirements:
Students must have attended the lecture and the seminar on “General pathology”.

### Introduction:
The participants of the course will work with material taken from routine autopsies of the institute, archived materials and material of slaughtered animals. The alterations in organs will be discussed in groups with an assistant present. The pathological-anatomical and differential diagnoses will be collected and discussed. Each case will be discussed epicritically, referring to its possible etiologies, pathogenesis and clinical relevance.

### Overall aims and objectives:
Students should be able to:

- Produce a forensically applicable organ report. This will include a complete description of the alterations in the organs, the formulation of the pathological-anatomical diagnoses, the differential diagnoses and the epicrisis.

### Reading list:
- Dahme/Weiss: Grundriss der speziellen pathologischen Anatomie der Haustiere, Verlag: Enke; 6. völlig neu bearb. Auflage (2007), ISBN-13: 978-3830410485
- McGavin/Zachary: Pathologic Basis of Veterinary Disease, Verlag: Mosby; 4th ed.
- (2006), ISBN-13: 978-0323028707
- respectively the translated version: Pathologie der Haustiere: Allgemeine, spezielle und funktionelle Veterinärpathologie- mit Zugang zum Elsevier-Portal, Verlag: Elsevier, München (2009), ISBN-13: 978-3437582509 A

### Electronic sources:
see StudIP:
https://studip.uni-giessen.de

### Assessment:
a final discussion / attestation after the eighth semester, and an oral and a practical examination within the framework of the Veterinary Medical Examination in “General pathology and specific pathological anatomy and histology“ in the eleventh semester

## SEMINAR SPECIFIC PATHOLOGY [461]

### Coordinator
Herden

### Instructors:
Herden, Köhler, Henrich, Hirz

### Type of course:
seminar (1 CHW)

### ECTS:
1

### Requirements:
Students must have attended the lecture on “General pathology” and the seminar on “General pathology”.

### Introduction:
Important aspects of essential fields of specific pathology will be dealt with in discourse.
The topics will be announced at the beginning of semester and are available at StudIP. Students are going to prepare the respective topics individually. During the seminar, questions and problems will be debated and discussed on the basis of visual material that will be presented.
Among others, the following topics will be discussed: sampling in sections, biopsy, leucosis, skin tumours, differential diagnostics of encephalitis, metabolic bone diseases, classification and forms of pneumonia, the infection with the porcine circo virus, pericarditis and endocarditis, mammary tumours, FIP, erysipelas, swine fever, differential diagnostics of stomatitis, differential diagnostics of changes in equine colic, parvovirus.
The current list of the topics of the seminar will be available at StudIP for all participants of the seminar.

### Overall aims and objectives:
Students should be able to:

- comprehensively discuss and explain the topics that were dealt with

### Reading list:

- Dahme/Weiss: Grundriss der speziellen pathologischen Anatomie der Haustiere, Verlag: Enke; 6. völlig neu bearb. Auflage (2007), ISBN-13: 978-3830410485
- McGavin/Zachary: Pathologic Basis of Veterinary Disease, Verlag: Mosby; 4th ed.

[461] 1.21, 1.24, 1.33

- (2006), ISBN-13: 978-0323028707
- respectively the translated version: Pathologie der Haustiere: Allgemeine, spezielle und funktionelle Veterinärpathologie- mit Zugang zum Elsevier-Portal, Verlag: Elsevier, München (2009), ISBN-13: 978-3437582509 A

**Electronic sources:**
information and material for the course will be available at StudIP:
https://studip.uni-giessen.de

**Learning recommendations:**
a preparation of the topics before the respective seminar

**Assessment**:
a final exam at the end of the semester, an oral and a practical examination within the framework of the Veterinary Medical Examination in "General and Specific Pathology, Pathological Anatomy and Histology" in the eleventh semester

## EPIZOOTIC DISEASE CONTROL AND EPIDEMIOLOGY OF INFECTIOUS DISEASES [462]

**Coordinator:**
Bauerfeind

**Instructors:**
Bauerfeind, Eisenberg, Ewers, Heydel, König, Menge, Weber, Lamp

**Type of course:**
lecture (3 CHW)

**ECTS:**
3

**Requirements:**
Students must have attended the courses in: "Bacteriology and Mycology",
"Virology" and "Parasitology" in 4th and 5th semesters.

**Introduction:**
This course will deal with the relevance, the objectives, strategies and methods, the organisation and the legal foundations in Germany. Major emphasis will be placed on the structure and function of the official institutions that are involved in animal disease control and

[462] 1.1, 1.3, 1.10, 1.18, 1.21, 1.24, 1.29, 1.36

those institutions they cooperate with; the German and European Animal Health Laws; as well as the regulations concerning the processing of by-products of animal origin. The general part of the lecture will mainly deal with aspects of epidemics and hygiene concerning animal husbandry; the application of animal vaccines; and the national, intra-community and EU cross-border transport of goods, animals and pathogens. The specific part will focus on the strategies and protective measures for the control of epizootics in Germany. In order to understand national proportions, EU regulations and other international regulations will be taken into account.

### Overall aims and objectives:

Students should be able to:

- name and explain the objectives, strategies and methods of the national animal disease control
- list epizootics and other infections diseases of animals that are subject to reporting and risk assess with regard to the risk of exposition
- explain the processes of epizootic legislation
- list the authorities and institutions that are concerned with the control of epizootics and define their respective areas of responsibilities
- explain the relevant animal health legislations (Animal Health Act, animal transport-regulation, vaccine-regulation etc) and explain their aims and content
- explain the Federal Ordinances issued for the control of specific epizootics and explain their aims and content
- apply animal health regulations on specific questions (e.g. animal transports, the disposal of animal by-products, application of vaccines, outbreaks of epizootics)
- discuss and assess the advantages and disadvantages of measures of the epizootics legislation

### Reading list:


- Geissler, Rojahn, Stein: Sammlung Tierseuchenrechtlicher Vorschriften. Verlag R. S. Schulz, München
- Bisping: Kompendium der Staatlichen Tierseuchenbekämpfung, Verlag: Hippokrates (1999), ISBN-13: 978-377731423


### Electronic sources:

Relevant information on the following websites:

www.bmelv.de
www.bmg.bund.de
www.oie.int
www.vetion.de
http://eur-lex.europa.eu
www.fli.bund.de

### Scripts:

Accredited participants can obtain current lecture notes (selection) from the internet platform Stud.IP. Older documents can be obtained from the students body of lecture notes.

https://studip.uni-giessen.de

### Self-assessment:

A questionnaire is available on the homepage of the Institute of Animal Hygiene and Infectious Diseases of Animals.

https://www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/ihit/lehre/fragenkataloge

### Learning recommendations:

Students are advised to thoroughly re-read their lecture notes with the help of textbooks, legal documents and the questionnaire. A division of the work and joint meetings with fellow students can also be very helpful.

### Assessment:

an oral examination (100%) within the framework of the Veterinary Medical Examination in “Epizootic Disease Control and Epidemiology of Infectious Diseases" after the eighth semester

## 9TH AND 10TH SEMESTER CLINICAL ROTATION

*(Rotation places for exchange students are limited and can only be allocated by individual agreement and only in the intramural part)*

During the clinical rotation, students acquire practical veterinary skills by spending 2 or 4 weeks each intramurally in the various departments of the university's veterinary clinic and additionally completing extramural internships in veterinary curative practice as well as at the veterinary office, slaughterhouse and hygiene control.

The intramural part of the clinical rotation is completed in groups of a maximum of 8 students, the organisation and allocation is carried out by the study coordination.

The extramural part is organised by the students independently, taking into account the requirements laid down in the TAppV.

| INTRAMURAL | TIME IN WEEKS | ECTS |
|---|---|---|
| Block 1: Clinic for Horses - Surgery | 2 | 4 |
| Block 2: Clinic for Horses - Internal Medicine | 2 | 4 |
| Block 3-4: Clinic for Small Animals - Surgery | 2 | 4 |
| Block 5-6: Clinic for Small Animals - Internal Medicine | 2 | 4 |
| Block 7: Clinic for Birds, Reptiles, Amphibians and Fish | 2 | 4 |
| Block 8-9: Clinic for Obstetrics, Gynaecology and Andrology | 4 | 8 |
| Block 10: Clinic for Ruminants | 2 | 4 |
| Block 11: Clinic for Pigs | 2 | 4 |
| Block 12: Pathology and Bacteriology or Virology | 1<br>1 | 2<br>2 |
| EXTRAMURAL | | |
| Block 13: Slaughterhouse internship | 3 | |
| Block 14: Public Veterinary Services | 2 | |
| Block 15: Hygiene control | 2 | |
| Block 16: Practice | 16 | |

### Information on Block 12:

Pathology and bacteriology/virology take place in rotation with each other. Every student completes pathology, but only some of the students complete virology, the other part spends the second week of the rotation block in bacteriology.

## CLINIC FOR HORSES (SURGERY) 2 WEEKS [463]

### Coordinator:

Röcken

### Instructors:

All veterinarians of the Clinic for equine surgery and orthopaedics

### Course type:

Practical, practice

### ECTS:

4

### Prerequisites:

Successful completion of the 8th semester

### Introduction:

During the clinical rotation, the knowledge acquired in the previous years is to be deepened and applied. Based on real cases, the students come to the clinic to train their veterinary skills and put what they have learned into practice. Furthermore, experience with many patients is gained and deepened.

### Overall aims and objectives:

Students should be able to:

- ask general and, depending on the disease, specific points of anamnesis for common surgical and orthopaedic diseases in horses, ponies and donkeys
- implement the systematic approach of many surgical and orthopaedic examinations
- reproduce basic principles of the use of diagnostic as well as surgical instruments
- interpret the results of imaging procedures, especially endoscopic, sonographic and radiographic findings, in the field of equine surgery and orthopaedics

[463] 1.4, 1.6, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.29, 1.30, 1.31, 1.32

- suggest further examinations in a reasonable sequence for common or important surgical and orthopaedic diseases of the horse
- work up cases, diagnose and explain therapeutic options
- suggest therapeutic options in a well-founded manner
- learn the basic skills of equine practice

### Reading list:

- Auer und Stark; Equine Surgery
- Dietz, Handbuch Pferdepraxis

### Assessment:

Development of a case report

## CLINIC FOR HORSES, INTERNAL MEDICINE 2 WEEKS [464]

### Coordinator:

Fey

### Instructors:

Fey, Roscher et al.

### Course type:

Practical exercises with repetition of theoretical backgrounds

### ECTS:

4

### Prerequisites:

Successful completion of the 8th semester

### Overall aims and objectives:

Students should be able to:

- inquire general and, depending on the disease, specific points of anamnesis for common internal diseases in horses, ponies and donkeys
- perform general examination and specific clinical examination of organ systems in patients and summarise their examination results with regard to a tentative diagnosis
- suggest further examinations in a reasonable order for common or important internal diseases of the horse

[464] 1.4, 1.6, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.29, 1.30, 1.31, 1.32

- name laboratory diagnostic tests of blood and other body fluids
- evaluate and explain in particular parameters of haematology, clinical chemistry, essential hormones and functional tests with regard to their diagnostic significance
- name the advantages and disadvantages of common diagnostic procedures for the detection of infectious or contagious diseases in horses
- interpret the results of imaging procedures, in particular endoscopic, sonographic and radiographic findings, in the field of equine internal medicine
- explain the clinical pictures including pathogenetic aspects of important infectious and non-infectious internal diseases as well as diseases of the skin in horses
- suggest therapeutic options in a well-founded manner
- explain the legal aspects of equine therapy
- explain and perform simple diagnostic and therapeutic activities on horses

### Reading list:

- Handbuch Pferdepraxis, Thieme Verlag; Documents in StudIp

### Assessment:

Ungraded trial exam on a clinic patient.

## CLINIC FOR SMALL ANIMALS (SURGERY) 2 WEEKS [465]

### Coordinator:

Kramer

### Instructors:

Staff of the Clinic for Small Animal Surgery

### Course type:

Internship

### ECTS:

4

### Prerequisites:

2nd part of the Veterinary Medical Examination

[465] 1.4, 1.6, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.29, 1.30, 1.31, 1.32

### Introduction:
Participation in all departments of small animal surgery (outpatient clinic, ward, operating theatre, radiology, anaesthesia).

### Overall aims and objectives:
Students should be able to:

- present patients in the ward round
- prepare the patient and the surgeon to perform a surgery
- name the fundamentals of X-ray image assessment and preparation of an ultrasound
- make the preparations for anaesthesia and monitor it

### Reading list:
- Chirurgie der Kleintiere, Fossum, 2009

### Assessment:
Veterinary Medical Examination

## CLINIC FOR SMALL ANIMALS (INTERNAL MEDICINE) 2 WEEKS [466]

### Coordinator:
Moritz

### Instructors:
Prof. Dr. Natali Bauer, Dr. Anna-Lena Proksch, Dr. Esther Haßdenteufel Prof. Dr. Matthias Schneider, Dr. Katarina Hazuchova, Prof. Dr. Nadine Passlack

### Course type:
Practical exercise on the animal

### ECTS:
4

### Prerequisites:
Participation in the lectures of the 5th, 6th, 7th, 8th semester and successfully passed exams, according to StuPO.

[466] 1.4, 1.5, 1.6, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.29, 1.30, 1.31, 1.32

### Introduction:

Problem-oriented diagnostics in internal medicine and clinical laboratory diagnostics

### Overall aims and objectives:

Students should be able to:

- work through a clinical case in a problem-oriented way
- create a problem list from the findings of the history and clinical examination
- prioritise the problem list according to importance
- list the differential diagnoses for the most important problems
- formulate an examination plan
- formulate an extended problem list based on the findings of the further examinations
- prioritise the extended problem list according to importance
- name the differential diagnoses for the most important extended problems
- make symptomatic and aetiological diagnoses
- create a management plan / treatment plan for the case
- name the prognosis.
- explain the pathophysiological relationships

### Reading list:

- Lernmaterialien der Vorlesungen
- Klinik der Hundekrankheiten
- Praktikum der Hundeklinik
- Krankheiten der Katze
- Differentialdiagnosen Innere Medizin bei Hund und Katze

### Assessment:

an oral exam 60%

## CLINIC FOR BIRDS, REPTILES, AMPHIBIANS AND FISH 2 WEEKS [467]

### Coordinator:

Lierz

### Instructors:

Franca Möller, Jessica Link, Bianca Bücking, Johannes Dusek

[467] 1.4, 1.6, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.30, 1.31, 1.32, 1.33

## Course type:
Practical

## ECTS
4

## Prerequisites
Special exams in the following subjects (§3 Para. 4 Study and Examination Regulations):
Animal Husbandry & Animal Hygiene; Animal Welfare & Ethology; Animal Nutrition; Clinical Propaedeutics; Virology; Bacteriology & Mycology; Parasitology; Animal Disease Control and Infectious Disease Epidemiology; Pharmacology & Toxicology; Pharmaceutical and Narcotics Law; Radiology; Forensic Veterinary Medicine; Professional and Ethical Law

## Introduction:
The clinical rotation in the Clinic for Birds, Reptiles, Amphibians and Fish (KVRAF) includes observation, discussion, assistance (assisting) and supervised performance of examinations and treatments of polyclinic and inpatients (ornamental and wild birds, reptiles, amphibians and fish) as well as their emergency care. Several laboratory tests and pathological-anatomical examinations are also carried out and discussed. Furthermore, the students take part in field trips as part of the poultry health management.
Seminars/courses are offered on selected, important topics (dissection course, X-ray course and practical introduction to clinical microbiology).

## Overall aims and objectives:
Students should be able to:

- make a targeted preliminary report on individual patients and livestock and to carry out clinical examinations of birds and reptiles as well as pathological-anatomical examinations of birds
- discuss differential diagnoses and the necessary examinations for further differentiation on the basis of the findings
- know the radiological anatomy of birds and assess radiographs
- provide professional first aid and appropriate feeding for wild birds found
- apply remedies and vaccines to birds and reptiles in a professional manner
- transfer internal and surgical knowledge acquired to concrete cases within the framework of case discussions
- assess poultry husbandry on the basis of legal and ethological principles
- initiate therapeutic measures in a poultry livestock, taking into account the legal framework conditions, and to discuss therapy-accompanying and prophylactic measures

.

### Reading list:

*Poultry:*

- Rautenschlein, Ryll: Erkrankungen des Nutzgeflügels, Publisher: utb, 1st edition (2014), ISBN 978-3-8252-8568-5 oder e-Book: https://hds.hebis.de/ubgi/Record/HEB368953955
- Siegmann, Neumann: Kompendium der Geflügelkrankheiten, Publisher: Schlütersche, 7th edition (2012), ISBN-13: 978-3-89993-083-2,

*Ornamental birds:*

- Pees: Leitsymptome bei Papageien und Sittichen: diagnostischer Leitfaden und Therapie. Publisher: Enke, 2nd edition (2011), ISBN: 9783830410843
- Kaleta und Krautwald-Junghanns: Kompendium der Ziervogelkrankheiten, Publisher: Schlütersche, 4th edition (2011), ISBN: 978-3-89993-087-0.
- X-ray atlas: Krautwald-Junghanns et al: Atlas der bildgebenden Diagnostik bei Heimtieren. Publisher: Schlütersche, 1st edition 2009. ISBN: 978-3-89993-040-5

*Reptiles:*

- Mader: Reptile and Amphibian medicine and surgery. Publisher: Elsevier. 3. 2019 edition. ISBN: 978-0323482530
- Pees: Leitsymptome bei Reptilien: diagnostischer Leitfaden und Therapie. Publisher: Enke (2015), ISBN: 978-3-8304-1227-4 or e-Book: eISBN: 978-3-8304-1228-1

### Assessment:

a presentation is given as proof of performance within the two-week rotation period.
an oral exam within the framework of the Veterinary Medical Examination "Poultry Diseases" (TAppV § 42)

## CLINIC FOR OBSTETRICS, GYNAECOLOGY AND ANDROLOGY 4 WEEKS [468]

### Coordinators:

Wehrend, Wrenzycki

### Instructors:

Wehrend, Wrenzycki, Hospes, Schuler, NN

### Course type:

Seminar, practical exercise, animal practice

[468] 1.4, 1.5, 1.6, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.29, 1.30, 1.31, 1.32

### ECTS:
8

### Prerequisites:
Successful completion of the 8th semester

### Introduction:
Repetition and deepening of reproductive biology and reproductive medicine correlations and transfer of knowledge to activities in practical reproductive medicine and the analysis of livestock problems.

### Overall aims and objectives:
The students should be able to deepen their knowledge of veterinary reproductive medicine and livestock management and apply it to clinical cases. In this process, he/she should recognise any knowledge deficits and fill them. The aim is that a clinical case can be presented in free speech.

### Reading list:
Lecture notes from the block Reproduction and Livestock Management

### Assessment:
Accompanying oral knowledge tests on obstetrics and reproduction in dogs and horses, examination of a semen sample, writing a medical report with calculation of the costs incurred by the animal owner on the basis of the fee schedule for veterinarians (GOT).

## CLINIC FOR RUMINANTS 2 WEEKS [469]

### Coordinator:
Sickinger

### Instructors:
Sickinger, Jörling, Jost, Kasper, Lang, Stahl

### Course type:
Clinical training on animals (in the form of a seminar)

[469] 1.4, 1.6, 1.8, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.29, 1.30, 1.31, 1.32

### ECTS:
4

### Introduction:
The rotation is intended to give students the opportunity to deal with species-specific issues and diseases.

### Overall aims and objectives:
During the rotation, students have the opportunity to gain experience in clinical examination, diagnostics and therapy including surgical measures (surgical assistance) on ruminants. Animal species covered are cattle, sheep, goats, new and old world camelids and wild ruminants.
Most important buiatric diseases are repeated and the learning content is to be applied on the patient under supervision.
Wherever possible, students will be involved in livestock visits as part of the animal health service.

### Reading list:
- Lecture notes of the Clinic for Ruminants
- Dirksen, Gründer, Stöber (eds.): Innere Medizin und Chirurgie des Rindes

### Assessment:
Veterinary Medical Examination, PB 5: Examination on the patient and theory part

## CLINIC FOR PIGS 2 WEEKS [470]

### Coordinator:
Reiner

### Instructors:
Reiner, Becker, Kühling, Langbein, Mandler

### Course type:
practical exercises

### ECTS:
4

[470] 1.4, 1.6, 1.8, 1.9, 1.11, 1.12, 1.14, 1.15, 1.16, 1.17, 1.18, 1.20, 1.21, 1.22, 1.23, 1.24, 1.26, 1.28, 1.29, 1.30, 1.31, 1.32

### Prerequisites:
Successful completion of the 8th semester

### Overall aims and objectives:
Students should be able to:

- name and explain the essential aspects of hygiene in pig practice and in the pig herd
- describe the essential elements of anamnesis and herd inspection and establish connections with pig-specific diseases
- explain the special features of the selection and preparation of animals for clinical examination and post-mortem examination as well as of samples for further examinations and justify them from a technical and epidemiological-statistical point of view
- explain the interactions between husbandry factors and pathogens and their effects on the clinical picture, prognosis and prophylactic and therapeutic measures using examples
- name the special features and the position of pig medicine in comparison with other clinical branches of veterinary medicine
- think through, present and discuss a pig-specific livestock problem, taking into account history, livestock inspection, clinical examination, dissection results and further examinations, individually and in a team
- explain and carry out simple preparatory, diagnostic and therapeutic activities on pigs independently

### Reading list:

- Reiner, Krankes Schwein-kranker Bestand, Ulmer

### Assessment:
Ungraded exam at the end of the 2-week course; presentation of a livestock problem.

## INSTITUTE FOR VETERINARY PATHOLOGY, 1 WEEK [471]

### Coordinator:
Herden

### Inspectors:
Herden, Köhler, Henrich

### Course type:
Practical exercises

[471] 1.5, 1.6, 1.11, 1.14, 1.21, 1.24, 1.28, 1.33

ECTS:
2

Prerequisites:
Successful participation in the special pathology seminar, histopathology course, pathological-anatomical referrals

Introduction:
The rotation provides in-depth theoretical and practical training in general and special pathology based on selected dissection cases.

Overall aims and objectives:
Students should be able to:

- independently carry out dissection of domestic mammals following the autopsy instructions (species-specific dissection procedure)
- recognise and describe organ and tissue alterations
- make pathological-anatomical diagnoses and differential diagnoses
- write reports on findings including description of findings, pathological-anatomical diagnoses and differential diagnoses as well as epicritical evaluation of the case including the aetiological diagnoses and differential diagnoses
- carry out assessments of the morphological findings and findings on the cause of death in the clinical-anamnestic context
- deal with the hygiene and safety measures necessary in the dissection area and in the handling of potentially infectious material

Reading list:

- Baumgärtner, W., Gruber, A.D.: Allgemeine Pathologie für die Tiermedizin. 3rd ed., Thieme Verlag, 2020 (also available digitally at the Thieme-Vet-Center of the JLU)
- Baumgärtner, W.; Gruber, A.D.: Special Pathology for Veterinary Medicine. 2nd ed., Thieme Verlag, 2020 (also available digitally at the Thieme-Vet-Center of the JLU)
- Zachary, J.F.: Pathologic basis of veterinary disease. 6th ed., Mosby, 2016

Assessment:
Presentation of the examined cases and assessment of the findings reports

## BACTERIOLOGY 1 WEEK [472]

### Coordinator:
Ewers, Bauerfeind

### Instructors:
Bauerfeind, Ewers, Heydel, Kerner, Lämmler, Prenger-Berninghoff, Pulss, Schmidt

### Course type:
Practical and seminar

### ECTS:
2

### Prerequisites:
Participation in the course "Bacteriology and Mycology" (general and specific part); successful completion of the 2nd examination section of the Veterinary Medical Examination.

### Introduction:
Teaching in bacteriology during the year of rotation serves to deepen the material taught in the 5th semester. For this purpose, the students are trained in dealing with pathogenic bacteria and fungi using authentic clinical sample material from diseased animals. In detail, they learn conventional and modern methods of laboratory diagnostics of bacterial and fungal diseases. Training focuses on microscopic, cultural, biochemical and serological examination methods.

### Overall aims and objectives:
Students should be able to:

- carry out simple microbiological and serological working methods and evaluate examination results
- correctly carry out complex laboratory diagnostic tests and identify the pathogens of important microbially caused diseases in animals
- evaluate laboratory diagnostic findings with regard to diagnoses and therapy suggestions
- master hygienic safety measures in microbiological laboratory work and handle pathogenic microorganisms safely

[472] 1.8, 1.11, 1.21, 1.24, 1.28

### Reading list:

- Selbitz, Truyen, Valentin-Weigand: Tiermedizinische Mikrobiologie, Infektions- und Seuchenlehre, Enke-Verlag, 10th, completely revised edition (2015), ISBN: 978-3830410805
- Quinn et al: Clinical Veterinary Microbiology; 2nd revised edition (2013); Mosby, St Louis, United States; ISBN-13: 9780723432371

### Assessment:

an oral and written case presentation at the end of the week.

## VIROLOGY 1 WEEK [473]

### Coordinator:

Weber

### Instructors:

Bank-Wolf, König, Schmid, Tekes, Weber

### Course type:

Internship/Practical

### ECTS:

2

### Introduction:

Discussion on sample collection and sample shipment for virological laboratory diagnostics. Dealing with infectious agents and safe working in the laboratory. Carrying out virological test procedures (cell culture, virus cultivation, serum neutralisation test, immunofluorescence, PCR/ RT-PCR, plaque test, agar diffusion, electron microscopy, ELISA). Interpretation of the test results and evaluation of the aetiological significance.

### Overall aims and objectives:

Students should be able to:

- explain criteria for taking and sending samples
- describe procedures of virological laboratory diagnostics and name the required sample materials
- assess the advantages and disadvantages as well as the suitability of virological laboratory tests in the context of clinical questions

[473] 1.11, 1.21, 1.24, 1.28

- interpret results of virological laboratory diagnostics and apply them to clinical cases

### Reading list:

- Documentation virological course (internship microbiology and virology)
- Tiermedizinische Mikrobiologie, Infektions- und Seuchenlehre; Hans-Joachim Selbitz Uwe Truyen Peter Valentin-Weigand (eds.). 10th updated edition 2015 672 p., ISBN: 9783830412625

## SKILLS LAB – ROTATION [474]

### Coordinator:

Arnhold

### Instructors:

Student tutors

### Course type:

Practical (0,5 CHW)?

### ECTS:

0,5

### Introduction:

In the 9th and 10th semester exercise, various veterinary skills are taught using models and simulators.
Currently, the Skills Lab comprises 12 comprehensive learning stations.

### Overall aims and objectives:

Students should be able to:

- prepare blood smears, stain with Diff-Quick and microscopy
- place a urinary catheter in the bitch
- carry out injection techniques and blood sampling in different animal species
- learn suturing and tying techniques
- intubate dogs and cats and place a nasal feeding tube
- demonstrate auscultation of the heart and lungs on a simulator and recognise physiological and pathological findings
- demonstrate cardiopulmonary resuscitation on a dog

[474] 1.4, 1.14, 1.15, 1.16, 1.17, 1.19, 1.21, 1.23, 1.29

- demonstrate restraints on different animal species on a model and learn how to handle them
- demonstrate dressing techniques on a small animal and horse leg
- wash, disinfect and dress sterilely in the context of preparation for surgery
- carry out the rectal examination on the horse and distinguish between physiological and pathological conditions.
- assess radiographs professionally and position patients correctly for optimal radiographs
- learn the simple use of ultrasound and endoscopes
- carry out artificial insemination on cattle
- learn veterinary communication with the animal owner on the basis of a pre-report survey

### Reading list:

- Baumgartner, Walter, Klinische Propädeutik der Haus- und Heimtiere, Publisher: Parey Bei Mvs; 7th completely revised and expanded 9th edition (2018).
- Reiner G., Krankes Schwein – kranker Bestand, 2015
- Von Pückler, Kerstin, Röntgen Hund und Katze – Thorax und Abdomen, Verlage Thieme, 2018

### Electronic learning materials:

see StudIP:
https://studip.uni-giessen.de/studip/

### Learning recommendations:

Use the electronically provided teaching aids to prepare and follow up the exercise.

### Assessment:

none

# APPENDIX

## LIST OF SUBJECTS AND DAY ONE COMPETENCES

(as approved by ECCVT on 17 January 2019)

### Forewords

A. Competence is a concept that integrates knowledge, skills and attitudes. Competence requires acquisition of technical skills but further involves applying relevant knowledge, and having the confidence and ability to transfer what has been learnt to a variety of contexts.

B. In order to facilitate for educational establishments to meet the requirements of the overall basic veterinary competence that the EU has established it needs to be broken down to more specific "Day One Competences": Overall basic veterinary competence is currently laid down in different pieces of the EU legislation, namely:

- Directive 2005/36/EC amended by Directive 2013/55/EU (on the recognition of professional qualifications)
- Directive 2010/63/EU (on the protection of animals used for scientific purposes)
- Regulation 852/2004/EC (on the hygiene of foodstuffs)
- Regulation 853/2004/EC (on specific hygiene rules for food of animal origin)
- Regulation 854/2004/EC (on specific rules for the organisation of official controls on products of animal origin intended for human consumption)
- Regulation (EU) 2017/625 (on official controls)
- Regulation 1099/2009/EU (on the protection of animals at the time of killing) as amended by Regulation (EU) 2017/625
- Regulation (EU) 2016/429 (on transmissible animal diseases and amending and repealing certain acts in the area of animal health)
- Proposal on Regulation on veterinary medicinal products

C. Overall basic competence ought to encompass all references in the different pieces of the EU legislation to ensure consistency on the recognition of professional qualifications in European Union and beyond.

D. 'Day One Competences' is the minimum standard required and is the starting point for a variety of roles in the veterinary profession. After graduation, ongoing professional development will be needed in whichever field the new graduate decides to enter, and some roles may require postgraduate training and further formal qualifications (e.g. Diplomate of a European College, PhD).

E. A new graduate who has achieved Day One Competences should be capable to independently perform appropriate entry-level tasks and duties of the veterinary profession and confident enough to practise veterinary medicine at a primary care level on their own, while knowing when it is appropriate to seek direction from more experienced colleagues. New

graduates are likely to need more time to perform some procedures. Support and direction from more senior colleagues should be available.

F. Veterinary educational establishments are responsible for developing the Day One Competences of their students and ensuring that they have met the competences by the time they graduate. They are greatly assisted in this by the practising arm of the veterinary profession, which provides Extramural Practical Training so that students can practise applying these competences in the workplace.

G. These Day One Competences are in agreement with the above-mentioned EU Directives, Regulations and Proposals related to veterinary professional qualifications and the following references:

- OIE recommendations on the Competencies of graduating veterinarians ('Day 1 graduates') to assure National Veterinary Services of quality[1]
- European Commission: A working document on the development of a common education and training framework to fulfil the requirements under the Directive[2]
- FVE & EAEVE report on European Veterinary Education in Animal Welfare, Science, Ethics and Law[3]
- Standards and Guidelines for Quality Assurance in the European Higher Education Area (2015)[4]
- Final Recommendations of the 4th OIE Global Conference on Veterinary Education[5]
- One Health approach as recognised by WHO[6] and OIE[7]

http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/Vet_Edu_AHG/DAY_1/DAYONE-B-ang-vC.pdf
http://ec.europa.eu/environment/chemicals/lab_animals/pdf/guidance/education_training/en.pdf
http://www.carodog.eu/wp-content/uploads/2014/10/full_report_aw_curriculum_adopted3.pdf
http://www.enqa.eu/wp-content/uploads/2013/06/ESG_3edition-2.pdf
http://www.who.int/features/qa/one-health/en/
http://www.oie.int/en/for-the-media/onehealth/

## DAY ONE COMPETENCES

1.1: Understand the ethical and legal responsibilities of the veterinarian in relation to animals under his/her care, the environment, clients, policies and society.

1.2: Demonstrate knowledge of the organisation, management and legislation related to a veterinary business economics and employment rights.

1.3: Promote, monitor and maintain health and safety in the veterinary setting; demonstrate knowledge of systems of quality assurance; apply principles of risk management to their practice.

1.4: Communicate effectively with clients, the public, professional colleagues and responsible authorities, using language appropriate to the audience concerned and in full respect of confidentiality and privacy.

1.5: Prepare accurate clinical and client records, and case reports when necessary, in a form satisfactory to colleagues and understandable by the public.

1.6: Work effectively as a member of a multi-disciplinary team in the delivery of services.

1.7: Understand the economic and emotional context in which the veterinary surgeon operates.

1.8: Be able to review and evaluate literature and presentations critically.

1.9: Understand and apply principles of clinical governance, and practise evidence-based veterinary medicine.

1.10: Use their professional capabilities to contribute to the advancement of veterinary knowledge and One Health concept, in order to improve animal health and welfare, the quality of animal care and veterinary public health.

1.11: Demonstrate ability to cope with incomplete information, deal with contingencies, and adapt to change.

1.12: Demonstrate that they recognise personal and professional limits, and know how to seek professional advice, assistance and support when necessary.

1.13: Demonstrate an ability of lifelong learning and a commitment to learning and professional development. This includes recording and reflecting on professional experience and taking measures to improve performance and competence.

1.14: Take part in self-audit and peer-group review processes in order to improve performance.

1.15: Obtain an accurate and relevant history of the individual animal or animal group, and its/their environment.

1.16: Handle and restrain animal patients safely and with respect of the animal and instruct others in helping the veterinarian perform these techniques.

1.17: Perform a complete clinical examination and demonstrate ability in clinical decision-making.

1.18: Develop appropriate treatment plans and administer treatment in the interests of the animals under their care with regard to the resources available.

1.19: Attend in an emergency and perform first aid in common animal species*.

1.20: Assess the physical condition, welfare and nutritional status of an animal or group of animals and advise the client on principles of husbandry and feeding.

1.21: Collect, preserve and transport samples, select appropriate diagnostic tests, interpret and understand the limitations of the test results.

1.22: Communicate clearly and collaborate with referral and diagnostic services, including providing an appropriate history.

1.23: Understand the contribution that imaging and other diagnostic techniques can make in achieving a diagnosis. Use basic imaging equipment and carry out an examination effectively as appropriate to the case, in accordance with good health and safety practice and current regulations.

1.24: Recognise signs of possible notifiable, reportable and zoonotic diseases as well as abuse and take appropriate action, including notifying the relevant authorities.

1.25: Access the appropriate sources of data on licensed medicines.

1.26: Prescribe and dispense medicines correctly and responsibly in accordance with legislation and latest guidance.

1.27: Report suspected adverse reactions through the appropriate channel.

1.28: Apply principles of bio-security correctly.

1.29: Perform aseptic procedures appropriately.

1.30: Safely perform sedation, and general and regional anaesthesia; implement chemical methods of restraint.

1.31: Assess and manage pain.
1.32: Recognise when euthanasia is appropriate and perform it with respect of the animal, using an appropriate method, whilst showing sensitivity to the feelings of owners and others, with due regard to the safety of those present; advise on disposal of the carcase.

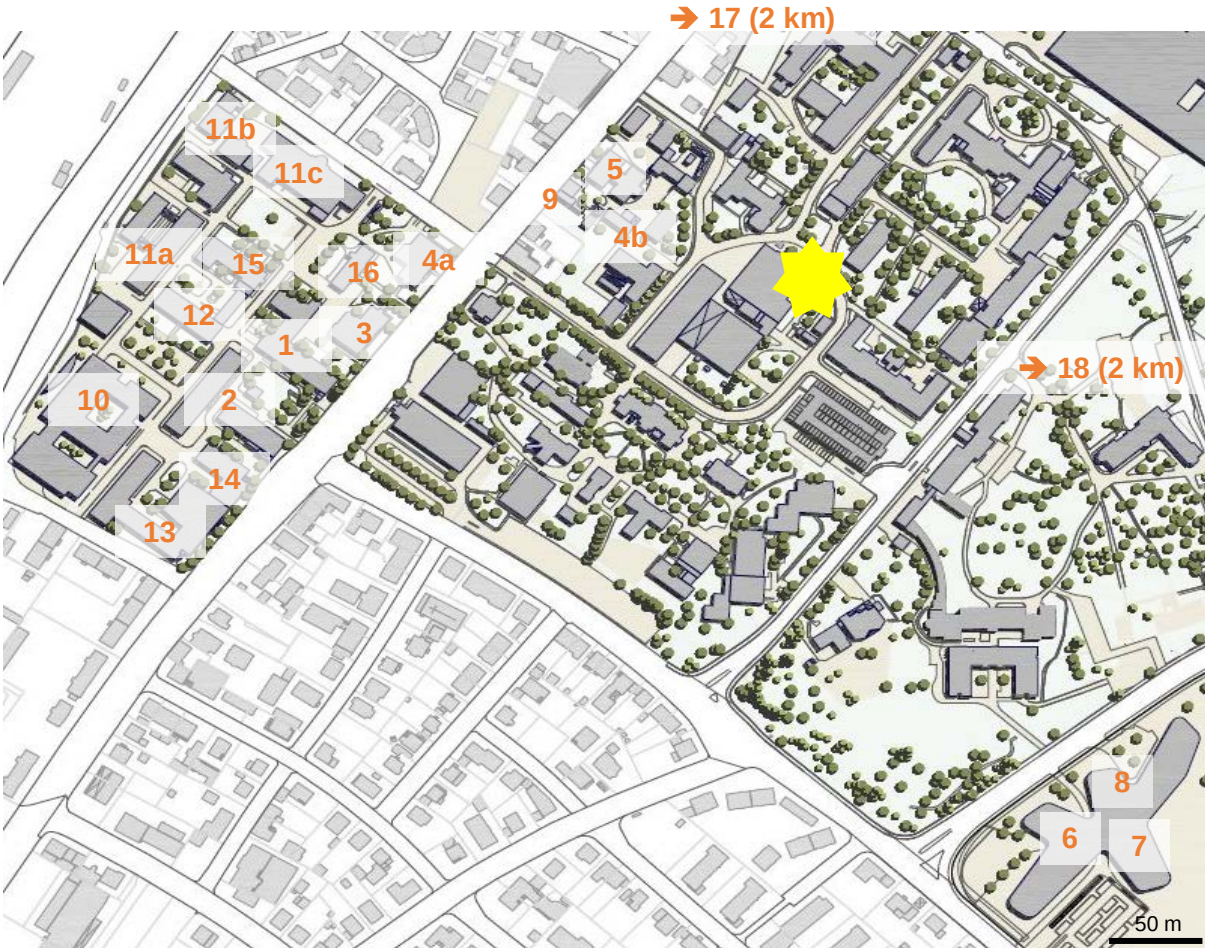
1.33: Perform a systematic gross post-mortem examination, record observations, sample tissues, store and transport them.

1.34: Perform ante-mortem inspection of animals destined for the food-chain, including paying attention to welfare aspects; correctly identify conditions affecting the quality and safety of products of animal origin, to exclude those animals whose condition means their products are unsuitable for the food-chain.

1.35: Perform inspection of food and feed including post-mortem inspection of food producing animals and inspection in the field of related food technology.

1.36: Advise on, and implement, preventive and eradication programmes appropriate to the species and in line with accepted animal health, welfare and public health standards.

# Appendix C: Sitemap of core facilities of the Veterinary Faculty




| | |
|---|---|
| 1 | Institute of Veterinary Anatomy, -Histology and Embryology,<br>Frankfurter Straße 98, 35392 Gießen |
| 2 | Institute of Veterinary Physiology and Biochemistry,<br>Frankfurter Straße 100, 35392 Gießen |
| 3 | Institute of Veterinary Pathology,<br>Frankfurter Straße 96, 35392 Gießen |
| 4a | Institute of Veterinary Food Science,<br>Frankfurter Straße 92, 35392 Gießen, |
| 4b | Hall for meat inspection, Frankfurter Str. 93, 35392 Gießen |
| 5 | Institute of Hygiene and Infectious Diseases of Animals,<br>Frankfurter Straße 85, 35392 Gießen |
| 6 | Institute of Virology (Biomedical Research Center Seltersberg),<br>Schubertstraße 81, 35392 Gießen |
| 7 | Institute of Parasitology (Biomedical Research Center Seltersberg),<br>Schubertstraße 81, 35392 Gießen |
| 8 | Institute of Pharmacology and Toxicology (Biomedical Research Center Seltersberg),<br>Schubertstraße 81, 35392 Gießen |
| 9 | Unit for Biomathematics and Data Processing,<br>Frankfurter Straße 95, 35392 Gießen |

| | |
|---|---|
| **10** | Clinic for Small Animals (Internal Medicine and Surgery) and<br>Clinic for Birds, Reptiles, Amphibia and Fish,<br>Frankfurter Straße 114, 35392 Gießen |
| **11a** | Equine Clinic (Internal Medicine),<br>Frankfurter Straße 126, 35392 Gießen |
| **11b** | Farriery<br>Frankfurter Str. 120, 35392 Gießen |
| **11c** | Equine Clinic (Surgery),<br>Frankfurter Straße 108, 35392 Gießen |
| **12** | Clinic for Pigs (Internal Medicine and Surgery),<br>Frankfurter Straße 110, 35392 Gießen |
| **13** | Clinic for Ruminants (Internal Medicine and Surgery)<br>Frankfurter Str. 106, 35392 Gießen |
| **14** | Clinic for Obstetrics, Gynaecology and Andrology of Large and Small animals with<br>Ambulatory Service, Frankfurter Straße 106, 35392 Gießen |
| **15** | Unit for Animal Welfare and Ethology,<br>Frankfurter Straße 104, 35392 Gießen |
| **16** | 16: Office of the Dean, state examination office and office for study affairs,<br>Frankfurter Straße 94, 35392 Gießen |
| **17** | Professorship of Milk Sciences,<br>Ludwigstraße 21, 35390 Gießen in the city center, about 2 km north of main campus |
| **18** | Campus of Natural Sciences (e.g. Physics, Chemistry, Zoology, Botany,<br>Animal Nutrition, about 2 km east of main campus) |



Faculty of Human Medicine

# Appendix D: Written assessment procedures for QA

Following the Bologna-Process in 1998 the standing conference of the state ministers for education and research of the Federal States of Germany decided to set up a central accreditation council. Accreditation was possible on the level of degree courses and as system accreditation. The latter being based on the establishment of a QA-system managed centrally by the university administration.
Excluded from the request for accreditation were the State Examination Courses like human and veterinary medicine where the curriculum needs authorization by the federal government which – in the case of veterinary medicine – is reflected by the Ordinance concerning the Certification of Veterinary Surgeons (TappV). This ordinance does not foresee that the degree of a Bachelor in Veterinary science may be given.

## Ongoing strategic development on the university Level

Presently the JLU deals with the establishment of mechanisms to get into the position to apply for system accreditation which will automatically also affect veterinary medicine.

Thus, in terms of quality management the JLU undertook an appraisal of quality assurance instruments and measures in its central fields of action in 2019. The central, university-wide instruments and measures are integrated in the regulatory cycle for quality assurance that is part of the University's strategic and development planning (Fig.: Quality cycle). This cycle includes the following steps: 1) definition of strategies and (quality) goals for the individual fields of action, 2) control and support of measures to ensure implementation according to the target agreements of the Executive Board with the faculties, 3) ongoing review of the measures in terms of the achievement of goals using various procedures and instruments (especially control of target agreements), and 4) regular presentation and discussion of development progress and results in the University's governing bodies and on the basis of this adjustment of the goals and measures after five years.


Fig. PDCA cycle for quality assurance, which is part of the University's strategic and development planning

University-wide quality management is therefore one of the key-management and leadership tasks of the Presidency and is closely linked to university-wide strategic and development planning. It integrates all of the University's central fields of action and the quality cycle for development planning includes the specific development processes in the performance dimensions of research, teaching, transfer in the strategic cross-sectional dimensions and in the area of administration and governance. On this basis, JLU will supplement the overall university quality cycle of strategic and development planning by establishing and interlinking its own quality assurance systems and corresponding control cycles in all performance dimensions and cross-sectional dimensions.

JLU also actively develops structures and processes to guarantee effective administrative action geared to the needs of stakeholders in research and teaching. In the past few years, a strong basis for this has been developed or optimized in many areas of central administration.

Mention should be made, for example, of the large-scale project to develop an identity management system (IDM). This has resulted in a new Staff Service Centre for employees, digital building plans throughout and other optimized administrative processes. In the meantime, the various processes, systems and organizational units relating to adminis- trative modernisation, information management, organizational development and digitali- sation will be systematically and closely

coordinated. As part of measures to develop strategic controlling, data processes will be reviewable across departments in future, stakeholders will be more effectively networked, and information should be more demand-oriented and easily retrievable. JLU will promote the further development of strategic controlling, with the participation of all departments involved in administration and controlling processes and, in particular, examine the possibility of introducing a central document management system or data warehouse solution.

Quality assurance instruments and processes in the area of studies and teaching will be more strongly networked, integrated and coordinated in a comprehensive quality manage- ment system with defined quality cycles. Quality management for studies and teaching is part of the University's overall quality management system see above), into which it is integrated via appropriate interfaces. The structures and processes will be presented in a quality handbook Studies and Teaching. The quality management system is supported by commission on courses of study which recommend ways to develop existing study programs based on program-specific data in partnership with lecturers, students and administration.

The further development of quality management measures for studies and teaching also forms the basis for the examination of alternatives to the accreditation of individual study programmes. In this connection, a preliminary project is being implemented in 2020 to exa- mine and assess the possibility of introducing system accreditation at JLU. On the basis of this, system accreditation may be prepared and implemented by 2025.

## Present situation

The quality of teaching at JLU is supported by programs offered by the Institute for Didactics of Higher Education. These programs were expanded in recent years due to special programs and funding, like the Early-Career Promotion Pact, the Quality Pact for Teaching and the joint project Digitally Supported Learning and Teaching in Hesse (DigLL). Further support is by the Central Hessen Network for Higher Education Didactics (HdM), run in cooperation by the JLU, the Marburg-University and the Mittelhessen University of Applied Sciences (THM), allowing the Institute for Higher Education Didactics of the JLU to offer extensive further training opportunities in didactics. These programs will further be developed for specific target groups based on an overall evaluation in 2022. There will be a special focus on higher education didactic programs for professorial teaching staff. Target group-specific and demand-oriented development will promote the more widespread use of programs.

The JLU is an attendance-based university. To support innovative curricula and formats, however, digitally taught courses for students have also been developed in recent years and the availability of digitally recorded lectures has been increased. In recent years the teaching and campus information systems deployed at JLU (specifically StudIP, FlexNow) have been continually further developed, modernised and adapted to current needs. To restructure the organisation and processes of the examinations offices, an audit and reorganisation procedure was initiated in 2018. An external evaluation of the reformed examination administration procedure is due in 2025

Part of the ongoing quality management of JLU is the annual implementation of the student survey at JLU www.uni-giessen.de/org/admin/stab/stl/ servicestelle/datenportal/ datenstb, which is carried out as an online interrogation based on longitudinal sampling so that a comparison of several student cohorts is possible. In general student participation varies between 20-30%. Key questions of this survey comprise general aspects of studying at the JLU, the attitude towards the chosen study program, the course of the study, financial aspects and some issues concerning the personal

situation. Evaluation of this survey reveals the student satisfaction index. This index was best for veterinary medicine with actually 89%, with an overall satisfaction with the study program even at 90%. Veterinary students only complain about deficiencies in the technical equipment. In case of the other faculties the satisfaction index ranged between 70 and 80 percent.

## Quality assurance of the study program at the Faculty of Veterinary Medicine of JLU Giessene

As indicated above, students enrolled in the veterinary curriculum show a high degree of satisfaction. Another main criterion applied to assess the quality of the study program is the percentage of students graduating within the official time allotted to the veterinary curriculum of 5.5 years. With 85% of the students graduating to a DVM within the time limit given, the Faculty of Veterinary medicine by far tops the other faculties. Calculation is based on the number of students – in general about 185 – entering the clinical part of the veterinary curriculum (there is a regular drop out of students until semester 4 from the originally admitted 210 students).

Since the winter semester 2020/2021 the faculty has implemented an evaluation procedure of all lectures, seminars and practical courses. The aim is to obtain evaluations of all teaching events in a biannual cycle. Questionnaires for the various teaching formats were conceptualized in the Committee of Study Affairs of the Faculty.

Evaluation is supported by the Central Service Unit of the JLU for teaching evaluation. This unit handles the technical implementations as well as the automated evaluation of questionnaires using the software EvaSys. The results are forwarded to the respective teachers/instructors and the subject representatives and the Dean of study affairs. Students will be provided with a summary of the results in order to receive a feedback. Taken together this process facilitates for the Faculty to immediately react to upcoming weaknesses.

Furthermore, during the Covid-19 pandemic after each semester with mainly online and distance teaching, feedback Webex events have been carried out involving the team of the Office of Study Coordination, representatives of the student council and spokespersons of all semesters as well as the Dean of study affairs. In these feedback sessions spokespersons of each semester presented data on evaluations carried out in each semester.

## Implementation of evaluation rules (Evaluation Statutes)

Justus Liebig University Giessen (JLU) uses various instruments regrading teaching and studying which it regularly and systematically reviews and further develops.
In this context, evaluation statutes for study and teaching have been established. These statutes, which have been published in September 2021 will regulate the implementation of the central, cross-departmental and cross-center evaluation procedures. On the basis of the drafted version of the evaluation statutes, the process of course evaluation of the veterinary curriculum was adapted and implementation already started with the beginning winter semester 20/21.

The aim of the student course evaluation is to achieve a reflection of both lecturers and students in order to promote and support the continuous development of the teaching and learning quality. Data of the evaluation can also be used for internal and external reporting. This will be possible through

regular student surveys and feedback from the evaluation. The evaluation results are part of the quality management of the veterinary study program of the Faculty of Veterinary Medicine at JLU.

It is anticipated that approx. one third of all courses of the veterinary curriculum should be evaluated each semester. This means that all regularly offered courses should have gone through this procedure at least once within three years. The department has determined the selection of the respective courses in an evaluation plan. Lectures given by internal lecturers as well as by external lecturers should always go through this quality assuring procedure. Moreover, student representatives of the faculty council or as members of the committee of Study affairs are also able to suggest individual courses for going through this procedure. Additionally, every lecturer can make use of this evaluation process voluntarily for special reasons (e.g. prospective applications for higher positions).

The survey is usually carried out, when two thirds of the lecture is completed. Feedback of the evaluation of each course is primarily reported back to the lecturers as quickly as possible so that it can be discussed and if necessary action can be taken to get rid of any deficits.
The Office of Study Coordination or the dean of study affairs can view the results of the student course evaluations at any time. When the occasion arises (e.g. either very positive or very critical feedback), discussions take place between the dean of study affairs and the respective teaching staff on the quality of teaching.

The EAEVE (European Association of Establishments for Veterinary Education) further requires Veterinary teaching facilities to assure continuous evaluation of teaching (Standard Operating Procedures of the European System of Evaluating of Veterinary Training, May 30th 2019).

## Subject evaluations

Evaluations take place in all semesters for all lectures and courses implemented in the study programme (lectures, seminars, practical exercises, focus lectures as well as in the year of clinical rotation. The extramural part of the clinical rotation (EPT) has been evaluated for the last 5 years. In this evaluation the EPT establishments are anonymous. However, a good feedback about the skills and competencies learned is given.

Thus, evaluation comprises the whole study programme with the pre-clinical and the clinical phase of study. It is evaluated and assured in terms of quality improvement and for further development.

## Evaluation process

### Aim of the evaluation

The aim of the student course evaluation is to reflect on both the lecturers and the students in order to promote and support continuous further development of the quality of teaching and learning. The evaluation is also used for internal and external reporting. This is made possible through regular student surveys and feedback from the evaluation. The evaluation results are part of the quality management in studies and teaching in the veterinary medicine department.

### Process responsibility

- Dean's office of the veterinary medicine faculty at JLU

### Process contact person

- Office of study coordination of the veterinary medicine faculty at JLU

## Process participants

- Dean's office
- Faculty Council
- Committee of study affairs
- Teacher/ Lecturer
- Students
- Dean for study affairs
- Office of study coordination
- Central Service Unit for teaching evaluation

## Involved IT systems

- Evasys
- Zensus

## Applicable guidelines
## Overriding legislation:

- Ordinance on the license to practice medicine for veterinarians (Verordnung zur Approbation von Tierärztinnen und Tierärzten - TAppV)
- University Framework Act (Hochschulrahmengesetz - HRG)
  → For the evaluation of research, teaching and funding: §6 HRG
- Hessian Higher Education Act (Hessisches Hochschulgesetz - HHG)
  → Section 12 (1)
- Hessian Data Protection and Freedom of Information Act (Hessisches Datenschutz- und Informationsfreiheitsgesetz - HDSIG)

## Internal university legislation:

- Evaluation statutes for studies and teaching at the Justus Liebig University of Gießen (published -2021)

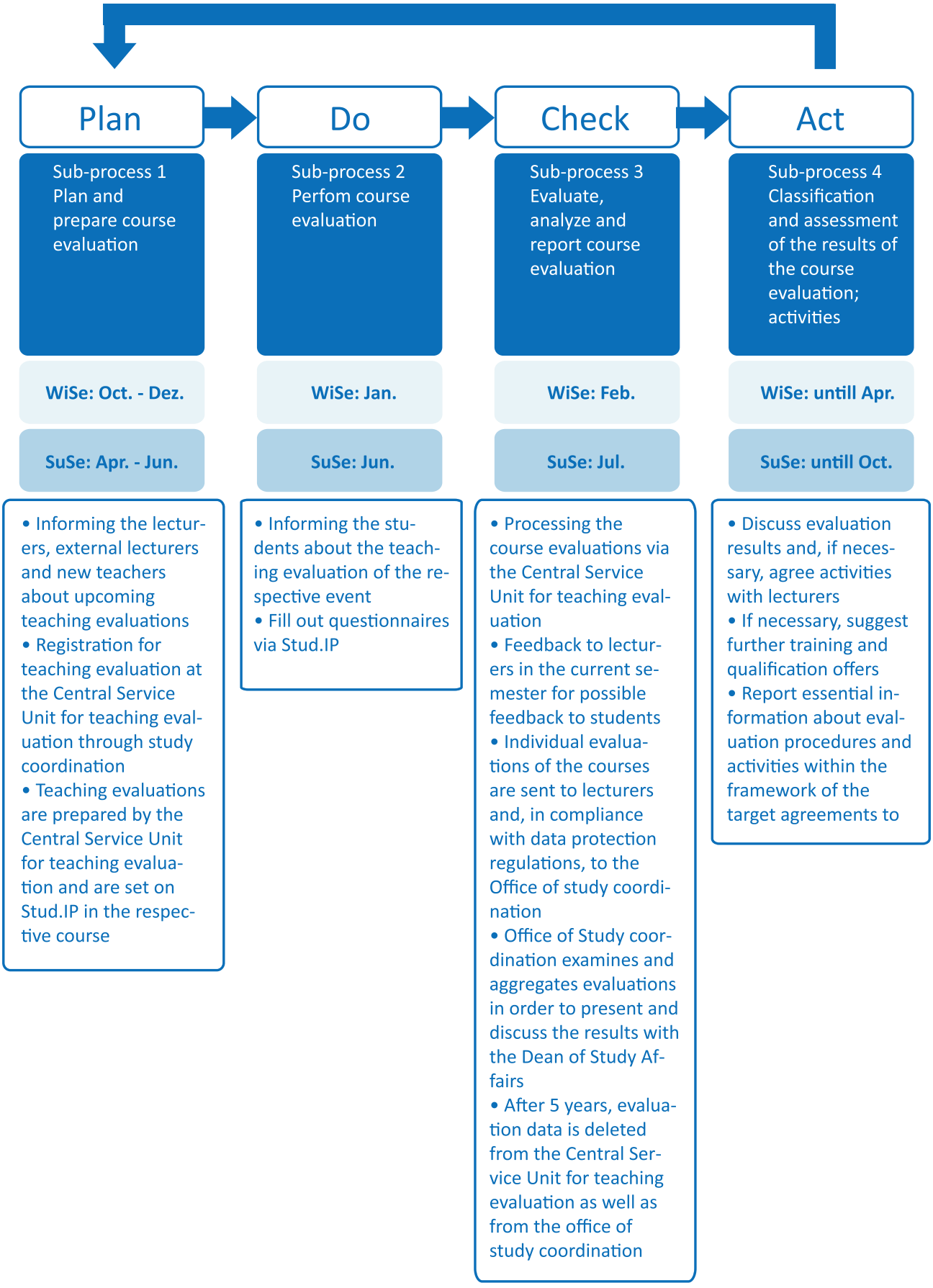
## External specifications

- EAEVE Standard Operating Procedures (SOP), in the currently valid version

## Process trigger

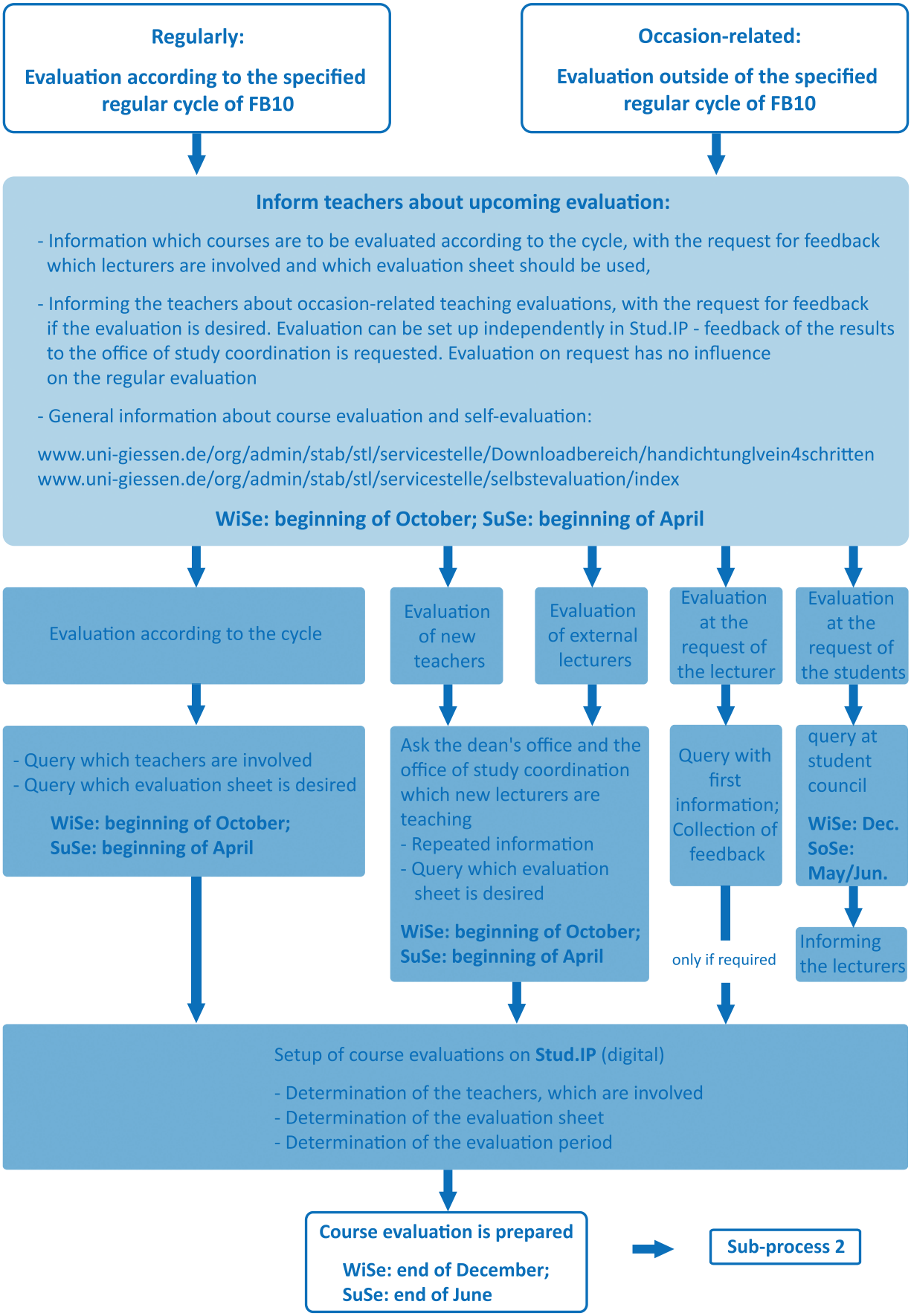
- Regular evaluation cycle (according to the evaluation statutes for study and teaching of the JLU): 1/3 of all events per semester → Evaluation of all events within 3 years
- Occasion-related, in the first 3 years of teaching activity for newly appointed university professors and lecturers in the veterinary medicine department at JLU
- Lectures by external lecturers are always evaluated
- Occasion-related at the request of the lecturer
- Occasion-related at the request of the student representatives

## Process overview



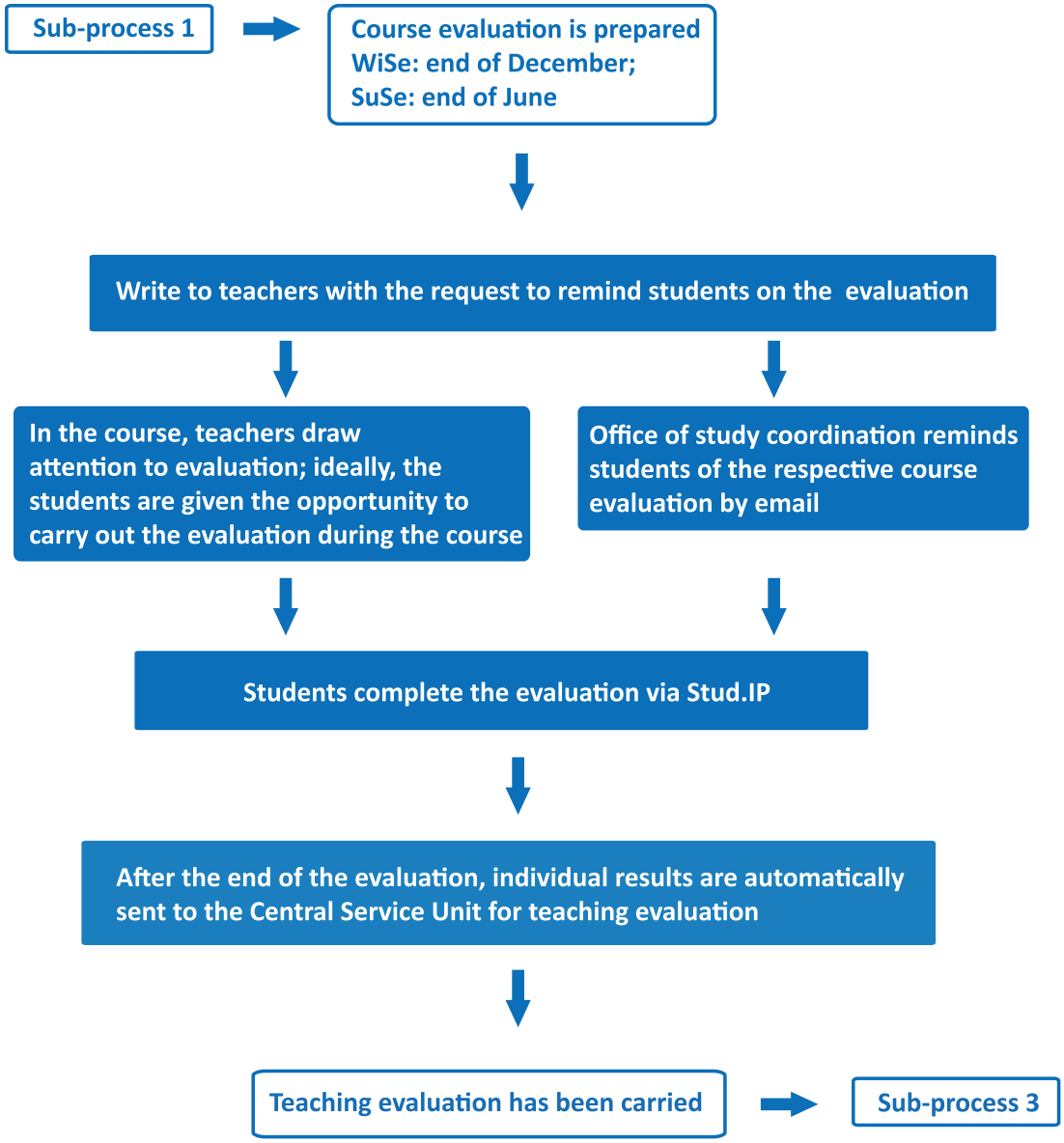
## Sub-process 1: plan and prepare course evaluation

Process flow



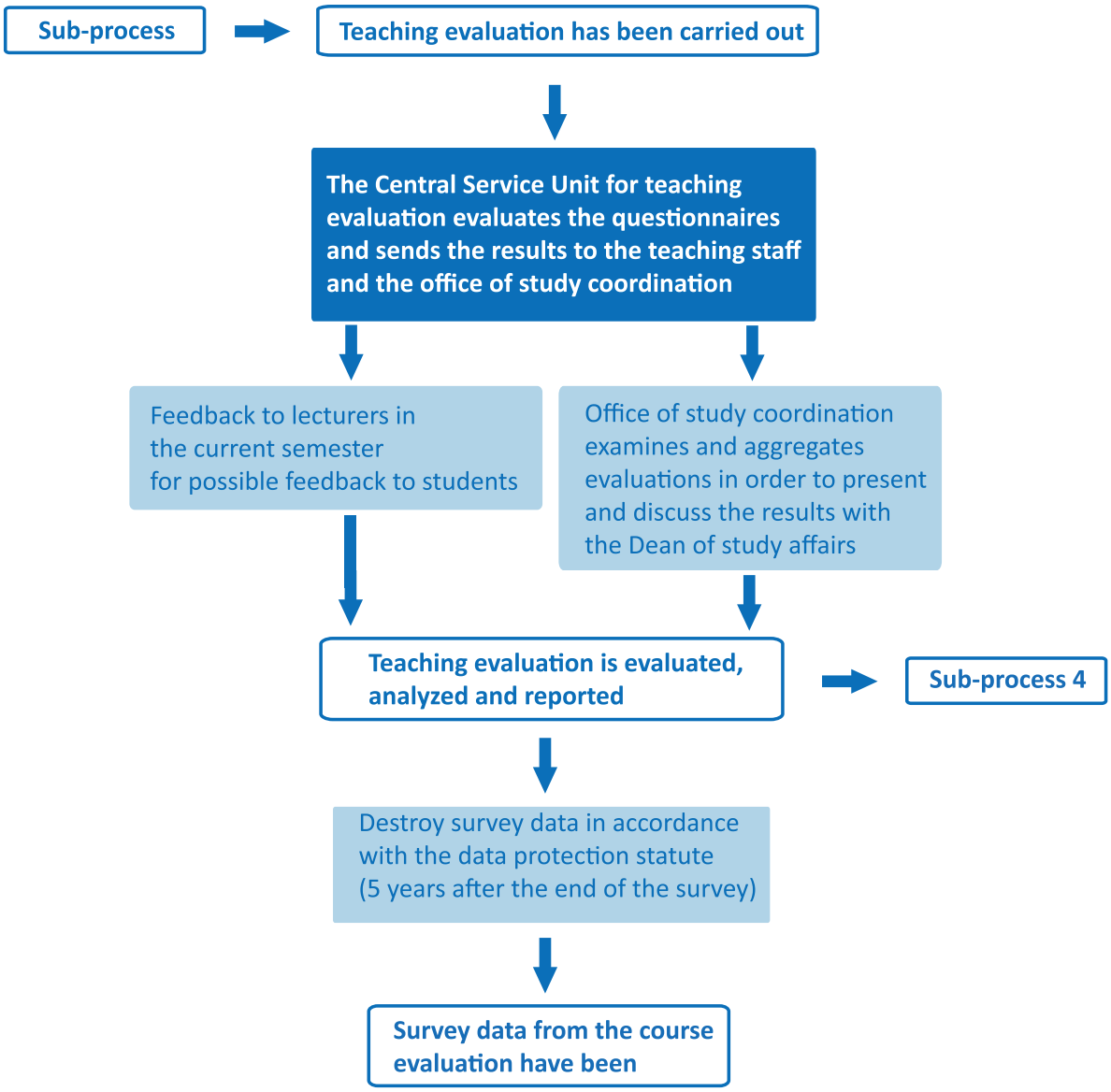
### Sub-process 2: Perform course evaluation

Process flow



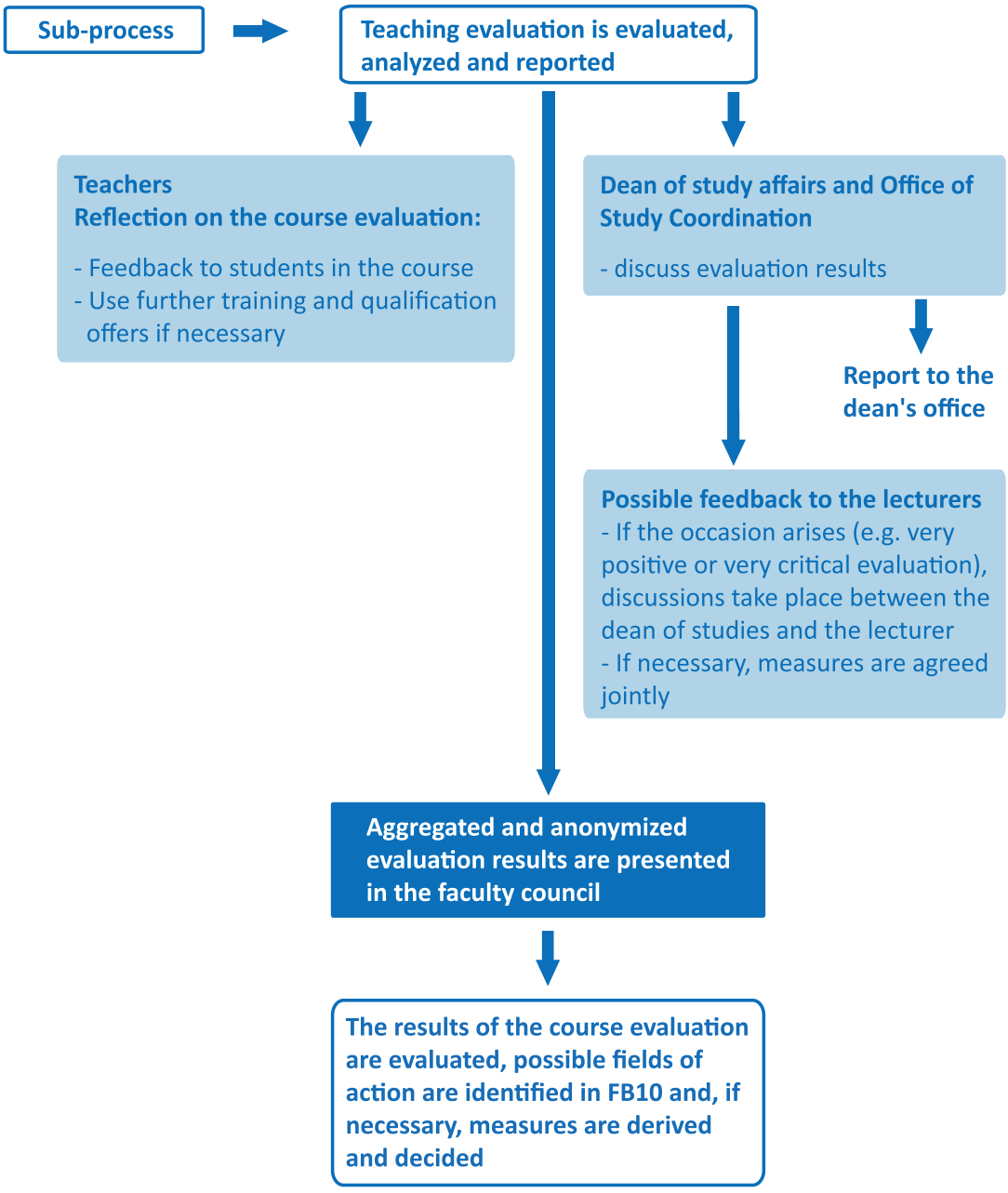
### Sub-process 3: conduct, evaluate, analyze and report course evaluation

Process flow



**Sub-process 4: Assessment of the results of the course evaluation and improve processes**

Process flow



Besides the official evaluation process frequent meetings, at least once a semester of the Commission of study affairs together with the Dean of study affairs take place. In these meetings insufficiencies and deviations of the study programme are analyzed and discussed by its members. The commission is chaired by the Dean of study affairs. Further members are 4 professors, 1 member of the non-professorial scientific staff and 4 students. During these meetings students as representatives of the student council report on any problems, insufficiencies in the programme and about complaints by their fellow students. As a consequence of these meetings the dean of study affairs or members of the office of study affairs get in contact with the teaching staff of those events or lectures where these insufficiencies or problems occur to achieve an improvement. Feedback and development also happens in direct exchanges between students and supervisors or lecturers following course evaluations.

In order to obtain a quality assurance in the organ centered teaching blocks from semesters 6 to 8 feedback rounds are initiated by the module representatives (Appendix 3.1.3a). Within these feedback rounds inconsistencies, deficiencies and redundancies regarding the content of teaching of the previous block are addressed in order to improve the quality of teaching for the next cohort of students.


Fig. 2 Review process for improving the quality of exams

# Appendix E: List of scientific publications from the Establishment`s academic staff in peer reviewed journals during the las three academic years

## Year 2020

**Abultdinova A, Jakupov I, Roth J, Failing K, Wehrend A, Sickinger M (2020)**
Association of bovine uterine involution disturbances with serum neuropeptide concentrations.
Vet. World 13: 1854-1857

**Ahlén G, Frelin L, Nikouyan N, Weber F, Höglund U, Larsson O, Westman M, Tuvesson O, Gidlund EK, Cadossi M, Appelberg S, Mirazimi A, Sällberg M, OPENCORONA Consortium (2020)**
The SARS-CoV-2 N protein is a good component in a vaccine.
J. Virol. 94: e01279-20

**Ahmed MFE, Alssahen M, Lämmler C, Eisenberg T, Plütz M, Abdulmawjood A (2020)**
Studies on *Trueperella pyogenes* isolated from an okapi (Okapia johnstoni) and a royal python (Python regius).
BMC Vet. Res. 16: 292

**Ahmed MFE, Ramadan H, Seinige D, Kehrenberg C, Abd El-Wahab A, Volkmann N, Kemper N, Schulz (2020)**
Occurrence of extended-spectrum beta-lactamase-producing Enterobacteriaceae, microbial loads, and endotoxin levels in dust from laying hen houses in Egypt.
BMC Vet. Res. 16: 301

**Akineden Ö, Wittwer T, Geister K, Plötz M, Usleber E (2020)**
Nucleic acid lateral flow immunoassay (NALFIA) with integrated DNA probe degradation for the rapid detection of/Cronobacter sakazakii/ and */Cronobacter malonaticus/* in powdered infant formula.
Food Control 109:106952

**Alarcón P, Manosalva C, Quiroga J, Belmar I, Álvarez K, Díaz G, Taubert A, Hermosilla C, Carretta M D, Burgos R A, Hidalgo M A (2020)**
Oleic and Linoleic Acids Induce the Release of Neutrophil Extracellular Traps via Pannexin 1-Dependent ATP Release and P2X1 Receptor Activation.
Front. Vet. Sci. 7: 260

**Alicka M, Kornicka-Garbowska K, Kucharczyk K, Kępska M, Röcken M, Marycz K (2020)**
Age-dependent impairment of adipose-derived stem cells isolated from horses
Stem Cell Res Ther. 3: 4

**Alssahen M, Hassan AA, Rau J, Sammra O, Wickhorst JP, Lämmler C, Prenger-Berninghoff E, Eisenberg T, Abdulmawjood A (2020)**
Comparative studies on *Schaalia (Actinomyces) hyovaginalis* isolated from wild boar, goat and sheep.
Berl. Münch. Tierärztl. Wschr. 133: doi:10.2376/0005-9366-19017

**Alssahen M, Hassan AA, Sammra O, Lämmler C, Saarnisto MR, Borowiak M, Malorny B, Rau J, Prenger-Berninghoff E, Plötz M, Abdulmajwood A (2020)**
Epidemiological analysis of *Arcanobacterium phocae* isolated from cases of mink dermatitis of a single farm.
Vet. Microbiol. 243: 108618

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# Appendix F:

# Ordinance concerning the Certification of Veterinary Surgeons (TAppv)

# Ordinance
# concerning the Certification of Veterinary Surgeons
(*Verordnung zur Approbation von Tierärztinnen und Tierärzten – TAppV*)

Issue date: 27 July 2006

Full quote:

Ordinance concerning the Certification of Veterinary Surgeons of 27 July 2006 (Federal Law Gazette [*BGBl.*] Part I p. 1827), amended by Article 37 of the Act of 2 December 2007 (Federal Law Gazette Part I p. 2686)

Version: Amended by Art. 37 of the Act of 2 December 2007 Part I 2686

**Preamble**

On the basis of section 5 sentence 1 of the Federal Veterinary Code (*Bundes-Tierärzteordnung*) in the version of the promulgation of 20 November 1981 (Federal Law Gazette Part I p. 1193), most recently amended by Article 151 of the Act of 25 November 2003 (Federal Law Gazette Part I p. 2304), in conjunction with section 1 (2) of the Competence Adjustment Act (*Zuständigkeitsanpassungsgesetz*) of 16 August 2002 (Federal Law Gazette Part I p. 3165) and the order for the establishment of an institution of 22 November 2005 (Federal Law Gazette Part I p. 3197), the Federal Ministry of Heath herewith orders as follows:

## CHAPTER 1
## VETERINARY TRAINING

### Section 1
### Objectives and Structure of Veterinary Training

(1) The objective of the training is an academically and practically trained veterinary surgeon who is capable of practising the veterinary profession responsibly and independently within the meaning of Section 1 of the Federal Veterinary Code and of undergoing further training and ongoing advanced training.

1. The fundamental veterinary, scientific, interdisciplinary and methodological skills,

2. practical skills,

3. spiritual and ethical foundations, and
4. a professional attitude committed to the well-being of humans, animals and the environment

shall be imparted as they are necessary for the entire scope of the veterinary profession to be practised responsibly, taking special account of quality assurance.

(2) Veterinary training shall comprise

1. an academic-theoretical component of studies in veterinary medicine lasting for four and a half years with 3,850 hours of compulsory and optional courses, which must not be exceeded, at a university or at an equivalent higher-education establishment (university) in which the necessary basic knowledge is imparted with a view to its subsequent use in veterinary medicine;

2. a practical component of studies lasting for 1,170 hours, with

   a) 70 hours on agriculture, animal breeding and animal husbandry,
   b) 150 hours in the therapeutic practice of a veterinary surgeon or in an animal hospital under veterinary supervision,
   c) 75 hours in hygiene control and control of foodstuffs,
   d) 100 hours in the inspection of animals for slaughter and meat,
   e) 75 hours in the public veterinary service,
   f) 700 hours in the therapeutic practice of a veterinary surgeon or in an animal hospital under veterinary supervision or an elective placement,

3. the following examinations:

   a) the Preliminary Veterinary Examination,
   b) the Veterinary Examination.

The standard period of study within the meaning of Section 10 (2) of the Framework Act on Higher Education (*Hochschulrahmengesetz*) shall be five years and six months for the entire training.

## Section 2
## Courses

(1) The university shall provide an education that complies with the objectives cited in Section 1 (1) and that allows the students to acquire the knowledge and skills required in the examinations provided for in this Ordinance. The imparting of the fundamentals of natural science and theory is to be concentrated on the training content that is relevant to veterinary medicine. The theoretical and clinical knowledge is to be linked as closely as possible during the entire training. For this purpose the university shall conduct, in particular, lectures, seminars, clinical demonstrations and exercises, including exercises on the animal, in the subjects cited at Annex 1. It may replace parts of these courses with appropriate interactive learning programmes. The number of students in the seminars, at the clinical demonstrations and the exercises shall be tailored to the teaching task by the universities. As far as possible and where appropriate, the contents of the teaching shall not be oriented to the individual discipline, but shall be imparted in an interdisciplinary, problem-oriented manner in line with the object of teaching. Interdisciplinary teaching shall be conducted and co-ordinated with the involvement of representatives from several subjects. The Rules for Study at each university shall govern this in more detail.

(2) During their studies the students shall participate in at least those teaching events cited in (1) sentence 4 above that the university shall designate as compulsory courses. The compulsory and optional courses shall amount to an average of 30 hours per week in a semester, except during the clinical training and the placements. They must contain the disciplines listed at Annex 1 with the required number of hours.

(3) The university shall offer optional courses in subjects cited at Annex 1, in which the students shall participate with at least 308 hours from the 1st to the 9th semesters, including at least 84 hours in subject areas for the Anatomical-Physiological Stage of the Preliminary Veterinary Examination and at least 126 hours in the subject areas of the Veterinary Examination.

(4) During the 8th and 9th semesters, the students shall participate in the compulsory course in the interdisciplinary subject .

## Section 3
## Trial Clause

(1) While retaining the total number of hours for the scientific-theoretical part of the course, amounting to 3,850 hours, the universities may make provision for deviations from the number of hours for the subjects listed at Annex 1 by up to 20 per cent of the total number of hours, subject to the proviso of (2).

(2) Subjects with 28 hours or fewer, as well as the subjects listed in Annex 1 Nos. 28 to 31, shall be excluded from the possibility of reducing the number of hours.

(3) The deviations in accordance with (1) shall be subject to the proviso that

1. the training objectives in accordance with Section 1 (1) as a foundation of the certification in accordance with Section 4 (1) of the Federal Veterinary Code are not jeopardised,

2. it has been ensured that the requirements of Article 38 of Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications (OJ EC L 178 p. 7) have been satisfied,

3. the conditions under which the university can reverse the deviations have been regulated,

4. it is still possible for the students to change university.

(4) The universities that avail themselves of the deviation in accordance with (1) shall inform the competent authority of this with a description of the objective of the trial and the expected quality improvements for veterinary training. Upon request they shall submit a report to the competent authority on the experience gathered.

## Section 4
## Model course of studies

(1) For the trial of new models of veterinary training, the competent authority, on request from a university, may introduce a model course derogating from the standard course of studies and may determine the respective contents. The goals of training as defined in Section 1 (1) must remain unaffected.

(2) Approval as a model course of studies shall be contingent on

1. the objective of the trial being described and revealing what qualitative improvements are anticipated for veterinary training to emerge from the model course of studies,
2. there being a special Rules for Study issued by the University,
3. it being ensured that the knowledge, skills and abilities to be proven in the Preliminary Veterinary Examination and the Veterinary Examination are examined in the model course of studies in a manner equivalent to the standard course of studies,
4. a proper, accompanying, final evaluation of the model course of studies by the university, using external expertise, is guaranteed,
5. the minimum and maximum duration of the model course of studies has been determined and extension applications are to be reasoned using results of the evaluation,
6. the prerequisites are named subject to which the university can discontinue the model course of studies,
7. the procedure to be followed on transition from the model course of studies to the standard course of studies is to be regulated with regard to further studies, allowance of study times and examinations and other study achievements, and
8. it is determined how the requirements of the standard course of studies as to the Preliminary Veterinary Examination and the Veterinary Examination are met in the model course of studies.

## CHAPTER 2
## EXAMINATION REGULATIONS

### Sub Chapter 1
### General Regulations

### Section 5
### Examination Committees

(1) One state examination committee of the Preliminary Veterinary Examination and one state examination committee for the Veterinary Examination shall be formed at every university.

(2) Every examination committee shall comprise the Chairman, one or more deputies and further members. The members of the examination committee shall be appointed in writing as examiners for specific examination subjects and each for no more than four years after the university has been heard by the competent authority. Professors from the university shall be appointed as Chairman and deputies and professors or other teaching staff from the subjects being examined shall be appointed as other members.

(3) The Chairman shall be responsible for supervision of the examinations and their proper implementation. He or she shall ensure that students who meet all the requirements for admission to the examination can take initial examinations in the respective examination subjects within the deadlines prescribed by the university. In urgent cases, the Chairman may, with the agreement of the competent authority, authorise a member of the teaching staff to temporarily take care of the examination business.

### Section 6
### Competent Examination Committee

The students shall sit the stages of the Preliminary Veterinary Examination and the Veterinary Examination before the competent examination committee at the university at which they are enrolled on the Veterinary Medicine course at the time they registered for the examination or were most recently enrolled. Resit examinations shall be sat before the examination committee where the examination was failed.

### Section 7
### Registration for the Examination

(1) For the examinations of the Preliminary Veterinary Examination in accordance with sections 19 and 22, and prior to the examinations of the Veterinary Examination in accordance with section 29, an application for approval shall be made to the Chairman of the examination committee. The following shall be enclosed with the application:

1. personal identification,

2. proof of entitlement to study at a university, in the case of certificates acquired outside the area of application of this Ordinance, also the recognition decision of the competent authority, as well as

3. the required proof of training in accordance with Sections 20, 23 and 31.

The proof under sentence 2 Nos. 1 and 2 shall only be enclosed prior to the first examination at a university.

(2) The proof shall be submitted as originals or as officially certified copies. It may be submitted in another form insofar as this is recognised in the individual case by the Chairman of the examination committee as being equivalent. The proof shall be placed in the examination files until completion of the relevant stage of the examination and then returned.

**Section 8**
**Admission to the Examination**

(1) The Chairman shall decide on admission to the examinations on behalf of the examination committee.

(2) Admission shall be refused if the student cannot furnish the required proof or may not resit an examination in accordance with Section 17 (1) sentence 3.

(3) After admission to the examination, the examinations shall be sat within the deadlines set by the university.

**Section 9**
**Sitting the Examination**

(1) The examinations shall be held by the members of the examination committee appointed or commissioned for the examination subjects concerned. They may also be held by several examiners.

(2) The Chairman or his deputy may participate in the examinations and set examination questions.

(3) The competent authority may send observers to the oral examinations. After prior registration, the Chairman of the examination committee shall allow up to five students of veterinary medicine who have already been admitted to the same examination or who are in the stage of training prior to the examination concerned, as well as one representative of the competent Chamber of Veterinary Surgeons, to be present at the examination, with the exception of the deliberations and the announcement of the examination results, provided that none of the candidates objects.

**Section 10**
**Form of the Examination**

(1) The examination may be conducted in writing, orally, by solving questions set in writing whereby it is to be stated which of the answers proposed with the questions are considered to be correct (multiple choice) or in a combination of these forms of examinations. The university may also derive the examination mark from continuous assessment; the provision of proof about regular and successful participation in the seminars and exercises shall remain unaffected. In individual examination subjects, the examination can be taken in several part examinations.

(2) No more than five students shall be examined together in the oral examination.

(3) If students can demonstrate with a medical certificate that they cannot sit the examination fully or partially in the intended form due to a physical disability, the Chairman shall allow equivalent examination achievements to be demonstrated by different means.

(4) The university shall define the form of the examination for the respective examination subject in accordance with (1), as well as the respectively necessary deviations from Sections 9, 11, 12 and 14, in a supplementary Code of Examination Regulations (Section 16 of the Framework Act on Higher Education).

**Section 11**
**Examination Date**

(1) The examinations shall be carried out soon after the lessons. They should be held in the periods free of lectures; they should as a rule be completed by the start of the next period of lectures, with the exception of resits. The Chairman shall set the examination dates in agreement with the examiners involved. The examinations shall be set in such a way that the standard study period pursuant to Section 1 (2) sentence 2 is not exceeded.

(2) The time in which no compulsory courses or placements are to be attended by the students concerned shall be regarded as periods free of lectures.

**Section 12**
**Invitation to Sit the Examination, Failure to Attend**

(1) The students shall be informed of the examination date at the latest seven days prior to the examination date. The information shall be served.

(2) If, for good reason, students miss an examination date or miss the deadline for handing in a written protocol of findings, they shall be invited to sit a new examination, which shall not be considered a resit, or a new deadline shall be set for them. The reason for the omission shall also be sent to the Chairman in writing without undue delay and its validity shall be demonstrated upon request. In the event of omission due to illness a medical certificate shall also be submitted. The Chairman may demand that the certificate from a health office be submitted. The achievements of the students in the examination concerned shall be deemed to be "inadequate" in the event of failure to attend without good reason.

(3) If the students discontinue an examination or withdraw from it, (2) above shall apply *mutatis mutandis*.

(4) Students who have not registered for an examination without good reason at the latest one academic year after the earliest possible date for them or six months before the last possible date for them shall be invited to attend mandatory student counselling *ex officio* by the Chairman of the examination committee.

**Section 13**
**Objective of the Examination**

(1) The examination shall determine whether the students have acquired the knowledge and skills that they need to continue their studies and to perform the veterinary profession. The examination shall also cover whether the students understand how to theoretically and practically apply the basic knowledge they have proved in previous stages of the examination and whether they master the common specialist terminology.

(2) If a patient or another examination object upon which the students are to be examined is not available, the examiner shall decide how the examination shall be conducted properly, where appropriate on a dummy or a model.

**Section 14**
**Examination Marks**

(1) The examiner or a record keeper appointed by the Chairman shall in each case keep a written record of the course of the oral examination in accordance with the model in Annex 2, from which the subject matter of the examination and the assessment of the achievements can be seen. The examiners shall use the following examination marks to assess the examination achievements:

1. "very good" (1) = an outstanding achievement,
2. "good" (2) = an achievement that is considerably above the average requirements,
3. "satisfactory" (3) = an achievement that satisfies the average requirements in every respect,
4. "adequate" (4) = an achievement that still meets the requirements in spite of its shortcomings,
5. "inadequate" (5) = an achievement that no longer meets the requirements due to considerable shortcomings.

On proviso of Section 15, the examination mark "inadequate" may be awarded in an oral examination only if the students have been examined for at least 20 minutes; it shall be briefly justified in the written record.

(2) The university shall define a binding evaluation framework prior to the examination for examinations which are carried out by solving questions set in writing whereby it is to be stated which of the answers proposed with the questions are considered to be correct (multiple choice).

(3) The result of the examination shall be announced to the students after completion of the examination in each examination subject.

**Section 15**
**Irregularities**

If students disrupt the orderly course of the examination, or if they attempt to perpetrate deception, the examiner may interrupt the examination of these students. The Chairman, in agreement with the examiners concerned, may declare the achievements of these students in the examination concerned to be "inadequate" or, in particularly serious cases, declare the stage of the examination to have been failed.

**Section 16**
**Results of the Examination**

(1) The Chairman shall specify the results of the examination and award the certificates in accordance with Annexes 3 to 5. The certificates shall contain a list of the examination marks for the examination subjects as well as the overall results after the Preliminary Veterinary Examination and the Veterinary Examination have been passed. Examinations credited in accordance with Section 65 shall be identified separately on the certificates.

(2) An examination subject shall be deemed to have been passed if the students have received at least the examination mark "adequate".

(3) A stage of the Preliminary Veterinary Examination or the Veterinary Examination shall be deemed to have been passed if the students have passed all of the examination subjects in the stage concerned.

(4) The overall results of the Preliminary Veterinary Examination and of the Veterinary Examination shall each be made up of the average of the examination marks received for the examination subjects in the relevant stages. The average mark shall be calculated to two decimal places, the third decimal place not being taken into account. The overall mark shall be

1. "very good" for a numerical value of up to 1.49
2. "good" for a numerical value of 1.50 to 2.49
3. "satisfactory" for a numerical value of 2.50 to 3.49
4. "adequate" for a numerical value of 3.50 to 4.00.

(5) A certificate following the model of Annex 4 shall be drawn up to confirm that the Preliminary Veterinary Examination has been passed and a certificate following the model of Annex 5 shall be drawn up to confirm that the Veterinary Examination has been passed, each of which shall contain the numerical value in brackets adjacent to the overall result. If students have not passed the Preliminary Veterinary Examination or the Veterinary Examination, an overall mark shall not be calculated; if examinations have been credited in accordance with Section 65, an overall mark shall not be calculated unless the Chairman of the examination committee ascertains that the other examination marks obtained would permit a meaningful overall mark to be determined.

**Section 17**
**Resitting the Examination**

(1) Students may resit the examination twice in examination subjects that they have not passed. Section 20 (2) shall remain unaffected. If an examination subject is not passed when it has been resat twice, the Chairman shall declare that the examination has definitively not been passed. Another resit, even after studying veterinary medicine again, shall not be possible. The Chairman shall inform the other universities, as well as the authorities responsible for crediting students' achievements, thereof.

(2) A resit examination may be conducted at the earliest three weeks after the failed examination.

(3) Apart from the examiner, the chairperson or a member of the committee designated by him/her shall attend oral examinations at the second resit; they may also ask examination questions. With written examinations, the work of the second resit is to be evaluated, apart from by the examiner, by the chairperson or a member of the committee designated by him/her. At the request of the student, sentences 1 and 2 shall also apply *mutatis mutandis* to the first resit in accordance with the supplementary Code of Examination Regulations.

**Section 18**
**Notification of the Examination Results**

After completion of the Veterinary Examination, the Chairman shall notify the competent authority of the names of the students and the examination results.

**Sub Chapter 2**
**Scientific Stage of the Preliminary Veterinary Examination**
**(Preliminary Physics)**

**Section 19**
**Examination Subjects**

Preliminary Physics shall comprise the following examination subjects

1. Physics, including the fundamentals of Health Physics,
2. Chemistry,
3. Zoology, and
4. Botany, including Nutritional Science, Toxicology and Herbalism.

The examinations shall be sat by the end of the first year of studies.

**Section 20**
**Proof**

(1) The following proof shall be necessary for admission to the examinations

1. certification of regular, successful attendance at the seminars or exercises in the subjects set by the university for the examination subject in

   a) Physics, including the fundamentals of Health Physics,
   b) Chemistry,
   c) Zoology, and
   d) Botany, including Nutritional Science, Toxicology and Herbalism;

2. certification of regular, successful attendance at a course of medical terminology conducted by the university or recognised as equivalent by the Chairman of the examination committee; this proof may be replaced if a knowledge of Latin or Greek in accordance with the Decision of the Conference of Education Ministers of 26 October 1979 (Joint Ministerial Gazette 1980 p. 642) can be demonstrated.

(2) The university may offer students the opportunity to prove in an oral examination within the first month of starting the first semester of studies that they have sufficient knowledge of the subjects designated in (1) no. (1) (a) to (d) above. Proof of sufficient knowledge in accordance with Section 21 in one or more of these subjects shall be deemed as a passed examination within the meaning of Section 19 and as proof within the meaning of (1) above. If the examination is not passed in one or more subjects in accordance with sentence 1, the examination shall be deemed not to have been passed.

**Section 21**
**Contents of the Examination**

The examinations in the examination subjects of Physics, including the fundamentals of Health Physics, Chemistry, Zoology and Botany including Nutritional Science, Toxicology and Herbalism, shall cover the main basic knowledge required to understand natural processes and to subsequently apply them in veterinary medicine.

**Sub-Chapter 3**
**Anatomical-Physiological Stage of the Preliminary Veterinary Examination (Physics)**

**Section 22**
**Examination Subjects**

Physics shall comprise the following examination subjects

1. Anatomy,
2. Histology and Embryology,
3. Physiology,
4. Biochemistry, and
5. Animal Breeding and Genetics including Livestock Judging.

The examinations should be taken by the end of the second year of studies.

**Section 23**
**Proof**

(1) The following proof shall be necessary for admission to the examinations

1. certification of having passed Preliminary Physics no longer than one and a half academic years earlier,

2. certification of having regularly and successfully attended seminars and exercises in subjects set by the university for the respective examination subject in

   a) Anatomy,
   b) Histology,
   c) Embryology,
   d) Physiology,
   e) Biochemistry, and
   f) Animal Breeding and Genetics, including Livestock Judging

3. certification from the university of having attended a 70-hour exercise in two consecutive weeks on Agriculture, Animal Breeding and Animal Husbandry on a teaching farm and

4. certification from the university of having regularly and successfully attended at least 84 hours of optional teaching events in subjects in accordance with no. 2.

(2) The requirements of (1) no. 3 shall be deemed to have been met if an agricultural course with assistants' examination, a four-week agricultural placement on a recognised teaching farm or another comparable course recognised by the university has been completed.

**Section 24**
**Anatomy**

In the examination subject of Anatomy, the students shall completely or partially explain the contents of a bodily cavity, where necessary shall also remove it and each prepare a subject on the locomotor system and the organs or organ systems on the basis of existing preparations or preparations to be made up.

**Section 25**
**Histology and Embryology**

In the examination subject of Histology and Embryology, the students shall demonstrate their knowledge of cell theory, histology and organology on the microscopic-anatomical preparation as well as in general and specific development theory.

**Section 26**
**Physiology**

In the examination subject of Physiology, the students shall solve or evaluate an exercise problem from the field of Physiology and explain it and demonstrate their knowledge of the physiological foundations of living processes and the normal functional course of individual organ systems and their regulation in the organism as a whole. Nutritional physiology shall be considered.

**Section 27**
**Biochemistry**

In the examination subject of Biochemistry, the students shall solve or evaluate an exercise problem and explain it and demonstrate their knowledge of the biochemical and molecular-biological foundations of living processes and their management. The particularities of the intermediary metabolism among pet animals and production animals, as well as the biochemistry of nutrition, shall be considered.

**Section 28**
**Animal Breeding and Genetics including Livestock Judging**

In the examination subject of Animal Breeding and Genetics, the students shall assess a pet animal in terms of its commercial or breeding value and prove that they have acquired sufficient knowledge of genetics and in breeding pet animals.

**Sub Chapter 4**
**Veterinary Examination**

**Section 29**
**Examination Subjects**

The Veterinary Examination shall comprise the examination subjects

1. Animal Husbandry and Animal Hygiene,
2. Animal Welfare and Ethnology,
3. Animal Nutrition,
4. Clinical Propadeutics,
5. Virology
5. Bacteriology and Mycology,
7. Parasitology,
8. Control of Animal Epidemics and Infection Epidemiology
9. Pharmacology and Toxicology,
10. Law on Pharmaceuticals and Narcotics,
11. Poultry Diseases,
12. Radiology,

13. General Pathology and Special Pathological Anatomy and Histology,
14. Food Science including Food Hygiene,
15. Meat Hygiene,
16. Milk Science,
17. Reproductive Medicine,
18. Internal Medicine,
19. Surgery and Anaesthesiology, and
20. Forensic Veterinary Medicine, Law Governing Professional Matters and Professional Conduct.

**Section 30**
**Special regulations for the final examinations**

The examinations in the subjects General Pathology and Special Pathological Anatomy and Histology, Food Hygiene, Meat Hygiene, Milk Hygiene, Internal Medicine, Surgery and Anaesthesiology, Reproductive Medicine, as well as Forensic Veterinary Medicine, Law Governing Professional Matters and Professional Conduct, may not be completed prior to the end of the eighth semester.

**Section 31**
**Proof**

(1) The following proof shall be necessary for admission to the examinations

1. certificate relating to the Preliminary Veterinary Examination,
2. certification of having regularly and successfully attended the seminars or exercises set by the university for the respective examination subject of the Veterinary Examination,
3. certification of having attended a practical component of studies necessary for the respective examination subject in accordance with Sections 54 to 62 or another comparable substitute training acknowledged by the university.

(2) Furthermore, the following proof must be provided prior to conclusion of the examinations in accordance with Section 30:
1. certification of having regularly and successfully attended the courses in Biometry, Nutritional Science, Immunology,
2. certification of having studied veterinary medicine for a total of at least five-and-half study years, of which at least three study years after having passed the Preliminary Veterinary Examination, and
3. certification of having regularly and successfully attended for at least 224 hours optional courses, hours from optional courses in accordance with Section 23 (1) no. 4 not being taken into account.

**Sub-Chapter 5**
**Contents of the teaching and study subjects**

**Section 32**
**Animal Husbandry and Animal Hygiene**

The examination in the subject of Animal Husbandry and Animal Hygiene shall cover the keeping and care of pet animals and production animals and the importance of environmental influences on the health and performance of the animals as well as the impacts of keeping animals on the environment. In the case of animals that are used to obtain food, the impact of keeping them on the quality of the foodstuffs obtained shall be taken into account.

**Section 33**
**Animal Welfare and Ethnology**

In the examination subject Animal Welfare and Ethnology, students shall prove their knowledge of housing and care of animals that is species-specific and appropriate to their behaviour, as well as of the protection of the animals in animal trade, in animal transport, in slaughtering or killing and in animal

testing, as well as their knowledge of animal welfare regulations with their ethical and scientific foundations, and in ethnology.

**Section 34**
**Animal Nutrition**

The examination in the subject of Animal Nutrition shall cover nutrition, taking special account of the pathogenesis of illnesses caused by nutrition, a reduction in fertility and performance, the environmentally relevant effects of nutrition, including the possible introduction of unwanted substances into foodstuffs of animal origin and the foundations of dietetics, taking special account of nutritional science as well as the provisions of fodder legislation that are important in the veterinary field.

**Section 35**
**Clinical Propadeutics**

In the examination subject Clinical Propadeutics, the students shall examine an animal and prove that they have familiarised themselves with the basics of the clinical examination methods.

**Section 36**
**Virology**

In the examination subject of Virology, the students shall demonstrate their knowledge of the important types of virus in veterinary medicine, aetiology, the course, diagnosis, prevention and treatment of the illnesses they cause in animals as well as their importance to human health. Questions of immunology, epidemiology and epizoology shall be taken into account in this connection.

**Section 37**
**Bacteriology and Mycology**

In the examination subject of Bacteriology and Mycology, the students shall prepare a microbiological preparation, examine it, explain it and demonstrate their knowledge of the important types of bacteria and fungi in veterinary medicine, aetiology, the course, diagnosis, prevention and treatment of the illnesses they cause in animals as well as their importance to human health. In this connection, questions of immunology, epidemiology and epizoology shall be taken into account.

**Section 38**
**Parasitology**

In the examination subject of Parasitology, the students shall prepare a parasitological preparation, examine it, explain it and demonstrate their knowledge of the biology of animal parasites and the identification, course, treatment and prevention of parasitic illnesses as well as the importance of animal parasites to human health. In this connection, questions of immunology, epidemiology and epizoology shall be taken into account.

**Section 39**
**Control of Animal Epidemics and Infection Epidemiology**

In the examination subject Control of Animal Epidemics and Infection Epidemiology, students shall prove their knowledge of the general principles of the causes, spread, combating and economic impact of animal epidemics, including their prophylaxis, fundamentals of infection epidemiology, the law on animal epidemics, and the regulations on processing animal offal.

**Section 40**
**Pharmacology and Toxicology**

The examination in the examination subject of Pharmacology and Toxicology shall above all cover the effects and interactions of pharmaceuticals and other active agents in the healthy and diseased organism, a basic knowledge of the therapeutic use of these substances and the associated risks for animals and

humans, as well as Pharmacokinetics, particularly taking into account species-specific biotransformation and the excretion of such substances through an animal's body. The corresponding impact and characteristics of poisons and environmental contaminants in the healthy or diseased organism, as well as the therapy of acute and chronic poisoning, shall also be covered.

**Section 41**
**Law on Pharmaceuticals and Narcotics**

In the examination subject of Law on Pharmaceuticals and Narcotics, students shall prove that they can select and prescribe suitable pharmaceuticals based on at least three symptoms, as well as that they have knowledge of the principles of determining maximum residual amounts and on the derivation of waiting periods. Further, they shall prepare two pharmaceuticals in accordance with a prescription and prepare an invoice in accordance with the provisions applicable to pharmaceuticals prices. Over and above this, students shall prove their knowledge of the relevant legal provisions regarding the sale of pharmaceuticals and narcotics, as well as of the provisions and measures to avoid residuals in animal-origin food.

**Section 42**
**Poultry Diseases**

In the examination subject of Poultry Diseases, the students shall demonstrate their knowledge of the aetiology, pathogenesis, diagnostics, prophylactics and treatment of diseases of commercial poultry, wild, fancy and zoo birds, taking special account of keeping and feeding with regard to the origin and treatment of diseases.

**Section 43**
**Radiology**

(1) The examination in the examination subject of Radiology shall cover
1. the characteristics and impact of ionising rays,
2. the fundamentals of radiobiology,
3. the impact of ionising radiation on people, animals, food, fodder and the environment,
4. methods to prove the impact of radiation and to ascertain doses among employees and persons looking after animals,
5. methods of proving contamination with radioactive substances,
6. physical-technical principles and principles of the application of imaging diagnostic procedures, including the presentation of alternatives to the application of ionising radiation,
7. fundamentals of radiotherapy, as well as
8. the statutory, practical and technical radiological protection of employees and persons looking after animals (content of examinations from nos. 4 to 8 of the Basic Course in Radiological Protection acc. to Annex 1 of the Guideline on Radiological Protection in Veterinary Medicine (*Richtlinie Strahlenschutz in der Tierheilkunde*); Joint Ministerial Gazette (*Gemeinsames Ministerialblatt – GMBl*) 2005 p. 666).

(2) The examination successfully passed in accordance with (1) shall be recognised as a Basic Course in Radiological Protection acc. to Annex 1 of the Guideline on Radiological Protection in Veterinary Medicine if the competent agency has previously found that the prerequisites (contents of the teaching from Annex 1 of the Guideline on Radiological Protection in Veterinary Medicine) have been met.

(3) The acquisition of the expertise for the field of X-ray diagnostics cannot be commenced until after the examination has been successfully taken in the examination subject of Radiology during clinical training, and shall be orientated in line with the requirements of the Guideline on Radiological Protection in Veterinary Medicine.

**Section 44**
**General Pathology and Special Pathological Anatomy and Histology**

In the examination subject of General Pathology and Special Pathological Anatomy and Histology, the students shall demonstrate that they have acquired basic knowledge of the origins and course, the characteristics and the identification of pathological processes. Furthermore, they shall

identify and explain pathological-histological preparations, carry out an autopsy on an animal cadaver or examine one organ or several organs, explain the findings and then write them down as well as demonstrate their knowledge of identifiable pathological processes and their pathogenesis.

**Section 45**
**Food Science including Food Hygiene**

In the examination subject Food Science including Food Hygiene, students shall examine animal-origin food, with the exception of milk or dairy products, evaluate its characteristics, composition and marketability and note the findings. They shall prove their knowledge of their significance for the food of humans, on production, technology of the manufacture and treatment, as well as on their microbiological, chemical and other qualities. In particular, aspects of quality that are relevant to hygiene and health shall be taken into account in doing so. Furthermore, they shall prove knowledge of the influences exerted on food safety and quality at all levels of the food chain and the animals used for production, food, including the measures for quality assurance, evaluation of residues and of the relevant provisions of the law on food. Over and above this, students shall prove that they can categorise the potential causes of errors and faults, the hazards and the possible risks which can occur at all stages of the food chain, in the context of a risk analysis in accordance with scientific principles and take suitable control and correction measures.

**Section 46**
**Meat hygiene**

In the examination subject Meat Hygiene, students shall examine an animal for slaughter in the living state and an animal for slaughter in the slaughtered state or parts of a slaughtered animal or culled furred game in accordance with the valid legal provisions, shall make a statement regarding the suitability of the meat for human consumption and record findings and evaluations. They shall further prove their knowledge of the hygienic production and treatment of the meat, the knowledge underlying examination of the animal for slaughter and meat and of the specific legal foundations of meat hygiene, as well as the fundamentals of theory on the operation of abattoirs. To a particular degree, they shall prove their knowledge as regards the principles, concepts and methods of good manufacturing practice, of quality management, of risk analysis on a scientific basis and of a system of critical control points (HACCP procedure; Hazard Analysis Critical Control Point) and shall use case examples to examine and evaluate them. The prevention and containment of food-related risks to human health, as well as methods of epidemiology and monitoring and surveillance systems, shall be explored here.

**Section 47**
**Milk Science**

In the examination subject of Milk Science, the students shall examine and assess a milk sample (freshly milked sample, untreated milk sample or treated milk sample) or a dairy product and complete a written examination report. Furthermore, they shall demonstrate their knowledge of the physiology and pathology of milk formation, the hygiene and technology of milking and milk processing as well as of their health-hygiene and especially their microbiological and qualitative influence on the production, processing and marketing of milk and dairy products, including measures for quality assurance, as well as of the relevant legal provisions.

**Section 48**
**Reproduction Medicine**

In the examination subject of Reproduction Medicine, students shall examine an animal for sexual health or a pet animal of newborn age, shall make a diagnosis including physical and laboratory diagnostic examination methods, shall evaluate the anticipated course of treatment, shall draw up and explain a therapeutic plan, shall where appropriate initiate or implement treatment and shall draw up a written record of the findings. They shall furthermore prove their knowledge of gynaecology, including the illnesses of the mammary gland, obstetrics including neonatology and obstetric operations, normal reproduction and its disturbances among male domestic animals, as well as reproductive hygiene, artificial insemination and other biotechnical measures, including herd husbandry.

**Section 49**
**Internal Medicine**

In the examination subject of Internal Medicine the students shall examine an animal suffering from an internal disease or a skin disease or several such animals, shall make a diagnosis involving physical and laboratory diagnostic investigative methods, shall assess the probable course of the disease, shall draw up and explain a treatment plan, shall where appropriate start or administer the treatment, and shall draw up a written findings record about an examined animal. Furthermore, they shall demonstrate their knowledge of the theory of internal diseases and skin diseases of animals, taking account of general and special therapy as well as herd care.

**Section 50**
**Surgery and Anaesthesiology**

In the examination subject of Surgery and Anaesthesiology, students shall examine an animal to be treated surgically or several such animals, shall make a diagnosis, where appropriate including physical and laboratory diagnostic examination methods, shall evaluate the anticipated course of the disease, shall draw up and explain a therapeutic plan, shall where appropriate initiate or implement treatment and shall draw up a written record of the findings with regard to one of the animals to be examined. They shall carry out an operation or several operations on living or dead animals, including the necessary anaesthesiological activity. They shall furthermore prove their knowledge of surgery and anaesthesiology, as well as in particular of eye diseases, dentistry, hoof and claw diseases and hoof and horseshoe theory.

**Section 51**
**Forensic veterinary medicine, law governing professional matters and professional conduct**

In the examination subject of Forensic Veterinary Medicine, the Law Governing Professional Matters and Professional Conduct, students shall prove their knowledge of the law of obligations and of its impact on the purchase of animals and the pre-purchase veterinary examination of horses and knowledge regarding veterinary surgeons' duties of care and the law on liability. Furthermore, they shall demonstrate their knowledge of the provisions of the law on liability and of criminal law that are important for exercising the profession of veterinary surgeon, as well as of the organisation and history of the veterinary profession and of the law governing professional matters and professional conduct regarding veterinaries, including the legal particularities of running a surgery.

**Section 52**
**Special clinics for specific types of animal**

(1) Solidungulents, ruminants, pigs, as well as small and domestic animals, shall be considered in the examinations in accordance with Sections 48, 49 and 50.

(2) At universities that have established special clinics for specific types of animal, the examinations may be distributed in accordance with the decision of the examination committee in line with the available clinics.

**Section 53**
**Interdisciplinary Subject**

In the interdisciplinary subject, on the basis of the knowledge acquired during the previous studies and those continued in parallel, students shall be familiarised with contents and tasks in the clinical treatment of domestic animals and livestock which are of practical relevance. Here, in particular contents of internal medicine, reproductive medicine, livestock management and surgery shall be portrayed with the participation of pathological anatomy, clinical pharmacology, animal feeding, animal breeding, animal husbandry, law governing professional matters of veterinaries, animal welfare and ethnology, topographical anatomy, epidemiology, infectious diseases and control of animal epidemics in an interdisciplinary manner. Students should be afforded the opportunity to identify and process the development, diagnosis and therapy of diseases using concrete individual cases. Here, the contents of the teaching of clinical veterinary medicine and of other subjects are to be taken into consideration, particularly focussing on the impact of the application of ionising radiation or of radioactive substances,

the residue problems and environmental contaminants as well as food, meat and milk hygiene, in particular in the fields of risk evaluation, quality assurance and marketability of the food obtained from animals at all levels of food production at interdisciplinary level. The potential impact of the diseases of animals and the consequences of their therapy on human health and on the environment are also to be taken into consideration.

## CHAPTER 3
## THE PRACTICAL COMPONENT OF STUDIES

### Section 54
### Training Places

The training in accordance with this chapter shall be completed on all weekdays in the respective facilities outside the lecture periods, and as a rule shall be performed on a full-time basis to a suitable degree in line with the workload. The time of the working off shall be determined by the university.

### Sub-chapter 1
### The training of control activities, methods and techniques for the field of food, including the examination of fresh meat

### Section 55
### Training Places, Duration

(1) Training in control activities, methods and techniques for the field of food, including the examination of fresh meat, shall last for 75 hours in at least two weeks, which are to be consecutive. It shall be effected with an authority which is competent for hygiene control in slaughterhouses or food establishments or in units responsible for monitoring the handling of food or food inspection, in facilities of the food industry which monitor the quality and unobjectionability of food, or in relevant university facilities.

(2) The practical training in examining animals for slaughter and meat at an authority responsible for examining animals for slaughter and meat in an abattoir shall last 100 hours within at least three weeks which are to be consecutive.

(3) Deployment in the context of training in accordance with (2) may only be effected in establishments which have approval and in which full-time official veterinary surgeons work who are responsible for the monitoring activity. If only cattle or only pigs are slaughtered in an establishment, at least 30 hours shall be served in an abattoir with the respectively other type of animal during the training time in accordance with (2).

### Section 56
### Contents of the Course

**(**1) During the training in accordance with Section 55 (1), the students shall familiarise themselves under the close supervision of full-time veterinary surgeons working at the facility responsible for the control activities, control of foodstuffs in the establishments or at the competent authority or other facility, or other qualified persons, with the assessment of the state of hygiene of the premises and the equipment, as well as the methods to control the hygiene status of the plants and shall practice evaluating the treatment and processing technology. The training shall also encompass the control activities, methods and techniques for the food domain. Further, in line with the spectrum of tasks of the authority or of another facility, students are to practice and be given extensive skills in the control of various foodstuffs, to independently carry out an evaluation of the marketability or the industrial hygiene of a control subject on a scientific basis. The points of view of food technology and quality assurance should also be taken into account here.

(2) During the training in accordance with Section 55 (2), under the close supervision of full-time veterinary surgeons working at the authority responsible for the examination of animals for slaughter and meat, students shall practice the examination and assessment of the animal for slaughter

and of the meat of various types of animal. Over and above this, students shall learn about treatment of the animal for slaughter in line with animal welfare.

(3) Students shall receive a certificate of the training in accordance with Annexes 6 and 7 in accordance with Section 55 (1) and (2).

## Sub-Chapter 2
## Training in the Therapeutic Practice of a Veterinary Surgeon or in an Animal Hospital

### Section 57
### Training Places, Duration

(1) The First Stage of training, which may be completed in the therapeutic practice of a veterinary surgeon or in an animal hospital or equally divided between the two facilities, shall last for 150 hours in at least four weeks, which are to be consecutive. It shall not be completed prior to passing the Preliminary Veterinary Examination.

(2) The Second Stage of training, which may be completed in the therapeutic practice of a veterinary surgeon or in an animal hospital or in a combination of no more than four such facilities, shall last for 700 hours notwithstanding Section 60, and shall be completed in at least 16 weeks, which are to be consecutive, in accordance with the Rules for Study of the University.

(3) The acquisition of the certificate of regular, successful attendance at the courses specified for the examination subject of Radiology shall be a prerequisite for the commencement of training in accordance with (2).

### Section 58
### Training in the Therapeutic Practice of a Veterinary Surgeon

(1) The training in the therapeutic practice of a veterinary surgeon may be completed only with veterinary surgeons who

1. have been independently running a practice for at least two years,

2. run an in-house veterinary pharmacy, and

3. have not been punished by a professional tribunal in the two years immediately preceding the training.

(2) During the practical training in accordance with Section 57, the students shall inform themselves under the supervision, guidance and responsibility of the owner of the practice in all areas of the veterinary activities concerned.

(3) The students shall receive certificates in accordance with Annexes 8 and 9 for the training.

### Section 59
### Training in an Animal Hospital

(1) Training shall be completed in a university’s hospitals. It may also be completed in other hospitals under veterinary management that have recognition as an animal hospital from the competent Chamber of Veterinary Surgeons.

(2) During the training in accordance with subsection (1) the students shall inform themselves under the supervision, guidance and responsibility of the hospital management in the field of the animal hospital concerned. In this connection they shall adhere to the theoretical-scientific treatment of the fields of knowledge affected by the practical training.

(3) The students shall receive certificates in accordance with Annex 10 for the training.

### Sub-Chapter 3
### Elective Placement

#### Section 60
#### Training Places, Duration

Part of the placement in accordance with Section 57 (2) of a minimum of 75 hours in two weeks and a maximum of 350 hours in eight weeks may be completed

1) in an institute of a university with a scientific-medical discipline,
2) in a Federal or *Land* research institute with a scientific-medical purpose,
3) in a veterinary examination institute,
4) in an office of the veterinary administration,
5) at a state or state-sponsored animal health service, in an animal health office or in an insemination station,
6) in the pharmaceutical industry in the development, manufacture and testing of drugs, in the food industry in the manufacture and testing of foods of animal origin or in the fodder industry in the manufacture and testing of mixed fodder, or
7) in scientifically managed zoological gardens.

The students shall receive certificates in accordance with Annex 11 for the training.

### Sub-Chapter 4
### Practical Training in the Public Veterinary Service

#### Section 61
#### Training Places, Duration

The practical training in the public veterinary service shall last for 75 hours in at least two weeks, which are to be consecutive. It shall take place in offices of the veterinary administration.

#### Section 62
#### Contents of the Course

(1) The practical training in the public veterinary service in accordance with Section 61 shall give the students the opportunity to deepen and broaden their knowledge and skills. The students shall comprehensively practise the tasks of the veterinary administration. Furthermore, they are to obtain knowledge of administrative and regulatory law, as well as of organisation and administration.

(2) The students shall receive a certificate in accordance with Annex 12 for the successfully completed training.

## CHAPTER 4
## CERTIFICATION

#### Section 63
#### Application for Certification

(1) The application for certification as a veterinary surgeon shall be addressed to the competent authority in the *Land* in which the applicant has passed the Veterinary Examination. The following shall be enclosed with the application:

1. the identity card or with foreigners the passport of the applicant,

2. a declaration as to whether criminal court proceedings or investigations by the public prosecutor are pending over the applicant,

3. a medical certificate, which may not be more than one month old, according to which the applicant is not unsuitable for practising the profession for health reasons, and

4. a birth certificate or an excerpt from the family book of the parents, or in the case of married persons also the wedding certificate or an excerpt from the family book kept for the marriage, and
5. an official police clearance certificate, which may not have been issued more than one month prior to submission,
6. the certificate of the Veterinary Examination.

If an applicant who is not a national of one of the other Member States of the European Union or of another party to the Treaty on the European Economic Area or of a contracting party to which Germany and the European Community or Germany and the European Union have contractually granted such a legal right has been registered with the police in Germany for less than two years, he or she shall also enclose with his or her application a certificate in accordance with (3) sentence 1 or, if a certificate of this kind cannot be provided, a declaration that reveals whether he or she has a criminal record in the state where he or she was previously resident, whether criminal court proceedings or investigations by the public prosecutor are pending on him or her there or whether he or she has been prohibited from practising the veterinary profession there due to disciplinary or administrative measures.

(2) If certification is to be issued in accordance with Section 4 (1), (1a), (2) or (3) or in accordance with Section 15a of the Federal Veterinary Code, the application shall be addressed to the competent authority in the *Land* where the veterinary profession is to be practised. If the training has not taken place in accordance with the provisions of this Ordinance, the proof in accordance with Section 4 (6) sentence 1 Nos. 2, 5 and 7 of the Federal Veterinary Code shall be submitted instead of the certificate in accordance with (1) sentence 6 no. 6. The competent authority shall confirm the receipt of the documents to the applicant within one month, and shall inform him or her which documents are missing. If the proof has not been issued in German, a certified translation thereof shall also be submitted. The competent authority may demand the submission of further proof, in particular proof of previous professional activity. In the case of applicants who submit proof in accordance with Section 4 (1a) sentence 1 of the Federal Veterinary Code as nationals of a Member State of the European Union or of another party to the Treaty on the European Economic Area or of a contracting party to which Germany and the European Community or Germany and the European Union have contractually granted such a legal right, further proof, particularly proof of professional activity, may be requested only if the Federal Veterinary Code so provides or this appears to be necessary for particular reasons. In cases falling under sentence 2, the proof demanded in (1) no. 4 cannot be demanded from the applicant unless proof of training issued in a third state has not yet been recognised in another Member State.

(3) Instead of the certificate cited in (1) sentence 2 no. 5, nationals of one of the other Member States of the European Union or of another party to the Treaty of the European Economic Area or of a contracting party to which Germany and the European Community or Germany and the European Union have contractually granted such a legal right may submit documents in accordance with Section 4 (6) no. 3 of the Federal Veterinary Code. If the applicant has already practised the veterinary profession in his or her Member State of origin, the authority responsible for issuing the certification may request information via the Federal Ministry of Food, Agriculture and Consumer Protection from the competent authority of the Member State of origin, for instance about any punishments or other professional or criminal measures imposed on the applicant due to serious and precisely determined unprofessional conduct or punishable actions concerning the practise of the profession in the Member State of origin. If in cases of sentence 1 or 2 the authority responsible for issuing the certification has knowledge of circumstances that have occurred outside the area of application of the Federal Veterinary Code and that could be important with respect to the requirements of Section 4 (1) no. 2 of the Federal Veterinary Code, it shall inform the competent office in the Member State of origin via the Federal Ministry of Food, Agriculture and Consumer Protection and notify it of the result and the conclusions that it draws from the certificates and proof issued by it. The certificates and notifications cited in sentences 1 to 3 shall be treated in confidence. They may be used as a basis for the assessment only if they have been issued no more than three months prior to submission.

(4) Instead of the medical certificate cited in (1) sentence 2 no. 3, nationals of the other Member States of the European Union or of another party to the Treaty on the European Economic Area or of a contracting party to which Germany and the European Community or Germany and the European Union have contractually granted such a legal right may submit an appropriate certificate from the competent authority in their Member State of origin. (3) sentences 4 and 5 shall apply *mutatis mutandis*.

(5) A decision shall be made on the application of a national of a Member State of the European Union or of another party to the Treaty on the European Economic Area or of a contracting party to which Germany and the European Community or Germany and the European Union have contractually granted such a legal right, at the latest three months after submission of the documents to be submitted by the applicant in accordance with (1) to (4). Insofar as it is a matter of recognition of proof of training in accordance with Section 4 (1a) sentence 3 or Section 4 (2) sentence 2 no. 3 of the Federal Veterinary Code, four instead of three months shall be available for cases in accordance with sentence 1.

### Section 64
### Certificate

The certificate shall be issued in accordance with the pattern of Annex 13. It shall be served on the applicant.

## CHAPTER 5
## SUPPLEMENTARY PROVISIONS

### Section 65
### Crediting Study Periods and Examinations

(1) In the case of people who are Germans within the meaning of Article 116 of the Basic Law, nationals of one of the other Member States of the European Union or of another party to the Treaty on the European Economic Area or of a contracting party to which Germany and the European Community or Germany and the European Union have contractually granted such a legal right or stateless foreigners within the meaning of the Act on the Legal Status of Stateless Foreigners in Federal Territory, the following shall be fully or partially credited provided that they are equivalent

1. periods spent on a course of related study at a university in Germany,

2. periods spent on a course of study of veterinary medicine or a related course of study at a university abroad.

(2) Subject to the proviso of (1), examinations that have been sat within the context of study in accordance with (1) Nos. 1 and 2 shall be recognised.

(3) The crediting cited in (1) and the recognition cited in (2) may take place for other people.

(4) Study periods shall be credited and examinations recognised upon application.

### Section 66
### Competent Authority

(1) The decisions in accordance with Section 65 shall be made by the competent authority in the *Land* in which the applicant in the area of application of this Ordinance

1. is registered or enrolled to study veterinary medicine, or
2. has submitted an application for registration or enrolment for studies in veterinary medicine.

In the case of sentence 1 no. 2, the application in accordance with Section 65 is to be submitted with the application for registration or enrolment; a decision in accordance with Section 65 shall be linked with the decision on registration or enrolment.

(2) The applicant shall receive a certificate about the decision made. The certificate shall be valid as proof within the meaning of Sections 20, 23 and 31 subject to the proviso of its contents.

### Section 67
### Exceptions

The university at which the student is enrolled may on request allow exceptions to the provisions

1. of Section 6,

2. of Section 20 (2) sentence 1 with regard to the prescribed period to take the examination,

3. of Section 23 (1) no. 1 that the applicant must have passed Preliminary Physics no more than one and a half academic years earlier for admission to the examination,

4. of Section 31 (2) no. 2 that the applicant must have studied veterinary medicine for at least three academic years after passing the Preliminary Veterinary Examination for admission to the examination,

5. of Section 58 (1) no. 1 with respect to the length of independent running of a practice insofar as this is required to avoid an unintended hardship and the goal of the training is not impaired. Exceptions granted in accordance with sentence 1 Nos. 2 to 5 shall also apply as proof for admission to the subsequent examination stages subject to the proviso of their contents.

**Section 68**
**Transitional Provisions**

(1) Students who have registered for the Preliminary Veterinary Examination prior to 1 October 2006 shall take the Preliminary Veterinary Examination in accordance with the Ordinance concerning the Certification of Veterinary Surgeons of 10 November 1999 (Federal Law Gazette Part I p. 2162), most recently amended by Article 3 of the Ordinance of 4 December 2002 (Federal Law Gazette Part I p. 4456). In the case of the further studies after passing the Preliminary Veterinary Examination the present Ordinance shall be applied.

(2) Students who have passed the Preliminary Veterinary Examination after 1 October 2006 but have not yet been admitted to the Veterinary Examination shall be trained and examined in accordance with this Ordinance.

(3) For students who have passed one stage of the Veterinary Examination before 1 October 2006 in accordance with the Ordinance concerning the Certification of Veterinary Surgeons of 10 November 1999 (Federal Law Gazette Part I p. 2162), most recently amended by Article 3 of the Ordinance of 4 December 2002 (Federal Law Gazette Part I p. 4456), the Ordinance concerning the Certification of Veterinary Surgeons of 10 November 1999 (Federal Law Gazette Part I p. 2162), most recently amended by Article 3 of the Ordinance of 4 December 2002 (Federal Law Gazette Part I p. 4456) shall also be applicable to the further studies.

(4) For students at universities which have not adapted their Code of Studies and Examination Regulations to this Ordinance by 1 October 2006, (1) to (3) shall apply on proviso that 1 October 2007 shall replace 1 October 2006.

**Section 69**
**Entry into force, cessation of validity**

(1) The present Ordinance shall enter into force on 1 October 2006.

**Final formula**

The Bundesrat has consented.

**Annex 1 (re. Section 2 (1), (2) and (3))**
**Subject areas and total number of hours***)

(source of the original text: Federal Law Gazette Part I 2006, 1841-1842)

| | | | | | |
|---|---|---|---|---|---|
| 1. | Physics, including fundamentals of Radiophysics | 56 hours | 23. | General Pathology, Special Pathological Anatomy and Histology including autopsies | 182 hours |
| 2. | Chemistry | 126 hours | 24. | Internal Medicine including Laboratory Diagnostics, Dietetics Reproductive Medicine including Obstetric and Udder Diseases Surgery and Anaesthesiology, Ophthalmic Diseases, Dentistry, Hoof and Claw Diseases Livestock Management and Ambulatory Care | 420 hours |
| 3. | Zoology | 70 hours | | | |
| 4. | Botany, including Nutritional Science, Toxicology and Herbalism | 70 hours | | | |
| 5. | Biometry | 28 hours | | | |
| 6. | Theory of the Profession (medical terminology, history of veterinary medicine, professional science) | 42 hours | 25. | Food Science, including Food Hygiene, Technology and Quality Assurance, Food Toxicology, Residue Evaluation, Food Law and Inspection of Foods; Milk Science including Technology and Quality Quality Assurance, Microbiology of Milk and Milk Inspections; Meat and Poultry Hygiene including Technology and Quality Assurance | 252 hours |
| 7. | Anatomy | 224 hours | 26. | Clinical Training in subjects no. 18, 22 and 24 | 518 hours |
| 8. | Histology and Embryology | 98 hours | 27. | Interdisciplinary subject | 196 hours |
| | | | | | |
| 9. | Agricultural Theory | 28 hours | 28. | Exercises in Agriculture, Animal Breeding and Animal Husbandry | 70 hours |
| 10. | Animal Husbandry and Animal Hygiene | 56 hours | 29. | Practical Training in a Veterinary Practice or a Veterinary Hospital | 850 hours |
| 11. | General Radiology and Clinical Radiology | 42 hours | 30. | Practical Training in Hygiene Control and Control of Foodstuffs and in the Inspection of | 175 hours |

| | | | | | |
|---|---|---|---|---|---|
| | | | | Animals for Slaughter and Meat | |
| 12. | Physiology, Biochemistry | 280 hours | 31. | Practical Training in the Public Veterinary Service | 75 hours |
| | | | 32. | Optional Courses that the student must also attend | 308 hours |
| 13. | Animal Breeding and Genetics, including Breeding Theory and Livestock Judging | 84 hours | | | |
| 14. | Clinical Propadeutics | 98 hours | | | |
| 15. | Animal Welfare and ethnology | 84 hours | | | |
| 16. | Laboratory Animal Science | 14 hours | | | |
| 17. | Animal Nutrition and Nutritional Science | 98 hours | | | |
| 18. | Forensic Veterinary Medicine, Veterinary Professional Law | 28 hours | | | |
| 19. | Poultry Diseases | 28 hours | | | |
| 20. | Pharmacology and Toxicology, including Clinical Pharmacology, Drug and Anaesthesia Law, Prescription and Drug Preparation Theory, Assessing Risks | 126 hours | | | |
| 21. | Bacteriology, Mycology, Virology, Parasitology, Immunology, Control of Animal Epidemics, Epidemiology | 266 hours | | | |
| 22. | Diseases in Reptiles, Amphibians, Fish and Honey Bees | 28 hours | | | |
| | | | | | 5,020 hours |

*) The names of the courses and any merging of various subject areas into combined courses shall not be affected by this Annex.

**Annex 2 (re Section 14 (1))**

source of the original text: Federal Law Gazette Part I 2006, 1843-1844

Examination Committee for the – Preliminary Veterinary Examination – Veterinary Examination –

Examiner: .....

Institute or Hospital .....

Written Record of the Examination

in .....(examination subject)
The student of veterinary medicine .....
.....…….... (First name and surname)
was examined in the above-mentioned examination subject on .....
Examiners involved in accordance with Section 9 (2) of the Ordinance concerning the Certification of Veterinary Surgeons:

.....

.....
Subject matter of the examination:*) .....
.....
.....….....……
…….....
Assessment of the achievement: ….....
.....
.....……
…….....
....., (date).....
..... .....
(Signature of record keeper, (Signature of examiner)
unless examiner has produced the written record)

_____
*) This is space for the course of the examination or the contents to be entered in key words.

Resit

on .....

Examiners involved in accordance with Section 17 (3) sentence 1 of the Ordinance concerning the Certification of Veterinary Surgeons:
.....

…….....
Students admitted in accordance with Section 9 (3) sentence 2 of the Ordinance concerning the Certification of Veterinary Surgeons – a representative of the competent Chamber of Veterinary Surgeons – were – not – present at the examination (if such people were present: The student gave his or her consent to the presence of these people.)

Subject matter of the examination:*) .....
.....
.....
…….....
Assessment of the achievement: .....
.....
.....
.....
....., (date).....
..... .....
(Signature of the further committee member) (Signature of examiner)
.....
(Signature of record keeper,
unless examiner has produced the written record)

_____
*) This is space for the course of the examination or the contents to be entered in key words.

**Annex 3 (re Section 16 (1))**

source of the original text: Federal Law Gazette Part I 2006, 1845

The Chairman of the Examination Committee for the Preliminary Veterinary Examination

at ..... (University)

in ..... (City)

Certificate
on the Results
of the Scientific Stage of the Preliminary Veterinary Examination
(Preliminary Physics)
The student of veterinary medicine .....

(First name and surname)

born on ..... 19.. in .....

was awarded the following marks in the Scientific Stage of the Preliminary Veterinary Examination

1. in Physics including the fundamentals of radiological protection .....

2. in Chemistry .....

3. in Zoology .....

4. in Botany of Fodder, Toxic and Medicinal Plants.....

and thus passed/failed the Scientific Stage of the Preliminary Veterinary Examination on .....*).

Examinations credited: .....
....., (date).....
The Chairman
of the Examination Committee
(Seal)
.....
(Signature)

_____
*) Date of the last examination (or resit).
**) delete what is not applicable

**Annex 4 (re. Section 16 (1) and (4))**

source of the original text: Federal Law Gazette Part I 2006, 1846

The Chairman of the Examination Committee for the Preliminary Veterinary Examination

at ..... (University)

in ..... (City)

Certificate
on the Results
of the Anatomical-Physiological Stage of the Preliminary Veterinary Examination
(Physics) and of the Overall Results of the Preliminary Veterinary Examination

The student of veterinary medicine

.....

(First name and surname)

born on ..... 19.. in .....

was awarded the following marks in the Anatomical-Physiological Stage of the Preliminary Veterinary Examination
1. in Anatomy .....
2. in Histology and Embryology .....
3. in Physiology .....
4. in Biochemistry .....
5. in Animal Breeding and Genetics, including Livestock Judging .....
and thus – taking account of the examination marks of the Certificate on the Results of the Scientific Stage of the Preliminary Veterinary Examination on .....*) passed the Preliminary Veterinary Examination with the overall result ..... – failed the Anatomical-Physiological Stage of the Preliminary Veterinary Examination **).

Examinations credited:
.....
....., (date).....
The Chairman
of the Examination Committee
(Seal)
.....
(Signature)

_____
*) Date of the last examination (or resit)
++) delete what is not applicable
.

**Annex 5 (re Section 16 (1))**

source of the original text: Federal Law Gazette Part I 2006, 1847-1848

The Chairman of the Examination Committee for the Veterinary Examination

at ..... (University)

in ..... (City)

Certificate
on the Results
of the Veterinary Examination and on the Overall Results of the Veterinary Examination

The student of veterinary medicine .....

(First name and surname)

born on ..... 19.. in
.....
was awarded the following marks in the Veterinary Examination

1. in Animal Husbandry and Animal Hygiene.....
2. in Animal Welfare and Ethnology.....
3. in Animal Nutrition.....
4. in Clinical Propadeutics.....
5. in Virology .....
6. in Bacteriology and Mycology.....
7. in Parasitology.....
8. in Control of Animal Epidemics and Infection Epidemiology.....
9. in Pharmacology and Toxicology .....
10. in Law on Pharmaceuticals and Narcotics.....
11. in Poultry Diseases.....
12. in Radiology.....
13. in General Pathology and Special Pathological Anatomy and Histology.....
14. in Food Science including Food Hygiene.....
15. in Meat Hygiene.....
16. in Milk Science.....
17. in Reproductive Medicine.....
18. in Internal Medicine.....
19. in Surgery and Anaesthesiology.....
20. in Forensic Veterinary Medicine, Law Governing Professional Matters and Professional Conduct .....

and thus passed/failed++) the Veterinary Examination on .....*) with the overall result.
Examinations credited: .....

....., (date).....

The Chairman
of the Examination Committee
(Seal)
.....
(Signature)

_____

*) Date of the last examination (or resit).
++) delete what is not applicable

**Annex 6 (re Section 53 (3))**

(source of the original text: Federal Law Gazette Part I 2006, 1849;
or of the individual amendments cf. footnote)

.....
(Name of the authority competent in accordance with Section 55 (1))

Certificate
on Practical Training in monitoring activities,
methods and techniques for the food domain

The student of veterinary medicine
.....
(First name and surname)

completed the practical training in monitoring activities, methods and techniques for the food domain

in the period from ..... to ..... .

During this period in ... hours he/she practised the assessment of the hygienic status of the premises and the installations of the plants as well as the assessment of processing technology under my supervision and guidance. Furthermore, he/she had the opportunity to familiarise himself/herself with methods for monitoring the hygienic status of the plants. Furthermore, he/she has practiced under my guidance the supervision and examination of food.

....., (date).....

(Seal or stamp)
.....

(Signature of the training veterinary surgeon)

**Annex 7 (re Section 53 (3))**

source of the original text: Federal Law Gazette Part I 2006, 1850

.....
(Name of the competent authority)

Certificate
on the Practical Training
in the Inspection of Animals for Slaughter and Meat

The student of veterinary medicine .....

(First name and surname) completed practical training in the inspection of animals for slaughter and meat

in the slaughterhouse/s in .....

in the period from ..... to ..... .

During this period in … hours he/she practised the assessment of the animals for slaughter and the meat of various animal species under my supervision and guidance. Furthermore, he/she had the opportunity to familiarise himself/herself with the technical procedures in the slaughterhouse.

The slaughterhouse/s correspond/s to the requirements of Section 55 (3) sentence 1 of the Ordinance concerning the Certification of Veterinary Surgeons.

....., (date).....
(Seal or stamp)

.....
(Signature of the training veterinary surgeon)

**Annex 8 (re Section 58 (3))**

source of the original text: Federal Law Gazette Part I 2006, 1851

.....
(Name and address of the practice owner)

Certificate
on the First Stage of the Practical Training

in the Therapeutic Practice of a Veterinary Surgeon (Section 57 (1) of the Ordinance concerning the Certification of Veterinary Surgeons)

The student of veterinary medicine .....

(First name and surname)
completed practical training in my practice

in the period from ..... to ..... .

During this period in … hours he/she was instructed in all areas of my veterinary activities and involved in regular participation under my supervision, guidance and responsibility.

I swear that I meet the requirements of Section 58 (1) of the Ordinance concerning the Certification of Veterinary Surgeons.

....., (date).....
(Stamp)

.....
(Signature of practice owner)

**Annex 9 (re Section 58 (3))**

source of the original text: Federal Law Gazette Part I 2006, 1852

.....
(Name and address of the practice owner)

Certificate
on the Second Stage of the Practical Training
in the Therapeutic Practice of a Veterinary Surgeon (Section 57 (2) of the Ordinance concerning the Certification of Veterinary Surgeons)

The student of veterinary medicine .....

(First name and surname)

completed practical training in accordance with Section 58 in my practice

in the period from ..... to ..... (… hours).

I swear that I meet the requirements of Section 58 (1) of the Ordinance concerning the Certification of Veterinary Surgeons.

....., (date).....

(Stamp)
.....
(Signature of practice owner)

**Annex 10 (re Section 59 (3))**

source of the original text: Federal Law Gazette Part I 2006, 1853

.....
(Name of the Animal Hospital)

Certificate
on Practical Training in an Animal Hospital

The student of veterinary medicine .....

(First name and surname)

completed practical training in accordance with Section 59 of the Ordinance concerning the Certification of Veterinary Surgeons

in .....
(name of the animal hospital)

in the period from ..... to ..... (… hours).

....., (date).....
(Seal or stamp)
.....
(Signature of the head of the animal hospital)

**Annex 11 (re Section 60 sentence 2)**

source of the original text: Federal Law Gazette Part I 2006, 1854

.....
(Name of the training institute)

Certificate
on Practical Training in an Elective Placement

The student of veterinary medicine .....

(First name and surname)

completed practical training in the elective placement in accordance with Section 60 of the Ordinance concerning the Certification of Veterinary Surgeons

in .....
(name of the training institute)

in the period from ..... to .....

In particular, the training covered the following
activities:.....

Over … hours in… weeks he/she had the opportunity to deepen, broaden and practically apply his/her knowledge in the above-mentioned fields.

....., (date).....
(Seal or stamp)

.....
(Signature of the training veterinary surgeon)

**Annex 12 (re Section 62 (2))**

source of the original text: Federal Law Gazette Part I 2006, 1855;
or of the individual amendments cf. footnote)

.....
(Name of the unit)

Certificate
on the Practical Training in the public veterinary service

The student of veterinary medicine .....

(First name and surname)

completed practical training in the public veterinary service in our institution…….

in the period from ..... to .....

During this period in … hours over consecutive two weeks he/she was given the opportunity to familiarise him/herself with the fields of public veterinary service under my supervision and guidance.

....., (date).....
(Seal or stamp)

.....
(Signature of trainer)

**Annex 13 (re Section 64)**

source of the original text: Federal Law Gazette Part I 2006, 1856

**Certificate**
Mr/Ms
.....

born on .....

in .....

meets the requirements of the Federal Veterinary Code.

With effect from today he/she shall be awarded Certification as a Veterinary Surgeon. Certification shall grant entitlement to bear the professional title of Veterinary Surgeon and to practice the veterinary profession.

....., (date).....

(Seal or stamp)

.....
(Signature)

# Appendix G:

# Study regulations (StuPOVet)

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

Der Präsident

# Mitteilungen der Justus-Liebig-Universität Gießen

Ausgabe vom **09.08.2019**

**6.60.10 Nr. 1**

Studien- und Prüfungsordnung für den Studiengang „Tiermedizin“

# Studien- und Prüfungsordnung für den Studiengang „Tiermedizin (StuPoVet)“ des Fachbereichs 10 – Veterinärmedizin – der Justus-Liebig-Universität Gießen

## Vom 04.07.2007

*Zuletzt geändert durch Beschluss vom 30.01.2019*

*Diese Ordnung in der Fassung des Vierten Änderungsbeschlusses gilt ab Wintersemester 2019/20 für alle Studierenden, die ihr Studium vor dem Sommersemester 2017 aufgenommen* haben. Im Übrigen gelten die bisherigen Bestimmungen fort.

*Bisherige Fassungen:*

| | Fachbereichsrat | Senat | Präsidium | Verkündung |
|---|---|---|---|---|
| Urfassung | 04.07.2007 | | | |
| 1. Änderung | 12.12.2007 | | | |
| 2. Änderung | 09.09.2013 | | 18.09.2013 | 19.09.2013 |
| 3. Änderung | 11.07.2017 | 19.07.2017 | 01.08.2017 | 16.08.2017 |
| 4. Änderung | 30.01.2019 | 05.06.2019 | 12.06.2019 | 09.08.2019 |

## Inhaltsverzeichnis

### § 1 Regelungsgegenstand und Geltungsbereich

(1) Diese Studien- und Prüfungsordnung (StuPOVet) regelt in Ergänzung der TAppV Ziele, Inhalt und Verlauf des Studiengangs sowie die Studienleistungen, welche Voraussetzungen für die Teilnahme an den Prüfungen sind, den Ablauf der Prüfungen und die Bewertung von Prüfungsleistungen.

(2) Das Studium des Ersten Studienabschnitts umfasst nach §§ 19 und 22 TAppV eine Studienzeit von zwei Jahren bis zum vollständigen Bestehen der Tierärztlichen Vorprüfung (vgl. "Studienplan" Anlage 1 und "Übersicht aller Semesterwochenstunden" Anlage 2).

(3) Der Zweite Studienabschnitt umfasst nach § 29 TAppV ein Studium der Veterinärmedizin von mindestens drei Jahren (vgl. "Studienplan" Anlage 1 und "Übersicht aller Semesterwochenstunden" Anlage 2) einschließlich einer Rotation in paraklinischen und klinischen Einrichtungen von 20 Wochen Dauer (Anlage 3) sowie einen praktischen Studienteil im Sinne von § 54-61 TAppV und schließt mit dem vollständigen Bestehen der Tierärztli-chen Prüfung ab.

## Abschnitt I Studium

### § 2 Studienbeginn und Studiendauer

(1) Das Studium kann nur zum Wintersemester aufgenommen werden.

(2) Der Fachbereich stellt auf der Grundlage dieser StuPoVet eine "Übersicht aller Semesterwochenstunden" (Anlage 2) auf, die es den Studierenden ermöglicht, das Studium innerhalb einer Regelstudienzeit von 5 Jahren und 6 Monaten (§ 1 TAppV) abzuschließen.

### § 3 Gliederung des Studiums

(1) Ziele und Gliederung der tierärztlichen Ausbildung werden in § 1 der TAppV und Richtlinie 2005/36/EU des Europäischen Parlaments und des Rates vom 7. September 2005 über die Anerkennung von Berufsqualifikationen geregelt.

(2) Das Studium ist in Abschnitte gegliedert, die jeweils auf die Prüfungsabschnitte gemäß Anlage 2 und 4 vorbereiten.

(3) Eine Zulassung zur Teilnahme an leistungsnachweispflichtigen Veranstaltungen ab einschließlich des 5. Semesters ist nur möglich, wenn die Tierärztliche Vorprüfung erfolgreich abgelegt worden ist.

(4) Zugangsvoraussetzung für die klinische Ausbildung im fünften Studienjahr („Rotation“ Anlage 3) gemäß § 6 der StuPOVet sind erfüllt, wenn die Fachprüfungen der Prüfungsfächer gemäß § 29 Nr. 1-10, 12, 20 TAppV bestanden sind.

(5) In besonders begründeten Fällen kann der Studiendekan für die Zulassung zur Teilnahme an leistungsnachweispflichtigen Veranstaltungen ab einschließlich des 5. Semesters oder ins fünfte Studienjahr (Rotation) auf schriftlichen Antrag des Studierenden eine Ausnahmegenehmigung erteilen.

(6) Während der vorlesungsfreien Zeit des Ersten Studienabschnittes und vor der Meldung zum Physikum ist der Kurs über Landwirtschaft, Tierzucht und Tierhaltung (§ 23 Abs. 1 Pkt 3 bzw. Abs. 2 TAppV) oder das vierwöchige landwirtschaftliche Praktikum in einem anerkannten Lehrbetrieb gemäß § 23 Abs. 2 TAppV abzuleisten, wenn nicht eine berufliche Ausbildung gemäß § 23 Abs. 2 TAppV anzuerkennen ist.

(7) Während der vorlesungsfreien Zeit frühestens nach dem 6. Semester ist der praktische Studienteil von 150 Stunden in der kurativen Praxis eines Tierarztes oder in einer unter tierärztlicher Leitung stehenden Tierklinik (§ 57 Abs. 1 TAppV) abzuleisten. Diese Praktikumszeit kann je zur Hälfte in zwei aufeinanderfolgende Wochen abgeleistet werden.

(8) Der praktische Studienteil nach §1 Abs. 2 Satz 2c bis 2f TAppV kann frühestens nach Beendigung des wissenschaftlich-theoretischen Studienteils (§ 1 Abs. 2, Satz 1 TAppV) erfolgen.

(9) Vor Beginn des letzten Prüfungsabschnitts gemäß Anlage 4 müssen alle praktischen Studienteile nach § 1 Abs. 2 Satz 2 TAppV erfolgreich abgeschlossen sein.

## § 4 Studienpläne und Lehrveranstaltungen

(1) Die Studienpläne sind dieser Ordnung als Anlage 1 und die Aufteilung der Semesterstunden als Anlage 2 beigefügt.

(2) Lehrveranstaltungen sind:

1. Vorlesungen (V), die auf die Lehrinhalte der praktischen Übungen und Seminare vorbereiten, in denen Lehrstoff gegenstandsbezogen bzw. problemorientiert erarbeitet wird,
2. Praktische Übungen und Kurse (Ü)
3. Seminare (S)
4. Klinische Demonstrationen (D)
5. Querschnittsunterricht Klinik (QF)
6. Pflicht-QF-Klinik (mit Anwesenheitspflicht).

Möglich sind auch kombinierte Lehrveranstaltungen (V/Ü/S). Exkursionen können ebenfalls Teile von Lehrveranstaltungen sein. Der Schwerpunkt der klinischen Ausbildung an der Hochschule findet im fünften Studienjahr (Rotation) statt. Teile der Lehrveranstaltungen können in englischer Sprache und/oder in Form interaktiver Lernprogramme angeboten werden.

(3) Die an der Lehre beteiligten Einrichtungen bieten Wahlpflichtveranstaltungen gemäß § 2 Abs. 3 TAppV an.

Wahlpflichtveranstaltungen müssen durch den Studiendekan im Benehmen mit dem Studienausschuss des Fachbereichs im Voraus anerkannt worden sein. Die Studierenden können Wahlpflichtveranstaltungen aus diesem Angebot wählen. Eine Wahlpflichtveranstaltung gleichen Inhalts wird nur einmal angerechnet.

Wahlpflichtveranstaltungen für Studierende eines Semesters dürfen nicht zeitgleich zu Veranstaltungen abgehalten werden, deren Besuch verpflichtend für alle Studierenden dieses Semesters ist. Ein Anspruch auf die Teilnahme an bestimmten Wahlpflichtveranstaltungen besteht nicht.

Seminare, Kurse oder Praktika aus anderen Fachbereichen der Justus-Liebig-Universität können als Wahlpflichtveranstaltungen anerkannt werden, solange die Voraussetzungen nach den Blockbeschreibungen erfüllt sind. Der

Besuch einer Woche einer ganztägigen Wahlpflichtveranstaltung (5 Tage zu je 6 Unterrichtsstunden) wird mit nicht mehr als 28 Stunden bescheinigt.

## § 5 Teilnahme- und Leistungsnachweise, Leistungskontrollen

(1) Die regelmäßige und erfolgreiche Teilnahme an einer Lehrveranstaltung mit obligatorischer Anwesenheits- und Erfolgskontrolle, zu der sich die Studierenden fristgerecht anzumelden haben, wird durch Bescheinigungen nachgewiesen. Die Bescheinigungen werden von der jeweils verantwortlichen Lehrkraft in von dem Vorsitzenden des jeweiligen Prüfungsausschusses festgelegter Weise erteilt und dem Prüfungsamt übermittelt. Auf Antrag der Studierenden können Bescheinigungen in schriftlicher Form ausgegeben werden.

Mögliche Formen der Leistungskontrollen sind schriftlich, mündlich oder praktisch sowie Kombinationen der genannten Formen.

(2) Regelmäßig teilgenommen hat, wer an mindestens 85 % der Stunden der leistungsnachweispflichtigen Veranstaltung anwesend war. Hat ein Studierender aus triftigem Grund (z. B. wegen Krankheit) nicht in diesem Umfang teilgenommen, so entscheidet der Veranstaltungsleiter, ob das Versäumnis noch in demselben Semester nachgeholt werden kann und legt Art und Umfang der zu erbringenden Leistungen fest. Kann hierüber keine Einigung erzielt werden, entscheidet der Studiendekan.

(3) Die erfolgreiche Teilnahme an einer leistungsnachweispflichtigen Lehrveranstaltung wird mit Anwesenheits- und/oder Erfolgskontrolle festgestellt. Die Form der Kontrolle wird von der verantwortlichen Lehrkraft festgelegt und bekannt gegeben. Die Bewertung der Kontrolle lautet „Bestanden“ oder „Nicht bestanden“.

(4) Es ist mindestens eine Wiederholungsmöglichkeit der Erfolgskontrolle vor der Zulassung zur jeweiligen Prüfung, zu deren Zulassung der Leistungsnachweis als Voraussetzung gilt, anzubieten. Wird die Erfolgskontrolle wiederholt nicht bestanden, muss die leistungsnachweispflichtige Veranstaltung wiederholt werden.

(5) Versucht der Prüfling das Ergebnis seiner Prüfungsleistungen durch Täuschung oder Benutzung nicht zugelassener oder nicht angegebener Hilfsmittel oder Quellen zu beeinflussen, wird die Prüfung als mit "Nicht Bestanden" bewertet. Ist dem Prüfling in dem Studiengang bereits bei einer vorherigen Prüfung eine Täuschung nachgewiesen worden, gelten bei erneuter Täuschung die Prüfung und der Studiengang als endgültig nicht bestanden.

(6) Ein Prüfling, der sich einer Störung des Prüfungsablaufes schuldig gemacht hat, kann von den jeweiligen Prüfern oder Aufsichtsführenden von der Fortsetzung der Prüfungsleistungen ausgeschlossen werden

## § 6 Klinische Ausbildung im fünften Studienjahr (Rotation)

(1) Der praktische Studienteil erfolgt gemäß § 1 Abs. 2, Satz 2c bis 2f TAppV alternierend mit der klinischen Ausbildung (TAppV Anlage 1 Punkt 26) während des fünften Studienjahres (Rotation). Die Dauer der Studienphasen in den verschiedenen Einrichtungen regelt Anlage 3.

(2) Die regelmäßige und erfolgreiche Teilnahme an der klinischen Ausbildung im fünften Studienjahr (Rotation) ist vor der Zulassung zur Tierärztlichen Prüfung gemäß § 29 Nr. 13, 14, 15, 17, 18, 19 TAppV nachzuweisen.

(3) Zur Ermittlung des Zeitumfangs der verschiedenen Studienphasen in der Rotation gemäß § 1 Abs. 2 Ziffer 2 TAppV wird eine wöchentliche Pflichtausbildungszeit der Studierenden von mindestens 30 Stunden vorausgesetzt. Die tägliche Ausbildungszeit richtet sich nach den funktionellen Abläufen der ausbildenden Einheiten.

(4) Die Studierenden können im Rahmen der zu erbringenden Stundenzahl während der klinischen Ausbildung im fünften Studienjahr (Rotation) zur Teilnahme an Nacht-, Wochenend- und/oder Feiertagsdiensten eingeteilt werden. Wenn erforderlich, kann dafür ein entsprechender Freizeitausgleich gewährt werden.

(5) Während der klinischen Ausbildung im fünften Studienjahr (Rotation) sollen die Studierenden die während des vorhergehenden Studiums erworbenen Kenntnisse und Fähigkeiten auf den einzelnen Patienten/Bestand anwenden. Entsprechend ihrem Ausbildungsstand sollen sie unter Anleitung, Aufsicht und Verantwortung des ausbildenden Tierarztes die ihnen zugewiesenen tierärztlichen Tätigkeiten durchführen.

(6) Die Studierenden sollen innerhalb der Rotation zu mindestens 50 % der Zeit unter Anleitung tätig sein. Die Studierenden sollen Gelegenheit erhalten, an Einzelpatienten Anamnesen zu erheben, klinische und weiterführende Diagnostik zu betreiben sowie therapeutische Maßnahmen durchzuführen bzw. zu überwachen. Neben der Einzeltierbetreuung gehören Themen der Bestandsbetreuung, der Tierhaltung und des angewandten Tierschutzes zur praktischen Ausbildung.

### § 7 Studienberatung

(1) Der Studiendekan ist für die Organisation der Studienfachberatung verantwortlich.

(2) Für Studierende im ersten Semester wird eine Studieneinführung zu Beginn des Semesters veranstaltet.

## Abschnitt II Prüfungen

### § 8 Anerkennungsausschuss

(1) Für Entscheidungen nach § 65 TAppV wird gemäß § 66 TAppV ein Anerkennungsausschuss gebildet. Er besteht aus den Vorsitzenden der Prüfungsausschüsse gemäß § 5 Abs. 1 und 2 TAppV und § 10 dieser Ordnung und den stimmberechtigten Mitgliedern des Studienausschusses des Fachbereichs. Ist ein Studienausschuss nicht gebildet, wählt der Fachbereichsrat Mitglieder des Anerkennungsausschusses entsprechend § 53 Abs. 2 Sätze 4 und 5 HHG. Der Anerkennungsausschuss wählt einen der Prüfungsausschussvorsitzenden zu seinem Vorsitzenden.

(2) Der Anerkennungsausschuss kann einzelne Aufgaben den Vorsitzenden der Prüfungsausschüsse zur alleinigen Durchführung und Entscheidung übertragen. Gegen deren Entscheidungen haben die Mitglieder des Anerkennungsausschusses ein Einspruchsrecht. Über den Einspruch entscheidet der Anerkennungsausschuss mit der Mehrheit seiner Mitglieder.

(3) Die Mitglieder des Anerkennungsausschusses haben das Recht, jederzeit in die Unterlagen zu Anerkennungsverfahren Einsicht zu nehmen.

(4) Die Mitglieder des Anerkennungsausschusses unterliegen der Schweigepflicht. Sie sind von dem Vorsitzenden zur Verschwiegenheit zu verpflichten, sofern sie nicht im öffentlichen Dienst stehen.

### § 9 Anrechnung von Studienleistungen und Anerkennung von Prüfungen

(1) Über die Anerkennung von Leistungen und die Berücksichtigung der Noten von anerkannten Prüfungen für die Gesamtnote entscheidet auf schriftlichen Antrag des Studierenden der Vorsitzende des Anerkennungsausschusses bzw. die nach § 8, Abs. 2 benannte Person. Zur Feststellung der Gleichwertigkeit bei Prüfungen, Studienleistungen anderer Studiengänge oder von Studienleistungen nach § 65 Abs. 1 Satz 1 TAppV wird ein inhaltlicher Abgleich der laut Antrag absolvierten Prüfungs- und Lehrinhalte mit den an der Justus-Liebig-Universität für das Fach Veterinärmedizin vorgesehenen Prüfungs- und Lehrinhalten unter Beteiligung des jeweiligen Fachvertreters durchgeführt. Voraussetzung für die Feststellung der Gleichwertigkeit ist die Ableistung der Fächer an einer Universität oder wissenschaftlichen Hochschule und der vergleichbare Prüfungs- und Lehrinhalt.

(2) Werden Prüfungsleistungen anerkannt, sind die Noten – soweit die Notensysteme vergleichbar sind – zu übernehmen und nach Maßgabe der Prüfungsordnung in die Berechnung der Gesamtnote einzubeziehen. Bei nicht vergleichbaren Notensystemen wird nur der Vermerk “bestanden“ in das Zeugnis aufgenommen. Eine Kennzeichnung der Anerkennung im Zeugnis ist vorzunehmen. Werden mehr als ein Drittel der Prüfungsleistungen ohne Benotung anerkannt bzw. mit „bestanden“ im Zeugnis gekennzeichnet, wird kein Gesamtergebnis im jeweiligen Prüfungsabschnitt ermittelt.

(3) Die Anrechnung von Teilfächern oder eine Anerkennung von Teilprüfungen erfolgt nicht.

## § 10 Staatliche Prüfungsausschüsse

(1) Zur Durchführung der Prüfungen wird gemäß § 5 TAppV jeweils ein staatlicher Prüfungsausschuss für die Tierärztliche Vorprüfung und für die Tierärztliche Prüfung eingerichtet.

(2) Den Vorsitzenden der Prüfungsausschüsse obliegen die Organisation und Aufsicht über die Prüfungen und deren ordnungsgemäße Durchführung. Sie achten darauf, dass die Bestimmungen der StuPO Vet eingehalten werden und sorgen dafür, dass Studierende, die alle Voraussetzungen zur Zulassung zur Prüfung besitzen, Erstprüfungen in den jeweiligen Prüfungsfächern zu den in Anlage 4 vorgegebenen Fristen ablegen können.

(3) Die Vorsitzenden legen Prüfungstermine, Ankündigungs- oder Ladungsfristen, Prüfungsdauer, Gruppengrößen und weitere Modalitäten der Prüfungen auf Grundlage der TAppV fest. Sie berichten dem Fachbereichsrat über die Entwicklung der Prüfungen und der Studienzeiten.

(4) Im gesamten Prüfungsverfahren ist auf die Art und Schwere einer Behinderung oder chronischen Erkrankung Rücksicht zu nehmen. Art und Schwere einer Behinderung sind durch den Prüfling durch ein ärztliches Attest oder einen Schwerbehindertenausweis nachzuweisen, in Zweifelsfällen kann der Vorsitzende ein amtsärztliches Attest verlangen. Macht ein Prüfling, gestützt auf das ärztliche Attest, glaubhaft, dass er wegen seiner Behinderung oder chronischen Erkrankung nicht in der Lage ist, die Prüfungsleistung ganz oder teilweise in der vorgesehenen Form abzulegen, gleicht der Prüfungsausschuss durch entsprechende Maßnahmen, wie zum Beispiel eine Verlängerung der Bearbeitungszeit oder eine andere Gestaltung des Prüfungsverfahrens, diesen Nachteil aus. Die „Allgemeinen Bestimmungen der JLU für Prüfungsordnungen zur Herstellung von Chancengerechtigkeit vom 21.3.2007“ finden entsprechende Anwendung.

(5) Das Regierungspräsidium Gießen vertritt die Prüfungsausschüsse gerichtlich und außergerichtlich, soweit die Staatsprüfung unmittelbar betroffen ist. Widerspruchsbehörde gegen Entscheidungen zu Studienleistungen oder im Studium erworbenen Prüfungsanteilen ist der Präsident der JLU.

(6) Geschäftsstelle der Prüfungsausschüsse ist das staatliche Prüfungsamt des Fachbereiches Veterinärmedizin.

## § 11 Zuständiger Prüfungsausschuss

Die Studierenden können die Tierärztliche Vorprüfung bzw. Prüfung vor dem Prüfungsausschuss nur dann ablegen, wenn sie im Studienfach Tiermedizin an der Justus-Liebig-Universität Gießen immatrikuliert sind und die erforderlichen Leistungsnachweise vorliegen. Die Vorsitzenden bestimmen die Organisation der Speicherung von Studiennachweisen.

## § 12 Prüfer

Auf schriftlichen Antrag der/des Studierenden kann der Vorsitzende des zuständigen Prüfungsausschusses in begründeten Fällen einen Prüferwechsel vornehmen.

## § 13 Zulassung zur Prüfung

(1) Für die Prüfungen ist innerhalb von drei Wochen nach Beginn der jeweils vor den Prüfungsterminen liegenden Vorlesungszeit schriftlich ein Antrag auf Zulassung an den Vorsitzenden des jeweils zuständigen Prüfungsausschusses zu richten. Dem Antrag sind beizufügen:

1. Der gültige Personalausweis,
2. Der Nachweis der Hochschulzugangsberechtigung, bei Zeugnissen, die außerhalb des Geltungsbereichs dieser Verordnung erworben wurden, auch zusätzlich der Anerkennungsbescheid der zuständigen Behörde,
3. Die erforderlichen Ausbildungsnachweise nach den §§ 20, 23 und 31 TAppV,
4. Die für den Prüfungsabschnitt erforderlichen Studiennachweise (Prüfungsvoraussetzungen).

Die Nachweise nach Satz 2 Nr. 1 und 2 sind nur vor einer erstmaligen Prüfung an der Universität dem Prüfungsamt abzugeben. Die Nachweise nach Nr. 4 können entsprechend Abs. 4 nachgereicht werden.

Die Prüfungsabfolge ergibt sich für die tierärztliche Vorprüfung aus den §§ 19 und 21 TAppV, für die tierärztliche Prüfung nach § 29 TAppV aus der Anlage 4. Die dort genannten Prüfungsabschnitte setzen jeweils einen gesonderten Zulassungsantrag voraus.

(2) Die Nachweise nach Abs. 1 Satz 2 Nr. 1 und 2 sind in amtlich beglaubigter Ablichtung vorzulegen. Die Form der Nachweise nach Nr. 3 bestimmt der Vorsitzende. Sie können in anderer Form vorgelegt werden, soweit diese im Einzelfall durch den Vorsitzenden des jeweiligen Prüfungsausschusses als gleichwertig anerkannt werden. Die Nachweise Nr. 1 und 2 werden bis zum Abschluss des Studiums zu den Prüfungsakten genommen und anschließend wieder zurückgegeben.

(3) Die Festlegung der Prüfungszeiträume für die Prüfungsfächer erfolgt durch den jeweiligen Vorsitzenden. Die einzelnen Prüfungstermine setzt der Vorsitzende im Benehmen mit den beteiligten Prüfern fest. Bei jedem Prüfling soll der Abstand zwischen den einzelnen Prüfungen mindestens 1 Woche betragen. Die Termine werden spätestens vier Wochen vor Beginn eines Prüfungsabschnittes öffentlich bekannt gegeben und dem einzelnen Prüfling entsprechend Abs. 4 übermittelt.

(4) Die Ladung zur Prüfung nach § 12 Abs. 1 TAppV erfolgt unbeschadet der Regelung in Abs. 5 spätestens sieben Werktage vor der ersten Prüfung des jeweiligen Abschnittes.

(5) Über die Zulassung zu den durch Ladung terminierten Prüfungen entscheidet der Vorsitzende des jeweiligen Prüfungsausschusses spätestens drei Werktage vor dem Beginn des Prüfungsabschnittes nach Überprüfung der dann vorliegenden Prüfungsvoraussetzungen. Sind diese unvollständig, wird die Zulassung versagt und die Ladung damit gegenstandslos.

(6) Eine Wiederholungsprüfung darf frühestens 3 Wochen nach erfolglos abgelegter Prüfung durchgeführt werden. In besonders begründeten Fällen kann der Vorsitzende im Einvernehmen mit dem Studierenden einen kürzeren Zeitraum festlegen.

(7) Für den Rücktritt von einer Prüfung, zu der der Studierende entsprechend Abs. 5 zugelassen worden ist, gilt § 12 Abs. 2 TAppV.

(8) Die Prüfung nach § 20 Abs. 2 TAppV wird nur angeboten für die Fächer Physik und Chemie. Die Zulassung zur mündlichen Prüfung in Physik bzw. Chemie setzt voraus, dass der Studierende das jeweilige Fach in der Schule als Leistungs- bzw. Neigungskurs oder einen Kurs in diesem Sinne mit erhöhtem Anforderungsniveau belegt und im Abiturzeugnis der Durchschnitt der Leistungen in diesem Fach aus der Qualifikationsphase und der Abiturprüfung mit “sehr gut“ nachgewiesen ist.

## § 14 Prüfungsverfahren

(1) Bei mündlichen Prüfungen hat ab der ersten Wiederholungsprüfung (Zweitprüfung) außer dem Prüfer der Vorsitzende oder ein von diesem bestimmtes Ausschussmitglied anwesend zu sein. Bei schriftlichen (auch elektronischen) Prüfungen ist die Leistung der zweiten Wiederholungsprüfung (Drittprüfung) außer vom Prüfer zusätzlich durch den Vorsitzenden oder ein von ihm bestimmtes Ausschussmitglied zu bewerten. Auf Antrag des Studierenden findet der Satz 2 auch bei der ersten schriftlichen oder elektronischen Wiederholungsprüfung Anwendung. Bei einer zweiten Wiederholungsprüfung (Drittprüfung) einer schriftlichen oder elektronischen Prüfung kann der Studierende ein mündliches Prüfungsverfahren beantragen. Über den Antrag entscheidet der Prüfungsausschussvorsitzende.

(2) Zu Beginn einer Prüfung haben sich Studierende durch einen amtlichen Ausweis mit Lichtbild oder dem Studienausweis zu legitimieren.

(3) Zulässig sind mündliche, praktische, elektronische und schriftliche Prüfungen oder Kombinationen davon als Einzel- oder Gruppenprüfungen, wobei bei mündlichen Prüfungen mindestens zwei, jedoch nicht mehr als fünf Studierende gemeinsam geprüft werden sollen. Bei praktischen Prüfungen, z.B. bei Objective Structured Clinical Examinations oder Prüfungsteilen am Tier soll neben dem Prüfer mindestens eine weitere Person anwesend sein,

soweit dies vom Studierenden gewünscht ist. Die Form der Prüfung wird in Anlage 4 festgelegt. Schriftliche Prüfungen sind Klausuren, die auch unter Verwendung des Antwort-Wahl-Verfahrens (Single bzw. Multiple Choice) durchgeführt werden können. Schriftliche Prüfungen beinhalten die Beantwortung einer oder mehrerer Aufgabenstellungen. Die Bearbeitungszeit beträgt nicht weniger als 30 Minuten. Die Dauer anderer Prüfungsformen hängt von der festgelegten Prüfungssituation und deren konkreten Umständen ab. In einer mündlichen Prüfung muss dem Prüfling mindestens 20 Minuten Zeit gegeben werden, auf Fragen des Prüfers sein Wissen bzw. seine Erkenntnisse vorzutragen.

(4) Die wesentlichen Gegenstände und Umstände mündlicher und praktischer Prüfungen und die Bewertung der Leistung sind vom Prüfer oder einem vom Vorsitzenden zu bestellenden Protokollführer in einem Protokoll festzuhalten. Hierzu wird die Anlage 2 der TAppV nach den Anforderungen der JLU ergänzt und ist in dieser Form Anlage 5a und für Wiederholungsprüfungen Anlage 5b dieser Ordnung.

(5) Studierende, die von einer Prüfung ordnungsgemäß zurückgetreten sind, sind erneut zu laden. Ein ordnungsgemäßer Rücktritt liegt beim Nachweis eines triftigen Grundes vor. Der triftige Grund ist dem Vorsitzenden unverzüglich schriftlich mitzuteilen und auf Verlangen glaubhaft zu machen. Im Falle des Versäumnisses wegen Krankheit ist ein ärztliches Attest nach Anlage 6 innerhalb von drei Werktagen vorzulegen. Im Falle eines mehr als zweimaligen Versäumnisses einer Prüfung wegen Krankheit innerhalb eines Prüfungsabschnittes gemäß Anlage 4, muss ein amtsärztliches Attest des Gesundheitsamtes Gießen vorgelegt werden. Bei Abbruch einer andauernden Prüfung wegen Krankheit muss immer das Attest des Gesundheitsamtes in Gießen vorgelegt werden.

(6) Bei Versäumnis, Abbruch oder Rücktritt ohne triftigen Grund gelten die Prüfungsleistungen des Studierenden als “nicht ausreichend“.

## § 15 Bewertung der Prüfungsleistungen

(1) Für die Bewertung der Leistungen in Prüfungen sind die Noten entsprechend § 14 Abs. 1 TAppV zu verwenden.

(2) Die Leistungen in schriftlichen Prüfungen sind wie folgt zu ermitteln:

| | | |
|---|---|---|
| “sehr gut“ | (1) | wenn 88 % und mehr |
| “gut“ | (2) | wenn 75 – 87 % |
| “befriedigend“ | (3) | wenn 63 – 74 % |
| “ausreichend“ | (4) | wenn 51 – 62 % |
| “nicht ausreichend“ | (5) | wenn 50 % oder weniger |
| | | der maximal erreichbaren Leistung erzielt wurden. |

Sind die Ergebnisse schriftlicher Leistungen in Noten auszudrücken, ist erforderlichenfalls auf den ganzen Prozentwert zu runden, wobei bei einem Prozentwert kleiner x,5 auf x abgerundet, bei einem Punktwert größer/gleich x,5 auf x+1 aufgerundet wird.

(3) Die Prüfung ist bestanden, wenn der Prüfling in einem Prüfungsfach mindestens die Note “ausreichend“ erhalten hat.

(4) Das Prüfungsergebnis in einer mündlichen Prüfung ist dem Studierenden jeweils nach Abschluss der Prüfung in diesem Fach bekannt zu geben. Das Ergebnis schriftlicher Prüfungen ist vom Prüfer durch anonymisierten Aushang oder individuell elektronisch innerhalb von 21 Tagen nach der Prüfung bekannt zu geben

(5) Nach Abschluss der Prüfung wird dem Prüfling auf schriftlichen Antrag Akteneinsicht gewährt. Der Antrag ist binnen eines Monats nach Bekanntgabe des Prüfungsergebnisses beim Vorsitzenden des zuständigen Prüfungsausschusses zu stellen. Der Vorsitzende bestimmt Ort und Zeit der Einsichtnahme.

# Abschnitt III Schlussvorschriften

## § 16 Inkrafttreten und Übergangsbestimmung

Diese Ordnung in der Fassung des Vierten Änderungsbeschlusses gilt ab Wintersemester 2019/20 für alle Studierenden, die ihr Studium vor dem Sommersemester 2017 aufgenommen haben. Im Übrigen gelten die bisherigen Bestimmungen fort.

Verzeichnis der Anlagen:

| | |
|---|---|
| Anlage 1 | Studienplan |
| Anlage 2 | Übersicht aller Semesterwochenstunden |
| Anlage 3 | Rotation (5. Studienjahr) |
| Anlage 4 | Zeitpunkt der Prüfungsabschnitte, Vorleistungen und Prüfungsmodalitäten |
| Anlage 5 a und 5 b | Prüfungsniederschrift |
| Anlage 6 | Formular für die Bescheinigung der Prüfungsunfähigkeit |

# Appendix H: Examination regulations of the study program at the Faculty of Veterinary Medicine at JLU Giessen

**Timing of examination, requirements and examination modality in veterinary medicine Justus-Liebig-University Giessen**

| | Examination /-periode (after the lectures) | Subject | Requirements | examination modality * |
|---|---|---|---|---|
| | **End of 2nd Semester** | Physics including physical part of Radiology and radiation protection | Experimentalphysics (practicsl part and written test) | written/oral (100%) |
| | | Chemistry | Chemistry written test: part 1 and 2, Chemistry practical course : part 2 | written/oral (100%) |
| | | Zoology | Zoological seminar | written (100%) |
| | | Botany (animal food, drug and toxic plants) | Introduction in systematic of local plants with special regards to animal food, drug and toxic plants | written (100%) |
| | | | Terminology course | |
| | **End of 3rd Semester** | Anatomy | Anatomy part I., II., III. | oral (100%) |
| | | Histology and Embryology | Histology part 1: cells- and tissue, Histology part 2: tissue microscopy Seminar general Embryology | oral/ written (100%) |
| | **End of 4th Semester** | Physioloy | practical course and Seminar | oral/ written (100%) |
| | | Biochemistry | Biochemical practical course and Seminar | oral/practical (100%) or written/practical (100%) |
| | | Animal Breeding and Genetics | Pratical course in Agricultural Theory, Animal Breeding and Genetics, breeds and standards or aquivalent practical course according to § 3 (6) StuPOVet, | written/practical (100%) |

| | Examination /-periode (after the lectures) | subject | Requirements | examination modality * |
|---|---|---|---|---|
| para-/clinical part | **End of 5. Semester** | Bakteriology and Mycology | practical course / Seminar in Bakterioloy, Mycology and Immunology | practical (20%)<br>oral (80%) |
| | | Virologie | practical course / Seminar in Virology including Immunology | written (100%) |
| | | Klinische Propädeutik | practical course in Propedeutics | oral/practical (100%) |
| | | General Pathology and Special Pathological Anatomy and Histology including Autopsies | Seminar in general Pathology | written (30%) |
| | | Pharmacology and Toxicology Part 1 General Pharmacology, Part 2 Toxicology, | Seminar in general Pharmacology and Toxicology | written (20%)<br>written (20%) |
| | **End of 6. Semester** | Animal Husbandry [10.1] and Animal Hygiene | - | oral (100%) |
| | | Parasitology | practical course in Parasitology | oral/practical (100%) |
| | | Prescription and Drug Preparation, Drug and Anaesthesia Law | practical course in Prescription and Drug Preparation | practical within semester (20%)<br>oral/written (80%) |
| | | Animal Nutrition | practical course in food science<br>practical course in animal nutrition | written (100%) |
| | | Surgery including Anaesthesiology, part 1 | special lectures | written |
| | | Internal Medicine including clinical pathology, part 1 | special lectures | written |
| | **End of 7. Semester** | Tierschutz und Ethologie | - | written (100%) |
| | | General and Clinical Radiology | lectures General and Clinical Radiology | written (100%) |
| | | Surgery including Anaesthesiology, part 1 | special lectures | written |
| | | Internal Medicine including clinical pathology, part 1 | special lectures | written |

| | | | | |
|---|---|---|---|---|
| | **End of 8. Semester** | Pharmacology and Toxicology including Clinical Pharmacology; Part 3 clinical Pharmacology | Pharmacology and Toxicology including Clinical Pharmacology part 1 and 2 | written (60%)** |
| | | Milk Science | practical course examination of milk | written (100%) |
| | | Control of Animal Epidemics and Epidemiology | - | oral (100%) until 2020<br>written (100%) starting 2021 |
| | | Forensic Veterinary Medicine, Veterinary Professional Law | - | written (100%) |
| | | Surgery including Anaesthesiology, part 2 | special lectures | written (40% calculated out of part 1, 2 und 3) |
| | | Internal Medicine including clinical pathology, part 2 | special lectures | written (40% calculated out of part 1, 2 und 3) |
| | | Reproductive Medicine, part 1 | special lectures | written (40%) |
| | | General Pathology and Special Pathological Anatomy and Histology including Autopsies | Course Histopathology,<br>Seminar Pathologogy.-Anatom.<br>Special Pathological,<br>clinical rotation Pathology | oral/practical/written (70%) |
| | **End of 10. Semester** | Food Science | Practical course Animal for Slaughter and Meet inspection | oral/practical (40%)**<br>schriftlich written (60%) |
| | | Food Science, Meat Hygiene | Practical course Food Science, food technology | oral/practical (40%)**<br>schriftlichwritten (60%) |
| | | Reproductive Medicine part 2 | Reproductive Medicine part 1 (40%),<br>clinical rotation Reproductive Medicine, Ambulatory Care | oral/practical (60%) |
| | | Avian Diseases | Livestock Management and Ambulatory Care practical courses avian Pathology, clinical rotation | oral (100%) |
| | | Surgery including Anaesthesiology, part 3 | Surgery including Anaesthesiology part 1 and 2(40%),<br>clinical rotation Surgery including Anaesthesiology | oral/practical (60%) |
| | | Internal Medicine including clinical pathology, part 3 | Internal Medicine including clinical pathology, part 1 and 2<br>clinical rotation internal medicine,<br>Virology<br>Bacteriology/Mycology and Parasitology | oral/practical (60%) |
| | | | Statistic course | |

Mean result of splitted examinations must be < 4. (§ 14 Abs. 1 TAppV ***** Coordinators can change the fromat of examination (written, oral, practical) in accordance with the student- and faculty council. Exminat format hast o be announces befor lectures. ****** Resulat of examination must be sufficient

# Appendix to 1.2.1

## Personal responsibilities within the Faculty of Veterinary Medicine at JLU

| Deans`s Office (2018-2020) | | |
|---|---|---|
| **Function** | **Name** | **Institute** |
| Dean | Prof. Dr. Dr. h.c. Martin Kramer | Clinical Unit for Small Animals (Surgery) |
| Vice Dean for Research | Prof. Dr. Martin Diener | Institute of Vet.-Physiology |
| Dean of Study Affairs | Prof. Dr. Dr. Stefan Arnhold | Institute of Vet.-Anatomy, -Histology and -Embryology |
| Head of Administration | Dr. Christoph Braun | Dean`s Office |

| Elected Members of the Faculty Council (2018-2020) | | |
|---|---|---|
| **Name** | **Group** | **Institute** |
| Prof. Dr. Kerstin Fey | Professor | Equine Clinical Unit (Internal Medicine) |
| Prof. Dr. Rüdiger Gerstberger | Professor | Institute of Vet.-Physiology |
| Prof. Dr. Joachim Geyer | Professor | Institute of Pharmacology and Toxicology |
| Prof. Dr. Christoph Grevelding | Professor | Institute of Parasitology |
| Prof. Dr. Andreas Moritz | Professor | Clinical Unit for Small Animals (Internal Medicine) |
| Prof. Dr. Gerald Reiner | Professor | Clinic Unit for Swine |
| Prof. Dr. Friedemann Weber | Professor | Institute of Virology |
| Dr. Manfred Henrich | Academic Staff | Institute of Pathology |
| Dr. Franca Möller Palau-Ribes | Academic Staff | Clinic Unit for Birds, Amphibia, Reptiles and Fish |
| Brigitta Buß | Non-Academic Staff | Institute of Vet.-Physiology |
| Alina J. Anton | Student | |
| Jonas Faber | Student | |
| Julius Hermanns | Student | |

| Chairpersons of Committees | | |
|---|---|---|
| **Faculty Committees** | **Name** | **Institute** |
| Committee of Study Affairs | Prof. Dr. Dr. Stefan Arnhold | Institute of Vet.-Anatomy, -Histology and -Embryology |
| QSL-Commission | Prof. Dr. Dr. Stefan Arnhold | Institute of Vet.-Anatomy, -Histology and -Embryology |
| Committee for Strategic Planning | Prof. Dr. Dr. h.c. Martin Kramer | Clinic Unit for Small Animals (Surgery) |
| Committee for Financial Matters | Prof. Dr. Martin Diener | Institute of Vet.-Physiology |
| Committee for Price-Granting | Prof. Dr. Dr. h.c. Martin Kramer | Clinic Unit for Small Animals (Surgery) |
| Ad Hoc Committee for Research Matters | Prof. Dr. Martin Diener | Institute of Vet.-Physiology |
| Graduation Committee | Prof. Dr. Dr. h.c. Martin Kramer | Clinic Unit for Small Animals (Surgery) |

| State Examination Office (Section 1, tierärztliche Vorprüfung) | | |
|---|---|---|
| **Function** | **Name** | **Institute** |
| Chairperson | Prof. Dr. Carsten Staszyk | Institute of Vet.-Anatomy, -Histology and -Embryology |
| Vice Chairperson | Prof. Dr. Rüdiger Gerstberger | Institute of Vet.-Physiology |
| Vice Chairperson | Prof. Dr. Dr. Stefan Arnhold | Institute of Vet.-Anatomy, -Histology and -Embryology |

| State Examination Office (Section 2, tierärztliche Prüfung) | | |
|---|---|---|
| **Function** | **Name** | **Institute** |
| Chairperson | Prof. Dr. Andreas Moritz | Clinic Unit for Small Animals (Internal Medicine) |
| Vice Chairperson | Prof. Dr. Kerstin Fey | Equine Clinical Unit (Internal Medicine) |
| Vice Chairperson | Prof. Dr. Christoph Grevelding | Institute of Parasitology |
| Vice Chairperson | Prof. Dr. Melanie Hamann | Institute of Pharmacology and Toxicology |
| Vice Chairperson | Prof. Dr. Axel Wehrend | Clinical Unit for Obstetrics and Gynaecology |

| Representatives of The Faculty of Veterinary Medicine at JLU | | |
|---|---|---|
| **Function** | **Name** | **Institute** |
| Director Veterinary Teaching Hospital | Prof. Dr. Axel Wehrend | Clinical Unit for Obstetrics and Gynaecology |
| Animal Welfare Officer | Prof. Dr. Stephanie Krämer<br>Dr. Guido Haschke | Chair for Laboratory Animal Science and Animal Protection |
| Equal Opportunities Officer | Dr. Katja Roscher | Equine Clinical Unit (Internal Medicine) |
| Hygiene Officer | Prof. Dr. Rolf Bauerfeind | Institute of Hygiene and Infectious Diseases of Animals |
| Library Officer | Prof. Dr. Kerstin Fey | Equine Clinical Unit (Internal Medicine) |

| Verein der Freunde und Förderer der Veterinärmedizin in Gießen e.V. | | |
|---|---|---|
| **Function** | **Name** | **Institute** |
| President | Prof. Dr. Sabine Wenisch | Clinical Unit for Small Animals (Surgery) |
| Treasurer | Prof. Dr. Dr. Stefan Arnhold | Institute of Vet.-Anatomy, -Histology and -Embryology |

# Appendix to 1.3 a

## Detailed SWOT analysis

### Summary

### Self evaluation report (SWOT analysis) Faculty of Veterinary Medicine Justus-Liebig-University Giessen
### covering the period 2007 – 2018
### with an “update” 2020

### Content

# 1. Explanatory Background

In the federal state of Hesse the acquisition of funds for research and teaching falling into the rubric "Performance-based Allocation of Funds (LOMC Budget)" is an important factor concerning basic funding of the university by the state of Hesse. Consequently the allocation of funds to a faculty from the central university budget also reflects the acquirement of LOMC-Funds by a faculty. Concerning the Faculty of Veterinary Medicine the acquirement of LOMC-Funds has decreased from about 3 mil. in 2007 to roughly 1.6 mil. in 2015, to increase slowly thereafter.

Part 2 of this document is the original SER as developed for the period 2007 – 2018 with the aim to assess the state of the faculty, to provide an analysis of the observed decrease in funds and a solution how to further improve the situation

Part 1 of this document gives short summaries of the findings and conclusions documented in Part 2 for chapters 1 to 9 with an update concerning the situation as observed in 2020.

## Update 2020

Third fund acquirement by the Faculty in the past three years was as follows
2,532,154 € (2018), 3,307,793 € (2019) and 6,005,166 € (2020).

# 2. Development Teaching

## Summary

The veterinary curriculum is characterized by a high teaching and consequently a high study load. In the years 2013 to 2018 almost 86% of the students originally enrolled have successfully finished undergraduate education with about 80% passing within the time allotted (11 semesters). Survey of students revealed a weekly workload of about 40 hours. Students showed a high degree of satisfaction. The additional information given was that further improvement is possible by improving technical equipment.

## Update 2020

## Strength

- the number of students passing in time has been maintained. Mean value for 2018 and 2019 is 76%. The total number of students passing was 85%.
- Strong support of self-directed learning by providing a well-equipped and tutored clinical skills laboratory which is well accepted by the students.
- e-lectures and IT teaching with direct interaction student/teacher (in part as a result of the Corona crisis).
- wide variability in clinical case-loads, also providing the possibility for cross sectional lectures.
- cross sectional teaching and its regular adjustment between the various teachers provides a basis for better understanding basic and specific topics and hence the learning process.
- the positioning of the clinical rounds, including rounds in pathology and microbiology, and all extramural practical courses into the 5th year has shown to considerably improve hands on clinical training and the understanding of para-clinical training and training in veterinary public health
- strong research-based teaching
- seminars for postgraduates are open to undergraduates

### Weaknesses

- The squeezing of the teaching load in 11 semesters does not allow for much flexibility and requires strict adherence to the time-table within each semester.
- Due to animal protection regulations the number of "propaedeutical animals" available for clinical training has been drastically reduced.
- only limited space/access for students in some areas, e.g. poultry meat inspection, special laboratory facilities in microbiology, e.g. MALDI-TOF, genome sequencing.

### Improvement opportunities

-Provision of better teaching facilities with money becoming available when new professors are appointed
-better definition of learning objectives during clinical rotations
-implementation of more interactive teaching opportunities
-increase of elective and optional seminars and courses
-improvement of inter-faculty cooperation
-lack of animals for the propaedeutical courses can be partially compensated by a practical training in the skills lab facility.

## 3. Development in the Area of Research

### Summary

According to agreements made with the president, the faculty has concentrated on the following areas: Infection, regenerative medicine, reproduction, inflammation, wild life biology, clinical sciences. Each area is based on an intra faculty cooperation. Additionally, various members of the faculty cooperate in inter- and trans-university research programs within the Justus-Liebig-University, within Hesse and on an international level.

Success in research is assessed by the acquirement of funds going into the program of "Performance-based Allocation of Funds (LOMZ)" which is an important factor for financing of the university by the federal state of Hesse and consequently the Faculty. The following graph show the spending of funds considered in the LOMZ program.

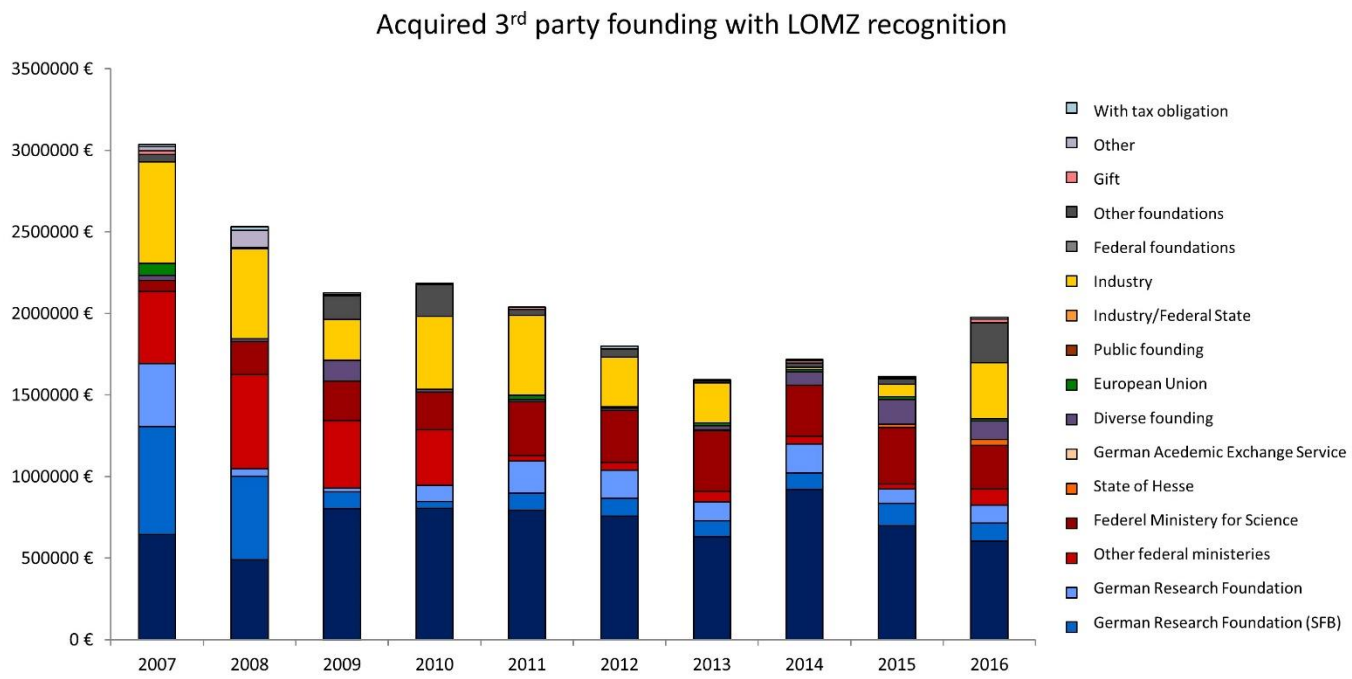


Fig. 1: Acquired 3rd party funding with LOMZ recognition

The decrease starting in 2008 is evident as is the re-increase starting in 2016. In 2018 the funds acquired amounted up to 3,307,793 €.

The following 3 graphs show the spending of all extramural funds acquired by the faculty. There are distinct differences between years and the various institutes/clinical sections, with some establishments more or less staying at the bottom line.

To improve the situation in 2014 the Faculty has established an ad hoc structure commission which deals with future aspects of external grant funded research, the research requirements when professorial positions are filled, internal failure analysis and support of research projects which look promising to obtain extramural support of young scientists.

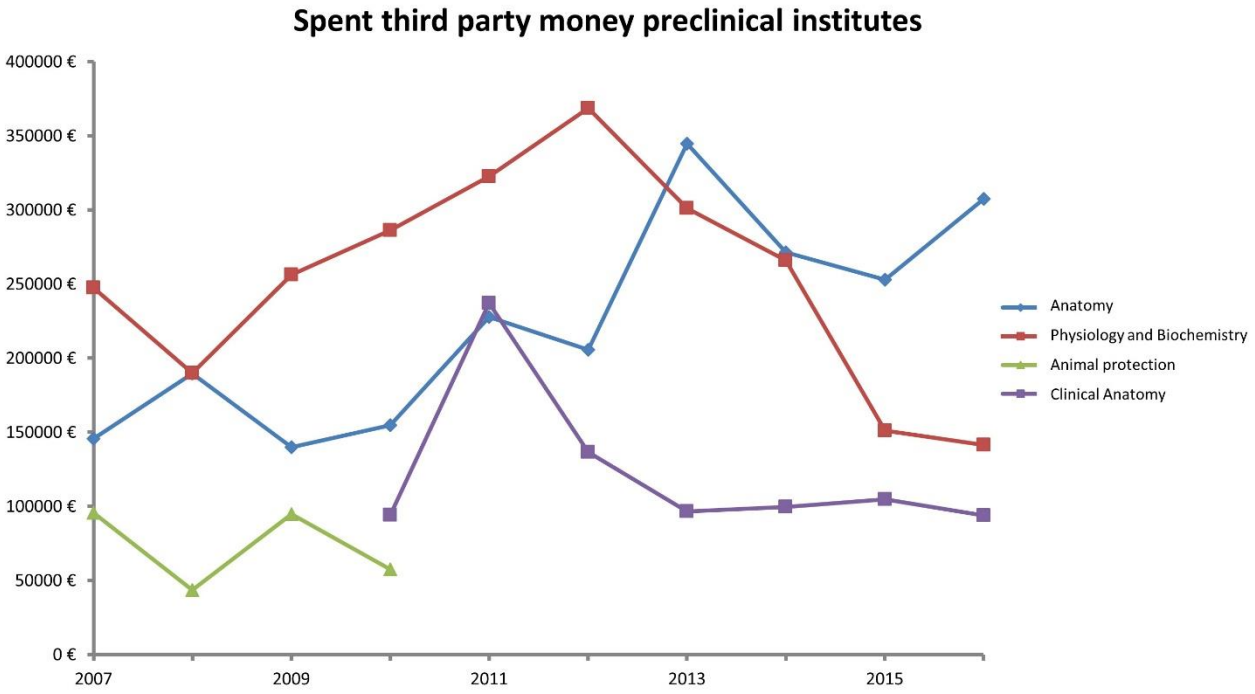


Fig. 2: Spent third party funds by preclinical institutes (animal protection: the chair became vacant in 2010, the position was open until 2017)

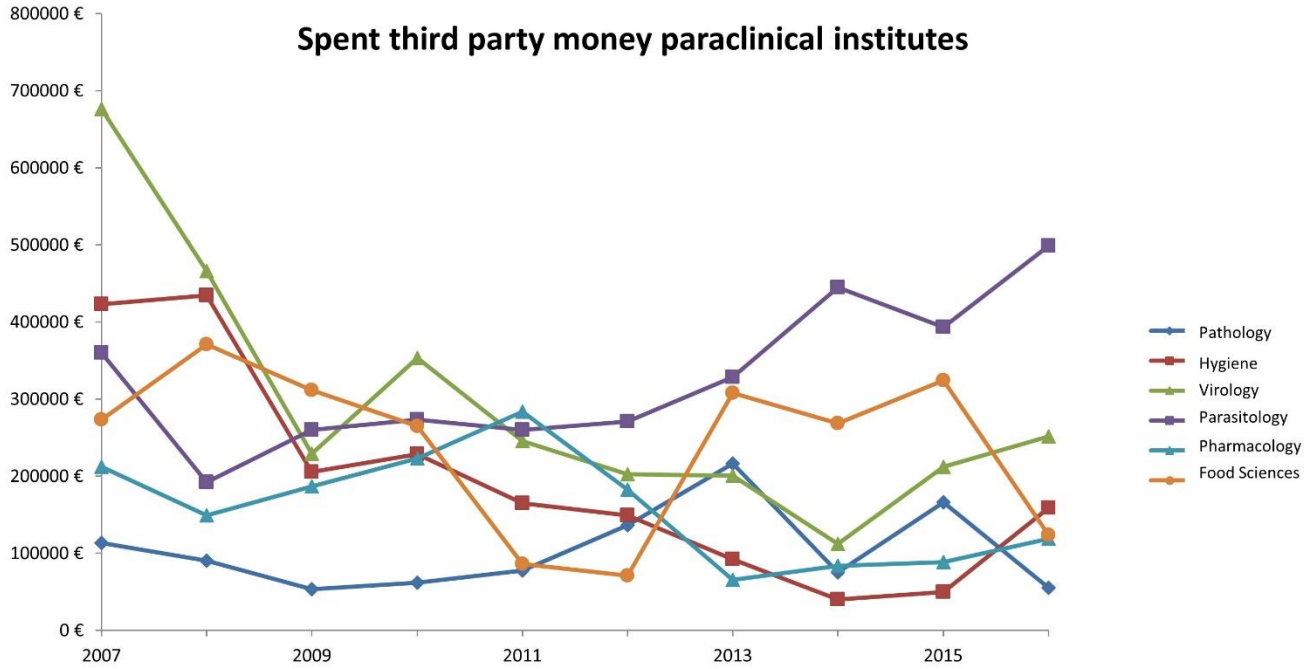


Fig. 3: Spent third party funds by paraclinical institutes

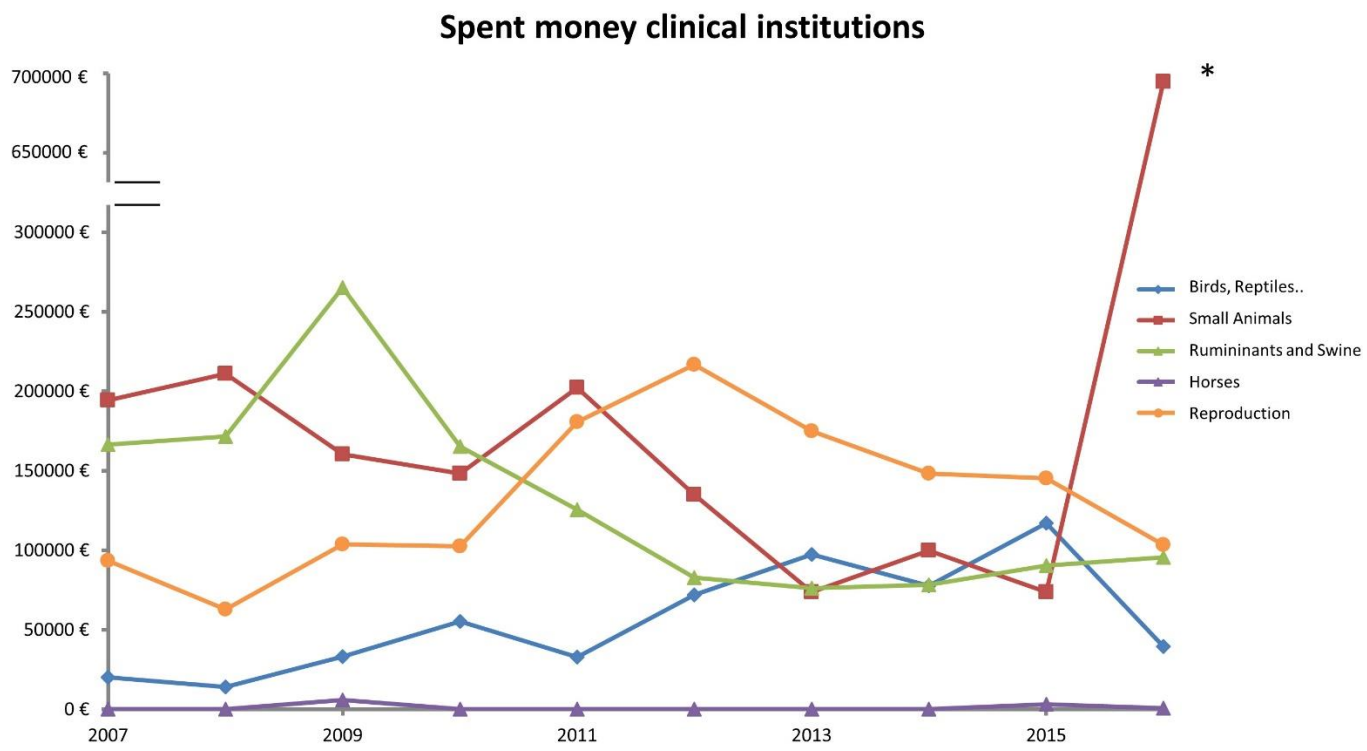


Fig. 4: Spent third party funds by clinical units

## Update 2020

The whole university and consequently the Faculty suffered from a cyber-attack in December 2019, the resulting problems could only be overcome in the course of 2020. Additionally, activities of the Faculty were hampered by the corona restrictions implemented in March 2020.

A big problem results from the fact that the forthcoming budget allotted to the Faculty is “global”, making no distinctions between the various traits and leaves it to the Faculty to sequester the respective amount to cover the salary increase.

This situation will be difficult to overcome.

## Strength

-the research activities of the faculty have distinctly improved since 2016 until present with the focus on microbiology (virology, bacteriology), parasitology, reproduction, inflammation, wild life biology and clinical sciences, also considering the “One Health” concept. The third party funds spent in 2019 and 2020 amounted up to 3 307 793 and 3 239,490 €. Most funds acquired are considered as “performance based allocation of funds (LOMZ)”, an important factor helping to secure basic funding of the Faculty by the presidency.

- clinical research, teaching and services have been strengthened by establishing in 2019 a professorship for horse orthopaedics, with focus on regenerative medicine and in 2020 a new professorship in the clinic for small animals, internal medicine with focus on small animal nutrition. Clinical research is on an inter-species level, including food-, pet- and exotic animals.

- para-clinical research has further been strengthened by successful acquiring funds, leading to the establishment (01. 08. 2019) of a full research bound professorship in the field of parasitology/zoonosis
- the good intra- and inter-faculty cooperation and – depending on the subject – also on an inter university level has been further strengthened.
- with the new clinical buildings/facilities for "Small Animals" and "Birds, Reptiles, Amphibian and Fish" excellent laboratory facilities have become available, adding to the spectrum of already available facilities.
- on an optional level and depending on the topic students are encouraged to participate in certain research projects.
- good publication records in in part highly ranked international journals were maintained.

## Weaknesses

- the shortage of permanent scientific staff is a problem of the Faculty due to the numerus clausus regulations. The shortage in technical staff is another problem the faculty suffers from.
- lack of postdoc positions financed by the university.
- restricted use of some laboratories due to not meeting increasing safety standards in some older buildings.
- the lack of financial support to append/replace laboratory equipment on the institute level with state-of-the-art equipment and for its maintenance is an ongoing problem.
- the lack of facilities to perform studies with food animals on the biosafety level 1 and 2 has not yet been overcome.
- up to now there is no central platform with the respective specialised staff for certain analytical techniques like mass spectrometry, FACS-analysis, transmission and scanning electron microscopy or genome sequencing and –analysis (also to support clinical research). In Process: Establishment of a research data base FinD-Mi (Forschungsdatenbank Mittelhessen)
- the present Easy-Vet–IT clinical program allows only limited access to clinical data to establish clinical meta-data.

## Improvement opportunities

Apart from a long-term strategy to overcome some highly cost-intensive weakness-points mentioned above, improvement of the following points must be seen as a realistic opportunity.

- better involvement of students in research projects.
- improvement of the Easy-Vet-IT program to better allow establishment of clinical meta data.
- to restore full usability of laboratories in some older buildings, e.g. in connection with the positioning of new professorial staff.
- installation of core facilities.
- Improvement of inter-university integration of research projects most likely increases the likelihood to become approved (general approval rate by the German Research Foundation presently < 30 %).

# 4. Developments in the Area of Promotion of Young Talents

## Summary

Between 2007 and 2018 the average number of postgraduate students graduating to a Dr. med. vet., Dr. biol. anim. or PhD was 70. During the same period only 11 out of this group achieved the "Habilitation", in Germany still considered the essential qualification criterion to become appointed as a professor. The Faculty considers this number as too low to maintain the claim to fill a professorship only with highly qualified young scientists. This is a problem for all veterinary establishments within the area teaching in German.

To counteract, the Giessen Faculty has established a program to support young scientists with "seeding money" (2x20,000 €) in order to bring them into a position to apply for research funds meeting the "LOMZ-Criteria". This serves as a quality control and since the program has been established two applications have been granted, from which one led to a successful DFG funding.

To maintain "quality and excellence" across the JLU, all junior professorial positions will be filled with the option to become tenured. So far two position have been filled according to these criteria in the Faculty of Veterinary Medicine.

A strictly structured PhD-program had been installed 2003 in cooperation with the Faculty of Medicine. So far 25 students coming from our faculty have graduated. This program contains the track "Clinical Scientist", it further offers the possibility to graduate after having achieved clinical qualification (e.g. Fachtierarzt, Diplomate of a European College). Additionally, also the conditions to enter the traditional program to achieve graduation to a Dr. med. vet. have been strengthened, clearly describing the responsibilities of the supervisor(s) and the students.

The French-German Summer School for the promotion of veterinary science is held once per year with concentration on different topics. It is to encourage and train graduate students to deal with scientific matters and to develop national and international cooperation.

## Update 2020

## Strength

- Four more young scientists have finished the habilitation program, another one has almost completed the underlying procedure. This indicates that the efforts made by the Faculty are successful.
- Two further junior tenure track professorial positions (W1/W2) have been filled, with the faculty expecting them to develop successful and highly competitive research.
- The faculty has been provided with funds by industry to yearly support one undergraduate student to spend a research-semester in the USA.
- With the opening of the new Small Animal Clinic and the Clinic for Birds, Reptiles, Amphibian and Fish, facilities for clinical and basic research were considerably improved.

## Weaknesses

-the number of students graduating to a PhD resp. Dr. med. vet. or Dr. biol. anim. in the academic years 2018/2019 and 2019/2020 has decreased to 59 resp. 42.
-the lack of fellowships or paid positions for graduate students trying to go the scientific track has not yet been overcome.
-in some areas the access to "up to date laboratory space and facilities" is still limited.

-the new regulations concerning the use of animals for experimental purposes make it extremely difficult to get certain programs in basic research going. To work with patients is highly restricted to clinical research.

### Opportunities

-a more successful acquisition of funds would improve the situation to provide paid positions for graduate students. This situation should improve with new professors having come in or to come and after having overcome the extra ad hoc spendings by the state of Hesse to meet the "Corona Crisis".
-with better involvement of undergraduate students in certain research programs and improvement of laboratory facilities in some areas, hopefully student interest in research will increase.

## 5. Appointment of Professorial Staff

### Summary

Across the 7 veterinary establishments teaching in German the situation is hampered by the fact, that there is a lack of highly qualified (young) scientists with a veterinary diploma applying for the positions posted. Other than for example in the areas of biology, biochemistry or human medicine with multiple applications, a "selection of the best", who would meet the demands of the faculty in respect to teaching, research and clinical expertise is hardly possible. This is in part due to the fact, that highly qualified graduates rather start their research career in institutes, like e.g. the Max-Planck Institutes, which are generally better funded and equipped than university institutes. Another problem results from the fact that clinical specialisation (European diplomat) hardly conforms with entering a scientific career (PhD-program).

The faculty has therefore decided to also post vacant positions internationally and to allow onset of teaching in English with the requirement to switch to German after a defined period of time. Additionally, "head hunting" has been introduced, also trying to recruit people who meet the spectrum of research activities the faculty is or should be engaged in. In respect to research each filling of a professorial position is based on a critical analysis of present and future needs, also taking into account inter-faculty cooperation.

In a further step the faculty has also defined which out of the 35 professorial positions may, but not must, be filled with non-veterinarians. In case of more than one professorship per institute, the faculty tries to maintain the balance between veterinarians and non-veterinarians. Presently 7 positions are hold by non- veterinarians (see table 1).

| | Denomination | Recent staffing | Retirement date | Possibility to for non-vets to fulfill this position |
|---|---|---|---|---|
| Institut für Veterinär-Anatomie, -Histologie und -Embryologie | | | | |
| W3-Arnhold | Veterinär-Anatomie, -Histologie und -Embryologie | Vet | 2030 | ** |
| W3-Anatomy | Veterinär-Anatomie, -Histologie und -Embryologie | Other | - | ** |
| C3-Kressin | Veterinär-Anatomie, -Histologie und -Embryologie | Vet | 2024 | ** |
| W2-Staszyk | Veterinär-Anatomie und Zellbiologie | Vet | 2036 | ** |
| Institut für Veterinär-Physiologie und -Biochemie | | | | |
| C4-Gerstberger | Veterinär-Physiologie | Other | 2021 | ** |
| W2-Diener | Veterinär-Physiologie | Other | 2027 | ** |
| W2-Mazurek | Veterinärmedizinische Biochemie | Other | 2031 | ** |
| W2/W3 N.N. | Biochemie in der Tiermedizin | - | | ** |
| Professur für Versuchstierkunde und Tierschutz | | | | |
| W2-Krämer | Versuchstierkunde und Tierschutz Refinement (3R) | Vet | 2035 | ** |
| Institut für Veterinär-Pathologie | | | | |
| W3 N.N. | Veterinär-Pathologie | - | | |
| W2-Herden | Allgemeine und spezielle Pathologie der Tiere | Vet | 2032 | |
| Institut für Tierärztliche Nahrungsmittelkunde | | | | |
| C4-Bülte | Tierärztliche Nahrungsmittelkunde (ab 01.04.2019 W3-Kehrenberg) | Vet | 2019 | |
| C4-Usleber | Milchwissenschaften | Vet | 2028 | |
| W1-Plötz | Veterinärmedizinische Lebensmitteldiagnostik | Vet | 2019 | |
| Institut für Hygiene und Infektionskrankheiten der Tiere | | | | |
| W3-Ewers | Veterinärmedizinische Bakteriologie und Mykologie einschl. Tierhygiene | Vet | 2036 | |
| C3-Bauerfeind | Tierseuchenbekämpfung und Zoonosen | Vet | 2026 | |
| Institut für Virologie | | | | |
| W3-Weber | Virologie | Other | 2032 | |
| W1-Tekes | Klinische Virologie | Vet | 2019 | |
| Institut für Veterinär-Parasitologie | | | | |
| W3-Taubert | Parasitologie | Vet | 2034 | |
| C3-Grevelding | Parasitologie und parasitäre Krankheiten | Other | 2028 | |
| W3-Druid | Parasitologie und Zoonosen (F. Falcone ab 01.08.2019) | Other | | |
| Institut für Pharmakologie und Toxikologie | | | | |
| W3-Geyer | Pharmakologie und Toxikologie | Other | 2041 | |
| W2-Hamann | Experimentelle und klinische Veterinär-Pharmakologie | Vet | 2041 | |
| Klinik für Vögel, Reptilien, Amphibien und Fische (KVRAF) | | | | |
| W3-Lierz | Krankheiten der Vögel und Hygiene der Geflügelhaltung | Vet | 2038 | |
| W2-Reptilien N.N. | Reptilien, Amphibien und Fische | - | | |
| Klinik für Pferde | | | | |
| W3-Röcken | Chirurgie des Pferdes | Vet | 2024 | |
| W3-Fey | Innere Krankheiten der Pferde | Vet | 2032 | |
| W1/W2-Burk-Luibl | Pferdeorthopädie (ab 01.04.2019) | Vet | | |
| Klinik für Kleintiere | | | | |
| C4-Kramer | Kleintierchirurgie | Vet | 2027 | |
| W2-Schmidt | Veterinär-Neurochirurgie/-radiolologie und klinische Neurologie | Vet | 2042 | |
| W1/W2 N.N. | Klinische Grundlagenforschung in der Inneren Medizin der Kleintiere | - | | |
| W2-Moritz | Klinische Pathophysiologie und Klinische Labordiagnostik | Vet | 2028 | |
| Klinik für Wiederkäuer und Schweine (KWS) | | | | |
| C4-Doll | Krankheiten derWiederkäuer (Innere Medizin und Chirurgie) | Vet | 2018 | |
| W2-Reiner | Schweinekrankheiten | Vet | 2028 | |
| Klinik für Geburtshilfe, Gynäkologie und Andrologie der Groß- und Kleintiere (KGGA) | | | | |
| W3-Wehrend | Klinische Reproduktionsmedizin | Vet | 2034 | |
| W3-Wrenzycki | Molekulare Reproduktionsmedizin | Vet | 2031 | |
| Professur für Klinische Anatomie und Experimentelle Chirurgie | | | | |
| W2-Wenisch | Klinische Anatomie und Experimentelle Chirurgie | Vet | 2029 | |

Tab. 1.: Definition of which out of the 35 professorial positions may, but not must, be filled with non-veterinarians. Explanation of colours: Dark red: position must be filled with a veterinarian; Bright red: position most unlikely to be filled with a non-veterinarian; Yellow: eventually to be filled with non-veterinarian; Bright green: conceivable to be filled with non-veterinarian; Dark green: well conceivable to be filled with non-veterinarian. In any case an important criterion to be observed is that "training authorization" for veterinary specialization must be maintained.

## Update 2020

### Strength

Three professorial positions (science of food of animal origin, horse orthopaedics, basic sciences in internal medicine of small animals) have been filled with veterinarians meeting the demands of the faculty. Appointment procedures with highly qualified veterinarians for the professorships "General Pathology" and "Diseases of Ruminants, internal medicine and surgery" are in progress. Similarly, the appointment procedure for the professorship "Biochemistry" is in progress, the applicant, however, is a highly qualified non veterinarian.

### Weaknesses

- The basic problems in finding adequate candidates to fill professorial positions have not been overcome.
- There is a lack of university funds to update clinical facilities beyond the Clinic for Small Animals and the Clinic for Birds, Reptiles, Amphibian and Fish, laboratories and laboratory equipment and to meet the demands of the applicants who were found suitable in order to make them accept the position.

### Opportunities

The excellent and most successful intra and inter faculty research established at the JLU may motivate some applicants to accept the offer to come in spite of some deficits in facilities and equipment.
Increase of acquired funds may result in provision of an increased basic funding of the faculty by the university.

# 6. Development and Perspectives concerning the Infra- structure

### Summary

A certain part of the income from clinical and para-clinical services is centralized by the dean and serves an essential co-factor to finance the needs of incoming professors, to update certain facilities and to provide the necessary share to get funds for special equipment. Thus, for example, the professorship for molecular reproductive medicine was supported with 100,000 € to finally establish the in vitro fertilization laboratory, 500,000€ were provided to receive an equal amount from the German Research Foundation (DFG) to finance a 3Tesla MRT for small animals and horses. A total of 1.5 Mio € will be put on reserve to bring the veterinary-pathology laboratories to a standard meeting up-to date demands (S1, S2-standard).

## Update 2020

## Strength

Concerning the status 2020 excellent facilities for teaching, research and clinical services were provided with the new (2019) Small Animal Clinic and the Clinic for Birds, Reptiles, Amphibian and Fish. The modern "**meat inspection teaching facilities**" were put into use in 2016 and the institutes of parasitology, of pharmacology and toxicology and of virology had moved into the new biomedical research centre (BFS) end of 2012.

The facilities for the Clinic of Obstetrics, Gynaecology and Andrology and the Clinic for Ruminants have been fused, good laboratory facilities are available, however, the facilities to house patients need adaption to the new situation and further improvement. Fusing of facilities has improved the access of students to food animals and consequently practical training.

The facilities in the clinical section for horse surgery remain in the old setting, however, they have been renovated and have reached a high level of acceptance by staff, students and clients. Decision has been made to establish new horse surgery facilities next to the Clinic for Small Animals. The state of Hesse will provide 10 Mil Euro, start of the action is envisaged for 2022/2023.

Laboratory and dissection facilities in the institute of anatomy are good, as are the facilities in the institute of Physiology and Biochemistry and the dissection hall in pathology.

The skill laboratory was established in 2016, providing excellent self-learning and supervised training facilities for students; the Faculty cares for a constant updating.

## Weaknesses

Renovation and updating the laboratory facilities in the older buildings, some of them under monument protection, is a long and tedious process, largely due to a lack of central university funds.

The facilities of the clinical section **equine internal medicine** have remained in the old housing of the former clinic for internal medicine; an interim solution to update the facilities is urgently needed.

Particularly concerning large animals there is still a lack of adequate housing for experimental animals and animals used for propaedeutical instructions.

Except for the official agricultural practical course there is only limited access of students to experimental farm of the Faculty of Agricultural Sciences, Nutritional Sciences, and Environmental Management.

Due to constantly new financial demands arising it will be difficult for the faculty to maintain the budget derived from service income.

Lack of staff to properly maintain the indoor and outdoor facilities of the faculty.

## Options

The university has a concept to completely restructure the horse clinic, also concerning the section equine internal medicine.

To establish modern, up to date S1 and S2 laboratories in the institute of pathology in connection with filling the W3-professorship.

To modernise some of the lecture halls.

# 7. Development and Perspectives concerning Equal Opportunities

## Summary

In following the strategy of the JLU and the state of Hesse, the faculty aims to increase the number of women holding a professorship (up to > 40 %) and of women finishing the “habilitation process” (up to >50%). In 2015 the professorships held by women was 32 % and thus top within the JLU and distinctly above the mean level for Germany which was 27 % in 2017. The faculty sees this as a result of the Dual-Career concept first introduced by the JLU in 2011 and other measures supporting family matters.

## Update 2020

## Strength

By 2020 additionally three women had passed the procedure to fill a professorship and have accepted the conditions provided by the University/Faculty.

Three more young, female, scientists from our faculty have successfully finished the habilitation process resp. the process has almost been finished.

## Weaknesses

Some highly qualified female scientist who applied for the position of a professor did not accept our offer due to lack of staff, funds and up to date laboratory facilities going with the position posted.

The provision of postdoc positions would make it distinctly easier to enter the habilitation process.

## Options

The head hunting concept and the Dual-Career concept might help that more female scientist apply for professorial positions.

There is always the hope that more funds become available to make positions posted by the Faculty/JLU more attractive.

# 8. Development and Perspectives of International Cooperation

## Summary

Apart from a strong participation of our students in the Erasmus Program, contracts signed with the École Nationale Vétérinaire de Nantes, France, the Uludag-University Bursa, Turkey, and the College of Veterinary Medicine, University of Tennessee, Knoxville, USA, University of Georgia, Athens, USA are strongly directed towards student participation. Concerning research, a trilateral contract has been signed in 2016 with the Jilin-University, Changchun, China and the Macquarie University Sydney, Australia. Funded by various organizations and accounting for different research topics an intensive cooperation with exchange of researchers is with the Aberystwyth University Wales, and the Wellcome Trust Sanger Institute, both UK, the L'Université de Perpignan, France, and - in the USA - with the George Washington University and the University of Texas, Southwestern Medical Centre.

To stimulate cooperation with “Islamic countries” in 2014 a scientist from the Mansoura University was sponsored for a 3.5 year stay at the Small Animal Clinic and since 2018 a scientist from the Assiut University; sponsoring agency: German-Egyptian Research Long-Term Scholarship Program.

### Update 2020

### Strength

The faculty has a strong international program, largely based on strong research programs developed in certain areas like parasitology and reproduction. Similarly, the sponsoring of the topic “neuro-immune interactions in neuro-inflammations” by the DAAD and GSSP has strengthened our international cooperation.

Presently also arrangements have been made with the Universidad Austral de Chile and the Universidad Nacional de San Marcos Lima, Peru.

### Weaknesses

There is no special administrative staff on the faculty level to support and maintain international cooperation. This means an extra burden for the responsible scientific staff. For these reasons some of the applications for cooperation can-not really be handled properly.

### Options

The faculty works on its limits concerning international cooperation. However, there is always the option for interested scientific staff members to develop their special relations and to eventually get support from the Academic Exchange Office of the JLU. The Faculty is also interested to get engaged in a joined project with Chile sponsored by German research funds.

## 9. Quality Assurance

### Summary

This chapter focuses on research and postgraduate education and reveals to the fact that the order to graduate to a Dr. med. vet. was rigorously standardised, clearly describing the requirements to be met by the students and supervisors.

The strengthening of intra- and inter faculty research projects has become a central matter, with research options to be defined by the dean in cooperation with the faculty council. These considerations must also be in agreement with the target agreement made with the presidency of the university. This must also be considered when posting professorial vacancies.

# 10. General Summary

## Teaching

The veterinary curriculum, which is characterized by a high teaching and consequently a high study load, is passed by about 80% of the students within the prescribed terms (time allotted 11 semesters). On average 84% of the students originally enrolled have successfully passed the undergraduate education in the years 2013 to 2018. The positioning of the clinical rounds, including rounds in pathology and microbiology, and all extramural practical courses in the 5th year has shown to considerably improve hands on clinical training and the understanding of para-clinical training and training in veterinary public health. However, the squeezing of the teaching load in 11 semesters does not allow for much flexibility and requires strict adherence to the timetable within each semester. Yet, survey of students revealed a high degree of satisfaction, with the additional information given, that further improvement is possible by improving technical equipment.

## Research

According to agreements made with the President of the University, the Faculty has concentrated on the following areas: Infection, regenerative medicine, reproduction, inflammation, wildlife biology, clinical sciences. Each area is based on an intra faculty cooperation. Additionally, various members of the faculty cooperate in inter- and trans-university research programs within the Justus-Liebig-University, within Hesse and on an international level. Success in research is assessed by the acquirement of funds going into the program of "performance-based allocation of funds (LOMZ)" which is an important factor for financing of the university by the federal state of Hesse. Research funds acquired by the faculty started to decrease in 2008. In order to meet this situation, the Faculty in 2014 established an ad hoc commission which deals with future aspects of external grant funded research, the research requirements when professorial positions are filled, internal failure analysis and support of research projects which look promising to obtain extramural support of young scientists. Consequently, a re-increase of acquired fund started in 2016. However, still existing major shortcomings are: a shortage of permanent scientific and technical staff. A lack of postdoc positions financed by the university. A restricted use of some laboratories and experimental animal facilities due to not meeting safety standards. A long-term strategy, also based on the positioning of new professorial staff, will hopefully provide opportunities to overcome some of the weak points

## Promotion of young scientists

The conditions to enter the program to achieve graduation to a Dr. med. vet. or Dr. biol. anim. have been strengthened. Between 2007 and 2018 the average number of students graduating in this program was 70. Additionally, a strictly structured PhD-program has been installed in 2003 in cooperation with the Faculty of Medicine; so far 25 students coming from our Faculty have graduated. This program also contains the track "Clinical Scientist", it offers the possibility to graduate after having achieved clinical qualification (e.g. Fachtierarzt, Diplomate of a European College). 11 graduates out of these programs have achieved the "Habilitation", in Germany still considered the essential criterion to be qualified to become appointed as a professor.

The faculty considers this number as far too low to maintain the positioning of highly qualified young scientists on professorial positions. To counteract, the Faculty has established a program to support young scientists with "seeding money" (2 x 20,000 €) in to develop and start research

programs meeting the criteria to apply for "LOMZ-capable" research funds. With the opening of the new Small Animal Clinic and Clinic for Birds, Reptiles, Amphibian and Fish facilities for clinical research were considerably improved.

A still weak point is the lack of fellowships or paid positions for graduate students trying to enter the scientific track. Additionally, the new regulations concerning the use of animals for experimental purposes make it extremely difficult to get certain programs going. To work with patients is not a substitute. Clearly, a more successful acquisition of funds would at least in part improve the situation. The faculty also hopes that with a better involvement of undergraduate students in some research programs and improvement of laboratory facilities in certain areas, student interest in research will increase.

## Appointment of Professorial Staff

There is a lack of highly qualified (young) scientists with a veterinary diploma applying for the positions posted, allowing application of the system “selection of the best” in respect to teaching, research, and clinical expertise. This is in part due to the fact, that highly qualified graduates rather start their research career in institutes, like the Max-Planck Institutes, which in general are better funded and equipped than university institutes. Another problem results from the fact that clinical specialisation (European diplomat) hardly conforms with entering a scientific career (PhD-program).

The faculty has therefor decided to also post vacant positions internationally and to allow onset of teaching in English. Additionally, “head hunting” has been introduced, also trying to recruit people who meet the spectrum of research activities, the faculty is or should be engaged in.

In a further step the faculty has also defined which out of the 35 professorial positions may, but not must, be filled with non-veterinarians. In case of more than one professorship per institute, the faculty tries to maintain the balance between veterinarians and non-veterinarians. Presently 7 positions are hold by non- veterinarians. Presently 6 positions are still open, giving the Faculty the chance to find proper candidates.

The excellent and most successful intra and inter faculty research established at the JLU may motivate some applicants to accept the offer despite some deficits in facilities and equipment.

Increase of acquired funds may result in provision of more basic funding of the faculty by the university.

## Development and Perspectives concerning the Infrastructure

Excellent facilities for teaching, research and clinical services were provided in 2019 with the new Small Animal Clinic and the Clinic for Birds, Reptiles, Amphibian and Fish. The “meat inspection teaching facilities” were put into use in 2016 and the institutes of parasitology, of pharmacology and toxicology and of virology had moved into the new biomedical research centre end of 2012. The facilities for the Clinic of Obstetrics, Gynaecology and Andrology and the Clinic for Ruminants have been fused, resulting in an improved access of students to food animals and consequently practical training. Good facilities for laboratory animals are available. The facilities in the clinical section for horse surgery remain in the old setting, however, they have been renovated and have reached a high level of acceptance. Similarly, the clinical facilities for the unit “Horse Internal Medicine” remain in the old setting, however, a renovation is urgently needed.

Laboratory and dissection facilities in the institute of anatomy are good, as are the facilities in the institute Physiology and Biochemistry and the dissection hall in pathology. The skill laboratory was established in 2016 and is constantly enlarged.

The university has a concept to completely restructure the horse clinic, with locating the surgery facilities next to the small new animal clinic, allowing a common use of some the radio-diagnostic equipment.

Unfortunately, renovation and updating of clinical and laboratory facilities in the older buildings is a long and tedious process, largely due to a lack of central university funds. To overcome some of these problems a certain percentage of the income from clinical and para-clinical services is centralized by the dean and serves an essential co-factor to finance the needs of incoming professors, to update certain faculty facilities and to provide the necessary share to get funds for special equipment.

Except for the official agricultural practical course there is only limited access of students to experimental farm of the Faculty of Agricultural Sciences, Nutritional Sciences, and Environmental Management and the placement of further "propaedeutical animals" on this location should be implemented as soon as possible.

Lack of staff to properly maintain the indoor and outdoor facilities of the faculty is another problem.

## Development and Perspectives concerning Equal Opportunities

In following the strategy of the JLU and the state of Hesse, the faculty aims to increase the number of women holding a professorship (to > 40 %) and of women finishing the “habilitation process” (to >50%). In 2015 the professorships held by women was 32% and thus top within the JLU and distinctly above the mean level for Germany which was 27% in 2017. The faculty sees this as a result of the Dual-Career concept first introduced by the JLU in 2011 and other measures supporting family matters.

Unfortunately, some highly qualified female scientist who applied for the position of a professor did not accept our offer due to lack of staff, funds and up to date laboratory facilities going with the position posted.

There is always the hope that more funds become available to make positions posted by the Faculty/JLU more attractive.

## Development and Perspectives of International Cooperation

Apart from a strong participation of our students in the Erasmus Program, contracts signed with the École Nationale Vétérinaire de Nantes, France, the Uludag-University, Bursa, Turkey, and the College of Veterinary Medicine, University of Tennessee, Knoxville, USA, are strongly directed towards student participation. Concerning research, a trilateral contract has been signed in 2016 with the Jilin-University, Changchun, China and the Macquarie University Sydney, Australia. Funded by various organizations and accounting for different research topics an intensive cooperation with exchange of researchers is with the Aberystwyth University Wales and the Wellcome Trust Sanger Institute, both UK, the L'Université de Perpignan, France, and - in the USA - with the George Washington University and the University of Texas, Southwestern Medical Centre. Arrangements have also been made with the Universidad Austral de Chile and the Universidad Nacional de San Marcos Lima, Peru

To stimulate cooperation with “Islamic countries” in 2014 a scientist from the Mansoura University was sponsored for a 3.5 year stay at the small animal clinic and since 2018 a scientist from the

Assiut University; sponsoring agency: German Egyptian Research Long-Term Scholarship Program.

The faculty works on its limits concerning international cooperation. Unfortunately, there is no faculty based special administrative staff to support and maintain international cooperation. This means an extra burden for the responsible scientific staff. For these reasons some of the applications for cooperation can-not really be handled properly.

However, there is always the option for interested scientific staff members to develop their special relations and to eventually get support from the Academic Exchange Office of the JLU.

## Quality Assurance

This chapter focuses on research and postgraduate education. The order to graduate to a Dr. med. vet. was rigorously standardised, clearly describing the requirements to be met by the students and supervisors.

The strengthening of intra- and inter faculty research projects has become a central matter, with research options to be defined by the dean in cooperation with the faculty council. These considerations must also be in agreement with the target agreement made with the president of the university. This must also be considered when posting professorial vacancies.

# Appendix to 1.3 b

## International student exchange at the Faculty of Veterinary Medicine at JLU

### Aims

The international exchange of students not only promotes academic and professional aspects, but mainly the personal development of students and has therefore been given special support in the Justus Liebig University Giessen for many years.
A various selection of Erasmus partner universities and cooperation partners outside the EU as well as a wide range of information and individual support in the faculty offer optimal conditions for student exchanges.
In addition to the positive aspects for students, international mobility also offers great additional benefit for the Faculty of Veterinary Medicine and the entire university through constant intercultural exchange and international networking.

### Overview

The Faculty of Veterinary Medicine of JLU Giessen has inter-institutional agreements in the framework of the Erasmus + program with 22 universities in 15 European countries.
In addition, two Swiss universities work together with the faculty as part of the Swiss European Mobility Programme (SEMP).

In addition to students from the partners from the Erasmus program countries, the faculty also actively participates in exchanges with JLU partners as part of Erasmus International Credit Mobility.

Veterinary students from JLU have a wide range of options for studying or doing an internship at a partner university. Incoming students from the partner universities are very welcome both for study visits and for internships in the clinics of the Faculty of Veterinary Medicine at JLU.

Participants in the Erasmus program make up the largest part of the student exchange.

Furthermore, there are also partnerships with universities from around the world.
The internship positions offered within the framework of cooperation agreements with partners in the USA (University of Georgia in Athens and University of Tennessee in Knoxville) are requested with great interest by students in their finaly year during their year of clinical rotation annually and are financially supported by the Association of Friends and Supporters of Veterinary Medicine at JLU (VFFV) as well as by the Steuben-Schurz Gesellschaft one of the oldest USA-German friendship organizations.

For incoming students, the Faculty offers short term internship places within the International Association for the Exchange of Students for Technical Experience (IAESTE) every year.

The Faculty of Veterinary Medicine of JLU provides the frame conditions for successful international student exchanges and continues to develop them consistently.

### Process responsibility
- Deanery for study affairs

### Process contact person
- Erasmus departmental coordinator

### Process participants
- Students
- Deanery
- Erasmus Departmental Coordinator
- Cooperation coordinator
- Responsible person for European affairs
- International Office of JLU
- Chairman of the examination board of the veterinary examination (Responsible for Recognition)
- Partner institutions

## Process part: Outgoing students
### Before the mobility
- First information about the possibilities of a stay abroad in the 1st semester
- Information event "Studying abroad with Erasmus" in the 3rd semester: former Erasmus students report on their experiences, Erasmus faculty coordinator provides general information on the scholarship program as well as how to integrate the Erasmus exchange into the course of studies)
- Application and selection process with individual advice from Erasmus faculty coordinator
- Nomination at the partner university
- Information event in the 4th semester offered to selected students to prepare the semester abroad (organised by the Erasmus Faculty Coordinator)
- Outgoing students get a checklist with all relevant information
- Information event on the mobility grant (organised by the International Office)
- Students prepare the necessary documents with the support of the Erasmus Faculty coordinator
- Meeting with students selected for an internship at partner university in the USA; students get detailed information about scholarships, visa, internship organisation, etc.

### During the mobility
- Support by Erasmus coordination at JLU by phone and email during the semester abroad
- Adapt Learning Agreement if necessary
- Support at host university by the local Erasmus coordination

### After the mobility
- Receipt of the necessary documents from the host university
- Recognition of equivalent study and examination achievements at JLU

- Realisation of crash courses and special exam dates: thanks to the support of the institutes and clinics of the department, missing courses and exams can be made up for in order to guarantee course of studies without loss of time
- All outgoings compose written experience reports which are published on the website of the International Office and which can be used for future generations for orientation and as well for all responsible persons to improve processes
- Experiences are also shared in personal conversations between students and Erasmus faculty coordinator


Fig. 1 Quality assurance in the process of student exchange (outgoing)

# Internship abroad in the Clinical Rotation year (outgoing students)

## Opportunities for an internship abroad

- Internship at an Erasmus partner university
- Internship at a non-European university with a cooperation agreement
- Self-organized internship abroad

## Information and advice on internships abroad

- Information event for prospective fifth year students about requirements and possibilities of internships abroad (including exchange with partner universities in the USA). Furthermore, various scholarship programs such as Erasmus Traineeship and DAAD PROMOS presented by the International Office.
- Individual advice is offered by Erasmus Faculty Coordinator, Cooperation Coordinators and contact persons for scholarship programs at the International Office
- The approval and recognition of internships abroad takes place after examination of the requirements by the chairman of the examination board for the veterinary examination
- Students receive insurance cover for internships abroad from the “Studentenwerk”

## Process part: Incoming students

### Before the mobility at JLU

- Nomination by the home university
- Incoming students can find detailed information about courses, exams and ECTS points in the ECTS course catalogue
- Individual advice on the study program at JLU
- Learning Agreement is checked and adapted if necessary

### During mobility at JLU

- A wide range of welcome services for incoming students is part of the university's self-image
- Orientation week (International Office): Support with e.g. enrollment, opening a bank account, orientation at the university
- Organization of the course of studies; if necessary, adaptation of the learning agreement; creation of Erasmus documents (Erasmus departmental coordination)
- Support with registration in the electronic systems of JLU
- Organization of exams, in some cases offer of special exams for Erasmus incoming students
- Individual support at the department through Erasmus coordination during the semester
- Support from study buddies (usually former Erasmus outgoings who have already acquired a high level of intercultural competence)
- JLU language courses and interdisciplinary tutorials as well as organized excursions offered to international students (International Office)
- If students apply on time, they will receive a guaranteed place in one of the university's student dormitories
- By enrolling at JLU, incomings have full access to the infrastructure and technical systems of JLU and free use of local public transport
- International meeting place “Lokal International” with a cafeteria and regular events for German and international students

### After the mobility at JLU

- Transcript of Records and other documents (Erasmus departmental coordinator)
- Final conversation and review (Erasmus departmental coordinator)
- Recognition of study results achieved at JLU at the home university (home coordinator)

### Internships at JLU for incoming students

- Individual advice; planning the traineeship program before the mobility
- Integration in rotation groups respectively organization of internship in coordination with the clinics with the inclusion of the interests of students in terms of species and subject areas
- After their stay, the students receive a traineeship certificate and, if necessary, an evaluation of the student's performance during the internship in coordination with the responsible mentors at the clinics

## Perspective

### New Erasmus+ program generation 2021-2027

The successful Erasmus+ program is to be continued in the new program period 2021-2027 and expanded with new modules.
Shorter mobility stays and "blended learning" offers are intended to address new target groups, e.g. doctoral students.

### Digitalisation

Starting with the new program generation, JLU will use the „Erasmus Without Paper“-system to manage online learning agreements and inter-institutional agreements and to exchange student nominations, acceptances and transcript of records related to student mobility. Digital processes aim to simplify program administration and make a contribution to sustainability.

Virtual exchange and "blended mobility" will complement physical mobility.

### Virtual International Program (VIP)

Starting from winter semester 2020/21, the Virtual International Program (VIP) was launched at JLU. A great number of online courses from the entire range of subjects at JLU are opened to students from partner universities all over the world. It received a great response right from the start. An evaluation of participating students and teachers gained positive feed back.
Students benefit from subject-specific courses as well as from language courses or intercultural trainings. The program is free of charge for all participants from partner institutions.
Students who successfully complete one or more courses receive an official Transcript of Records with ECTS points.
The Faculty of Veterinary Medicine participates in the VIP from summer semester 2021 and intends to expand the online course offering in the future to share teaching based on current research in order to strengthen international networking through intercultural exchange.

### New partnerships

Starting with the new Erasmus program period, the University of Agriculture in Krakow and the Near-East University of Cyprus are expected to enrich the range of Erasmus partnerships.

# Appendix to 1.5 a

## Seminars for continuing education, seminars of the OHG

| | |
|---|---|
| 07.02.2018 | Dr. Tobias Eisenberg: Den Letzten beißen die Ratten – Rattenbissfieber im Wandel der Zeit |
| 16.05.2018 | Festkolloquium Prof. Dr. R. Fritsch<br>Prof. Dr. Sabine Tacke: Anästhesie und Schmerztherapie – gestern und heute<br>Prof. Dr. Dr. h.c.mult Hartwig Bostedt: Torsio uteri ante partum beim Pferd – eine gemeinsame Aufgabe zwischen der Chirurgischen und Geburtshilflichen Klinik<br>Prof. Dr. Michael Röcken: Ovariektomie und Ovariohysterektomie bei der Stute – heutzutage eine Indikation für den Chirurgen? |
| 06.06.2018 | Prof. Dr. Stephanie Krämer: Perspektiven des 3R-Konzeptes |
| 10.07.2018 | Festkolloquium Prof. Dr. Dr. h.c.mult Hartwig Bostedt<br>Prof. Dr. Sandra Goericke-Pesch: Kleintierreproduktion im Fokus<br>PD. Dr. Rainer Hospes: Zitzenverletzungen bei der Milchkuh<br>Prof. Dr. Burkhard Meinecke und Prof. Dr. Sabine Meinecke-Tillmann: Lucina sine concubito |
| 31.10.2018 | Dr. Maike Klein, Vet. Amt Gießen: Amtstierärztliche Überwachung von Pferdesportveranstaltungen |
| 31.01.2019 | Dr. Helena Schneider, KVARF, Gießen: Assistierte Reproduktion beim Vogel – Tierärzte im Artenschutz |
| 20.02.2019 | PD. Dr. Nikolai Hildebrandt: Therapie der Kardiomyopathien der Katze |
| 22.05.2019 | Festkolloquium Prof. Dr. Kaleta<br>Prof. Dr. T. Wilke: Schistosomiasis in Südostasien: Wenn eine Schnecke den Kampf<br>entscheidet |
| 11.06.2019 | Festkolloquium Prof. Dr. K. Frese<br>Prof. Dr. Christiane Herden, Institut für Veterinär-Pathologie Justus-Liebig-Universität<br>Gießen: Bornaviren – vom Tierpathogen zur Zoonose |
| 23.10.2019 | Festkolloquium Prof. Dzapo<br>Prof. Dr. Dr. Matthias Gauly, Universität Bozen: Einfluss der modernen Tierhaltungssysteme auf die Tiergesundheit: Gemeinsame Aufgabe von Landwirtschaft und Veterinärmedizin<br>Dr. Gerhard Quanz, Landesbetrieb Landwirtschaft Hessen, Bad Hersfeld: Was können Leistungsprüfungen landwirtschaftlicher Nutztiere für eine zukunftsorientierte Tierhaltung beitragen?<br>Prof. Dr. Dr. habil. Gerald Reiner: Klinikum Veterinärmedizin Justus-Liebig-Universität Gießen: Genetik für Gesundheit und Wohlbefinden |
| 20.11.2019 | Prof. Dr. Benjamin Lamp, Institut für Virologie, Justus-Liebig-Universität Gießen: Virusinfektionen bei Honigbienen |
| 29.01.2020 | Prof. Dr. Janina Burg, Klinik für Pferde, Chirurgie, Justus-Liebig-Universität Gießen: Stammzellen in der Sehnenregeneration |
| | Stilstand COVID 19 |
| 04.11.2020 | Dr. Markus Baur, Leiter der Auffangstation für Reptilien, München e.V.:cThema: Exoten im Tierschutz (Online-Seminar) |

# Appendix to 1. 5 b

## Continuing Education for local farmers provided by the Clinic for Obstetrics, Gynaecology and Andrology of Large and Small Animals

| 2018-2019 | |
|---|---|
| 06. Januar 2018 | Geburtshilfekurs für den Arbeitsgemeinschaft Border Collie Deutschland (ABCD) e.V. |
| 05. Januar 2019 | Geburtshilfekurs für den Arbeitsgemeinschaft Border Collie Deutschland (ABCD) e.V. |
| 02. Februar 2019 | 11. Hessischer Ziegentag |
| 19. März 2019 | Geburtshilfekurs für Landwirte des Arbeitskreises Milchviehhalter, Fulda |
| 04. Mai 2019 | Klauenpflegeseminar für den Arbeitsgemeinschaft Border Collie Deutschland (ABCD) e.V. |
| 07. September 2019 | Parasitologieseminar für den Arbeitsgemeinschaft Border Collie Deutschland (ABCD) e.V. |
| 14. Dezember 2019 | Geburtshilfekurs für Landwirte des Arbeitskreises Mutterkuhhalter, Fulda |
| 11. Januar 2020 | Geburtshilfekurs für Landwirte des Arbeitskreises Mutterkuhhalter, Main – Kinzig |
| 08. Februar 2020 | Geburtshilfekurs für Landwirte der Arbeitskreise Milchviehhalter, Main – Kinzig, Gießen, Marburg, Korbach |

# Appendix to 1.5 c

## ATF hosted continuning education

### Fortbildungen 2018:

| Datum | Titel / Thema |
|---|---|
| 27./28. Januar | Organotherapie A<br>(Fortbildung geeignet zum Erwerb der ZB Biologische Tiermedizin) |
| 27./28. Januar | Praxisseminar Akupunktur Kleintier: Untersuchungsgang, Diagnostik und Therapie - Fälle aus der Kleintierpraxis |
| 3./4. Februar | Veterinärakupunktur Grundkurs IV |
| 3./4. März | Veterinärakupunktur Grundkurs V |
| 21. April | Aktuelle Aspekte der Fortpflanzung beim Rind |
| 21./22. April | Veterinärakupunktur Grundkurs VI |
| 10.-12. Mai | Phytotherapie Kurs A/B<br>(Fortbildung geeignet zum Erwerb der ZB Biologische Tiermedizin) |
| 23./24. Juni | Veterinärakupunktur Grundkurs VII |
| 8./9. September | Veterinärakupunktur Grundkurs VIII |
| 12. Oktober | 6. Rechtsseminar für gutachterlich tätige Tierärzte |
| 13./14. Oktober | Veterinärakupunktur Grundkurs I |
| 20. Oktober | Kastration von Hund und Katze |
| 10./11. November | Veterinärakupunktur Grundkurs II |

### Fortbildungen 2019:

| Datum | Titel / Thema |
|---|---|
| 19./20. Januar | Organotherapie B<br>(Fortbildung geeignet zum Erwerb der ZB Biologische Tiermedizin) |
| 26./27. Januar | Veterinärakupunktur Grundkurs III |
| 9./10. Februar | Bienen Modul 1: Bienenhaltung, -biologie, -zucht<br>(Fortbildung über Bienenkrankheiten und die tierärztliche Betreuung von Bienenbeständen) |
| 23./24. Februar | Veterinärakupunktur Grundkurs IV |
| 6./7. April | Veterinärakupunktur Grundkurs V |
| 25./26. Mai | Veterinärakupunktur Grundkurs VI |
| 30. Mai – 1. Juni | Phytotherapie Kurs C/D<br>(Fortbildung geeignet zum Erwerb der ZB Biologische Tiermedizin) |
| 15./16. Juni | Veterinärakupunktur Grundkurs VII |
| 7./8. September | Veterinärakupunktur Grundkurs VIII |

**Fortbildungen 2020:**

| Datum | Titel / Thema |
|---|---|
| 18./19. Januar | Veterinärakupunktur Grundkurs I |
| 25./26. Januar | Organotherapie A<br>(Fortbildung geeignet zum Erwerb der ZB Biologische Tiermedizin) |
| 1./2. Februar | Bienenkrankheiten Diagnostik und Therapie und Rechtliches |
| 15./16. Februar | Veterinärakupunktur Grundkurs II |
| 13. März | 7. Rechtsseminar für gutachterlich tätige Tierärzte |
| 25./26. April | Veterinärakupunktur Grundkurs III |
| 16. Mai | Reproduktionsmedizin Pferd Kurs 1: Gynäkologie/Frühträchtigkeit |
| 16./17. Mai | Veterinärakupunktur Grundkurs IV |
| 17. Mai | Reproduktionsmedizin Pferd **für Tiermedizinische Fachangestellte**<br>(Theorie und Praxis) |
| 21.-23. Mai | Phytotherapie Kurs E/F<br>(Fortbildung geeignet zum Erwerb der ZB Biologische Tiermedizin) |
| 23. Mai | Reproduktionsmedizin Pferd Kurs 2: Trächtigkeit, Geburt und Puerperium (Theorie) |
| 24. Mai | Reproduktionsmedizin Pferd Kurs 2: Trächtigkeit, Geburt und Puerperium (Praxis) |
| 6. Juni | Reproduktionsmedizin Pferd Kurs 3: Neonatologie beim Fohlen (Theorie) |
| 7. Juni | Reproduktionsmedizin Pferd Kurs 3: Neonatologie beim Fohlen – (Praxis) |
| 19./20. September | Veterinärakupunktur Grundkurs V |
| 7./8. November | Veterinärakupunktur Grundkurs VII |
| 14. November | Reproduktionsmedizin Pferd Kurs 4: Andrologie und Besamung |
| 15. November | Reproduktionsmedizin Pferd: Von der Besamung bis zur Geburt – Fortbildung für **Züchter** |

# Appendix to 3.1.1 a

## Veterinary Medicine Education during the Covid-19 pandemic in 2020 at the Faculty of Veterinary Medicine at JLU Giessen

As the infection with the SARS-Cov-2 virus developed into a worldwide pandemic with increasing numbers of infected people also in Germany, in early 2020 a lock down of public life and activities was decided and consequently also affected both studying and research at universities. This coincided with the scheduling for the upcoming summer semester. Thus, it was decided by the presidency of JLU that the summer semester 2020 should start one week later than usually and that it should be planned as a pure online semester ("maximal digital"). Teaching staff was requested to develop concepts to offer all lectures, seminars and courses in an electronic variant or as online events. Even practical exercises should be replaced by virtual formats. There were however, no strict specifications how lectures, seminars and other teaching events should be carried out in a digital way. Teaching staff were free to apply whatever electronic teaching format they would prefer. Unfortunately, at this time point most members of the teaching staff only had little experience offering lectures, seminars etc. in an electronic version. Anyway, staff members had to decide whether they would offer their courses in a synchronous or asynchronous way and took on this task with a very high motivation and engagement in order to prevent any disadvantages or delays for the students during their course of studies. Thus, the timetables for the various semesters had to be adjusted accordingly, with the effect that only synchronous courses were integrated into the curriculum. Asynchronous lectures were announced by email or in online web conventions and students were free to follow these courses whenever it was suitable for them. In that way a high degree of flexibility was integrated into the veterinary curriculum at the Faculty of Veterinary Medicine at JLU.

Support for establishing digital courses, lectures and seminars was granted by the JLU IT- service (HRZ). Furthermore, a competence team for digital teaching was founded by the staff department for teaching and study affairs. Additionally, a working group „teaching in the summer semester 2020" was introduced.

With the learning platforms Stud.IP blended-learning-formats were already established and routinely offered at JLU. The choice of teaching material usually uploaded and deposited on these learning platforms was however enormously increased by presenting lectures as sreencasts or narrated power point presentations.

Larger presentations or videos were published via ILIAS, which is a platform for the integration of more sophisticated learning components, including videos (see Standard 6).

For the performance of synchronous teaching concepts and for getting into direct contact with students, who were enrolled in the respective courses, software programs such as Cisco Webex or MS Teams were recommended by the IT service and consequently used by the lecturers.

Using all these offered tools it was even possible to carry out the chemical practical course by recording the experiments on video and students had to write protocols on the experiments being displayed.

Departments and Institutes, which already had established virtual teaching concepts before the pandemic such as the Dept. of Veterinary-Anatomy and the Dept. of Veterinary-Pathology with their "virtual microscope" had the advantage to offer these applications to the students instead of the regular microscopy classes.

Inspite of the prohibition to carry out any courses in presence of students it was a major concern to guarantee the practical education to the students during their year of clinical rotation, which is the stage in their study program, when they may acquire as many practical skills as possible in order to meet the requirements of the DOCs. In this respect the office of study affairs (study coordination) developed a concept to reduce the number of students being present in the participating clinics or institutes. Thus, the groups of 8 students normally being present in the clinics was divided into half. Four students out of one group worked out clinical cases in a 14 days "homeoffice"period",

guaranteeing the full quarantine period in case of an undiscovered infection at the same time. This concept was approved by the pandemic crisis management group and thus by JLU administration with the outcome that only final year students of the faculty of human medicine and veterinary students were allowed to carry on their clinical education.

A further aspect that caused many problems to final year students was the cancellation of extramural placements (internships) not only in private practice but also in abattoirs as well as in the whole public health sector. Those students who after an intensive search for alternatives still were not able to obtain an appropriate placement were offered in-house replacement courses, which were worked out by the faculty in cooperation with the local authorities representing the public-health sector. Students who could not carry out their placement at an abattoir received an in-house training related to all aspects of an abattoir placement. Fortunately, by utilizing every possibility for continuing veterinary studies at JLU Giessen any delay in the study program could be avoided and even examinations could be taken in their regular intervals. In frequent evaluations and feed-back rounds with the coordinators from the office of study affairs and with the Dean of Study Affairs they were able to express their apprehensions to miss out on any practical teaching. Furthermore, they were of course not satisfied about the fact that they could not attend any lectures and the cancellation of practical courses neither were they able to meet up with their fellow students for a social exchange. However, the majority of students acknowledged the multitude of efforts by the teaching staff for the continuation of the study program under pandemic conditions. These feedback talks were carried out via Cisco Webex in the presence of members of the student council and representative students of all semesters. Students even presented short evaluations of online lectures and seminars for each year of the veterinary curriculum. For a detailed compilation of lectures, courses and seminars during summer semester 2020 under pandemic conditions see Appendix 1.

# Appendix to 3.1.1 b:

## Study program during the Covid-19 pandemic

**Kurse 2. Semester**

| Fach | Sem | Vorlesung Übung Seminar | Pflicht | Format | Anmerkungen | Portal zur Bereitstellung von Unterrichts-material | Forum (StudIP) |
|---|---|---|---|---|---|---|---|
| Allgemeine Embryologie | 2 | Seminar | ja | synchron | in Kleingruppen | StudIP, ILIAS | ja |
| Chemie | 2 | Ü/ Praktikum | ja | asynchron | 12 Praktikumstage: virtuell und theoretisch; zusätzlich freiwillige synchrone Besprechungen | Stud.IP, ILIAS | |
| Anatomie Präparierkurs | 2 | Übung | ja | **Präsenz** | Präsenz-Übung in reduzierter Form | StudIP, ILIAS | ja |
| Biometrie | 2 | Übung | ja | asynchron | Hochladen der kursrelevanten Teile des Unterrichtsstoffes in aufbereiteter Form für ein Eigenstudium in ein- bis zweiwöchentlichem Abstand; auf Wunsch kann ein Biometrieskript in gedruckter Form gegen eine geringe Gebühr von den Studierenden bestellt werden; Hochladen der Übungsaufgaben zur selbständigen Bearbeitung; mit angemessener Zeitverzögerung Hochladen der Musterlösungen | | bei Bedarf |
| Botanik | 2 | Übung | ja | asynchron | **digitale Skripte** mit praktischen Anwendungen incl. Herbarium; **Lernvideoeinsatz** zur Einführung bereits vor Beginn der Veranstaltung, wöchentliche kontaktfreie **Bereitstellung von Pflanzenmaterial zum Selbstbestimmen** sowie digitaler Skripte zu spezifischen Pflanzenfamilien mit Schwerpunkt Giftpflanzen der Veterinärmedizin, Abends detaillierte | StudIP | ja |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Auflösung der ausgegebenen Pflanzen via email; App zum Pflanzenbestimmen. Leistungskontrolle Bestimmungsübungen: **Abgabe eines Herbariums** mit 60 definierten, selbst aufzufindenden Pflanzen aus einer Liste von 100 Arten | | |
| Futtermittelkunde | 2 | Übung | ja | asynchron | Versuche wurden digitalisiert und als Videos zur Verfügung gestellt. Rechenübungen wurden von Studierenden im Selbststudium mithilfe des zur Verfügung gestellten Lehrmaterials durchgeführt. | Stud-IP | - |
| Histologie | 2 | Übung | ja | asynchron | Den praktischen Teil können die Studierenden durch Verwendung des **virtuellen Mikroskop**s selbständig erarbeiten. | StudIP, ILIAS | ja |
| Anatomie | 2 | Vorlesung | nein | synchron und asynchron | **synchron: Kressin** | StudIP, ILIAS | ja |
| Futtermittelkunde | 2 | Vorlesung | nein | asynchron | Die Vorlesung wird mit der PPT-Funktion Bildschirmaufzeichnung als Screencast aufgezeichnet und in ILIAS hinterlegt, auf welches die Veranstaltungsteilnehmer über StudIP zugreifen können. Zusätzlich wird der Foliensatz als pdf auf StudIP hinterlegt. | StudIP/ILIAS | |
| Tierschutz und Ethologie I | 2 | Vorlesungen | nein | asynchron | Ppt-Folien mit Audiokommentar | studip/ILIAS | |
| Landwirtschaftslehre | 2 | Vorlesungen | nein | | im SoSe 20 ENTFALLEN | | |

**Kurse 4. Semester**

| Fach | Sem | Vorlesung/ Übung/ Seminar | Pflicht | Format | Anmerkungen | Portal zur Bereitstellung von Unterrichts-material | Forum (StudIP) |
|---|---|---|---|---|---|---|---|
| Biochemie | 4 | Übung | ja | asynchron | Filme und/oder Fotos der praktischen Versuche sowie Seminarfolien mit schriftlichen oder | Studip und / oder Ilias | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | besprochenen Erklärungen. Hausaufgaben-Ordner in Studip, in dem die Studierenden ihre Protokolle und Lernkontrollen als Leistungsnachweis hochladen | | |
| Physiologie | 4 | Übung | ja | synchron | Online via AdobeConnect | Stud.IP | ja |
| Propädeutik - Clinical Skills Lab | 4 | Übung | ja | **Präsenz** | Jede/r Teilnehmer*in besucht den kompletten Kurs an einem Veranstaltungstag über 3 Stunden = **1 Termin pro Student*in** | Stud.IP | / |
| Tierzucht und Genetik | 4 | Übung | ja | asynchron | MP4-Videos zum Thema Tierbeurteilung | ILIAS | |
| Allgemeine Virologie | 4 | Vorlesung | nein | asynchron | | Stud.IP | |
| Bakteriologie u. Mykologie (allgemeiner Teil) einschl. Immunologie | 4 | Vorlesung | nein | asynchron | Stud.IP: Themenkatalog zum Prüfungsfach; PowPoint-Folien zum Selbststudium (Vorlesungsfolien mit Kommentaren; pdf-Format) Fragen der Studierenden werden über E-Mail beantwortet und in zusammengefasster Form ("FAQs") über Stud.IP präsentiert. **VL Einführung in die Immunologie (Menge): synchron** | Stud.IP | |
| Biochemie | 4 | Vorlesung | nein | asynchron | Vorlesungsfolien mit schriftlichen und/oder besprochenen Erklärungen | Studip und / oder Ilias | |
| Physiologie | 4 | Vorlesung | nein | asynchron | | Stud.IP | ja |
| Propädeutik | 4 | Vorlesung | nein | synchron und asynchron | **Format je nach Klinik synchron**: KTI, KVRAF, Medical Training (externe Referentin) | | |
| Tierzucht und Genetik | | Vorlesung | nein | asynchron | PowerPoint-Slides mit Sprachtext als MP4-Video in ILIAS, zusätzlich Skripte in StudIP | ILIAS/StudIP | |
| Tierschutz und Ethologie II | 4 | Vorlesungen | nein | asynchron | Ppt-Folien mit Audiokommentar | studip/ILIAS | StudIP -> ILIAS |

## Kurse 6. Semester

| Fach | Sem | Vorlesung/ Übung/ Seminar | Pflicht | Format | Anmerkungen | Portal zur Bereitstellung von Unterrichts-material | Forum (StudIP) |
|---|---|---|---|---|---|---|---|
| Kurs "Rezeptieren" AVO Kurs | 6 | Übung | ja | **Präsenz** und online synchron | **Galenikkurs** - Präsenz (3 Termine pro Student*in) **Rezeptierkurs -** synchron zusätzlich Folien in Stud.IP | | |
| Tierernährung | 6 | Übung | ja | asynchron | Vorlesung wird mit der PPT-Funktion Bildschirmaufzeichnung als **Screencast** aufgezeichnet und in ILIAS hinterlegt, auf welches die Veranstaltungsteilnehmer über StudIP zugreifen können. Zusätzlich wird der Foliensatz als pdf auf StudIP hinterlegt. | StudIP/ILIAS | |
| Arznei- und Betäubungs-mittelrecht | 6 | Vorlesung | nein | synchron | zusätzlich Folien in Stud.IP | | |
| Fleisch- und Lebensmittel-hygiene | 6 | Vorlesung | nein | Synchron und asynchron | Übersichts- und Abschlussveranstaltung mit Fragenbeantwortung und themenbezogene Handouts | Stud.IP | Fragen-bereiche (allgemein und speziell zu den jeweiligen Veranstalt-ungen) |
| Milchkunde | 6 | Vorlesung | nein | asynchron | Präsentationen als pdf | Stud.IP | ja |
| Spezielle Pathologie | 6 | Vorlesung | nein | synchron und asynchron | **Format je nach Dozent*in** | | Folien |
| Spezielle Pharmakologie | 6 | Vorlesung | nein | synchron | zusätzlich Folien in Stud.IP | | |
| Klinische Vorlesungen in den Organblöcken | 6 | Vorlesung | nein | synchron und asynchron | **Format je nach Klinik synchron**: KTI (verschiedene Doz., inkl. gesamter Block Haut), PFI (Roscher), QF Immunologie (Menge), Block Anästhesiologie (Tacke, Geyer) | | |

## Kurse 8. Semester

| Fach | Sem | Vorlesung/ Übung/ Seminar | Pflicht | Format | Anmerkungen | Portal zur Bereit-stellung von Unter-richts-material | Forum (StudIP) |
|---|---|---|---|---|---|---|---|
| Seminar Funktionelle Pathologie | 8 | Seminar | nein | | ENTFÄLLT im SoSe 20 (entfällt ebenfalls im SoSe 21) | | |
| Seminar Spezielle Pathologie | 8 | Seminar | ja | synchron | | | Folien |
| Ü Histo-Pathologie | 8 | Übung | ja | synchron | Webinar (Synchronlehre über Adobe Connect) | | Folien und virtuelles Mikroskop |
| Ü Patholog.-Anatom. Vorweisungen | 8 | Übung | ja | **Präsenz** und online synchron | Pro Termin 8 Studis vor Ort in Demohalle, Rest über Live-Stream zugeschaltet | | |
| Lebensmittel-untersuchung und -technologie | 8 | Übung | ja | **Präsenz** | 13 Gruppen, 3 Termine pro Student*in | Stud.IP / Handouts | Fragenbereiche (allgemein und speziell zu den jeweiligen Veranstaltungen) |
| Lebensmittel-kunde einschließlich Lebensmittel-hygiene | 8 | Vorlesung | nein | synchron | themenbezogene Handouts | Stud.IP / Handouts | Fragenbereiche (allgemein und speziell zu den jeweiligen Veranstaltungen) |
| Tierseuchen-bekämpfung & Infektions-epidemiologie | 8 | Vorlesung | nein | asynchron | **Themenkatalog** zum Prüfungsfach; **Skript** "Tierseuchen-bekämpfung und Infektionsepidemiologie"; **PowPoint-Folien** zum Selbststudium (Vorlesungsfolien mit Kommentaren; Ansicht Notizenmaster; pdf-Format); Fragen der Studierenden werden über E-Mail beantwortet und in zusammengefasster Form ("FAQs") über Stud.IP präsentiert. | Stud-IP | |
| Berufs- und Standesrecht | 8 | Vorlesung | | asynchron | | | |
| Spezielle Pathologie | 8 | Vorlesung | nein | synchron und asynchron | **Format je nach Dozent*in** | | Folien |
| Spezielle Pharmakologie | 8 | Vorlesung | nein | synchron | zusätzlich Folien in Stud.IP | | |
| Klinische Vorlesungen in den Organblöcken | 6 | Vorlesung | nein | synchron und asynchron | **Format je nach Klinik synchron**: KTI (verschiedene Doz.) | | |

# Appendix to 3.1.2

## Bodies and Organizations having influence on the legal constraints of the veterinary curriculum in Germany

### Assembly of the German Establishments for Veterinary Education (Veterinärmedizinischer Fakultätentag)

www.allgemeiner-fakultaetentag.de
www.vmft.de

The General Faculty Assembly (Allgemeiner Fakultätentag) is an organisation that unites all German university faculties (departments). Its aim is to discuss and take position on higher education topics across all disciplines, with an emphasis on linking research and education.

The Assembly of German Veterinary Establishments (Veterinärmedizinischer Fakultätentag) is a member of the General Faculty Assembly. Members of the Assembly of the German Veterinary Establishments are the five German veterinary schools, the Veterinary University of Vienna (AT) and the Vetsuisse faculties of Bern and Zurich (CH). The assembly meets at least once a year. Each faculty is represented by a delegation of faculty members, academic and technical staff as well as students. Representatives of the veterinary profession, the veterinary chambers as well as the Federal Ministry are invited as guests. In March 2016 Prof. Jürgen Zentek, Dean of the Berlin Veterinary School, became President of the Assembly.

Main topics are the curricular and structural developments within the German speaking veterinary faculties as well as relevant political issues. This includes intended changes of the curriculum.

### German Veterinary Chamber (Bundestierärztekammer, BTK) and State Veterinary Chamber of Hesse (Landestierärztekammer Hessen)

www.bundestieraerztekammer.de
www.ltk-hessen.de

All licensed veterinarians in Germany are members of the State Veterinary Chamber in which they reside. All State Veterinary Chambers are members of the German Veterinary Chamber (BTK). The Establishment is represented with delegates both in the boards and the assemblies at state and federal level, and representatives of the chambers are invited to attend the meetings of the Assembly of the German Veterinary Establishments as well as the “Fachgespräche” in order to receive feedback on educational issues from the profession.

### German Veterinary Association (Deutsche Veterinarmedizinische Gesellschaft DVG)

www.dvg.net

The DVG is the German scientific organization of the veterinary profession. The main objective is to promote veterinary research and to make research results accessible to veterinary practitioners through scientific meetings and publications. The DVG is structured in a wide range of sections that represent the various disciplines within veterinary medicine.
The Establishment is represented both with board and ordinary members in most of those sections, thereby contributing to the advancements in veterinary science in Germany.

# Appendix Tabl. 3.1.2

## Teaching Import form other faculties to the Faculty of Veterinary Medicine at JLU Giessen

| Institute | Faculty | TO/SWS | Lecture/Practical | Semester |
|---|---|---|---|---|
| Institute of Animal Physiology and Molecular Biomedicine | Faculty of Biology and Chemistry | 4 | L Zoology | 1 |
| | | | | |
| Institute of Physics | Faculty of Mathematics, Physics and Geography | 6 | L + P Physics | 1 |
| | | | | |
| Institute of Organic Chemistry | Faculty of Biology and Chemistry | 9 | L + P Chemistry | 1, 2 |
| | | | | |
| Institute of Botany | Faculty of Biology and Chemistry | 4 | L + P Botany | 1, 2 |
| | | | | |
| Institute of Animal Breeding and Genetics | Faculty of Agriculture | 2 | L Animal Rearing | 1 |
| | | | | |
| Institute of Animal Nutrition | Faculty of Agriculture | 3 | L + P Animal Nutrition | 2 |
| | | | | |
| Institute of Business Operations | Faculty of Agriculture | 2 | L Agriculture | 2 |
| | | | | |
| Institute of Animal Breeding and Genetics | Faculty of Agriculture | 6 | L+P Animal Breeding and Genetics | 3, 4 |
| | | | | |
| Institute of Animal Nutrition | Faculty of Agriculture | 4 | L+P Animal Nutrition | 5, 6 |

L = Lecture
P = Practical

Lectures in animal breeding and animal nutrition take place in lecture halls of the Faculty of Veterinary Medicine.
All other lectures and practicals take place at the various external institutes: Department of Botany, Heinrich-Buff-Ring 38, 35392 Giessen, Department of Zoology, Heinrich-Buff-Ring 38, 35392 Giessen; Department of Chemistry, Heinrich-Buff-Ring 17, 35392 Giessen; Department of Physics, Heinrich-Buff-Ring 16, 35392 Giessen; Department of Animal Nutrition, Heinrich-Buff-Ring 26-32 (IFZ), 35392 Giessen.

# Appendix to 3.1.3 a

## List of module representatives organizing organ centered teaching

### Modules and persons responsible

| | |
|---|---|
| **6th Semester** | |
| | Module general practice: Prof. Geyer<br>Module lymphoreticular organs: Prof. Moritz<br>Module Skin: Dr. Thom<br>Module Anesthesia: Prof. Tacke<br>Module musculoskeletal system: Dr. Peppler |
| **7th Semester** | |
| | Module respiration: Prof. Reiner<br>Modul cardiovascular diseases: Prof. Schneider<br>Module gastrointestinal tract: Prof. Fey |
| **8th Semester** | |
| | Module urology: Dr. Sickinger<br>Module endocrinology: Prof. Moritz<br>Module laboratory animal science: Prof. Krämer<br>Module reproduction: Prof. Wehrend<br>Module herd health management: Prof. Lierz |

# Appendix to 3.1.3 b

## Training Plan Rotational Students

### Equine Clinic – Internal medicine

### 1st week: 25 hours plus night/ on-call duty

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th colspan="2">Saturday</th><th>Sunday</th></tr>
<tr><td rowspan="2">7:30-12:30</td><td>Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td><td>Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td><td>Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td><td>Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td><td>Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td><td colspan="2" rowspan="3">Start 8:00 a.m. Morning examination and treatment, then on-call duty<br><br>Weekend duty / on-call duty<br>includes ward rounds, treatment of inpatients and, as far as possible, examination and treatment of emergency patients</td><td rowspan="3"></td></tr>
<tr><td></td><td>Course: Glass Horse Gastrointestinal Tract*</td><td>Course: Rectal examination course*</td><td>Course: Drug application*</td><td></td></tr>
<tr><td>Night duty Mon-Thu start 16:15<br><br>Fri start 14:30</td><td colspan="5">During night duty is on-call duty, we offer lodging; every student must appear at the clinic at the beginning of the duty. Students take part in one night and one weekend duty; on the day after night/weekend duty there is no compulsory attendance; voluntary attendance is possible</td></tr>
</table>

* Courses can be exchanged / changed in terms of content depending on the current patient situation

## Equine Clinic – Internal medicine

## 2nd week: 25 hours plus night/ on-call duty

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>7:30-8:15</td><td rowspan="2">Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td><td>Practical training<br>Seminar pathology</td><td rowspan="2">Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td><td rowspan="2">Practical training<br>Clinical examination of the patients; ward rounds; trial exam; treatments and examinations</td><td rowspan="2">Practical training<br>Clinical examination of the patients; ward rounds; trial exam; treatments and examinations</td><td rowspan="4" colspan="2">Start<br>8:00 a.m.<br>Morning examination and treatment, then on-call duty<br><br>Weekend duty / on-call duty<br>includes ward rounds, treatment of inpatients and, as far as possible, examination and treatment of emergency patients</td></tr>
<tr><td rowspan="2">8:15-12:30</td><td>Practical training<br>Clinical examination of the patients; ward rounds; treatments and examinations</td></tr>
<tr><td></td><td>Course: Laboratory Course*</td><td>Course: Discussion of special clinical cases*</td><td></td><td></td></tr>
<tr><td>Night duty Mon-Thu start 16:15<br><br>Fri start 14:30</td><td colspan="5">During night duty is on-call duty, we offer lodging; every student must appear at the clinic at the beginning of the duty. Students take part in one night and one weekend duty; on the day after night/weekend duty there is no compulsory attendance; voluntary attendance is possible</td></tr>
</table>

* Courses can be exchanged / changed in terms of content depending on the current patient situation

## Equine Clinic – Surgery

### 1st week: 30 hours

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>24 h per day</td><td colspan="5">24 h practical training<br>Students are divided into 8h shifts<br><br>Division into:<br>• Polyclinic/ Orthopaedics<br>• Stable/ Intensive Care<br>• Anaesthesia<br>• Surgery</td><td colspan="2" rowspan="3">24 h practical training<br>Students are divided into 8h shifts<br><br>Patient care and emergency duty</td></tr>
<tr><td>7:30 a.m.</td><td></td><td>Pathological round, discussion of surgical cases and section findings</td><td>Book-Club, a chapter from a surgical book is discussed</td><td>Case report, a case report from the clinic is presented and discussed</td><td>Journal-Club, a newly published article is presented and discussed</td></tr>
<tr><td></td><td></td><td>1 h practical exercise imaging/ X-ray</td><td>0,5 h practical exercise in the operating theatre</td><td>1 h practical exercise anaesthesia</td><td></td></tr>
</table>

## Equine Clinic – Surgery

## 2nd week: 30 hours

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>24 h</td><td colspan="5">24 h practical training<br>Students are divided into 8h shifts<br><br>Division into:<br>• Polyclinic/ Orthopaedics<br>• Stable/ Intensive Care<br>• Anaesthesia<br>• Surgery</td><td rowspan="3" colspan="2">24 h practical training<br>Students are divided into 8h shifts<br><br>Patient care and emergency duty</td></tr>
<tr><td>7:30 a.m.</td><td></td><td></td><td>Book-Club, a chapter from a surgical book is discussed</td><td>Case report, a case report from the clinic is presented and discussed</td><td>Journal-Club, a newly published article is presented and discussed</td></tr>
<tr><td></td><td></td><td>1 h practical exercise conduction anaesthesia</td><td>1 h practical exercise suture course</td><td>1 h practical exercise elective topic (e.g. teeth, eyes, infusion etc.)</td><td></td></tr>
</table>

## Clinic for Small Animals – Internal Medicine

### 1st week: 30 hours plus 1 night or 1 weekend shift

| Time | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|
| 8:00-8:30 | Emergency Team | | | Liver shunt team | Liver shunt team | **Weekend duty**** Day duty 7:00-15:00 or Day duty 12:00-20:00 | |
| 8:30-14:00 | | | Dermatology | | | | |
| 14:00-20:00 | | Emergency Team | | | | | |
| **Night duty** Mon-Thu 20:00 until after 00:00 treatment | Night duty** | | | | | | |

***** Students are divided up and rotate through the departments - this is the exemplary representation of one of 8 training plans

****** 2 duties per student within the 2 weeks (1 weekend duty and 1 night duty during the week)

## Clinic for Small Animals – Internal Medicine

### 2nd week: 30 hours plus 1 night or 1 weekend shift

| Time | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|
| 8:00-14:00 | Polyclinic | Polyclinic | Laboratory (Central laboratory, Cytology) | Laboratory (Central laboratory, Cytology) | Ward | **Weekend duty**** Day duty 7:00-15:00 or Day duty 12:00-20:00 | |

***** Students are divided up and rotate through the departments - this is the exemplary representation of one of 8 training plans

****** 2 duties per student within the 2 weeks (1 weekend duty and 1 night duty during the week)

## Clinic for Small Animals - Surgery

### 1st week: 32,5 hours (students rotate through departments → 4 days plus 1 weekend duty)

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td rowspan="5">7:30-14:00</td><td colspan="5">Practical Training<ul><li>Polyclinic</li><li>Ward</li><li>Operation theatre</li><li>Anaesthesia</li><li>Imaging</li></ul></td><td colspan="2" rowspan="4">Weekend duty<br>1 duty Saturday or Sunday 8:00 a.m. to 2:30 p.m.; assistance in the polyclinic, in emergencies, care of inpatients, in emergency operations, perioperative monitoring, monitoring of intensive care patients</td></tr>
<tr><td>Daily after the ward round: Case discussion with Prof. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Kramer</td></tr>
<tr><td></td><td>Clinical Skills Lab: Exercises suturing techniques</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Online-course in suturing: handling instruments, suturing techniques, video instruction</td></tr>
<tr><td colspan="5">Online-course in hygiene: hygiene in everyday hospital life, especially surgery, surgery preparation</td></tr>
</table>

## Clinic for Small Animals - Surgery

### 2nd week: 32,5 hours (students rotate through departments → 4 days plus 1 weekend duty)

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td rowspan="5">7:30-14:00</td><td colspan="5">Practical Training<ul><li>Polyclinic</li><li>Ward</li><li>Operation theatre</li><li>Anaesthesia</li><li>Imaging</li></ul></td><td rowspan="5" colspan="2">Weekend duty<br>1 duty Saturday or Sunday 8:00 a.m. to 2:30 p.m.; assistance in the polyclinic, in emergencies, care of inpatients, in emergency operations, perioperative monitoring, monitoring of intensive care patients</td></tr>
<tr><td>Daily after the ward round: Case discussion with Prof. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Dr. Dr. h.c. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Dr. Dr. h.c. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Dr. Dr. h.c. Kramer</td><td>Daily after the ward round: Case discussion with Prof. Dr. Dr. h.c. Kramer</td></tr>
<tr><td></td><td>Clinical Skills Lab: Exercises suturing techniques</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Online-course in suturing: handling instruments, suturing techniques, video instruction</td></tr>
<tr><td colspan="5">Online-course in hygiene: hygiene in everyday hospital life, especially surgery, surgery preparation</td></tr>
</table>

## Clinic for Birds, Reptiles, Amphibians and Fish

### 1st week: 30 hours

<table>
<tr><th colspan="2">Time</th><th>Monday</th><th colspan="2">Tuesday</th><th>Wednesday</th><th colspan="2">Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td rowspan="3">8:00 - 13:00</td><td></td><td rowspan="3">Practical training<br>In the polyclinic<br><br>Course: 1 h<br>Handling birds and reptiles</td><td colspan="2"></td><td></td><td colspan="2"></td><td></td><td rowspan="4">9:30-11:30 and 16:00-18:00<br><br>Weekend duty / on-call duty *<br>includes the treatment of inpatients as well as the treatment of emregency patients</td><td rowspan="4"></td></tr>
<tr><td>8:15 - 8:30</td><td colspan="2">Online early meeting</td><td>Online early meeting</td><td colspan="2">Online early meeting</td><td>Online early meeting</td></tr>
<tr><td>10:00 - 13:00</td><td>Practical training<br>In the polyclinic</td><td rowspan="2">Course: 2,5 h<br>X-ray image assessment</td><td>Practical training<br>In the polyclinic</td><td>Practical training<br>In the polyclinic</td><td rowspan="2">Further training:<br>2 h<br>Dissection course</td><td>Practical training<br>In the polyclinic</td></tr>
<tr><td colspan="2">14:00 - 16:00</td><td></td><td>Practical training<br>In the polyclinic</td><td>Practical training<br>In the polyclinic</td><td>Practical training<br>In the polyclinic</td><td>Practical training<br>In the polyclinic</td></tr>
<tr><td colspan="2">Emergency duty*<br>Mon-Fri<br>17:00-18:00</td><td colspan="8">Treatment of emergency patients</td></tr>
</table>

***** 2 duties per student within the 2 weeks (1 weekend duty and 1 night duty during the week)

## Clinic for Birds, Reptiles, Amphibians and Fish

## 2nd week: 30 hours

<table>
<tr><th>Time</th><th colspan="2">Monday</th><th colspan="2">Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th></tr>
<tr><td>8:00 - 13:00</td><td>Practical training laboratory and herd health managment (dessections, laboratory diagnostics, stock visitation, vaccination)</td><td>Cours: 1 h Introduction dessection</td><td>Practical training laboratory and herd health managment (dessections, laboratory diagnostics, stock visitation, vaccination)</td><td>Further training: 2 h Introcuction in clinical pathology</td><td>Practical training laboratory and herd health managment (dissections, laboratory diagnostics, stock visitation, vaccination)</td><td>Practical training laboratory and herd health managment (dissections, laboratory diagnostics, stock visitation, vaccination)</td><td>Practical training laboratory and herd health managment (dessections, laboratory diagnostics, stock visitation, vaccination)</td><td rowspan="4">9:30-11:30 and 16:00-18:00<br><br>Weekend duty / on-call duty * includes the treatment of inpatients as well as the treatment of emregency patients</td></tr>
<tr><td>14:00 - 16:00</td><td colspan="2" rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">Practical training laboratory and herd health managment (dissections, laboratory diagnostics, stock visitation, vaccination)</td><td>Practical training laboratory and herd health managment (dissections, laboratory diagnostics, stock visitation, vaccination)</td><td rowspan="2"></td></tr>
<tr><td>16:00 - 17:00</td><td></td></tr>
<tr><td>Emergency duty* Mon-Fri 17:00-18:00</td><td colspan="7">Treatment of emergency patients</td></tr>
</table>

* 2 duties per student within the 2 weeks (1 weekend duty and 1 night duty during the week)

## Clinic for Obstetrics, Gynaecology and Andrology

### 1st week: 30 hours on an average

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>7:30</td><td colspan="5">Rounds incl. patient allocation (1st-3rd day) and patient presentation (compulsory)<br>After round on Monday: Introduction until 10 a.m.</td><td rowspan="4">07:30 – 17:00: duty for 2 students</td><td rowspan="4">07:30 – 17:00: duty for 2 students</td></tr>
<tr><td rowspan="2">following</td><td colspan="5">Collaboration in the individual departments: Division of students into two groups</td></tr>
<tr><td>Voluntary work</td><td>Group 1<br>A: Small animals<br>B: Large animals<br>C: Ambulance</td><td>Group 2<br>A: Large animals<br>B: Ambulance<br>C: Small animals</td><td>Group 1<br>A: Large animals<br>B: Ambulance<br>C: Small animals</td><td>Group 2<br>A: Small animals<br>B: large animals<br>C: Ambulance</td></tr>
<tr><td>13:00–14:00</td><td colspan="5">Lunch break</td></tr>
<tr><td>14:00–16:30</td><td>Voluntary work</td><td>Voluntary work</td><td>Voluntary work</td><td>Voluntary work</td><td>Voluntary work</td><td rowspan="2">17:00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td><td rowspan="2">17.00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td></tr>
<tr><td>17:00-7:30</td><td colspan="5">Night duty for 1 student at a time until 23:00<br>thereafter on-call duty for 1 student at a time until 7:30</td></tr>
</table>

## Clinic for Obstetrics, Gynaecology and Andrology

## 2nd week: 30 hours on an average

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>7:30</td><td colspan="5">Rounds incl. patient presentation (compulsory)</td><td rowspan="4">07:30 – 17:00: duty for 2 students</td><td rowspan="4">07:30 – 17:00: duty for 2 students</td></tr>
<tr><td rowspan="2">following</td><td colspan="5">Collaboration in the individual departments: Division of students into two groups</td></tr>
<tr><td>Voluntary work</td><td>Group 1<br>A: Small animals<br>B: Large animals<br>C: Ambulance</td><td>Group 1and 2:<br>Biotechnology<br>8:15 Large animal admission</td><td>Group 2<br>A: Large animals<br>B: Ambulance<br>C: Small animals</td><td>Voluntary work</td></tr>
<tr><td>13:00–14:00</td><td colspan="5">Lunch break</td></tr>
<tr><td>14:00–16:30</td><td>Voluntary work</td><td>Voluntary work</td><td>Voluntary work</td><td>Voluntary work</td><td>Voluntary work</td><td rowspan="2">17:00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td><td rowspan="2">17:00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td></tr>
<tr><td>17:00-7:30</td><td colspan="5">Night duty for 1 student at a time until 23:00<br>thereafter on-call duty for 1 student at a time until 7:30</td></tr>
</table>

## Clinic for Obstetrics, Gynaecology and Andrology

### 3rd week: 30 hours on an average

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>7:30</td><td colspan="5">Rounds incl. patient allocation and patient presentation (Tues - Fri = voluntary)</td><td rowspan="8">07:30 – 17:00: duty for 2 students</td><td rowspan="8">07:30 – 17:00: duty for 2 students</td></tr>
<tr><td>08:30-09:15</td><td>Voluntary work in the departments</td><td>Voluntary work in the departments</td><td>Voluntary work in the departments</td><td>Voluntary work in the departments</td><td>Voluntary work in the departments</td></tr>
<tr><td>09:30-13:00</td><td>Group 1and 2: Mare: Aspects of gynaecological examination including hormone use. Library</td><td>Group 1and 2: Small animals: discussion of gynaecological aspects, focus on vaginal cytology Library</td><td>Group 1and 2: Small animals: birth and mammary tumours, X-ray diagnostics Library</td><td>Group 1and 2: Topic complex endometritis mare incl. endometrial cytology Library</td><td>Group 1and 2: examination: horse and small animal Library</td></tr>
<tr><td>13:00-14:00</td><td colspan="5">Lunch break</td></tr>
<tr><td>14:00-15:00</td><td rowspan="2">Voluntary work in the departments</td><td rowspan="2">Voluntary work in the departments</td><td rowspan="2">Voluntary work in the departments</td><td rowspan="2">Voluntary work in the departments</td><td rowspan="2">Voluntary work in the departments</td></tr>
<tr><td>15:00-16:00</td><td>17:00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td><td>17:00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td></tr>
<tr><td>17.00-7:30</td><td colspan="5">Night duty for 1 student at a time until 23:00<br>thereafter on-call duty for 1 student at a time until 7:30</td></tr>
</table>

## Clinic for Obstetrics, Gynaecology and Andrology

### 4th week: 30 hours on an average

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>7:30</td><td colspan="5">Rounds incl. patient presentation (Mon = compulsory, Tues - Fri = voluntary)</td><td rowspan="3">07:30 – 17:00: duty for 2 students</td><td rowspan="3">07:30 – 17:00: duty for 2 students</td></tr>
<tr><td rowspan="2">following</td><td>Andrology incl. Sperm collection Jump room</td><td>until 10.00 voluntary work</td><td>until 10:30: voluntary work</td><td>Examination birth (07:30 bis 10.00) Course room basement</td><td rowspan="2">Voluntary work in the departments</td></tr>
<tr><td>ab 10:30: Sperm course Histology lecture hall Anatomy</td><td>10.00-13.00 Obstetrics including instrumentation Course room basement</td><td>ab 10:30: practical training gyn. Cattle Course room basement</td><td>Farm animal surgery course (10.30 bis 13.00) Course room basement</td></tr>
<tr><td>13:00 – 14:00</td><td colspan="5">Lunch break</td></tr>
<tr><td>14:00-16:30</td><td>Sperm analysis course Histology lecture hall Anatomy</td><td>gynaecological examination and bovine cycle (Seminar) Library</td><td>Biotechnology incl. practical exercises</td><td>Hardthof excursion incl. Herd managment small ruminants (Meeting place: cattle shed)</td><td>13.30-15.00 examination: Sperm analysis course</td><td rowspan="2">17:00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td><td rowspan="2">17:00–24:00: Night duty for 1 student thereafter on-call duty for 1 student at a time until 7:30</td></tr>
<tr><td>17:00-7:30</td><td colspan="5">Night duty for 1 student at a time until 23:00<br>thereafter on-call duty for 1 student at a time until 7:30</td></tr>
</table>

## Clinic for Ruminants

### 1st week: 30 hours

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>7:30-8:15</td><td>Introduction</td><td>Clinical training</td><td>Clinical training</td><td>Clinical training</td><td>Voluntary work</td><td></td><td></td></tr>
<tr><td>8:15</td><td colspan="5">Rounds incl. Patient presentation (Mon - Thurs compulsory; Fri voluntary)</td><td rowspan="6">07:30 – 13:00: Clinic and on-call duty</td><td rowspan="6">07:30 – 13:00: Clinic and on-call duty</td></tr>
<tr><td rowspan="2">following</td><td>Propaedeutics course</td><td>Laboratory course</td><td>Surgery course</td><td rowspan="2">Clinical training</td><td rowspan="2">Voluntary work</td></tr>
<tr><td>Voluntary work</td><td>Clinic</td><td>Seminar hoof diseases</td></tr>
<tr><td>13:00-14:00</td><td colspan="5">Lunch break</td></tr>
<tr><td>14:00-16:30</td><td colspan="4">Clinical training for night duty (1 student)</td><td rowspan="2">Voluntary work</td></tr>
<tr><td>16:30-7:30</td><td colspan="4">On-call duty for night service</td></tr>
</table>

### 2nd week: 30 hours

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr>
<tr><td>7:30-8:15</td><td>Introduction</td><td>Clinical training</td><td>Clinical training</td><td>Clinical training</td><td>Voluntary work</td><td></td><td></td></tr>
<tr><td>8:15</td><td colspan="5">Rounds incl. Patient presentation (Mon - Thurs compulsory; Fri voluntary)</td><td rowspan="5">07:30 – 13:00: Clinic and on-call duty</td><td rowspan="5">07:30 – 13:00: Clinic and on-call duty</td></tr>
<tr><td>following</td><td>Clinical training</td><td>Surgery course claw</td><td>Seminar on selected diseases</td><td>Seminar on selected diseases</td><td>Voluntary work</td></tr>
<tr><td>13:00-14:00</td><td colspan="5">Lunch break</td></tr>
<tr><td>14:00-16:30</td><td colspan="4">Clinical training for night duty (1 student)</td><td rowspan="2">Voluntary work</td></tr>
<tr><td>16:30-7:30</td><td colspan="4">On-call duty for night service</td></tr>
</table>

## Clinic for Pigs

### 1st week: 30 hours

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr>
<tr><td>8:00-9:00</td><td></td><td rowspan="7">Herd visits, e.g. castration, health monitoring, herd care or pig health service</td><td></td><td rowspan="7">Herd visits, e.g. castration, health monitoring, herd care or pig health service</td><td></td></tr>
<tr><td>9:00-10:00</td><td rowspan="2">Introduction by Prof. Dr. Gerald Reiner</td><td rowspan="6">Case processing</td><td>Preliminary discussion of the case</td></tr>
<tr><td>10:00-11:30</td><td rowspan="5">Case processing</td></tr>
<tr><td>11:30-12:30</td><td>Introduction of herd visits and case allocation</td></tr>
<tr><td>12:30-14:00</td><td>Case processing</td></tr>
<tr><td>14:00-15:00</td><td></td><td></td></tr>
</table>

### 2nd week: 30 hours

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr>
<tr><td>8:00-9:00</td><td></td><td rowspan="6">Herd visit, e.g. castration, health monitoring, herd care or pig health service</td><td></td><td rowspan="3">Herd drive, e.g. castration, health monitoring, herd care or pig health service</td><td></td></tr>
<tr><td>9:00-10:00</td><td rowspan="3">Laboratory</td><td rowspan="5">Case processing</td><td rowspan="2">Case discussion with Prof. Dr. Gerald Reiner</td></tr>
<tr><td>10:00-11:30</td></tr>
<tr><td>11:30-12:00</td><td></td></tr>
<tr><td>12:00-13:00</td><td rowspan="3">2,5 h Case processing</td><td></td></tr>
<tr><td>13:00-15:00</td><td rowspan="2">Case processing</td><td></td></tr>
<tr><td>15:00-17:00</td><td></td><td></td></tr>
</table>

## Institute for Veterinary Pathology

### 1 Week: 30 h

| Time | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| 8:30-11:30 | **Practical Training**<br><br>Introduction to autopsy techniques, basics of hygiene, hygiene regulations, occupational health and safety | **Practical Training** | **Practical Training** | **Practical Training** | **Practical Training** |
| 13:00-16:00 | Drafting of a post-mortem report | Drafting of a post-mortem report | Drafting of a post-mortem report, Histopathology | Drafting of a post-mortem report, Histopathology | Drafting of a post-mortem report, Histopathology |

## Institute for Virology

### 1 Week (alternative to Institute of Hygiene and Infectious Diseases of Animals): 30 h

| Time | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| 9:00-12:00 | **Practical training in the laboratory** | **Practical training in the laboratory** | **Practical training in the laboratory** | **Practical training in the laboratory** | **Practical training in the laboratory** |
| 13:00-16:00 | **Practical training in the laboratory** | **Practical training in the laboratory** | **Practical training in the laboratory** | **Practical training in the laboratory** | **Practical training in the laboratory** |

## Institute of Hygiene and Infectious Diseases of Animals

## 1 Week (alternative to Institute for Virology): 30 h

<table>
<tr><th>Time</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr>
<tr><td>8:00-9:00</td><td></td><td colspan="4" rowspan="2">Individual rotation in the laboratories:<br>A) Rinsing and culture medium or<br>B) Bacteriological-mycological diagnostics or<br>C) Serology or<br>D) S2 laboratory</td></tr>
<tr><td>9:00-11:00</td><td>Introduction<br>(Protective clothing, programme, institute tour, instruction)</td></tr>
<tr><td>11:00-13:00</td><td>Work in the laboratory<br>(repetition of the range of methods on pure cultures)</td><td>Work in the laboratory<br>(continuation of bacteriological examination and self-study)</td><td>Work in the laboratory<br>(continuation of bacteriological examination and self-study)</td><td>Work in the laboratory<br>(continuation of bacteriological examination and self-study)</td><td>Final colloquium<br>(presentation and discussion of the bacteriological examination results)</td></tr>
<tr><td>14:00-15:00</td><td>Cultural-bacteriological examination of a sample from diagnostics</td><td>Colloquium<br>(interpretation of findings)</td><td rowspan="2">Colloquium<br>(Molecular identification methods)</td><td rowspan="2">Colloquium<br>(interpretation of findings)</td><td rowspan="2"></td></tr>
<tr><td>15:00-16:00</td><td></td><td></td></tr>
</table>

# Appendix Tabl. 3.1.4

## Complete list of elective courses

### Table: 1 Elective courses offered by the Faculty during an academic year (summer semester 2019 and winter semester 2019/2020)

Students must attend at least 84 hours of elective coursework in the preclinical part and the total number of elective course hours in clinical education is 224 h.

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| **Anatomy (situs)** | Basic science | 3 | | 18 | | | 10 | | | Pre-clinical |
| **Animal hormones and their effects** | Basic science | 3 | | 15 | | | | | | Pre-clinical |
| **Biological and anatomical basics** | Basic science | 1 | | 28 | | | | | | Pre-clinical |
| **Comparative and functional anatomy of the organ systems** | Basic science | 2 | | 28 | | | | | | Pre-clinical |
| **Interdisciplinary seminar Physiology of excitable cells** | Basic science | 3 | | 26 | | 15 | | | | Pre-clinical |
| **Pathobiochemie und Regulation des Energiestoffwechsels** | Basic science | 3 | | 14 | | | | | | Pre-clinical |
| **Pathophysiological seminar** | Basic science | 3 | | 26 | | | | | | Pre-clinical |
| **Pathophysiological seminar II** | Basic science | 4 | | 24 | | | | | | Pre-clinical |
| **Physics in Physiology** | Basic science | 1 | | 26 | | | | | | Pre-clinical |
| **What actually is AST (GOT)? Practical biochemistry behind the laboratory parameters** | Basic science | 3 | | 10 | | 4 | | | | Pre-clinical |
| **Animal welfare discussion platform** | Basic science | 1, 3, | | 12 | 2 | | | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 5, 7, 9, 11 | | | | | | | | |
| **Animal welfare for ornamental poultry and exotic wild animals (excursion Tenerife)** | Basic science | 2, 4, 6, 8, 10 | 22 | | | | | 67 | | Clini-cal |
| **Animal welfare with a difference: a scientific examination of current animal welfare issues** | Basic science | 7 | | 9 | 5 | | | | | Clini-cal |
| **Antiparasitics and their use against parasites in pets** | Basic science | 6 | | 28 | | | | | | Clini-cal |
| **Basics of color inheritance and associated diseases** | Basic science | 6 | | 12 | | | | | | Clini-cal |
| **Bird physiology for the clinic** | Basic science | 5, 7 | | 32 | | | | | | Clini-cal |
| **Business administration for veterinarians** | Basic science | 4, 6, 8 | | 28 | | | | | | Clini-cal |
| **Business administration for veterinarians II** | Basic science | 6, 8 | | 28 | | | | | | Clini-cal |
| **Cell and molecular biological aspects of parasitic organisms** | Basic science | 7 | | 30 | | | | | | Clini-cal |
| **Cell Biological Aspects of Parasites - News from Research** | Basic science | 6, 8 | | 12 | 12 | | | | | Clini-cal |
| **Communication in conflict and stressful situations - (How do I tell the pet owner? - Communication in the veterinary practice)** | Basic science | 6, 8 | | 12 | 2 | | | | | Clini-cal |
| **Communication training for practice** | Basic science | 4, 5, 6, 7 | | 15 | | | | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| Current problems of animal welfare law | Basic science | 2, 4, 6, 8, 10 | | 14 | | | | | | Clini-cal |
| Current topics in infection biology | Basic science | 6,8 | | 13 | | | | | | Clini-cal |
| Diet "to go" for dogs and cats in theory and practice - how do I tell the owner? | Basic science | 6, 8 | | 14 | | | | | | Clini-cal |
| Ethology and Physiology of Native Wildlife | Basic science | 3, 5, 7 | | 30 | | | | | | Clini-cal |
| Ethology and physiology of zoo and farm animals | Basic science | 4, 6, 8 | | 28 | | | | | | Clini-cal |
| Experimental methods of pharmacology and pharmacogenetics | Basic science | 5, 6, 7, 8 | | 5 | | 25 | | | | Clini-cal |
| General pathogenetics | Basic science | 5 | | 15 | | | | | | Clini-cal |
| General pharmacology and toxicology | Basic science | 5 | | 15 | | | | | | Clini-cal |
| Import and travel parasitoses | Basic science | 6 | | 8 | | 4 | | | | Clini-cal |
| Internship in zoo and farm animal ethology | Basic science | 4, 6, 8 | | | | | 28 | | | Clini-cal |
| Manual therapy in equine medicine | Basic science | 5, 7 | | | | | 14 | | | Clini-cal |
| Molecular genetic diagnosis of hereditary disorders and dispositions | Basic science | 6, 8 | | 14 | | | | | | Clini-cal |
| Parasitosis of domestic and zoo animals | Basic science | 6 | | 12 | | 1 | | | | Clini-cal |
| Pet and laboratory animal nutrition | Basic science | 5, 7 | 30 | | | | | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| Preclinical pharmacology and toxicology: scope and experimental methods | Basic science | 2, 4, 6, 8 | | 5 | | 10 | | | | Clini-cal |
| Rare and exotic animal diseases | Basic science | 8 | | 12 | | | | | | Clini-cal |
| Revision course/examination review course immunology | Basic science | 5 | | 14 | | | | | | Clini-cal |
| Science in Motion: Pathophysiology of the musculoskeletal system | Basic science | 6, 8 | 4 | 8 | 2 | | | | | Clini-cal |
| Selected parasitic zoonoses | Basic science | 6 | | 13 | | | | | | Clini-cal |
| Selected viral diseases | Basic science | 5 | | 16 | | | | | | Clini-cal |
| Seminar Pathogenetics of Small Animals (Dog / Cat) | Basic science | 7 | | 15 | | | | | | Clini-cal |
| Special analytics in animal nutrition | Basic science | 6 | | | | 60 | | | | Clini-cal |
| Species and nature conservation seminar | Basic science | 7 | | 6 | 8 | | | | | Clini-cal |
| The pharmaceutical drug development – Excursion to CSL Behring GmbH | Basic science | 1, 2, 3, 4, 5, 6, 7, 8 | | 7 | | 8 | | | | Clini-cal |
| Theory and practice of modern animal disease control | Basic science | 7, 8 | | 14 | | | | | | Clini-cal |
| Veterinary communication & peer feedback in practice | Basic science | 3, 5, 7 | | 15 | | | | | | Clini-cal |
| Veterinary Neuroscience Learning and Teaching | Basic science | 5, 7 | | 32 | | | | | | Clini-cal |
| Wildlife biology internship | Basic science | 3, 5, 7 | | | | | 30 | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| **Basics of statistical planning and evaluation of veterinary studies** | Basic subjects | 7 | | 30 | | | | | | Clini-cal |
| **Biometrics seminar** | Basic subjects | 2 | | 14 | | | | | | Clini-cal |
| **General Chemistry Tutorials for Veterinarians** | Basic subjects | 1 | | 15 | | | | | | Clini-cal |
| **Tutorial for the lecture General Chemistry** | Basic subjects | 1 | | 30 | | | | | | Clini-cal |
| **Amphibians at the vet** | Clinical science | 5, 7 | | 9 | | | | 5 | | Clini-cal |
| **Basics for the detection and treatment of diseases in New World camelids** | Clinical science | 5, 7 | | 15 | | | | | | Clini-cal |
| **Behavior modification in cats for stress-free veterinary treatment** | Clinical science | 3, 4, 5, 6, 7, 8 | | | | | | 28 | | Clini-cal |
| **Care of emergency patients in reproductive medicine I / II** | Clinical science | 4, 6, 8 | | | | | | 14 | | Clini-cal |
| **Care of emergency patients in reproductive medicine I / II** | Clinical science | 3, 5, 7 | | | | | | 15 | | Clini-cal |
| **Care of emergency patients in small animal surgery I and II** | Clinical science | 5, 6, 7, 8 | | 30 | | | | | | Clini-cal |
| **Care of emergency patients in small animal surgery I and II** | Clinical science | 5, 6, 7, 8 | | 30 | | | | | | Clini-cal |
| **Care of emergency surgical patients** | Clinical science | 5, 7 | | | | | | 14 | | Clini-cal |
| **Case studies from the fields of small animal surgery: neurology, orthopedics and soft tissue surgery** | Clinical science | 8 | | 28 | | | | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chick team: medical care and rearing of young wild birds** | Clinical science | 2, 4, 6, 8 | | 14 | | | | 14 | | Clini-cal |
| **Clinical chemistry in dogs and cats: case presentations with a biochemical background** | Clinical science | 5, 7 | | 14 | | | | | | Clini-cal |
| **Clinical Pathology - Small Animal internal medicine** | Clinical science | 5, 7 | | 14 | | | | | | Clini-cal |
| **Clinical Skills Lab** | Clinical science | 2, 3 | | | | | 16 | | | Clini-cal |
| **Clinical Skills Lab - Free Practice** | Clinical science | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 | | | | | 15 | | | Clini-cal |
| **Clinical traineeship in the Clinic for Small Animals - internal medicine I** | Clinical science | 4, 5, 6, 7, 8 | | | | | | 14 | | Clini-cal |
| **Clinical traineeship in the Clinic for Small Animals - internal medicine II** | Clinical science | 4, 5, 6, 7, 8 | | | | | | 14 | | Clini-cal |
| **Clinical Trainieeship - Clinic for birds, reptiles, amphibians and fish** | Clinical science | 1, 2, 3, 4, 5, 6, 7, 8, | | | | | | 56 | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| **Co-clinical traineeship in the Clinic for Small Animals - Surgery I** | Clinical science | 3, 4, 5, 6, 7, 8 | | 15 | | | | | | Clini-cal |
| **Co-clinical traineeship in the Clinic for Small Animals - Surgery II** | Clinical science | 3, 4, 5, 6, 7, 8 | | 15 | | | | | | Clini-cal |
| **Co-clinical traineeship: Introduction to emergency medicine for birds and reptiles** | Clinical science | 1, 2, 3, 4, 5, 6, 7, 8, | | 13 | | | | 15 | | Clini-cal |
| **Colloquium Wildlife Research** | Clinical science | 4, 6, 8 | | 28 | | | | | | Clini-cal |
| **Communication in emergency medicine** | Clinical science | 5, 6, 7, 8 | | 14 | | | | | | Clini-cal |
| **Diseases of Reptiles and Amphibians I** | Clinical science | 7 | | 9 | | | | 20 | | Clini-cal |
| **Diseases of Reptiles and Amphibians II** | Clinical science | 6, 8 | | 7 | | | | 20 | | Clini-cal |
| **DVG-Vet-Congress – bvvd** | Clinical science | 5, 7 | | | | | | | 15 | Clini-cal |
| **Equestrian events - duties of the veterinarian** | Clinical science | 5, 6, 7, 8 | | 4 | | | | 11 | | Clini-cal |
| **From the stable lane to the gene laboratory** | Clinical science | 6, 8 | 10 | | | 6 | | | | Clini-cal |
| **In vitro production of bovine embryos** | Clinical science | 5, 7 | | | | | 10 | | | Clini-cal |
| **In vitro production of embryos** | Clinical science | 6, 8 | | | | | 10 | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| **In-depth Propaedeutics I / II** | Clinical science | 4 | 14 | | | | | 14 | | Clini-cal |
| **In-depth Propaedeutics I / II** | Clinical science | 5, 7 | 15 | | | | | 15 | | Clini-cal |
| **Infection biology of wild animals (focus reproduction)** | Clinical science | 5, 6, 7, 8 | | 14 | | | | | | Clini-cal |
| **Intensive care medicine for surgical emergency patients I** | Clinical science | 2, 3, 4, 5, 6, 7 | | 28 | | | | | | Clini-cal |
| **Intensive care medicine for surgical emergency patients II** | Clinical science | 2, 3, 4, 5, 6, 7, 8 | | 28 | | | | | | Clini-cal |
| **Intensive care of buiatric patients** | Clinical science | 5, 6, 7, 8 | | 30 | | | | | | Clini-cal |
| **Internal diseases of horses** | Clinical science | 5, 6, 7, 8 | | 14 | | | | | | Clini-cal |
| **Interpretation of findings in clinical laboratory diagnostics** | Clinical science | 5, 6, 7, 8 | | 14 | | | | | | Clini-cal |
| **Introduction to behavior therapy I** | Clinical science | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 | | 28 | | | | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| **Introduction to behavior therapy II** | Clinical science | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 | | 28 | | | | | | Clini-cal |
| **Introduction to emergency medicine in birds and reptiles** | Clinical science | 5, 6, 7, 8 | | 13 | | | | 15 | | Clini-cal |
| **Introduction to Forensic Veterinary Medicine - Basics** | Clinical science | 5 | | 15 | | | | | | Clini-cal |
| **Introduction to Forensic Veterinary Medicine II** | Clinical science | 6 | | | | 16 | | | | Clini-cal |
| **Keeping and diagnosing farm fish** | Clinical science | 7 | | | | | | 20 | | Clini-cal |
| **Medical Training** | Clinical science | 4, 5, 6, 7 | | 7 | | | | 7 | | Clini-cal |
| **Minimization of antibiotics in farm animals** | Clinical science | 6, 8 | | | 28 | | | | | Clini-cal |
| **physical therapy** | Clinical science | 7, 8 | | | | | | 14 | | Clini-cal |
| **Pig herd health management** | Clinical science | 6, 8 | | 16 | 4 | | | 4 | | Clini-cal |
| **Postoperative treatment of surgical patients (co-clinical traineeship) I** | Clinical science | 2, 3, 4, 5, 6, 7, 8 | | 6 | | | | 8 | | Clini-cal |
| **Postoperative treatment of surgical patients (co-clinical traineeship) II** | Clinical science | 2, 3, 4, 5, | | 6 | | | | 8 | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 6, 7, 8 | | | | | | | | |
| **Propaedeutic Horse - internal medicine** | Clinical science | 4 | 13 | | | | | | 1 | Clini-cal |
| **Research in wildlife and exotic pet medicine** | Clinical science | 2, 4, 6 | | 45 | | | | | | Clini-cal |
| **Selected chapters on fish diseases** | Clinical science | 6, 8 | | | | | | 14 | | Clini-cal |
| **Small animal cardiology** | Clinical science | 7, 8 | | 14 | | | | | | Clini-cal |
| **Small animal webinars TiHo Hannover** | Clinical science | 6, 7, 8 | | 14 | | | | | | Clini-cal |
| **Special behavior therapy for dogs and cats** | Clinical science | 3, 4, 5, 6, 7, 8 | | | | | | 14 | | Clini-cal |
| **Special behavior therapy for horses** | Clinical science | 3, 4, 5, 6, 7, 8 | | 15 | | | | 14 | | Clini-cal |
| **Stem cells & Co: Regenerative medicine in horses** | Clinical science | 5, 7 | 4 | 10 | 4 | 6 | | 4 | | Clini-cal |
| **Tropical Veterinary Research: From EcoHealth to One Health** | Clinical science | 5, 6, 7, 8 | | | | | | 14 | | Clini-cal |
| **Udder and teat surgery, udder health** | Clinical science | 2, 4, 6, 8 | 14 | | | | 14 | | | Clini-cal |
| **Ultrasound examination of the horse with practical exercises** | Clinical science | 8 | 4 | | | | | 10 | | Clini-cal |
| **Wild Ruminants - Diseases, Ecology and Genetics I** | Clinical science | 5, 7 | | 28 | | | | | | Clini-cal |

| Electives | Subjects | Semester | Lectures | Seminars | Supervised self learning | Laboratory and deskbased work | Non-clinical animal work | Clinical animal work | Others | Section |
|---|---|---|---|---|---|---|---|---|---|---|
| **Wild Ruminants - Diseases, Ecology and Genetics II** | Clinical science | 6, 8 | 28 | | | | | | | Clini-cal |
| **Beekeeping and bee diseases** | Animal produc-tion | 5 | | 15 | | | | | | Clini-cal |
| **bovine herd health management** | Animal produc-tion | 7 | | 15 | | | | | | Clini-cal |
| **herd health management of small ruminants** | Animal produc-tion | 6, 8 | | 14 | | | | | | Clini-cal |
| **Excursions to food factories and sausage production** | FSQ & VPH | 5, 6, 7, 8 | | | 4 | | | | 15 | Clini-cal |
| **Microbial toxins in food** | FSQ & VPH | 6 | | 14 | | | | | | Clini-cal |
| **Veterinary practice: legal aspects** | FSQ & VPH | 5, 7 | 30 | | | | | | | Clini-cal |
| **Wildlife conservation medicine** | FSQ & VPH | 4, 6, 8 | | 24 | | | | | | Clini-cal |

# Appendix to 3.1.4 a

## Detailed description of the Skills Lab “PETS”

## Clinical Skills Lab - PETS

The PETS - Practical Experience of Technical Skills - of the faculty of Veterinary Medicine at Justus Liebig University was planned and set up in the winter semester 2015/2016. In this context, eight teaching units were initially created, which were used in the first semesters via elective courses. In the meantime, the initial stations have been expanded by many additional exercise options. Furthermore, four new stations have been set up and the range of courses has been markedly expanded. Currently, all together 12 comprehensive teaching stations have been established.

## Concept

The entire teaching project Skills Lab "PETS" is characterised in particular by a coherent overall teaching concept that builds up on one another.

### Elective course and free practice hours

Already very early in the study programme, specifically in the 2nd and 3rd semester, the elective course is offered to 32 students each. Four students are supervised by a student tutor in each station (peer teaching format). As can be seen from the attached teaching evaluation, the students not only enjoy learning in the Skills Lab accompanied by the acquisition of a high motivation for their further studies, they also feel better prepared for the clinical semesters.

Student evaluations revealed that in addition to the great demand of the elective courses the students repeatedly expressed the desire to be allowed to repeat individual stations independently. This ledled to the decision to expand the learning offer with free practice hours. Since the winter semester 2019/2020, students can book one out of eleven of the twelve stations at set times (the communication station must be intensively accompanied by a tutor and is therefore not available in this format). If students have proven to have worked on all eleven stations in the course of two consecutive semesters, one compulsory elective curricular hour can be recognised. This results in a high flexibility and takes in to account the very busy timetable and stressful learning phases. Four students per station can work simultaneously. The learning objectives are to be achieved independently. In case of problems or technical questions, the students are additionally supported by two student tutors.

Depending on the preferred learning concept, students can thus attend the elective course in the 2nd or 3rd semester, in which they are supervised in a peer-teaching format. However, if students prefer to learn on their own or with friends in a group without supervision, they are free to obtain the compulsory elective curricular hour by attending the free practice hours. This flexibility also supports the diversity or gender aspects. There is a very large proportion of women among students enrolled in the veterinary study programme. When planning the courses in the Skills Lab, care was taken to ensure that pregnant students can also participate in most of the exercises without putting themselves at risk. This means that it is possible for them to learn practical veterinary skills during pregnancy, which would not be permitted using live animals. Participation is also linked to the fact that they receive a certificate of achievement.

### Compulsory courses

As a further building block in the overall teaching concept, the skills lab has been firmly integrated into the curriculum at two points. On the one hand, all students in the 4th semester go through a skills lab course during their propaedeutics to ensure a good transition to the clinical part of their studies, which prepares them for practical work on animals from the 5th semester onwards. In fact, 93% of the participants confirm with "very true" to "quite true" that they actually feel better prepared for the clinical propaedeutics in the presence of live animals. During this course veterinary students work with living animals for the first time and are thus rather grateful to have already learned some veterinary skills on the simulator beforehand and to be able to practice them.

In addition, the Skills Lab could be firmly anchored in the year of rotation (practical year in the 9th and 10th semester). In this course, too, the students go through the Skills Lab in small groups of 3 to 4 students. Of the eleven stations scheduled for the rotation, five stations were completed in a peer-teaching format and six stations as self-directed learning units in the 2019/2020 rotation year prior to the pandemic. This teaching concept is the result of two accompanying scientific studies aimed at developing a didactic and subject-specific teaching concept for the Skills Lab, PETS. In the first study carried out during the second semester it could be shown that self-directed learning, i.e. working independently in a group in the different learning stations, achieves similar learning results in comparison to the peer teaching format, in which the students are supervised by a student tutor (Schmitt, A. 2019). A follow-up study will examine the transferability of the results to the rotation year. The final results of this study are expected to be published at the end of 2021. However, preliminary results have already led to the combination of both teaching concepts within the framework of the skills lab course during the year of clinical rotation.

The fixed integration of the skills lab at two time points in the curriculum of the veterinary study programme ensures great sustainability. This approach is so far unique at veterinary establishments in Germany and distinguishes the "PETS" from any other skills lab at veterinary schools in Germany. The overall range of courses results in a well-coordinated spiral curriculum. Certain teaching contents are repeated and taken up again, others are added and further developed. They are always adapted to the level of knowledge of the respective semester and focus on the required learning aims.

## Quality assurance

### Evaluation concept

Another point that characterises the project is the extensive evaluation concept. The courses are not only evaluated as a whole at the end. The direct evaluation measures at the stations have proved to be very important and valuable. On the one hand, they include a short evaluation by means of a target disc, on which the tutor's performance, the station content, the teaching materials and the personal feeling of success can be assessed. In addition, the participants express constructive criticism in each station via anonymous feedback slips. On this basis, all teaching materials and station contents are continuously revised and expanded, and the teaching concepts are readjusted, so that the entire teaching project is subject to a continuous improvement process. Due to the dynamic development and reaction to criticism and suggestions, the students feel accepted and valued.

## Tutor training

Training and support of the student tutors is a major aspect for a successful implementation of the skills lab. Tutors receive extensive professional and didactic training in advance. In addition, practical coaching is organised once per semester. In this format, critical situations that have come up are discussed together in the group and solutions are worked out. This is accompanied by the tutor qualification programme of JLU.

The student tutors benefit from their own learning experience and gain their first teaching experience. In addition, their own knowledge and practical skills are consolidated. Within the framework of the extensive evaluation measures, the positive response of the students participating in the courses quickly became apparent. They are very enthusiastic about the courses and give positive feedback on the support of the student tutors.

## Teaching concept

At each station, the participants find a task with clearly formulated learning aims and illustrated step-by-step instructions. In addition, further learning materials, e.g. videos are also available. All materials are also present for preparation and follow-up on the JLU learning platform Stud.IP.

In peer teaching, the student tutors give explanations or practical demonstrations of the respective learning content for each topic and correct the participants during their exercises. Feedback is crucial for the students' learning success. This feedback is given either by the tutor and/or by visual feedback from the simulator (Is artificial blood really flowing when blood is taken? Can the dog be ventilated after intubation? etc.). The learning concept of self-directed learning makes use of this - supplemented by feedback from the group. The immediate sense of achievement when working through the stations is an important motivating factor.

What makes PETS special is the teaching by guidance at eye level, which creates a very personal and relaxed working atmosphere. This also fosters the learning success. Everyone can learn and practise at their own pace without pressure. This increases the students' self-confidence with regard to the skills they have adopted and they feel much better prepared for their first contacts with living patients (see excerpts from evaluations).

In this respect the veterinary skills learned within the setting of the skills lab promotes the acquisition of first day competences. Thus, learning content is directly linked to early professional activities. For high quality teaching content and materials are agreed in close cooperation with the clinics.

The communication station is an integral part of both the propaedeutic and rotation courses at PETS and is thus established in the curriculum. This ensures that every student is addressed and possibly also participates in unpleasant but necessary exercises. The students benefit from the personal atmosphere in the small groups and their needs can be sensitively addressed. The subject of communication is not yet a compulsory part of veterinary study in Germany. However, later professional success as a veterinarian depends to a large extent on one's own communicative skills. Communicative skills have a decisive influence on customer satisfaction, adherence to therapy, the associated therapy success and not least on one's own job satisfaction.

## Development

The aim is to continuously develop the Skills Lab and to advance the improvement process on the basis of the evaluations. This concerns the expansion of the stations as well as the teaching. Development potential is seen in the area of animal welfare, specifically in laboratory animal science, taking in to account the 3R concept.


Figure 1 PDCA-Cycle of the Clinical Skills Lab - PETS

# Appendix to 3.1.4 b

## Current stations in the Skills Lab

### Current stations / skills lab

| Station 1 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Prepare blood smear | X | X | | X |
| II. stain blood smear with Diff Quik | X | X | | X |
| III. microscopy of the specially prepared blood smears | X | X | | X |
| IV. Microscopy of fixed blood smears of different animal species | X | X | | X |
| V. Microscopy of parasitological specimens | | X | | |
| VI. microscopy of histopathological preparations | | X | | |
| VII. processing and evaluation of a blood sample with the help of the "Vet ABC". | X | X | | X |
| VIII. correct packing of different specimens for shipment (under construction) | | | | |
| IX. Two laboratory cases for independent learning | | X | | |
| X. Pushing a urinary catheter in a bitch incl. urine collection | | | | X |
| XI. Performing a urinalysis incl. detailed learning material | | X | | |
| a. Using a refractometer | | | | |
| b. By means of a urine stick | | | | |

| Station 2 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Practicing i.v. injection and pushing a venous catheter on a venous board | X | X | X | X |
| II. s.c. Injection on the dog | X | X | X | X |
| III. i.m. injection on the dog | X | X | X | X |
| IV. i.v. injection on horse | X | X | X | X |
| V. Blood sampling on horse | X | X | X | X |
| VI. i.v. injection on bird | X | X | X | X |
| VII. Blood collection on bird | X | X | X | X |
| VIII. i.v. injection on dog's paw | X | X | X | X |
| IX. Sliding of a venous catheter at the dog's paw | X | X | X | X |
| X. Blood collection from the dog's paw | X | X | X | X |
| XI. Preparations for an infusion (under construction) | | | | |
| XII. Blood collection from pig | X | X | X | X |
| XIII. i.m. Injection on the pig | X | X | X | X |
| XIV. handling of an inoculation gun in pigs (under construction) | | | | |
| XV. handling of a perfusor (under construction) | | | | |

| Station 3 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Instrumentation | X | X | | |
| II. surgical knots on the knot board | X | X | | X |
| III. surgical knots on the knot rack | X | X | | |
| IV. Stapling on the suture pad | X | X | | |
| V. Perform various suturing techniques on suture pads of different animal species (horse, bovine, porcine, small animal, hollow organ, intestine). | X | X | | X |
| a. Single staples | X | X | | X |
| b. Sultan diagonal stitching/ cross stitching | X | X | | X |
| c. U-booklets | X | X | | X |
| d. Donati | X | X | | X |
| e. Mattress seam | X | X | | X |
| f. Furrier | | X | | X |
| g. Cushing | | X | | X |
| h. Lember seam | | X | | X |
| i. Intracutaneous suture | | X | | X |
| j. Forging suture | | X | | X |
| k. Reverting suture | | X | | X |
| VI. closure of the abdominal wall in cattle (under construction) | | | | |
| VII. application of the bust band to the vulva in sheep (under construction) | | | | |
| VIII. Closure of the abdominal wall in dogs (under construction) | | | | |
| IX. Practice of sterile removal of needle-thread combinations | X | X | | X |
| X. Practice sterile suture removal from bobbin | X | X | | X |

| Station 4 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Intubation of the cat | X | (X) | | X |
| II. inserting a nasal feeding tube into the cat`s nose | X | (X) | | X |
| III. Intubation in the dog | X | X | | X |
| IV. Correct ventilation on a ventilator simulator (under construction) | | | | |
| V. Training on an anesthesia machine (under construction) | | | | |

| Station 5 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Cardiopulmonary resuscitation in dogs | X | X | | X |
| II. performing an examination of the cardiovascular system | X | X | X | X |
| III. auscultation of physiological heart sounds and pathological heart murmurs | X | X | X | X |
| IV. Auscultation of physiological and pathological lung sounds | X | X | X | X |
| V. Use of the stethoscope | X | X | X | X |

| Station 6 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Small and pet animal handling | X | X | X | |
| a. Restraints | X | X | X | |
| i. Muzzle sling | X | X | X | |
| ii. Muzzle | X | X | X | |
| b. Proper lifting and restraining on the treatment table | X | X | X | |
| c. Forced cage | X | X | X | |
| d. Casher | X | X | X | |
| e. Collar | X | X | X | |
| f. EU pet passport | X | X | X | |
| II. birds and exotics | X | X | X | |
| a. Catching a budgerigar incl. correct fixation | X | X | X | |
| b. Fixation of a turtle | X | X | X | |
| c. Handling of the snake hook | X | X | X | |
| III. cattle | X | X | X | |
| a. Milking techniques | X | X | X | |
| b. Sterile milk sampling | X | X | X | |
| c. California mastitis test | X | X | X | |
| d. Percussion/ lung borders | X | X | X | |
| e. Low lacing techniques | X | X | X | |
| f. Knot halter | X | X | X | |
| g. Nose brake | X | X | X | |
| h. Teat bandage | X | X | X | |
| IV. Horse | X | X | X | |
| a. Tying out the hind limb | X | X | X | |
| b. Putting on a halter | X | X | X | |
| c. Putting on a snaffle | X | X | X | |
| d. Safety knot | X | X | X | |
| e. Measuring the stock | X | X | X | |
| f. Signalement | X | X | X | |
| g. Nose brake | X | X | X | |
| h. Guide chain | X | X | X | |
| i. Placement and reading of a microchip | X | X | X | |
| j. Equine passport | X | X | X | |
| k. Tooth age determination | X | X | X | |

| Station 7 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. General dressing theory | X | X | | X |
| II. Dog | X | X | | X |
| a. Head dressing | X | X | | X |
| b. Paw bandage | X | X | | X |
| c. Thoracic dressing | X | X | | X |
| d. Abdomen dressing | X | X | | X |
| III. horse | X | X | | X |
| a. Toe pad dressing | X | X | X | X |
| b. Hoof dressing | X | X | | X |

| Station 8 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Sterile dressing incl. washing and disinfection | X | X | | X |
| II. Hand disinfection using fluorescent disinfectant to visualize wetting gaps under UV light | X | X | | X |

| Station 9 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. i.v. injection at the neck | | X | | X |
| II. i.m. injection at the neck | | X | | X |
| III. pushing venous catheter at the neck (under construction) | | | | |
| IV. Blood sampling at the neck | | X | | X |
| V. Rectal examination in the horse | | X | X | X |
| VI. simulation of pathological intestinal displacements | | | | X |
| VII. vaginal examination in the horse by means of speculum (use of different ovaries) | | | X | |

| Station 10 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Ultrasound | | X | | X |
| II. endoscopy | | X | | X |
| III. x-ray positioning in the dog | | X | X | X |
| IV. Evaluate analog radiographic cases in the small animal on the radiographic viewer | | X | | X |
| V. Evaluate digital radiographs of the horse (under construction) | | | | |
| VI. Radiation protection | | X | | X |

| Station 11 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| I. Artificial insemination in cattle | | X | | X |
| II. vaginal examination in cattle by means of speculum | | | X | |

| Station 12 | Elective | Free Training | Propae-deutics | Rotation |
|---|---|---|---|---|
| II. taking an anamnesis in different animal species | | | X | X |

# Appendix to 3.1.5:

# Logbooks

# Logbook

Dear Rotation Student,
This logbook is intended to serve as a guideline whether the stated contents and learning aims could be offered and conveyed to you. Please understand that there may be deviations depending on the number of patients.

This sheet will be evaluated by machine. Please mark an answer in the following way: ○⊗○.
If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Equine Clinic - Internal medicine

**First and last name** of student

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "EQUINE CLINIC - INTERNAL MEDICINE": CONTENTS AND AIMS

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Communicate with clients | ○ | ○ | ○ |
| Signalement | ○ | ○ | ○ |
| Perform a complete clinical examination | ○ | ○ | ○ |
| Use ultrasound | ○ | ○ | ○ |
| Laboratory diagnostics: Collecting samples | ○ | ○ | ○ |
| Laboratory diagnostics: Storage and transfer of samples | ○ | ○ | ○ |
| Laboratory diagnostics: Performing standard laboratory tests | ○ | ○ | ○ |
| Laboratory diagnostics: Performing urine analysis | ○ | ○ | ○ |
| Laboratory diagnostics: Interpretation of results | ○ | ○ | ○ |
| Application of drugs (p.o. /s.c. / i.m. / i.v. / indwelling catheter insertion - see or get explained) | ○ | ○ | ○ |
| ECG | ○ | ○ | ○ |
| Rectal examination | ○ | ○ | ○ |
| Nasopharyngeal probe (see and get explained) | ○ | ○ | ○ |
| Report and interpretation of clinical examination results | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
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| |
| Date / Signature supervising veterinarian |
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# Logbook

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If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Equine Clinic - Surgery

| **First and last name** of student |
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Please enter the **number of your rotation group**.

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|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "EQUINE CLINIC - SURGERY": CONTENTS AND AIMS

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Perform a complete clinical examination | ○ | ○ | ○ |
| Perform basic first aid (emergency patient) | ○ | ○ | ○ |
| Use X-ray | ○ | ○ | ○ |
| Use ultrasound | ○ | ○ | ○ |
| Application of drugs (p.o. / rectal /s.c. / i.m. / i.v. / i.mam. / indwelling catheter insertion) | ○ | ○ | ○ |
| Anaesthesia | ○ | ○ | ○ |
| Wound management incl. bandages | ○ | ○ | ○ |
| Dental treatment | ○ | ○ | ○ |
| Orthopaedics / Traumatology | ○ | ○ | ○ |
| Surgical operations | ○ | ○ | ○ |
| Intensive care medicine | ○ | ○ | ○ |
| Ophthalmology | ○ | ○ | ○ |
| Scientific Education (Journal Club/Case Reports/Book Club) | ○ | ○ | ○ |

### COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
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| |
| Date / Signature supervising veterinarian |
| |

# Logbook

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If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Institute for Animal hygiene and infectious diseases

| **First name and surname** of the student |
|---|
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Please enter the **number of your rotation group**.

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|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "INSTITUTE FOR ANIMAL HYGIENE AND INFECTIOUS DISEASES ": CONTENTS AND AIMS

#### Technical and operational security measures

| | Seen/ Explained | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Perform general protective measures and the correct use of personal protective equipment | ○ | ○ | ○ |
| Perform surface disinfection and hygienic hand disinfection correctly | ○ | ○ | ○ |
| Safe handling of potentially infectious material | ○ | ○ | ○ |
| Safe handling of biological and hazardous substances | ○ | ○ | ○ |
| Correct behavior in the case of danger | ○ | ○ | ○ |

#### Microbiological work in research and services

| | Seen/ Explained | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Processes in bacteriological routine diagnostics | ○ | ○ | ○ |
| Processes in mycological routine diagnostics | ○ | ○ | ○ |
| Processes in routine serological diagnostics | ○ | ○ | ○ |
| Carrying out molecular biological tests on clinical sample material and bacterial isolates | ○ | ○ | ○ |
| Preservation of microorganisms and maintenance of the strain collection | ○ | ○ | ○ |
| Production of stable-specific animal vaccines | ○ | ○ | ○ |
| Production of culture media for microbiology | ○ | ○ | ○ |
| Proper disposal of laboratory waste and recycling of reusable material | ○ | ○ | ○ |

## Independent bacteriological and mycological examination of a diagnostic sample from the animal

| | Seen/ Explained | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Application of laboratory diagnostic algorithms to examine clinical samples for microbiological pathogens | ○ | ○ | ○ |
| Explanation of the composition and functionality of specific differential, selective and elective media | ○ | ○ | ○ |
| Inoculation of sample material in liquid and solid culture media | ○ | ○ | ○ |
| Morphological assessment of microbial growth | ○ | ○ | ○ |
| Preparation and assessment of microbial subcultures | ○ | ○ | ○ |
| Gram staining of bacterial isolates and their assessment | ○ | ○ | ○ |
| Performance and assessment of biochemical, serological and biological tests on bacteria and / or fungi | ○ | ○ | ○ |
| Performance and assessment of antibiotic resistance tests | ○ | ○ | ○ |
| Written documentation of laboratory tests and results | ○ | ○ | ○ |
| Veterinary interpretation of microbiological findings | ○ | ○ | ○ |
| Presentation of own examination results in the case discussion | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
|---|
| |
| Date / Signature supervising veterinarian |
| |

# Logbook

Dear Rotation Student,

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This sheet will be evaluated by machine. Please mark an answer in the following way: ○⊗○.
If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Clinic for Obstetrics, Gynaecology and Andrology

| **First and last name** of student |
|---|
| |

Please enter the **number of your rotation group**.

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|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "CLINIC FOR OBSTRETRICS, GYNAECOLOGY AND ANDRLOGY": CONTENTS AND AIMS

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Communicate with clients | ○ | ○ | ○ |
| Signalement | ○ | ○ | ○ |
| Preparation of a case report including a cost survey | ○ | ○ | ○ |
| Maintaining medical records | ○ | ○ | ○ |
| Perform a complete clinical examination | ○ | ○ | ○ |
| Presentation of a patient | ○ | ○ | ○ |
| Interpretation of X-ray examination | ○ | ○ | ○ |
| Use ultrasound | ○ | ○ | ○ |
| Laboratory diagnostics: Collecting samples | ○ | ○ | ○ |
| Laboratory diagnostics: Performing standard laboratory tests | ○ | ○ | ○ |
| Laboratory diagnostics: Interpretation of results | ○ | ○ | ○ |
| Spermatological examination | ○ | ○ | ○ |
| Practical handling of medicines | ○ | ○ | ○ |
| Application of drugs (p.o. / rectal /s.c. / i.m. / i.v. / i.mam. / indwelling catheter insertion) | ○ | ○ | ○ |
| Diagnostics and treatments of urogenital tract including obstetrics | ○ | ○ | ○ |
| Soft tissue surgery | ○ | ○ | ○ |
| Obstetrics on the Phantom | ○ | ○ | ○ |
| Observance of biosecurity in everyday practice | ○ | ○ | ○ |
| Examination of herd health | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
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| |
| Date / Signature supervising veterinarian |
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# Logbook

Dear Rotation Student,

This logbook is intended to serve as a guideline whether the stated contents and learning aims could be offered and conveyed to you. Please understand that there may be deviations depending on the number of patients.

This sheet will be evaluated by machine. Please mark an answer in the following way: ○⊗○.
If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Clinic for Small Animals - Surgery

**First and last name** of student

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "CLINIC FOR SMALL ANIMALS - SURGERY": CONTENTS AND AIMS

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Communicate with clients | ○ | ○ | ○ |
| Signalement | ○ | ○ | ○ |
| Preparation of a case report | ○ | ○ | ○ |
| Maintaining medical records | ○ | ○ | ○ |
| Perform a complete clinical examination | ○ | ○ | ○ |
| Perform basic first aid (emergency patient) | ○ | ○ | ○ |
| Use X-ray | ○ | ○ | ○ |
| Use ultrasound | ○ | ○ | ○ |
| Laboratory diagnostics: Collecting samples | ○ | ○ | ○ |
| Laboratory diagnostics: Interpretation of results | ○ | ○ | ○ |
| Application of drugs (p.o. / rectal /s.c. / i.m. / i.v. / i.mam. / indwelling catheter insertion) | ○ | ○ | ○ |
| Anaesthesia including ECG | ○ | ○ | ○ |
| Wound management incl. bandages | ○ | ○ | ○ |
| Tooth restorations | ○ | ○ | ○ |
| Orthopaedics / Traumatology | ○ | ○ | ○ |
| Abdominal surgery (excluding genital tract) | ○ | ○ | ○ |
| Neurological examination | ○ | ○ | ○ |
| Other soft tissue surgery | ○ | ○ | ○ |
| Ophthalmology | ○ | ○ | ○ |
| Recognise when euthanasia is necessary and perform it humanely | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
| --- |
| |
| Date / Signature supervising veterinarian |
| |

# Logbook

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This sheet will be evaluated by machine. Please mark an answer in the following way: ○⊗○.
If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Clinic for Small Animals - Internal medicine

**Firts and last name** of student

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "CLINIC FOR SMALL ANIMALS - INTERNAL MEDICINE": CONTENTS AND AIMS

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Communicate with clients | ○ | ○ | ○ |
| Signalment | ○ | ○ | ○ |
| Preparation of a case report | ○ | ○ | ○ |
| Draw up an investigation plan | ○ | ○ | ○ |
| Create problem list | ○ | ○ | ○ |
| Name differential diagnostic possibilities | ○ | ○ | ○ |
| Maintaining medical records | ○ | ○ | ○ |
| Perform a complete clinical examination | ○ | ○ | ○ |
| Perform basic first aid (emergency patient) | ○ | ○ | ○ |
| Use X-ray | ○ | ○ | ○ |
| Use ultrasound | ○ | ○ | ○ |
| Laboratory diagnostics: Collecting samples | ○ | ○ | ○ |
| Laboratory diagnostics: Storage and transfer of samples | ○ | ○ | ○ |
| Laboratory diagnostics: Performing standard laboratory tests | ○ | ○ | ○ |
| Laboratory diagnostics: Performing urine analysis | ○ | ○ | ○ |
| Laboratory diagnostics: Interpretation of results | ○ | ○ | ○ |
| Application of drugs (p.o. / rectal /s.c. / i.m. / i.v. / i.mam. / indwelling catheter insertion) | ○ | ○ | ○ |
| Anaesthesia including ECG | ○ | ○ | ○ |
| ECG (without Anaesthesia) | ○ | ○ | ○ |
| Recognise when euthanasia is necessary and perform it humanely | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
| --- |
| |
| Date / Signature supervising veterinarian |
| |

# Logbook

Dear Rotation Student,

This logbook is intended to serve as a guideline whether the stated contents and learning aims could be offered and conveyed to you. Please understand that there may be deviations depending on the number of patients.

This sheet will be evaluated by machine. Please mark an answer in the following way: ○⊗○.
If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Clinic for birds, reptiles, amphibians and fish

| **First name and surname** of the student |
|---|
| |

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "CLINIC FOR BIRDS, REPTILES, AMPHIBIANS AND FISH": Content and learning objectives (first day competencies)

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Communicate with clients | ○ | ○ | ○ |
| Signalement | ○ | ○ | ○ |
| Maintaining medical records | ○ | ○ | ○ |
| Preparation of a case report | ○ | ○ | ○ |
| Perform a complete clinical examination bird | ○ | ○ | ○ |
| Examination and repair of plumage if necessary | ○ | ○ | ○ |
| Perform a complete clinical examination reptile | ○ | ○ | ○ |
| Perform basic first aid (emergency patient) | ○ | ○ | ○ |
| Care of juvenile birds | ○ | ○ | ○ |
| Beak and claw trimming | ○ | ○ | ○ |
| Interpretation of X-ray examination | ○ | ○ | ○ |
| Use Ultrasound | ○ | ○ | ○ |
| Laboratory diagnostics: Collecting samples | ○ | ○ | ○ |
| Laboratory diagnostics: interpretation microbiology (e.g. Sero, MolBio, culture) | ○ | ○ | ○ |
| Laboratory diagnostics: Performing standard laboratory tests (e.g. SSA, PU). | ○ | ○ | ○ |
| Laboratory diagnostics: Interpretation of laboratory results | ○ | ○ | ○ |
| Application of drugs (p.o. / intracloacal / s.c. / i.m. / i.v. / insert indwelling catheter) | ○ | ○ | ○ |
| Anaesthesia incl. ECG | ○ | ○ | ○ |
| Wound management incl. bandages | ○ | ○ | ○ |
| Sections | ○ | ○ | ○ |
| Orthopaedics / Traumatology | ○ | ○ | ○ |

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Abdominal surgery | ○ | ○ | ○ |
| Diagnostics and treatments of the genital tract including obstetrics | ○ | ○ | ○ |
| Other soft tissue surgery | ○ | ○ | ○ |
| General opthalmological examination | ○ | ○ | ○ |
| Recognise when euthanasia is necessary and perform it humanely | ○ | ○ | ○ |
| Biosecurity | ○ | ○ | ○ |
| Examination of herd health | ○ | ○ | ○ |
| Herd health diagnostic - collecting samples | ○ | ○ | ○ |
| Herd health management - Vaccination | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
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| |
| Date / Signature supervising veterinarian |
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# Logbook

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This sheet will be evaluated by machine. Please mark an answer in the following way: ○⊗○.
If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Pathology

| **First and last name** of student |
|---|
| |

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "PATHOLOGY": Contents and aims

### Hygiene

| | Have observed it | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Correct usage of gloves, gumboots, aprons and specific workwear | ○ | ○ | ○ |
| Correct cleaning and disinfection after necropsies (hand, gumboots, aprons, instruments, knives etc.) | ○ | ○ | ○ |
| Proper disposal of animal carcasses, technical details, legal regulations | ○ | ○ | ○ |

### Health and safety regulations

| | Have observed it | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Behavior in case of accidents | ○ | ○ | ○ |
| Correct handling of knives, scalpels and other sharp devices | ○ | ○ | ○ |
| Cut protection | ○ | ○ | ○ |
| Handling of potentially infectious or zoonotic material | ○ | ○ | ○ |

### Sampling

| | Have observed it | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Collection, storage and transfer of samples to etiologic diagnostic labs (amongst others parasitological, bacteriological or virological) | ○ | ○ | ○ |
| Collection and transfer of BSE/TSE samples corresponding to the current legal regulations | ○ | ○ | ○ |
| Independent biopsy sampling | ○ | ○ | ○ |
| Collection, transfer, processing and shipping of histological and cytological specimens | ○ | ○ | ○ |

## Development of theoretical and practical skills and competences in veterinary pathology

| | Have observed it | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Repetition and imparting of basic principles in general and special veterinary pathology | ○ | ○ | ○ |
| Description and interpretation of macroscopic lesions | ○ | ○ | ○ |
| Independent implementation of at least five sections (different species such as dog, cat, ruminant, horse, pig) | ○ | ○ | ○ |
| Writing and interpretation of organ and post-mortem examination reports | ○ | ○ | ○ |
| | applicable | | not applicable |
| Imparting of opportunities and chances of post mortal diagnostics | ○ | | ○ |
| Kennenlernen der Tierpathologie als potenziell attraktives Arbeitsfeld für junge TierärztInnen, einschließlich Ausbildungsstrukturen und -möglichkeiten<br>Veterinary pathology as a potential attractive work field for young veterinarians, including structures and opportunities | ○ | | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature student |
|---|
| |
| Date / Signature supervising veterinarian |
| |

# Logbook

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If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Clinic for pigs

**First and last name** of student

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "CLINIC FOR PIGS": CONTENTS AND AIMS

| | Seen/Explanined | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Signalement | ○ | ○ | ○ |
| Preparation of a case report | ○ | ○ | ○ |
| Perform a complete clinical examination | ○ | ○ | ○ |
| Perform basic first aid (emergency patient) | ○ | ○ | ○ |
| Laboratory diagnostics: Collecting samples | ○ | ○ | ○ |
| Laboratory diagnostics: Storage and transfer of samples | ○ | ○ | ○ |
| Laboratory diagnostics: Performing standard laboratory tests | ○ | ○ | ○ |
| Laboratory diagnostics: Performing urine analysis | ○ | ○ | ○ |
| Laboratory diagnostics: Interpretation of results | ○ | ○ | ○ |
| Application of drugs (p.o. / rectal /s.c. / i.m. / i.v. / i.mam. / indwelling catheter insertion) | ○ | ○ | ○ |
| Anaesthesia | ○ | ○ | ○ |
| Wound management incl. bandages | ○ | ○ | ○ |
| Orthopaedics / Traumatology | ○ | ○ | ○ |
| Diagnostics and treatments on the urogenital tract including obstetrics, castration and pregnancy examination by ultrasound | ○ | ○ | ○ |
| Recognise when euthanasia is necessary and perform it humanely | ○ | ○ | ○ |
| Biosecurity | ○ | ○ | ○ |
| Herd health management/ Examination of herd health | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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| |

## DOCUMENTATION

| Date / Signature Student |
| --- |
| |
| Date / Signature supervising veterinarian |
| |

# Logbook

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If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○●⊗.

## Logbook Rotation Clinic for ruminants

| **First and last name** of student |
|---|
| |

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "CLINIC FOR RUMINANTS": CONTENTS AND AIMS

| | Seen/Explained | Performed under supervision | Already seen or performed in other clinic (intramural) |
|---|---|---|---|
| Communicate with clients | ○ | ○ | ○ |
| Signalement | ○ | ○ | ○ |
| Preparation of a case report | ○ | ○ | ○ |
| Maintaining medical records | ○ | ○ | ○ |
| Perform a complete clinical examination | ○ | ○ | ○ |
| Perform basic first aid (emergency patient) | ○ | ○ | ○ |
| Interpretation of X-ray examination | ○ | ○ | ○ |
| Use ultrasound | ○ | ○ | ○ |
| Laboratory diagnostics: Collecting samples | ○ | ○ | ○ |
| Laboratory diagnostics: Performing standard laboratory tests | ○ | ○ | ○ |
| Laboratory diagnostics: Performing urine analysis | ○ | ○ | ○ |
| Laboratory diagnostics: Interpretation of results | ○ | ○ | ○ |
| Application of drugs (p.o. / rectal /s.c. / i.m. / i.v. / i.mam. / indwelling catheter insertion) | ○ | ○ | ○ |
| Anaesthesia including ECG | ○ | ○ | ○ |
| Wound management incl. bandages | ○ | ○ | ○ |
| Orthopaedics / Traumatology | ○ | ○ | ○ |
| Abdominal surgery (excluding sexual apparatus) | ○ | ○ | ○ |
| Other soft tissue surgery | ○ | ○ | ○ |
| Recognise when euthanasia is neccessary and perform it humanely | ○ | ○ | ○ |
| Biosecurity | ○ | ○ | ○ |
| Examination of herd health | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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| |

## DOCUMENTATION

| Date / Signature Student |
| --- |
| |
| Date / Signature supervising veterinarian |
| |

# Logbook

Dear Rotation Student,

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This sheet will be evaluated by machine. Please mark an answer in the following way: ○ ⊗ ○.
If you would like to correct an answer, please fill in the wrongly marked circle and a little bit beyond, like this: ○ ● ⊗ .

## Logbook Rotation Institute for Virology

| **First name and surname** of the student |
|---|
| |

Please enter the **number of your rotation group**.

| | | | | |
|---|---|---|---|---|
| ○ 01 | ○ 02 | ○ 03 | ○ 04 | ○ 05 |
| ○ 06 | ○ 07 | ○ 08 | ○ 09 | ○ 10 |
| ○ 11 | ○ 12 | ○ 13 | ○ 14 | ○ 15 |
| ○ 16 | ○ 17 | ○ 18 | ○ 19 | ○ 20 |
| ○ 21 | ○ 22 | ○ 23 | ○ 24 | ○ 25 |

### CLINICAL ROTATION "INSTITUTE FOR VIROLOGY ": CONTENTS AND AIMS

#### Hygiene, health and safety regulations

| | Seen/ Explained | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Correct use of personal protective equipment Protective clothing in the laboratory | ○ | ○ | ○ |
| Operating instructions | ○ | ○ | ○ |
| Cleaning and disinfection of surfaces, laboratory materials and equipment | ○ | ○ | ○ |
| Handling of infectious, potentially infectious or zoonotic material and hazardous substances | ○ | ○ | ○ |
| Proper disposal of animal by-products and chemicals | ○ | ○ | ○ |

#### Development of theoretical and practical skills and competences in virology

| | Seen/ Explained | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Repetition and teaching of basic principles of general and special virology | ○ | ○ | ○ |
| Selection of the correct test material for virological laboratory diagnostics | ○ | ○ | ○ |
| Proper collection of specimens for virological laboratory diagnostics | ○ | ○ | ○ |
| Correct completion of specimen accompanying letters | ○ | ○ | ○ |
| Packaging and shipping of biological examination material | ○ | ○ | ○ |
| Sterile / infectious cell culture, virus cultivation in cell culture | ○ | ○ | ○ |
| Microscopic observation of cell cultures, cytopathic effect | ○ | ○ | ○ |
| Serum neutralisation test | ○ | ○ | ○ |
| ELISA | ○ | ○ | ○ |
| Direct / indirect immunofluorescence methods | ○ | ○ | ○ |
| Electron microscopy including preparation of samples for electron microscopic diagnostics | ○ | ○ | ○ |

| | Seen/ Explained | Performed under supervision | Discussed and understood |
|---|---|---|---|
| Nucleic acid processing | ○ | ○ | ○ |
| Polymerase chain reaction (PCR), RealTime PCR | ○ | ○ | ○ |
| Agar gel precipitation (Coggins test) | ○ | ○ | ○ |
| Haemagglution test / haemagglutination inhibition test | ○ | ○ | ○ |
| Immunoblot | ○ | ○ | ○ |
| Assessment and interpretation of virological laboratory findings | ○ | ○ | ○ |
| Vaccinations / vaccination schedules in various domestic and farm animals | ○ | ○ | ○ |
| Getting to know virology as a potentially attractive field of work for young veterinarians, including training structures and opportunities | ○ | ○ | ○ |

## COMMENTS OR SUGGESTIONS?

| Please note here: |
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## DOCUMENTATION

| Date / Signature Student |
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| |
| Date / Signature supervising veterinarian |
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# Appendix to 3.4

## Statement of all Veterinary Faculties in Germany concerning the organization of EPTs

## Quality assurance of extramural traineeships in the framework of veterinary medicine training in Germany

Veterinary training in Germany is regulated by the German Veterinary Medical Licensure Law (TAppV) from 27. 07. 2006, last amended in 2016, which reflects the requirements of EU Directive 2005/36 / EC and translates these into applicable German law.
Apart from the subjects listed which have to be implemented by immediate teaching through the veterinary establishments (faculties, university), the TAppV provides requirements for content and training places of 1170 hours of mandatory extramural practical training (EPT). This practical training consists of the following four compulsory blocks:

1. Exercise in agriculture, animal breeding and animal husbandry (70 hrs)
2. Practical training in a private veterinary practice or veterinary hospital /clinic (850 hrs)
3. Practical training in hygiene control, control of foodstuffs, inspection of animals for slaughter and meat inspection (175 hrs)
4. Practical training in the public veterinary service (75 hrs)

Students generally complete this practical training in extramural institutions, however, several places are also offered by the clinics and institutions of veterinary establishments (as defined by the EAEVE).

The students independently organize their internships according to the TAppV and receive a certificate from the supervising veterinarian or institution. All certificates are checked by the veterinary establishments resp. the State examination offices for compliance with formal criteria according to TAppV.
For the purpose of securing a high standard in veterinary education and improving the achievement of first-day competences of graduates, veterinary establishments have developed learning target catalogs for the various extramural trainings, which include essential subjects and activities that students are to be taught or shown. These catalogs provide a guideline for the respective extramural training for both, students and teaching/supervising veterinarians. The written evaluation of each extramural training by the students and supervising veterinarians serves as an important feedback tool.
In order to further improve extramural training in a veterinary practice the Federal Association of Practicing Veterinarians (bpt) developed the quality label "Veterinary Training Practice" in collaboration with the veterinary establishments and the veterinary student body. Practices complying with these standards are recognized by the bpt as a training practice for students and may carry this label. Veterinary establishments strongly support this initiative and closely cooporate with the professional organization.
We would like to emphasize the following important point to EAEVE: The concept of external veterinary practices that are contractually bound to veterinary establishments and that often are financially rewarded for the implementation of extramural training currently cannot be implemented in Germany since it does not agree with the legislation concerning the organization of extramural training required by German universities. The budgets allocated to the veterinary establishments are designated for university-bound intramural education. It is within the responsibility of the veterinary profession to provide their service capacity for extramural training of students.

In consequence, any financial remuneration of contractual training practices would have to be borne by the individual veterinary establishment, which would cause a considerable reduction of the available resources for intramural training, given the tight budgets provided by the Federal States in Germany.

A further aspect relates to the annual calculation of the capacity of study places of each individual veterinary establishment on the basis of teaching personnel. This is legally anchored in Germany and governed by the Capacity Directive (KapVO). Any additional person involved in teaching on behalf of a veterinary establishment would be capacity-efficient and has to be included in the calculation of the study places. As a result of officially contracting veterinarians providing extramural training, the number of students to be enrolled in the first semester would substantially increase while the number of faculty-bound teaching personnel would remain constant. Consequently, the ratio of lecturers per student and the quality of the training during the intramural training would be noticeably reduced.
Therefore, the German Establisments for Veterinary Education jointly ask EAEVE to acknowledge the limitations imposed by the legal framework on the extramural practical training and accept the current status of quality control as implemented by the establishments.

Authored by all Establishments of Veterinary Education in Germany

# Appendix to 4.9:

# Central Hygiene Plan

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

Faculty 10
Veterinary Medicine

# Prevention of

# Nosocomial and Zoonotic Infections

# in Animal Clinics and Veterinary Institutes

# Guidelines

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# Important Phone Numbers

| Authority, person | Phone number |
|---|---|
| **Emergency Call** | **112** |
| **Fire Department** | **112** |
| Poison Control Center<br>(Giftnotrufzentrale Mainz) | 06131-19240 |
| Technical Emergency Service | 0641-12666 |
| Medical Officer, JLU Giessen<br>(Medical Airport Service, Arbeitsmedizinisches Zentrum Gießen, Stolzenmorgen 18, 35394 Gießen) | 0641-5330 |
| Deanary of Faculty 10 | 0641-99-38000 |
| Safety-at-work Officer<br>(JLU Giessen, Dezernat B 3.2) | 0641-99-12666 |
| Biosafety/Genetic Engineering Officer<br>(JLU Giessen, Dezernat B 3.3) | 0641-99-12216 |
| Non-hazardous Waste Management<br>(JLU Giessen, Dezernat E 3.6) | 0641-99-12538<br>0641-99-12617 |
| Hazardous Waste Management<br>(JLU Giessen, Dezernat B 3) | 0641-99-12214 |
| Veterinary Authorities, Giessen<br>(Amt für Veterinärwesen und Verbraucherschutz, Rodheimer Straße 33, 35398 Gießen) | 0641-9390-6200 |
| Public Health Authorities, Giessen<br>(Gesundheitsamt, Landkreis Gießen, Riversplatz 1-9, 35394 Gießen) | 0641-93900 |

# Veterinary Institutes, Clinics and Central Facilities

| Facility | Phone number |
|---|---|
| **Institute** | |
| Institut für Hygiene und Infektionskrankheiten der Tiere | 99 38301 |
| Institut für Pharmakologie und Toxikologie | 99 38401 |
| Institut für Parasitologie | 99 38461 |
| Institut für Tierärztliche Nahrungsmittelkunde | 99 38251 |
| Professur für Milchwissenschaften | 99 38950 |
| Institut für Veterinär-Anatomie, -Histologie und -Embryologie | 99 38101 |
| Institut für Veterinär-Pathologie | 99 38200 |
| Institut für Veterinär-Physiologie und -Biochemie | 99 38151 |
| Institut für Virologie | 99 38351 |
| **Veterinärklinikum** | |
| Klinik für Geburtshilfe, Gynäkologie und Andrologie der Groß- und Kleintiere mit Tierärztlicher Ambulanz | 99 38701<br>99 38771 |
| Klinik für Kleintiere, Chirurgie | 99 38536 |
| Klinik für Kleintiere, Innere Medizin | 99 38666 |
| Klinik für Pferde, Chirurgie | 99 38571 |
| Klinik für Pferde, Innere Medizin | 99 38607 |
| Klinik für Schweine (Innere Medizin und Chirurgie) | 99 38821 |
| Klinik für Vögel, Reptilien, Amphibien und Fische | 99 38431 |
| Klinik für Wiederkäuer (Innere Medizin und Chirurgie) | 99 38671 |
| Professur für klinische Anatomie und experimentelle Chirurgie | 99 38311 |
| Professur für Versuchstierkunde und Tierschutz & 3R-Zentrum | 99 38757 |
| **Zentrale Einrichtungen** | |
| AG Biomathematik und Datenverarbeitung | 99 38801 |
| Arbeitskreis Wildbiologie an der Justus-Liebig-Universität Gießen e.V. | 99 31431 |

# Contents

## Objectives of these guidelines

Infection prevention and control strategies are designed to protect animal patients from nosocomial infections and owners, veterinary personnel, veterinary students and the community from zoonotic diseases.

## Preface

These guidelines are intended to guide clinical/institutional practice and provide assistance for decision-making on infection prevention and control issues. Use of these guidelines should be flexible to accommodate specific challenges and risks in different facilities and areas of the faculty while ensuring best practice in infection prevention and control.

The measurements listed in the present guidelines are basic requirements for clinics and institutes of the Faculty of Veterinary Medicine of the Justus Liebig University (JLU) Giessen, which should be included in their individual infection control programs, respectively.

Thus, the purpose of this document is to equip veterinary personnel with a succinct guide to principles and practices of infection control relevant to any facility at the faculty. This document provides the basic information needed to develop an infection control program and establish basic infection control practices for such a facility, with specific emphasis on critical aspects such as hand hygiene, and cleaning and disinfection.

**Every veterinary clinic or institute regardless of type or size, is thus requested to implement an own formal infection control program, a written infection control manual that describes the program, and denominates an infection control practitioner (ICP) to coordinate the program.**

### Scope of the document

This document covers veterinary clinics and veterinary institutes and is relevant to all personnel that work in association with such facilities, including veterinarians, veterinary technicians, lay staff as well as students. For the purposes of this document, ‘veterinary personnel’ refers to all personnel that work in a veterinary clinic/institute. This also includes non-clinical staff, as in many situations these individuals may still have periodic direct or indirect contact with patients and/or pathogens within a clinic/institute.

### Reference

The present guidelines follow the instructions given in “Infection Prevention and Control - Best Practice” which was issued from the Canadian Committee on Antibiotic Resistance in August 2008 (www.ccar-ccra.org). The original text was revised 2011 as far as it was necessary to consider specific conditions at the Faculty of Veterinary Medicine of the JLU Giessen. The current version was updated 2021.

# 1 Basic principles of infection prevention and control

## 1.1 General concepts

Every veterinary clinic including the institute of food hygiene as well as all institutes where infectious material (all kind of pathogenic or potentially pathogenic microbes including viruses or material contaminated with such agents) is handled, regardless of size and type, should have a documented infection control program. This may range from simply a written collection of basic infection control practices, to a formal infection control manual with specific training, monitoring, surveillance and compliance programs. Lack of a clearly defined infection control program may lead to unnecessary patient morbidity and mortality, and exposure of veterinarians, staff, students and owners to zoonotic pathogens. Improved infection control is a necessity as veterinary medicine evolves. Advances in veterinary medicine mean that animals are living longer, and owners are often expecting a higher level of care for their pets that is more comparable to what they themselves may receive. There are also more animals at higher risk for infection in general because of more invasive and immunosuppressive therapies. In addition to the desire to achieve “best practice” standards whenever possible, the increasingly litigious nature of society may be one of the driving forces toward improved infection control in veterinary clinics. While the potential liability associated with morbidity and mortality in individual pets is limited, the potential consequences of zoonotic diseases in owners and staff are significant and warrant careful consideration. Infection prevention and control measures can be broadly divided into three main categories: those that decrease host exposure, decrease host susceptibility and increase host resistance to infectious pathogens.

1. Decreasing exposure is the most important measure of disease control in most situations. If a pathogen does not encounter an individual, then disease cannot occur. The number of the infectious organism to which a host is exposed is also an important factor in determining whether or not colonization or infection (disease) will ensue. Depending on the pathogen, decreasing or preventing exposure may be easy, difficult or impossible.

2. There are many factors that interact to determine whether or not infectious disease will develop in a particular host. In most cases, simple exposure of an animal to an infectious agent does not mean that disease will result. The susceptibility of the individual to a particular number of an infectious agent plays an important role. Although difficult to quantify, certain situations may result in increased susceptibility to infection and disease. Many factors causing increased susceptibility are not preventable, but some are, and efforts should be undertaken to address these issues. Factors to consider include judicious use of antimicrobials and other drugs, provision of proper nutrition, adequate pain control, and appropriate management of underlying disease.

3. Measures to actively increase resistance of a host are commonly used in veterinary medicine, but these should be considered only the third line of defense, after those meant to decrease exposure and susceptibility. Vaccination is currently the main technique used to increase resistance of animals or humans to infection. However, no vaccine is 100% effective. Therefore, while vaccination is an important part of infection prevention and

control, it must not be the only component of an infection control program if the program is to be successful. In addition, many hospital-acquired infections are caused by opportunist microorganisms for which vaccines are unavailable.

## 1.2 Transmission of infectious microorganisms

Transmission of infection during the provision of health care requires three elements: a source, microorganisms, a susceptible host, and a means of transmission for the microorganism. **Prevention of infection in animal health care settings should be directed primarily at interrupting the transmission of microorganisms from source to host, because agent and host factors are typically more difficult to control**.

### 1.2.1 Sources

Sources of infectious microorganisms may be animals which are merely colonized by an infectious agent (meaning the pathogen resides in or on the body, but is not associated with any clinical disease or host response), animals in the pre-clinical (incubation) phase of the infectious disease, animals with acute disease, animals with chronic disease caused by persistent infection, and animals that are recovering from clinical disease but are still shedding the infectious agent. People can be an important source of zoonotic pathogens, and like animals they may be colonized or infected. Currently, more than 200 zoonotic diseases have been recognized. Contamination on a person's clothing or body, particularly the hands, can also be a source of infectious microorganisms. Other potential sources include food, water, and an animal's own indigenous microflora, which may be difficult to control. Inanimate objects, including medical equipment, supplies and drugs, animal bedding, environmental surfaces and waste that have been contaminated can also be important sources. Microorganisms to consider include bacteria, viruses, fungi and parasites. In some cases, vectors such as lice, mosquitoes, flies, ticks, fleas, rodents and other vermin can transmit certain pathogens.

### 1.2.2 Susceptible hosts

Decreasing host susceptibility: Decreasing host susceptibility to infection is difficult to achieve in a hospital setting. Regarding patients, the judicious use of antimicrobials, minimizing the use of immunosuppressive agents, avoidance of dietary changes whenever possible, ensuring adequate nutritional intake, adequate pain control, and limiting the use of invasive devices should be considered, as these can all have an impact on host immune function. For hospital personnel, it may not be possible to directly decrease their own susceptibility to infection, but it is important to be aware of those individuals who may have increased susceptibility. These include persons who are immunosuppressed due to disease or medical treatment, or who are being treated with antimicrobial drugs, have open wounds or who are pregnant. Good communication between veterinary personnel, their physicians and clinic administration is important to lessen the risk of zoonotic infection.

Increasing host resistance

Vaccination is currently the main technique used to increase resistance of animals and humans to infection. As noted, no vaccine is 100% effective and there are many infections for which vaccines are unavailable. Factors to consider when developing vaccination recommendations or requirements include the prevalence of a particular disease in the area, risk to healthy and compromised patients, transmissibility of the disease, risk to veterinary

personnel, ability to treat the disease, efficacy of vaccination and safety of vaccination. Vaccination can only be maximally effective when it is used in conjunction with other appropriate infection control practices.

### 1.2.3 Routes of transmission

Microorganisms are transmitted in animal health care settings by four main routes: contact, droplet, air-borne and vector-borne transmission. The same microorganism may be transmitted by more than one route.

1. **Contact transmission** is the most important and frequent mode of transmission of health-care associated infections (HAIs). It can be divided into direct and indirect contact transmission
    - **Direct** contact transmission involves direct body surface-to-body surface contact resulting in physical transfer of microorganisms from an infected or colonized animal. For example, two dogs in a waiting room that come into direct contact when they sniff each other may transmit pathogens present in their noses or perineal areas; direct contact of a veterinarian's hands with a wound on an animal may result in transmission of opportunistic pathogens from the normal microflora of the person's hands, or infectious organisms present in the animal's wound, to the patient or the veterinarian, respectively.
    - **Indirect** contact transmission is the result of physical transfer of microorganisms from the original animal (or human) source to a new host, without direct contact between the two. This typically involves body surface contact with an inanimate object, environmental surface or the integument of another animal or person that has been transiently contaminated by the original animal (or human) source. For example, handling one animal and then petting another animal without washing one's hands constitutes indirect contact between the two animals.

2. **Droplet transmission** is theoretically a form of contact transmission. However, the mechanism of transfer of the pathogen from host to host is quite distinct from either direct or indirect contact transmission. Droplets are generated from the source animal primarily during coughing or sneezing, and during the performance of certain procedures such as suctioning. Transmission occurs when droplets containing microorganisms generated from the source animal are propelled a short distance through the air (usually less than one meter) and deposited on the new host's conjunctiva (i.e. in the eye), nasal mucosa, mouth, or an open wound. For example, a cat with an upper respiratory tract infection can transmit viruses or bacteria to another cat in the waiting room by sneezing on it, particularly if they are face-to-face, even if the animals do not touch each other directly. Because droplets do

not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission; that is, droplet transmission must not be confused with air-borne transmission. Droplets can also contaminate the surrounding environment and lead to indirect contact transmission.

3. **Airborne transmission** occurs by dissemination of either airborne droplet nuclei (5 µm or smaller, about 2-3 times the size of most bacterial pathogens) from partly-evaporated droplets containing microorganisms, or dust particles containing the infectious agent. Microorganisms carried in this manner remain suspended in the air for long periods of time and can be dispersed widely by air currents. They may be inhaled by another host within the same room, or they may reach hosts over a longer distance from the source, depending on environmental factors. Airborne transmission of pathogens in veterinary clinics is very rare. Vector-borne transmission occurs when vectors such as mosquitoes, flies, ticks, fleas, rats, and other vermin transmit microorganisms. Some act as simple mechanical vectors, comparable to indirect contact transmission, whereas others acquire and transmit microorganisms by biting. It is important to have control measures in place to reduce or eliminate the presence of such vectors in veterinary clinics.

## 1.3 Hierarchy of infection control measurements

The coordinated efforts of occupational health and safety groups and building engineers have created a framework in human medicine that includes three levels of infection control: engineering controls, administrative controls and personal protective measures. These levels of control can easily be applied to veterinary practices as well.

**Engineering controls** are built into the design of a facility (e.g. room design, sink placement, Heating Ventilation and Air Conditioning [HVAC] systems). It is important for infection prevention and control professionals to be involved in the design and planning of new facilities. They can also help to plan and design improvements which may be incorporated into an existing facility. Engineering controls include logical design of clinics to facilitate use of routine infection control measures such as hand washing, proper cleaning, and separation of animals of different species and different infectious disease risks. All new building or renovation plans need to be evaluated from an infection control perspective.

Administrative controls include protocols for hand hygiene, immunization of animals and staff, protocols for managing animals and staff during an infectious disease outbreak, and protocols for caring for animals with zoonotic infections.

**Personal protective equipment** (PPE), although very important, is the least desirable way to control infectious hazards because it does not eliminate them - it merely contains the hazard. Nonetheless, the inherent risk of exposure to microbial pathogens in veterinary clinics means that proper use of PPE is a critical component of a complete infection control program. Effective use of PPE is dependent on appropriate education and compliance of all staff.

**Personal protective equipment should be considered a last line of defense for hazards that cannot be overcome with other preventative measures**.

# 2 The infection control program

## 2.1 General prerequisites

Every veterinary clinic/institute, regardless of type or size, should have a formal infection control program that is coordinated by one specific person (Infection Control Practitioner, ICP), who should develop protocols, ensure that protocols are being followed, act as a resource for infection control questions, ensure proper training of new staff, direct and interpret surveillance and communicate with staff regarding infection control issues. This is not necessarily so cumbersome or time-consuming as many may think! The day-to-day responsibilities are typically minimal. It is also not a position that needs to be filled by an expert in infection control or someone with specific training, although that would certainly be desirable. In human hospitals, ICPs are typically nurses with specialized infection control training, who perform the day-to-day infection control duties and work under an infection control head, who is typically a physician with training in one or more of infection control, infectious diseases, microbiology and/or public health. These individuals are rarely available in veterinary medicine, but that does not mean that an effective program cannot be established. Either veterinary technicians or veterinarians would be appropriate in veterinary clinics. Formal training would be ideal but is not readily available, and the key requirement for the position is an interest in infection control. Ideally, over time, the ICP will advance his or her skills through formal and informal continuing education. In veterinary clinics, the ICP should be the central infection control resource. Among other duties, he or she should:

- Help facilitate development of a written infection control manual (Hygieneplan)
- Direct and document training of new staff (particularly lay staff)
- Perform formal or informal quality control evaluation of infection control practice compliance (e.g. observing cleaning and disinfection practices, hand hygiene)
- Be the person designated to receive information about and record incidents of suspected hospital-associated infections.

A written infection control manual (**Hygieneplan**) is an essential component of the infection control program. Written documentation can clearly explain infection control practices, ensure that new staff members are properly informed and raise awareness about infection control. Furthermore, written documentation may be important legally in the event of hospital-associated, or more concerningly, zoonotic infections. A written manual demonstrates a level of awareness and effort towards infection control and could be a critical measure to reduce liability risks by demonstrating use of some degree of due diligence. A sample of an infection control manual (Hygieneplan) is attached to these guidelines in **Annex 9**.

Support by hospital administration is also crucial to an effective infection control program. If practice owners and managers are unwilling to provide the ICP with adequate time, resources and support, the infection control program will fail. Hospital administration needs to ensure that all veterinary personnel understand and accept the importance of an infection control program, and intervene when required if issues (e.g. poor compliance) arise.

## 2.2 Surveillance

Surveillance is a key component of any infection control program. Effective infection control is impossible without surveillance, and some form of surveillance should be practiced by all veterinary facilities. Many clinical aspects of surveillance are easy, inexpensive and can be readily incorporated into day-to-day veterinary practice.

**Passive surveillance**

In the absence of an ongoing infectious disease outbreak, passive infectious disease surveillance is likely adequate for most clinics. Passive surveillance is practical, cost-effective and can be performed in any clinic. It involves analysis of data that are already available (e.g. bacterial culture and susceptibility results, results of other kinds of infectious disease testing) to determine elements such as endemic disease rates, antimicrobial susceptibility patterns and trends, and changes in disease patterns. An example of passive surveillance would be monitoring the surgical site infection (SSI) rate following all surgical procedures and specific surgical procedures (e.g. spays, neuters). Monitoring of bacterial culture and susceptibility testing can provide information regarding possible outbreaks of hospital associated infections (HAIs), as well as information to guide empirical antimicrobial therapy. Routine recording of animals with specific syndromes such as vomiting, diarrhea, coughing or sneezing is another simple means of providing information that can help in the prevention and early detection of outbreaks, and can help to identify index cases should a hospital outbreak occur.

Post-discharge surveillance is more problematic, but is very important for conditions such as SSIs, as many such infections do not develop until after the animal is discharged from the hospital. Post-discharge surveillance can consist of direct examination of the patient during a recheck appointment, evaluation of readmission data or simple telephone or mail contact with owners. The keys to passive surveillance are to centralize the available data, and to have a designated infection control practitioner (ICP) who is responsible for compiling and evaluating this data on a regular basis. Simply collecting the data or even entering it in a spreadsheet is of no value unless someone looks at it. This is particularly important in large clinics or hospitals where multiple veterinarians may have patients with similar infections but do not communicate this to others, and therefore the start of an outbreak can be missed. If an outbreak is identified, then a plan can be formulated and implemented in order to stop the spread of disease. This plan may or may not include additional active surveillance to identify additional cases.

**Active surveillance**

Active surveillance involves gathering data specifically for infection control purposes. As a result, it is usually more expensive and time consuming but usually provides the highest quality data. This is rarely needed in most veterinary clinics and is typically reserved for large facilities with increased infection control threats and personnel available to direct such testing, or during a specific outbreak investigation. An example of active surveillance is collection of nasal and rectal swabs from all animals being admitted to a hospital, whether or not they have signs of infection, to screen for methicillin-resistant Staphylococcus aureus.

## 2.3 Routine practice

Routine practices include:

- Hand hygiene
- Risk reduction strategies through use of personal protective equipment (PPE), cleaning and disinfection of the environment and equipment, laundry management, waste management, safe sharps handling, patient placement, and healthy workplace practices
- Risk assessment related to animal clinical signs, including screening for syndromes that might indicate the presence of an infectious disease (e.g. fever, coughing/sneezing, diarrhea, abnormal excretions/secretions), and use of risk assessment to guide control practices
- Education and guidance of veterinary personnel and owners

### 2.3.1 Hand hygiene

Hand hygiene is the responsibility of all individuals involved in health care. Effective hand hygiene kills or removes microorganisms on the skin while maintaining hand health and skin integrity (i.e. prevents chapping and cracking of skin). Sterilization of the hands is not the goal of routine hand hygiene - the objective is to reduce the number of microorganisms on the hands, particularly the number of microorganisms that are part of the transient microflora of the skin, as these include the majority of opportunistic pathogens on the hands. These transient microbes may be picked up by contact with a patient, another person, contaminated equipment, or the environment. There are two methods of removing/killing microorganisms on hands: washing with soap and running water or using an alcohol-based hand sanitizer.

**Hand hygiene is the single most important way to prevent infections in the healthcare setting**.

**Alcohol-based hand sanitizers**

Alcohol-based hand sanitizers/rubs are, with some exceptions, the preferred method for decontaminating hands that are not visibly soiled. They have superior ability to kill microorganisms on the skin than even hand washing with antibacterial soap, can quickly be applied, are less likely to cause skin damage, and can be made readily available at almost any point of care. Use of non-alcohol-based waterless hand sanitizers in healthcare settings is not recommended. Alcohol-based hand sanitizers should contain 70-90 % alcohol. Commercially available products mostly contain propanol. Use of products additionally containing emollients helps to reduce skin damage which can otherwise occur with frequent use of hand sanitizers. Products containing alcohol and chlorhexidine are also available. Chlorhexidine provides some residual antimicrobial action on the hands after use, but it is unclear whether or not these combinations provide any true benefit in clinical settings. They may be more useful as alternatives to traditional surgical scrubbing techniques (see Surgery section on page 40). Alcohol-based hand sanitizers are not effective against certain pathogens, including bacterial spores (e.g. clostridial spores) and *Cryptosporidium* spp. Nonetheless, alcohol-based hand sanitizers may be useful even if alcohol-resistant pathogens like *Clostridium difficile* are

present. The improved hand hygiene compliance seen with alcohol-based hand sanitizers and their efficacy against other pathogens are important aspects of infection control. Routine use of these products has not resulted in detectable increases in *C. difficile* infection rates in human hospitals. However, if hands are potentially contaminated by one of these organisms, hand washing with soap and running water should be performed if possible. Although even antimicrobial soaps are similarly ineffective against these pathogens directly, the physical process and mechanical action of hand washing can decrease the number of these organisms on the hands. Alcohol is also not as effective against non-enveloped viruses (e.g. canine parvovirus, feline panleukopenia virus) as it is against most other microbes. As for clostridial pathogens, hand washing with soap and running water is likely more effective, and should be used whenever possible when these pathogens are involved.

Hand sanitizers can be selected from the so-called VAH list (see **annex 3**). This list contains antiseptics recommended for use by the Verband für angewandte Hygiene (VAH, Germany). Only those products are listed that proved efficient during experimental examination according to VAH rules.

**Technique of hygienic hand disinfection:**

1. Remove all hand and arm jewelry.
2. Ensure hands are visibly clean (if soiled, follow hand washing steps).
3. Apply between 1 to 2 full pumps or a 3-5 ml of the product onto one palm.
4. Spread the product over all surfaces of hands, concentrating on finger tips, between fingers, back of the hands, and base of the thumbs. These are the most commonly missed areas.
5. Rub hands until product is dry. This will take a minimum of 30 seconds if sufficient product is used.

An illustration of this technique is given in **annex 5**.

Hands must be fully dry before touching the patient or patient´s environment/equipment for the hand rub to be effective, and to eliminate the rare risk of flammability in the presence of an oxygen-enriched environment, as may occur in the presence of gas anaesthetic machines.

**Hand washing**

Most transient bacteria present on the hands are removed during the mechanical action of washing, rinsing and drying hands. Hand washing with soap and running water must be performed when hands are visibly soiled. If running water is not available, use moistened towelettes to remove all visible dirt and debris, followed by an alcohol-based hand rub.

Bar soaps are not acceptable in veterinary practice settings because of the potential for indirect transmission of pathogens from one person to another. Instead, liquid or foam soap should be used

- Soap should be dispensed in a disposable pump dispenser.
- Soap containers should not be refilled without being disinfected, since there is a risk of contamination.

- Antibacterial soaps should be used in critical care areas such as intensive care units (ICUs) and in areas where invasive procedures are performed.

**Technique of hand washing:**

1. Remove all hand and arm jewelry.
2. Wet hands with warm (not hot) water. Hot water is hard on the skin, and will lead to dryness and additional skin damage.
3. Apply liquid or foam soap.
4. Vigorously lather all surfaces of hands for a minimum of 15 seconds. This is the minimum amount of time required for mechanical removal of transient bacteria. Pay particular attention to finger tips, between fingers, backs of the hands and base of the thumbs. These are the most commonly missed areas. A simple way how many people time their hand-washing is by singing “Happy Birthday”.
5. Using a rubbing motion, thoroughly rinse soap from hands under warm running water. Residual soap can lead to dryness and cracking of skin.
6. Dry hands thoroughly by blotting hands gently with a paper towel. Rubbing vigorously with paper towels can damage the skin.
7. Turn off taps with paper towel to avoid recontamination of your hands.

NOTE: If air hand dryers are used, hands-free taps are necessary, as turning taps off without using paper towel as described will result in recontamination of hands after washing.

**When is hand hygiene necessary?**

- Before and after contact with a patient
- Especially before performing invasive procedures
- Before and after contact with items in the patient’s environment
- After any contact with or any activity involving the body fluids of a patient
- Before putting on and especially after taking off (protective) gloves
- Before eating food
- After personal body functions, such as using the toilet or blowing one’s nose

**Factors that influence the effectiveness of hand hygiene**

- Condition of the skin: Intact skin is easier to clean than skin that is chapped, cracked, cut, abraded or otherwise inflamed. Intact skin is the first line of defense against bacteria.
- Finger nails: Natural nails more than 3-4 mm long are difficult to clean, can pierce gloves and harbour more microorganisms than short nails. Artificial nails or nail enhancements (including nail polish) should not be worn by anyone involved directly in patient care, as they have been implicated in the transfer of microorganisms in human medicine.

- Jewelery: Jewelery is very hard to clean, and physically protects bacteria and viruses from the antiseptic action of alcohol-based hand sanitizers and the mechanical cleaning action of soap and running water. Rings, bracelets or a wristwatch must not be worn during patient contact. Rings, in particular, increase the number of microorganisms present on hands and increase the risk of tears in gloves.

**Skin care**

Careful attention to skin care is an essential part of the hand hygiene program. Products used for hygiene should be “hand-friendly” – for example, alcohol-based hand sanitizers containing emollients are available, which can help reduce the drying effect of the alcohol. If skin integrity is an issue, the individual should consult his or her physician. Skin lotions can help maintain the health and integrity of the skin, but it is important to use a skin lotion that does not interfere with glove integrity. Petroleum-based lotion formulations can weaken latex gloves and increase permeability. Lotions that contain petroleum or other oil emollients should only be used at the end of the work day. If lotions are used during the work day, select a water-based product.

### 2.3.2 Personal protective equipment (PPE)

**General rules**

Personal protective equipment (PPE) is an important routine infection control tool. PPE use is designed to reduce the risk of contamination of personal clothing, reduce exposure of skin and mucous membranes of veterinary personnel to pathogens, and reduce transmission of pathogens between patients by veterinary personnel. Some form of PPE must be worn in all clinical situations, including any contact with animals and their environment. Tables 1 and 2 summarize infectious disease control precautions by disease condition and agent, and recommended personal protective equipment for routine veterinary procedures, respectively. These recommendations must always be tempered by professional judgment, while still bearing in mind the basic principles of infectious disease control, as every situation is unique in terms of the specific clinic, animal, personnel, procedures and suspected infectious disease.

Personal protective outerwear is used to protect veterinary personnel and to reduce the risk of pathogen transmission by clothing to patients, owners, veterinary personnel and the public. Protective outerwear should be worm whenever there may be contact with an animal or when working in the clinical environment (including cleaning).

**Lab coats**

Lab coats are meant to protect clothing from contamination, but generally they are not fluid resistant, so they should not be used in situations where splashing or soaking with potentially infectious liquids is anticipated. These garments should be changed promptly whenever they become visibly soiled or contaminated with body fluids, and at the end of each day. Lab coats worn in the clinic should not be worn outside of the work environment. Lab coats worn when handling patients with potentially infectious diseases should be laundered after each use, because it is almost impossible to remove, store/hang and reuse a contaminated lab coat without contaminating hands, clothing or the environment.

**Non-sterile gowns**

Gowns provide more coverage for barrier protection than lab coats, and are typically used for handling animals with suspected or confirmed infectious diseases, that are housed in isolation. Permeable gowns can be used for general care of patients in isolation. Impermeable (i.e. waterproof) gowns should be used to provide greater protection when

splashes or large quantities of body fluids are present or anticipated. Disposable gowns should not be reused, and reusable fabric gowns should be laundered after each use, because hanging/storing and reusing contaminated gowns inevitably leads to contamination of hands, clothing or the environment. Gloves should be worn whenever gowns are worn. Gowns (and gloves) should be removed and placed in the trash or laundry bin before leaving the animal's environment, and hands should be washed immediately afterwards

Personnel should learn to remove gowns properly in such a way as to avoid contaminating themselves and the environment. The outer (contaminated) surface of a gown should only be touched with gloves.

1. After unfastening or breaking the ties, peel the gown from the shoulders and arms by pulling on the chest surface while hands are still gloved.
2. Ball up the gown for disposal while keeping the contaminated surface on the inside.
3. Remove gloves and wash hands.
4. If body fluids soaked through the gown, promptly remove the contaminated underlying clothing and wash the skin.

**All gowns should be used only once, then discarded or laundered**.

**Protective gloves**

Gloves reduce the risk of pathogen transmission by providing barrier protection. They should be worn when contact with blood, body fluids, secretions, excretions and mucous membranes is possible. Gloves should also be worn when cleaning cages and environmental surfaces, as well as when doing laundry if gross contamination of items is present.

- Gloves should be removed promptly after use, avoiding contact between skin and the outer glove surface.
- Gloved hands should not be used to touch surfaces that will be touched by people with non-gloved hands.
- Care should be taken to avoid contamination of personal item such as telephones, pens and pagers.
- Hands should be washed or an alcohol-based hand sanitizer should be used immediately after glove removal. It is a common misconception that using disposable gloves negates the need for hand hygiene. Gloves do not provide complete protection against hand contamination, therefore hand hygiene immediately after removing gloves is essential.
- Disposable gloves must not be washed and reused.

- Change gloves and perform hand hygiene when:
  - moving from contaminated areas to clean areas on the same animal.
  - moving from dirty to clean procedures on the same animal.
  - after contact with large amounts of blood and/or body fluids.
  - between individual animals.

Gloves come in a variety of materials. The choice of glove material depends on their intended use. Latex gloves are commonly used, but if latex allergies are a concern, acceptable alternatives include nitrile or vinyl gloves. Latex gloves will decompose and lose their integrity when exposed to many chemicals. If exposure to chemicals such as disinfectants is expected (e.g. when cleaning and disinfecting cages), disposable nitrile gloves or heavier, reusable rubber gloves (e.g. common dishwashing gloves) can be used. Reusable gloves must also be disinfected at the end of each task.

**Non-reusable gloves should be used only once**.

### Face protection

Face protection prevents exposure of the mucous membranes of the eyes, nose and mouth to infectious materials. Face protection typically includes a nose-and-mouth mask (e.g. surgical mask) and goggles, or a full face shield, which should be used whenever exposure to splashes or sprays is likely to occur, including dental procedures, nebulization, and wound lavage.

### Respiratory protection

Respiratory protection is designed to protect the respiratory tract from zoonotic infectious diseases transmitted through the air. The need for this type of protection is limited in veterinary medicine because there are few relevant airborne or aerosol zoonotic pathogens in companion animals, in most regions. The N95 rated disposable particulate respirator is a mask that is inexpensive, readily available, easy to use and provides adequate respiratory protection in most situations. However, people need to be fit-tested to ensure proper placement and fitting of N95 masks. Special N95 masks are required for people with beards. Surgical masks are not a replacement for N95 masks.

### Footwear

Closed toed footwear must be worn at all times to reduce the risk of injury from dropped equipment (e.g. scalpels, needles, knifes, scissors), scratches from being stepped on by dogs, and to protect the feet from contact with potentially infectious substances (e.g. faeces, discharges and other body fluids). Rain boots must be worn during postmortem analysis of animals. Designated footwear or disposable shoe covers are required in areas where infectious materials are expected to be present on the floor, in order to prevent their spread to other areas. This is particularly important in veterinary clinics because patients, and sometimes the personnel working with them, often have very close contact with the floor, unlike human hospitals. This is also important in section halls of the institute of pathology. Designated

footwear or disposable shoe covers may also be required for patients with infectious diseases that are kept on the floor (e.g. in a large dog run) or that may contaminate the floor around their kennel (e.g. an animal with severe diarrhea). Such footwear must be removed as the person leaves the contaminated area, and should be immediately disposed of in the garbage (if disposable), or left at the entrance of the contaminated area on the “dirty” side.

## 2.4 Cleaning and disinfection

Cleaning and disinfection are two separate tasks. Cleaning involves the removal of visible organic matter with soap or detergent, whereas disinfection involves the application of a chemical or other procedure in order to kill the remaining microbes that cannot be adequately removed by cleaning. Cleaning is essential because the survival time of many infectious agents outside the host is prolonged by the presence of organic matter, and organic matter also decreases the effectiveness of almost all disinfectants. Depending on the level of disinfection used, disinfection kills or prevents the growth of many or most pathogens. Equipment should be cleaned and disinfected according to its intended use, the manufacturer's recommendations, and practice policy. Equipment must be cleaned before sterilization or disinfection. Surfaces where animals are housed, examined, placed for post mortem analysis or treated should be made of non-porous, sealed, easy-to-clean materials to facilitate cleaning and disinfection and minimize infection transmission. Personnel whose duties include cleaning and disinfection of equipment and different hospital or institutional areas should be trained regarding how to safely handle and use the products available in the clinic. In Germany, Material Safety Data Sheets including an instruction for safe use must be readily accessible for all the applicable chemical products.

### 2.4.1 General considerations

**Cleaning**

Cleaning entails the removal of all forms of organic matter (e.g. faeces, urine, blood, food, dirt etc.) from a surface. Veterinary clinics and those institutes where infective material is processed are requested to lay down cleaning procedures for common environmental surfaces. This can be done in connection with the required disinfection procedures.

- Ensure all areas are well ventilated during cleaning.
- After cleaning, allow all surfaces to dry completely.

**Cleaning is absolutely necessary before a disinfectant is used.**

<u>Removing loose, dry debris from surfaces:</u>

- Avoid generating airborne dust that may contain pathogens by:

- using a vacuum cleaner equipped with a HEPA filter. The filter helps to prevent aerosolization of pathogens such as ringworm. For this reason, vacuums without HEPA filters should not be used for cleaning in patient-contact areas.
- lightly spraying surfaces with water prior to mopping or sweeping.
- using an electrostatic wipe (e.g. Swiffer™ cloth).
- using a wet mop.
    - Exposure to aerosols generated by brushes during cleaning can be minimized by taking certain precautions, such as wearing a face mask and containing spatter if the brush or surface is damp. A surgical nose-and-mouth mask will provide some protection against droplet spatter, but not against finer particles and dry dust that can become suspended in the air. A properly-fitted N95 face mask can provide this level of protection (see Respiratory Protection on page 23).

Removing sticky, wet or dried-on organic material from surfaces:

- This kind of debris should be removed using a detergent or soap and a brush or cloth, as necessary.
- During cleaning, it is the mechanical action and surfactant properties of the soap that are important, not necessarily its antimicrobial activity.
- Avoid the use of pressure washers, particularly those that produce more that 120 psi of pressure. This amount of pressure may cause aerosolization of pathogens, and pressure washing may even damage surfaces, thus making them harder to disinfect properly. A home garden hose sprayer usually produces less than 120 psi of pressure, and would therefore be relatively safe to use in a small animal kennel area.

**Disinfection**

Disinfection can only be maximally effective if it is preceded by thorough cleaning. Some pathogens (e.g. clostridial spores) are highly resistant to disinfection, therefore cleaning in these cases is particularly crucial in order to mechanically remove the organisms.

- Ensure all areas are well ventilated during disinfection
- *Gloves should be worn when handling disinfectants, but latex gloves will decompose and lose their integrity when exposed to many chemicals. For small jobs, disposable nitrile gloves should be used instead. For large jobs, heavier rubber gloves (e.g. common dishwashing gloves) can be used, but reusable gloves of this type must also be disinfected at the end of each task.
- Use of protective eye goggles is also recommended when handling disinfectants due to the splash risk.
- Always apply the selected disinfectant according to the product label, with particular attention to:
    - appropriate dilution
    - required contact time

- If patients or personnel may have direct skin contact with the surface, or if the disinfectant used may damage a particular surface, the disinfectant may need to be rinsed off with clean water after an appropriate amount of time has elapsed.
- After disinfection, allow all surfaces to dry completely.

**Protective gloves must be worn during cleaning and disinfecting procedures, and hands must be washed after finishing.**

### Disinfectant selection

There is no standard disinfection program that can be used in all veterinary clinics or institutes, as many factors must be considered, e.g. the clinic environment, type of surfaces, potential pathogens and their tenacity, microbial loads, general practices (see also **annex 1** and **annex 2**). Considering a disinfectant for a particular purpose should take into account the product's spectrum of activity, susceptibility to inactivation by organic matter, tenacity of potential pathogens in the environment, compatibility with soaps and detergents, toxicity for personnel and animals, contact time required, residual activity, corrosiveness, environmental effects and cost. It is recommended to choose surface disinfectants from disinfectant lists maintained by the German Veterinary Society (Deutsche Veterinärmedizinische Gesellschaft, DVG). Recommended skin disinfectants (antiseptics) are reviewed in the VAH-list as mentioned above (for references of both lists see **annex 3**). Material Safety Data Sheets as wells as instruction for safe use of these products must be readily available to all personnel who work with them and around them.

### Cold sterilization

"Cold sterilization" is sometimes used from clinicians to chemically sterilize items through immersion in a sterilizing solution. Because of the toxicity of some cold sterile solutions, the time required to achieve sterilization using these chemicals, and the wide availability of autoclaves for sterilization, there is only minimal indication for use of cold sterilization. It is mainly applied to items that cannot tolerate steam sterilization, such as endoscopes. Although cold sterilization can be highly valuable for sterilizing instruments, misuse can result in ineffective sterilization. Potential problems include the use of inappropriate solutions, improper preparation of solutions (i.e. inadequate concentration), inadequate contact time, inadequate replacement/refreshment of solution, or inadequate removal of organic debris from equipment prior to immersion in solution. Commonly used disinfectants such as alcohol, iodophors, phenolics and most quaternary ammonium compounds are not effective sterilants and therefore are not acceptable for use on items intended to be used in surgical or other invasive procedures. Of the chemical sterilants, only glutaraldehyde and stabilized hydrogen peroxide-based compounds are effective at sterilizing instruments, and then only if the solutions are prepared and maintained properly, and allowed adequate contact time.

Prolonged contact time (e.g. 10 hours) is required for sterilization using these solutions. Therefore, cold sterilization is not a means for rapid sterilization of surgical instruments that have been inadvertently contaminated during surgery or for surgical instruments that will be used frequently on different patients throughout the day. In some veterinary clinics, disinfectant solutions of other kinds in which a set of instruments is routinely kept are frequently referred to as "cold sterile." Such misuse of this term should be avoided, as instruments kept in

disinfectant solutions other than glutaraldehyde or high-level sterilants should not be used for surgical or other invasive procedures Instruments must be cleaned to remove all visible organic debris (including blood) before placing them in a clean, fresh cold sterilant solution in order for the procedure to be effective. Most chemical sterilants come in solutions consisting of two parts that, when combined, form what is referred to as an "activated" solution. Refer to the product's label for the shelf life of the activated solution. Cold sterilant must be rinsed off all instruments using sterile saline or water before they are used, as some of these compounds (particularly glutaraldehyde) can be irritating to tissues. As with all other chemicals used in a veterinary clinic or institute the specific rules of the "Gefahrstoff-Verordnung" have to be respected.

### 2.4.2 Recommendations for cleaning and/or disinfection of selected equipment

**Endoscopes**

Proper cleaning and maintenance of endoscopes are important to prolonging the useful life of the instrument, but cleaning and disinfection are also important from an infectious disease control aspect. Endoscopes are semi-critical equipment, and as such require high level disinfection when used in humans. In veterinary medicine, high level disinfection is required prior to use in relatively sterile areas (e.g. urinary tract), but thorough low level disinfections is considered adequate for use in non-sterile areas (e.g. gastrointestinal tract, upper respiratory tract) if a transmissible infectious disease was not suspected in the previous patient and the subsequent patient is not significantly immunocompromised. Manufacturers typically provide detailed reprocessing (cleaning and disinfection) instructions for their instruments, which should be readily available as a reference for staff members responsible for the care of endoscopes. If the endoscope was purchased second hand and the reprocessing instructions were not provided, it is important to contact the manufacturer to obtain a copy. Some general guidelines regarding endoscope maintenance include:

- Endoscopes must be meticulously cleaned immediately after every use. Endoscopes typically have several moving or detachable parts and small channels in which moisture, debris and discharge can become trapped. Cleaning must be performed as soon as possible in order to prevent debris from drying onto surfaces, as this can make the debris considerably harder to remove. Prior cleaning is crucial to effective disinfection.
- All instrument and suction channels must be thoroughly cleaned after each use, even if the channels were not used during the procedure. Failure to clean these channels is a common error which can result in accumulation of debris, bacteria and biofilms within the instrument. Not only does this pose risk of disease transmission to subsequent patients, but it can also confound sample collection and culture.
- Rinsing and drying of the endoscope are also critical to proper maintenance. Failure to rinse off detergents or disinfectants can lead to significant irritation of the tissues of the next patient.
- Chemical sterilants (e.g. glutaraldehyde) are typically used for high-level disinfection or sterilization of endoscopes, as most cannot be steam-sterilized (autoclaved). Consult the manufacturer's instructions regarding what methods can be safely used for any particular endoscope. If a chemical sterilant is used, a timer should be used to measure

the exact contact time – too short a time may result in an inadequate microbial killing, while too long a time may result in damage to the instrument. It is recommended to use the disinfectant at elevated temperatures e. g. 60°C, if the endoscope is heat resistant at this temperature. This will increase the inactivating efficacy of the disinfectant.

**Clippers**

Use of good-quality clippers and maintenance of clipper blades are of great importance. Improper clipper use or maintenance can result in skin trauma, with subsequent risk for infection, or transmission of opportunistic pathogens between patients. Following routine use of clippers on areas of unbroken skin and non-infectious animals, basic cleaning with a stiff brush to remove visible dirt and hair from the blade is likely adequate. More thorough cleaning and disinfection of the blade, as described below, should be done periodically as well, depending on how often the clippers are used. Clippers should be thoroughly cleaned and disinfected after every use on an animal with a potentially transmissible infection (e.g. an animal with diarrhea), on any area where the skin or hair is significantly contaminated with faeces, urine, blood or other body fluids, and before and after use on an area where the skin is broken (especially if there is evidence of skin infection). First, a stiff brush should be used to remove visible dirt and hair from the blade, and a soapy, wet cloth used to remove any visible debris from the body of the clippers. The clipper blades can then be sterilized using a chemical sterilant (e.g. glutaraldehyde) or by autoclaving. The body of the clippers can be sterilized using hydrogen peroxide vapour or ethylene oxide (if available). Otherwise, after removing all visible debris, thorough manual wiping with a cloth wetted with a standard disinfectant solution should be performed, paying particular attention to the small crevices of the device and allowing for adequate contact time with the disinfectant. Refer to the clipper's instruction manual to determine what degree of contact with liquid the clippers can safely withstand.

**Anaesthetic equipment**

**Endotracheal tubes**: In human medicine, endotracheal (ET) tubes are typically considered single-use devices, but reuse of ET tubes has become more common with the rising costs of healthcare. These tubes can be effectively resterilized between patients using glutaraldehyde or ethylene oxide gas, although the physical integrity of the cuffs in particular can be compromised by repeated sterilization with these methods. These tubes are considered semicritical equipment, and as such should be subjected to high-level disinfection or sterilization. In veterinary medicine, it is impractical to discard ET tubes after a single use, but glutaraldehyde or ethylene oxide gas sterilization may not be readily available. Evidence-based guidelines for reuse of ET tubes in veterinary medicine are not available. Nonetheless, at an absolute minimum, ET tubes must be thoroughly cleaned (inside and outside) with hot water and detergent immediately after use to prevent any discharge or debris from drying and forming a biofilm on the device. Tubes should then be soaked in a solution of a quaternary ammonium compound (QAC), rinsed thoroughly and dried prior to being reused. It is important to test the integrity of the cuff before every use to ensure the device has not been compromised by repeated exposure to the disinfectant.

**Anaesthetic gas tubing and rebreathing bags**: Although the tubing connecting the anaesthetic machine to the patient's endotracheal tube should not come in direct contact with

the patient, moisture and condensation often accumulate in the tubes and may contain microorganisms from the animal's airway. In human medicine, this equipment is also typically single-use. As for ET tubes, evidence-based guidelines for reuse of this equipment in veterinary medicine are not available. At a minimum, gas tubing should routinely be washed thoroughly with hot water and detergent and hung to dry at the end of the day's procedures, or more often if they are heavily used. If there is visible discharge in the tubing, or if the animal has a known or suspected respiratory tract infection, the tubing should be washed with hot water and detergent, soaked in a solution of a QAC, rinsed with water and dried prior to being reused. Rebreathing bags should be cleaned/disinfected as for the associated gas tubing, as they also come in contact with the expired air from the patient. If an animal has a known or suspected transmissible respiratory tract infection, filters are available which can be placed between the ET tube and the rest of the anaesthetic circuit in order to help protect the equipment from contamination.

**Laundry**

Although single-use, disposable items are ideal from an infectious disease control aspect, such items can also produce tremendous waste. Laundry is therefore a very important component of infectious disease control in the clinic setting. Although soiled linens are a potential source of microorganisms, with appropriate hygienic handling, storage and processing of clean and soiled linens, the risk of disease transmission from these items can be reduced to an almost negligible level. Linens and special clothing used in veterinary clinics (e.g. cage blankets, towels, surgical drapes, surgical gowns, scrubs, lab coats) can be an important means of transporting pathogens from one area to another within the clinic, and to areas outside the clinic. As a result, clinic clothing (e.g. scrubs, lab coats) should always be washed onsite or sent to a commercial laundry facility that is equipped to handle laundry from medical/veterinary facilities. This helps to prevent transmission of pathogens to family members, family pets and the general population. Personnel should change into clinic clothes at the beginning of their shift and back into street clothes at the end of their shift. Clinics should have appropriate laundry facilities or laundry services to accommodate the need to change clothing daily, or more frequently if required. Microbial numbers on soiled linens (e.g. towels, blankets) and clothing are significantly reduced by dilution and during the mechanical action of washing and rinsing. Linens used in veterinary clinics should be laundered together using detergent, and dried in a hot air dryer to promote killing of microorganisms. See also **Annex 7**.

<u>Collection and handling</u>

Except for linens potentially contaminated with infectious agents (see below), all used linens can be handled in the same way. Heavily soiled linens should be rolled or folded to contain the heaviest contamination in the centre of the bundle, without contaminating personal clothing or the environment. Large amounts of solid debris, faeces or blood clots should be removed from linen with a gloved hand and disposable tissue or paper towel, which are then immediately placed in the garbage. Excrement should not be removed by spraying with water or shaking as this may result in contamination of the surrounding area and personal clothing.

<u>Bagging and containment</u>

- Linens should be handled with a minimum of agitation and shaking.
- Always place soiled linens directly in a hamper or bag designated for dirty laundry.
- Never place soiled linens on the floor.
- Laundry bags should be tied securely and not over-filled.
- Carts and hampers should be cleaned after each use.
- Laundry bags should be washed after each use. They can be washed in the same cycle as the linens they contain.

Transport

Linen transported by cart must be moved in such a way that the risk of cross-contamination is minimized (e.g. avoid moving the cart from potentially contaminated areas (runs/kennel area) to cleaner areas (prep room, surgery). Clean linen must be transported and stored in a manner that prevents contamination. If laundry carts are used, separate carts must be used for clean and dirty linens

Washing and drying

- Use of normal machine washing with a commercial laundry detergent and machine drying are sufficient to greatly reduce the numbers of most significant infectious pathogens from most soiled linens.
- If laundry is washed in cold water, an appropriate cold-water detergent must be used according to label directions.
- It should not be assumed that hot water washing will disinfect or sterilize items. High temperature (> 71.1 ºC) washing can significantly reduce bacterial numbers, but standard household washing machines do not typically reach this temperature, even if the hot water setting is used. It is strongly recommended to use washing powders with microbiocidal efficacy which are listed in the VAH list (for reference see **annex 3**). It is also recommended to use only validated washing procedures as described by the Robert Koch-Institute (RKI, 2017).
- The heat and drying effects of tumble drying are a critical step in the laundering process, and account for a large proportion of the decrease in bacterial counts achieved. Therefore, laundry should not be considered clean until it has also been dried completely, ideally using the highest heat possible.
    - Line-drying linens outdoors may have the advantage of also exposing the surface of the fabrics to ultraviolet (UV) light, if they are hung to dry in the sun. However, it would be difficult to expose all surfaces to sunlight, and thick fabrics, items made of multiple fabric layers and those containing seams may protect bacteria from UV exposure. Also, the antimicrobial action of the high heat of tumble drying is lost if linens are line-dried, therefore tumble drying is recommended, especially for any materials that may have been contaminated with a transmissible infectious pathogen.

Laundry from infectious cases

- Laundry from potentially infectious cases should be treated separately from other laundry.
- Linens should be collected in a separate linen bag and washed and dried separately.
- For linens with gross contamination of a potentially infectious nature (e.g. faeces from a diarrheic animal, discharge from an infected wound, urine from an animal with a urinary tract infection), as much organic material as possible should be removed by hand (using gloves and disposable tissue or paper towel, as described above). The items should then be pre-soaked in bleach solution (9 parts water + 1 part household bleach) for 10 - 15 minutes prior to machine washing. Alternatively, steam sterilization is recommended.

Protection of personal

Personnel need to protect themselves from potential transmission of pathogens from soiled linens by wearing appropriate personal protective equipment (e.g. gloves, gown, apron) when handling soiled linens. Personnel should wash their hands whenever gloves are changed or removed, or if they come in contact with soiled linens while not wearing gloves. Hand hygiene stations should be available in laundry area.

Commercial laundry facilities

A company which specializes handling laundry from medical/veterinary facilities should be charged if it is not possible to clean laundry properly on-site. Adequate separation of clean and dirty laundry in the transport truck is essential to ensure that there is no opportunity for mixing or cross-contamination of clean and dirty linens.

## 2.5 Waste management

Veterinary biomedical waste is a potential source of both zoonotic and non-zoonotic infectious pathogens. Biomedical waste typically includes sharps, tissues (anatomic waste), highly contaminated (e.g. blood-soaked) materials, and dead animals. Therefore, it is important to handle all such waste appropriately. The national guidelines for biomedical waste management have to be considered. Details are usually readily available through municipal web sites (www.laga-online.de/mitteilungen/docs/RL_Gesundheitsdienst_09_02.pdf). Specific guidelines and rules established at the Justus Liebig University Giessen must be respected as well (https://www.uni-giessen.de/org/admin/dez/b/3/abfall).

Although it is beyond the scope of these guidelines to describe veterinary biomedical waste management in detail, the following basic information may be helpful:

- In case of a notifiable disease the waste has to be disinfected according to directives of the veterinary authorities before removed.
- Used sharps are considered biomedical waste and should be disposed of in accordance with regulations from municipal and provincial/territorial authorities. Use approved, puncture-resistant sharps disposal containers to remove, store and dispose

used sharps such as needles, blades, razors and other items capable of causing punctures.

- Non-anatomical waste saturated or dripping with blood (e.g. blood-soaked lap sponges and gauze) are also best disposed of as biomedical waste.
- Liquid waste such as chest fluid, abdominal fluid, irrigating solutions, suctioned fluids, excretions and secretions usually may be poured carefully down a toilet or any drain connected to a sanitary sewer or septic tank. Provincial and territorial regulations may dictate the maximum volume of blood or body fluids that is permitted to be poured into the sanitary sewer. If there is likely to be splashes or sprays during this disposal process, appropriate personal protective equipment should be worn.
- All other waste, such as general office waste and non-sharp medical equipment, may be disposed of in the regular waste stream, and requires no special treatment other than containment during disposal and removal. Waste should be contained in a leak-proof container or bag that can be discarded with the waste (e.g. a plastic garbage bag). Urine and faeces are not considered biomedical waste, nor is disposable equipment that has come in contact with an infectious animal (e.g. examination gloves, gowns, bandage materials that are not saturated with blood). Nonetheless, some of these materials may pose a risk to clinic personnel, patients and waste disposal personnel in terms of their potential to transmit infectious pathogens. Therefore, additional precautions must be taken to minimize contamination of the clinic environment and the risks to people and animals from potentially infectious waste. These may include double-bagging of materials from isolation areas, and keeping waste cans covered to prevent access by curious animals and to prevent spillage if a waste can is knocked over. If contamination of the inside of a waste can occurs (e.g. due to a tear in a garbage bag), the container should be thoroughly disinfected after emptying.

## 2.6 Hygienic measurements in surgery

All surgical procedures cause breaks in the physiological defensive barriers of the skin or mucous membranes. These breaks are therefore accompanied by an inherent risk of surgical site infection (SSI). Surgical site infections can occur sporadically or as part of an outbreak, and can have devastating outcomes in some situations. Good general infection control practices (e.g. hand hygiene, cleaning and disinfection) are important for prevention of SSIs. Specific measures pertaining to surgery include maintenance of the surgical environment, use of appropriate personal protective equipment and hand hygiene, disinfection and sterilization of anaesthetic equipment and surgical instruments, appropriate use if peri-operative antimicrobials, and surgical site care before, during and after the procedure. Many of the recommendations below have to be considered as minimum practice standards.

**Surgical environment**

Having a well designed and maintained surgical area or suite is very important. In order to keep the surgical environment as clean as possible, this area should be separated from

personnel and animal traffic, and be easy to thoroughly clean and disinfect. A surgical area should only be used for surgical procedures, and should not be used for non-surgical procedures between surgeries. Entrance to the area should be restricted at all times to minimize traffic in the room. The number of people in the surgical area has been identified as a risk factor for SSI in small animals, so only essential personnel should be allowed in the area during any surgical procedure. All personnel participating in the procedure, including those performing surgical nursing duties, must be trained in operating room procedures.

**Personnel considerations**

Personal protectice equipment

All personnel in the surgical area should wear designated surgical scrubs, a surgery cap or hair bonnet, and a nose and-mouth mask when surgery is underway, regardless of whether or not they are directly involved in the procedure itself. Scrubs worn in surgery should not be worn when handling or treating other patients, and at a minimum should be covered with a lab coat when outside the surgery area (see Personal Protective Equipment under Routine Procedures). Personnel directly involved in the procedure should also wear a sterile gown and sterile gloves.

Hand hygiene

A surgical hand scrub should be performed before putting on a sterile gown and sterile gloves. Various surgical scrub techniques have been described. Most commonly, a structured five-minute surgical scrub with antibacterial soap is used:

- Remove all hand and arm jewelry
- A pick or file should be used to clean all dirt out from underneath the fingernails.
- If hands or arms are visibly dirty, they should initially be washed with soap and water as per standard hand hygiene protocols.
- Hands and forearms are then lathered with antibacterial soap. Scrubbing with a bristled ponge proceeds proximally from the fingertips to the forearms, just below the elbow. Additional details can be found in a surgical reference book.
- A sterile towel must be used to dry the hands before donning a gown and gloves.

Application of commercial alcohol-chlorhexidine combinations can be used as a replacement for traditional surgical scrubbing. This approach has been shown to be equally effective at removing bacteria, and is less time consuming and irritating to the skin, particularly if a surgical hand scrub is required multiple times in a day. If such a commercial combination is used, hands must be thoroughly washed and fingernails carefully cleaned initially. It is also critical to follow the label directions regarding the amount of product to use and how to apply it.

## Equipment considerations

Sterilization of instruments

Complete sterilization of surgical instruments and any items that might come in contact with the surgical field is a crucial procedure. Poor sterilization or inappropriate handling of instruments after sterilization can result in contamination of sterile tissues during surgery. Steam sterilization (i.e. autoclaving) is most commonly used in veterinary clinics. Quality control testing of autoclaves should be performed regularly and documented:

- Sterility indicator strips should be placed in every surgical pack. External autoclave indicator tape is not a reliable indicator of the sterility of a pack's internal contents.
- Biological sterility indicators should be used periodically. These indicators contain bacterial spores, which are the most resistant form of bacteria. After being autoclaved, the indicator is submitted for testing to ensure that all of the spores have been killed by the sterilization process. In human healthcare facilities it is recommended that these indicators are used daily, or at least weekly. Weekly or biweekly use is likely adequate in most veterinary clinics, depending on how heavily the autoclave is used. A biological sterility indicator should also be used in the next cycle anytime the autoclave has been moved, repaired, or if there has been any other indication of sterilization failure.

Flash sterilization should not be used unless absolutely necessary for emergencies only. Flash sterilization should never be used for surgical implants. Countertop "cold sterile" disinfectant solutions should not be used for any surgical instruments or implants, as these solutions typically do not achieve true sterilization of the instruments they contain.

**Quality control testing of autoclaves should be performed regularly**.

## Peri-operative application of antimicrobials

Administration of peri-operative (i.e. before, during and after surgery) antimicrobials is an important and complex issue. The goal of peri-operative antimicrobial therapy is to reduce the risk of post-operative infection, while minimizing the negative impact on the patient's natural microflora and the risk of antimicrobial-associated complications such as diarrhea. There is currently very little objective information about the need for antimicrobials for specific veterinary procedures, as well as the optimal choice of drug(s), timing and dosages. Antimicrobials are indicated in clean-contaminated, contaminated and dirty procedures. The need for antimicrobial prophylaxis in clean procedures is unclear. In human medicine, antimicrobials are not typically recommended for clean procedures such as arthroscopy, however there are conflicting opinions. Regardless, it is unclear whether recommendations from human medicine should be directly extrapolated to veterinary procedures, because there are obvious differences in post-operative incision care and patient environment for animals, which may increase the risk of infection. The need for peri-operative antimicrobial therapy for different procedures, particularly clean procedures, requires further research. Concerns with this practice that currently exist include inappropriate timing of administration (i.e. too far in advance of surgery or starting after surgery), excessive duration of therapy, inadequate dosing and inappropriate drug choice. If peri-operative antimicrobials are used, they should be administered so that therapeutic levels are present at the surgical site at the time of first incision.

This typically requires parenteral (i.e. not oral) administration of an antimicrobial approximately one hour before surgery. If the surgical time is longer than two half-lives of the drug(s), then an additional dose should be given during the surgery. In human medicine, it has been shown that starting antimicrobial therapy after surgery is no more effective than not using antimicrobials at all. Typically, antimicrobials are not needed after surgery since the highest-risk time for contamination of the surgical site (i.e. during the surgery itself) is already passed.

**Surgical site management**

Pre operative care

Pre-operative management of the surgical site may be very important, but there has been very little research in this area in veterinary medicine. The goal of pre-operative surgical site management is to eliminate potential pathogens without creating a physical environment that may increase bacterial colonization or infection post-operatively. If the patient's hair coat is visibly dirty, bathing the animal before surgery is reasonable if there is adequate time for the hair coat to dry before the procedure. In humans, it has been suggested that any method of hair removal can be associated with higher SSI rates, but obviously this cannot be avoided for the vast majority of procedures in veterinary medicine. Shaving the surgical site the night before has been associated with higher SSI rates in humans, therefore clipping (not shaving) of the surgical site should only be performed right before surgery. Care must be taken to avoid damaging the skin during this procedure, as abrasions provide sites for invasion and proliferation of opportunistic bacteria. Use of good quality, well-maintained clippers and blades helps to reduce the risk of skin abrasions. If skin lesions around the surgical site are noted before or after surgery, the finding should be recorded and investigated, to determine whether equipment maintenance and/or personnel training need to be improved. Animals should not be clipped in the surgery area/suite itself. A "prep" area outside of surgery area should ideally be used for this and any other pre-operative procedures.

**Skin preparation** after clipping is also important. Typical practices include thoroughly cleaning and scrubbing the site with antibacterial soap, followed by application of alcohol, and finally application of a chlorhexidine or iodine solution. Potential problems that need to be avoided include:

- Failure to prepare a large enough area of skin
- Inadequate initial cleaning with soap and water
- Contamination of preparation solutions
- Inadequate contact time with the antiseptic
- Contamination of the area during or after preparation due to improper technique

If skin preparation solutions (e.g. antibacterial soap and water, alcohol, chlorhexidine, iodine) are kept in refillable containers, these containers must be disinfected when empty before being refilled. Contamination of these solutions with bacteria that are resistant to their respective antimicrobial actions can occur. Refilling the containers without disinfecting them can allow these resistant contaminants to accumulate. An outbreak of catheter site infections was reported in a small animal clinic that was associated with contaminated skin preparation solutions.

Post-operative care

Post-operatively, a surgical incision site is highly susceptible to opportunistic infection from the bacteria of the patient's own microflora, from the environment or from hospital personnel. Contact with the surgical incision, particularly with bare hands, should be avoided. Covering or bandaging incisions for a minimum of 24 to 48 hours after surgery has been recommended in humans; this is also a reasonable recommendation in small animals in most situations. Bandage changes should be performed using aseptic technique. Pet owners and handlers should be instructed on how to manage an animal with an incision, and the signs for which to look that may indicate the development of a SSI. There is no objective information about the need to cover surgical incisions for more that 48 hours in veterinary or human medicine, but arguments can be made for both sides. Preventing the animal from licking, scratching or otherwise traumatizing the surgical site is critical. Damaging to the healing incision or the skin around it can result in the deposition of opportunistic pathogens, and make it easier for bacteria to grow in the area.

## 2.7 Patient care and handling

**Isolation facilities**

Every veterinary clinic should have a dedicated isolation area for caring for and housing animals with potentially contagious infectious diseases. The size and structure of the isolation facility varies with aspects such as clinic size, types of animal species treated and diseases that are endemic to the area. A proper isolation area should allow for complete physical separation of potentially infectious cases, and have areas for performing routine procedures such as bandage changes, thereby reducing the risk of direct or indirect infection of other hospitalized animals or clinic personnel. Ideally, isolation facilities should be in a low traffic location within the clinic.

If an isolation area was not included in the original physical design of the clinic, a potential alternative in some cases may be to convert an examination room into a dedicated isolation room. The room selected should be in the area of the lowest human and animal traffic possible. The room should be easy to clean and disinfect and emptied of all non-essential equipment. This type of room conversion can be difficult to do effectively depending on the design and layout of the clinic and the room itself. The feasibility of using such a room for isolation of infectious animals must be assessed on a facility-by-facility basis.

Ventilation should be designed such that movement of air from the isolation room to other areas of the clinic is prevented (i.e. the room should be vented to the outdoors). If this is not readily possible, a HEPA air filtration system should be used for the air leaving the isolation room. Only the equipment and materials needed for the care and treatment of the individual animal should be kept in the isolation room. This may include items such as a designated stethoscope, thermometer, grooming supplies, leash, and muzzle. Supplies of items that will be used on subsequent isolation patients (e.g. packages of bandage material, boxes of

needles and syringes) should not be kept in the isolation area. All items entering an occupied isolation area should be considered infectious and disposed of or disinfected after discharge of the patient. Items should not be removed from the room except for disposal. Use of disposable articles can minimize the need to take soiled items out of the isolation room.

When the isolation room is in use by an animal with a potentially contagious infectious disease:

- Prominent signage should indicate that the animal may be infectious and should outline any additional precautions that need to be taken in addition to routine isolation protocols.
- Access to the isolation room should be limited to the minimum number of essential personnel necessary to provide appropriate patient care.

Personal protective equipment and waste in the isolation area

All personnel entering an isolation area housing a potentially infectious animal, regardless of whether they plan on having direct contact with the animal, must wear appropriate personal protective clothing. At a minimum, this consists of a clean lab coat or similar item of outerwear that is only worn in the isolation area and disposable examination gloves. Depending on the diagnosis and the mode of transmission of the disease, shoe covers, masks and eye protection may be required when handling an animal in isolation.

- Gloves should be discarded after a single use. Hands must be washed immediately after gloves are removed.
- Similarly, gowns should be discarded (if disposable) after a single use. Reusable gowns and lab coats used in isolation should be laundered after a single use. Storing/hanging and reusing a contaminated gown or lab coat inevitably leads to contamination of hands, clothing and the environment. Therefore, when removed, these items should immediately be placed in the isolation room garbage or laundry bag.
- Eye/nose/mouth protection may be re-used with the same animal if they are not visibly soiled and can be consistently removed without contamination of the inside of the eye wear/mask or the immediate environment. Nose and mouth masks should only be reused by the same person. If the eyewear or mask becomes contaminated with body fluids such as urine or faeces, it should be replaced with a clean article.

Designated personal protective equipment must remain in the isolation room. Contaminated items and waste alike should be bagged prior to being removed from the isolation area. Articles should then immediately be either discarded or taken to the appropriate area for additional cleaning and disinfection. Waste from an isolation room should be treated as potentially infectious.

Patients in isolation

Dogs that are housed in isolation should not be walked nor allowed to urinate or defecate in public areas or areas used by other animals. If a dedicated area for walking is not available and the dog needs to be taken out of the primary isolation area to urinate and defecate, a separate run should be designated for each dog in isolation (i.e. if there is more than one animal in isolation, they cannot all use the same run). The run selected should be as far as

possible from runs being used by other animals. The dog should be moved directly to the run by personnel wearing appropriate personal protective clothing. Moving the animal through other areas of the clinic should be avoided as much as possible. Carrying the dog or transporting it on a gurney is ideal in order to minimize the risk of contamination of the floor and clinic environment. The designated run should be prominently labeled and disinfected daily. If a patient being housed in isolation absolutely must be taken elsewhere in the clinic for essential procedures such as radiographs or surgery, if at all possible this should be done the end of the day, or during a time where there is the least animal and personnel movement in the clinic.

- Appropriate personal protective equipment should be worn by all personnel involved with the procedure.
- Other animals should be kept out of the procedure area.
- The procedure area should be thoroughly cleaned and disinfected as soon as the procedure is completed.

**Footbaths and footmats**

Footbaths or footmats are used to decrease (but do not eliminate) microbiological contamination of footwear. Footbaths are shallow containers containing a disinfectant solution. Footmats are spongy commercial mats covered with a durable, easy-to-clean material that can be saturated with disinfectant. Footmats can increase compliance because they are easier to use, but they are more expensive and more difficult to maintain than footbaths. Data regarding the need for and efficacy of footbaths and footmats are very limited, and there is essentially no information relating to small animal clinics specifically. It has been shown that footbaths can reduce bacterial contamination of footwear in large animal clinic settings. Although other sources of contamination have been shown to be more significant in infection transmission, footwear and floor surfaces cannot be overlooked in an infection control program in a small animal clinic, because patients so often have extensive direct contact with the floor. Possible problems with footbath or footmat use must also be considered. Footbath or footmat use is almost invariably accompanied by spillage of disinfectant solution; this can create a slipping hazard on smooth floor surfaces, which are typically present in small animal clinics. Certain disinfectants can also damage floor surfaces with prolonged contact  Footbaths or footmats should be considered when personnel will be walking on a surface that could potentially be more contaminated than the general floor environment, and where spread of this contamination might pose a risk to patients or personnel. The most likely area where footbaths or footmats could be useful would be at the exit of an animal housing area (e.g. dog run) that contains a potentially infectious case, and where clinic personnel will be walking in and out of the potentially contaminated area. The need for routine use of footbaths or footmats in isolation areas where animals are confined in cages is questionable. If footbaths or footmats are used, selection of an appropriate disinfectant is important. The disinfectant should be effective against the specific pathogen(s) of concern, stable in solution, and effective with a relatively short contact time (see Tables 5 and 6). Oxidizing agents such as accelerated/stabilized hydrogen peroxide and peroxygen disinfectants are ideal. The solution should be **changed daily, or better sooner** if gross contamination of the bath/mat occurs.

**Maintaining proper concentrations of active disinfectants in footbaths and footmats is essential for proper performance**.

### Wounds and Bandages

Wound infections can be caused by many bacterial pathogens, some of which can be transmitted between animals or between animals and people. One example is methicillin-resistant Staphylococcus aureus (MRSA), which can infect both people and animals, but there are a variety of other pathogens that are of concern. This includes both multidrug resistant (e.g. S. aureus, S. pseudintermedius, enterococci) and susceptible bacteria. Wounds provide a prime site for invasion of opportunistic bacteria such as these. Even wounds that are not known to be infected should be protected from contamination by veterinary personnel and from the environment to reduce the risk of secondary infection.

• Sterile gloves should be worn for debridement, treatment and bandaging of deep wounds and those involving vital structures. Clean, non-sterile examination gloves are adequate for these procedures if the wound is more superficial.

- Bandages must be kept dry to prevent bacterial strike-though. This means keeping the outside of the bandage as dry as possible, and also including sufficient absorbent material in the bandage itself to prevent discharge from the wound from soaking through the bandage. If the outside of a bandage appears wet, it should be changed.
- Used bandage materials should be considered infectious. Such materials should be placed directly in the garbage and not on the floor, examination table or any other surface. The risk of contamination and spread of any pathogen is likely higher for wounds with a large amount of discharge.
- Wound treatments and bandage changes should be performed in an area that is easily disinfected (e.g. on an examination table). Wound irrigation and lavage should be performed in such a way that the fluid used is contained (e.g. in a sink or tub, or with disposable absorbent material). Bandages should NOT be changed in the kennel/ward area where there is a higher risk of cross-contamination of other patients.
- Hands should be washed thoroughly after changing a bandage. Equipment used for bandage changes (e.g. bandage scissors) should be disinfected between uses.

Animals with known MRSA or multi-resistant bacterial wound infections are likely to be colonized with these pathogens at other body sites as well (e.g. nose, rectum, intestinal tract), and should therefore be handled with contact precautions and housed in isolation.

### Feeding of raw meat

Raw meat-based diets for cats and dogs often contain a variety of enteropathogens, including Salmonella spp, Campylobacter spp, Clostridium difficile, Clostridium perfringens, extended spectrum beta-lactamase (ESBL) Enterobacteriacea, and enterohemorrhagic strains of Escherichia coli such as O157:H7. It has also been shown that animals fed raw meat diets may shed higher levels of Salmonella and ESBL Enterobacteriacea in their faeces. Raw meat diets and faeces from animals fed these diets thus may pose a risk to hospitalized animals and

clinic personnel, and may contaminate the hospital environment. Therefore, a policy against the feeding of raw meat to hospitalized animals should be in place.

**Admission of animals from shelters**

Humane societies, animal shelters and similar facilities typically contain transient, stressed populations of animals, large numbers of young animals, sick animals and animals with unknown health and vaccination status. As such, they should be considered high risk from an infectious disease standpoint. Animals admitted from these facilities should be subjected to a high degree of scrutiny. Recommended practices include:

- All animals from such facilities should be examined immediately upon arrival. They should not be allowed to come in contact with other animals in the waiting/reception area.
- If there is an ongoing outbreak of an infectious disease at an animal shelter, admission of animals from the facility for elective procedures should be restricted (i.e. admission for emergencies only). Otherwise, all animals from the facility should be admitted directly to isolation.
- Animals from these facilities should be housed separately from other patients, if possible. Use of a separate ward, separate area of a ward or leaving empty cages between those animals and other patients can be used, depending on the degree of separation required for the diseases of primary concern.

For elective procedures (e.g. spay, neuter):

- All dogs, cats and ferrets must have been vaccinated against rabies at least 2 weeks prior to presentation if they are more than 14 weeks old.
- All dogs and cats must have received other routine vaccinations (as needed according to geographic region) at least twice if they are more than 14 weeks old, with the most recent vaccine administered at least 2 weeks prior to presentation.
- All animals must have been dewormed with a broad spectrum anthelmintic at least 7-10 days prior to admission.
- Animals with abnormalities including, but not limited to, fever, oculo-nasal discharge, coughing/sneezing, diarrhea and potentially infectious skin conditions should not be admitted for elective procedures.
- Depending on the geographic region and time of year, flea treatment prior to admission may also be required.

## 2.8 Safety of clinical personnel

**Bites and scratches**

Bites and scratches are an inherent risk in veterinary medicine and a common cause of occupational injury and illness. In a survey of veterinarians from the USA, approximately two-thirds had sustained a major animal-related injury at one time. Bites and scratches accounted for just over one-third of these injuries. Up to 60% of dog bites and 80% of cat bites require medical attention. Approximately 3% to 18% of dog bites and 20% to 50% of cat bites become infected. Most dog and cat bite wound infections are caused by a mixture of aerobic and anaerobic bacteria. In general, veterinary personnel should be able to recognize behaviour in animals and situations that are associated with an increased tendency for an animal to bite. Professional judgment must be exercised to guide bite prevention practices. Personnel should take all necessary precautions to prevent animal-related injuries in the clinic. These may include physical restraint or chemical restraint (sedation or anaesthesia) of an animal. Appropriate equipment (e.g. different sizes of muzzles, bite-resistant gloves, catch pole, cat bags) should be readily available. Such equipment should also be as easy to clean as possible. Experienced veterinary personnel rather than owners should restrain animals for procedures whenever possible. Personnel must always be aware of changes in their patients' behavior which may precede attempts to bite. Veterinary personnel should not let client perceptions or attitudes prevent them from using appropriate bite-prevention measures (e.g. muzzling).

If anyone is bitten or scratched by an animal:

- Immediately wash the wound thoroughly with plenty of soap and water.
- Report the incident to the local public health unit.
- If a bite occurred, the rabies vaccination status of the animal must be noted
- Seek medical attention as soon as possible for any bite that:
    - is on a hand or is over a joint
    - is over a prosthetic device or an implant
    - is in the genital area
    - is over a tendon sheath, such as bite on the wrist or the ankle
    - causes a large amount of tissue damage (e.g. a deep tear or tissue "flap")

Medical attention should also be sought for any bite (particularly from a cat) sustained by a person with any of the following conditions:

- Compromised immune system (e.g. HIV/AIDS, transplant or chemotherapy patients)
- Chronic swelling (edema) in the area that was bitten
- If the person has had his or her spleen removed
- Liver disease, diabetes, lupus or other chronic systemic disease

If the bitten area becomes increasingly painful or swollen, if the wound develops a discharge, or if the person develops a fever or swollen lymph nodes, consult a physician as soon as

possible. A physician will decide (in some cases in consultation with public health personnel) if antimicrobial therapy, tetanus vaccination, rabies vaccination, or any additional treatment (e.g. lavage, debridement, sutures) are necessary. Most bite wounds are not sutured in order to promote drainage and reduce the risk of infection. Emergency contact information (i.e. physician, public health department) should be clearly posted in the clinic. All bites or scratches should be reported to the clinic infection control practitioner (ICP) and the injury documented. Bites and scratches should not be considered “part of the job” and summarily dismissed. Even seemingly small, innocuous injuries can develop severe complications. Regular review of injuries is useful to identify trends in behaviour that may be associated with injuries and to develop protocols to reduce the risk of injuries. Documentation is also important for employees in the event that serious health problems subsequently develop.

**Sharps**

Injuries from needles and other sharp implements are common in veterinary medicine but are largely preventable. Although there is not the level of risk of bloodborne pathogen exposure in veterinary practice as there is in human medicine, serious outcomes can result following needlestick or other sharps injuries, including significant trauma, secondary infection and drug reaction (i.e. toxic, allergic, idiosyncratic). Proper sharps handling practices are a practical yet effective way of reducing workplace injuries in veterinary clinics. Use appropriate barriers (e.g. closed toed shoes) and safe work practices when using sharp instruments and devices (e.g. needles, scalpels, etc.), after procedures and when cleaning used instruments.

- Never remove needle caps by mouth.
- Do not bend or manipulate needles in any way.
- Do not pass uncapped needles to another person.
- Ensure proper animal restraint to reduce inadvertent needle-stick injuries from animal movement.
- Do not recap needles by hand. If recapping is required, use the “one-handed scoop” technique (see below), forceps or a needle cap holder.
- Ensure that approved point-of-use sharps disposal containers are located everywhere needles are handled. These containers are puncture-resistant, leakproof, and prevent removal (both accidental and intentional) of discarded sharps.
- Always dispose of sharps immediately in an approved sharps disposal container.
- Never dispose of needles or other sharps into anything other than an approved sharps container, even if they are capped or otherwise contained. This reduces the risk of accidental injury to veterinary personnel, patients, clients and non-veterinary personnel (e.g. waste disposal personnel). The most important precaution for preventing needle-stick injuries is to avoid recapping needles. Recapping needles causes more injuries than it prevents. When it is absolutely necessary to recap needles as part of a medical procedure or protocol:
- Use a mechanical device such as forceps or hemostats to replace the cap on the needle.
- Alternatively, the needle can be recapped using the “one-handed scoop" technique:
    - Place the cap on a flat horizontal surface.

- Holding the syringe with the attached needle, or the needle hub alone (when unattached), scoop up the cap with the needle by sliding the needle tip inside, without touching the cap with one's other hand.
- Once the point of the needle is covered, tighten the cap by pushing it against an object, or by pulling the base of the needle cap onto the hub of the needle with the same hand holding the syringe.

**Recapping needles causes more injuries than it prevents**.

After injecting live vaccines or aspirating body fluids or tissue, the used syringe should be placed in a sharps container with the needle attached. Following most other veterinary procedures, the needle and syringe may be separated for disposal of the needle in the sharps container. This is most safely accomplished by using the needle removal device on an approved sharps container, which allows the needle to drop directly into the container without being handled or touched.

Sharps safety for clients

Periodically, owners may be required to treat their animals at home with injectable medications (i.e. insulin, subcutaneous fluids). In these situations, it is the responsibility of the attending veterinarian to:

- Provide (and document) training on how to handle sharps, including injection and disposal practices.
- Provide an approved sharps container or give clients clear instructions regarding how to obtain one.
- Ensure that the client is able to safely handle and dispose of sharps.
- Advise clients that the sharps container should be returned to the clinic for disposal when 3/4 full, and exchanged for a new container (if necessary).

**Used sharps are considered biomedical waste** in veterinary practices. Dispose of used sharps containers in accordance with regulations from municipal and/or provincial/territorial authorities.

### Diagnostic specimen handling

Urine from animals with suspected urinary tract disease, and all faeces, aspirates, and swabs should be treated as potentially infectious material. Protective outerwear (e.g. lab coat) and disposable gloves should be worn when handling these specimens. Gloves should be discarded and hands washed immediately after handling these items. Care should be taken to avoiding touching clean items (e.g., microscopes, telephones, food) while handling specimens or before glove removal. A separate refrigerator should be used for diagnostic specimens, which should be cleaned on a regular basis.

A designated area of the clinic should be used for specimen processing. This should be separate from treatment and surgery areas so as to decrease the risk of contamination of these areas. After processing a specimen, materials should be disposed of or stored properly and promptly.

- Specimen processing areas should be cleaned and disinfected immediately after use.
- Samples from animals with suspected or known infectious diseases should be disposed of as infectious waste.
- Leak-proof plastic containers should be used for specimen storage in a designated refrigerator which does not contain food, vaccines or medications of any kind.
- Contamination of the outside of sample containers should be avoided. If the outside of a container becomes contaminated, it should be cleaned and disinfected prior to storage.
    - Sharps such as microscope slides and glass pipettes should be disposed of in approved sharps containers

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**Dental procedures**

Dental procedures often entail a significant risk of splash exposure involving saliva, blood, and bacteria-laden debris. Procedures such as ultrasonic scaling can result in aerosolization of large numbers of bacteria. There is also potential for personnel to sustain cuts and abrasions from dental equipment or teeth during dental procedures. To reduce the risk of transmission of harmful bacteria from the animal's mouth to veterinary personnel, the person performing the procedure and anyone in the immediate vicinity should wear:

- Protective outerwear (e.g. designated lab coat, designated scrubs)
- Disposable gloves
- Surgical (i.e. nose and mouth) mask
- Protective eye glasses/goggles, or a full face shield

Dental procedures should be performed in a contained area away from other patients, personnel and high traffic areas. Procedure such as bandage changes, wound care or placement of invasive devices (e.g. intravenous catheters, urinary catheters) should never be performed in close proximity to a dental procedure due to the risk of contamination by aerosolized bacteria.

**Necropsies**

Necropsies are high risk procedures because of potential contact with infectious body fluids, aerosols, and contaminated sharps. Non-essential persons should not be present during necropsy procedures in order to minimize exposure of personnel to these hazards. Personnel involved in or present at necropsies should wear:

- Protective outerwear (e.g. designated lab coat, designated scrubs)
- Disposable gloves
- Protective eye glasses/goggles, or a full face shield

- Rain boots

In addition, when opening the body cavities of larger animals or for any other heavy cutting, cut-proof gloves which can be washed in the laundry should be used to prevent accidental injury from necropsy blades. Additional precautions for respiratory protection (including environmental controls and face masks) should be employed if power equipment is used, since these instruments increase the amount of potentially infected material that becomes aerosolized. In-clinic necropsies are forbidden. Instead the entire body has to be submitted to the Institute of Veterinary Pathology of the JLU GIessen. If another diagnostic laboratory is desired, ensure that all legal requirements for shipment of biological samples are met.

**Vaccination of personnel**

Vaccination should be considered a final line of protection but is important for certain diseases. Decisions regarding vaccination policies should consider the risk of exposure, the severity of disease, whether the disease is treatable, the transmissibility of disease, as well as the quality and safety of the vaccine.

Rabies: Rabies vaccination is indicated for anyone who has a greater than average risk of exposure to the virus. All veterinary personnel that might have contact with animals should therefore be vaccinated against rabies except in areas that have been formally declared rabies-free (e.g. Hawaii). This includes lay staff that might have periodic animal contact, such as front office staff. Even animals that are kept indoors can be exposed to rabies by bats, and the disease may not be suspected on initial admission. Rabies vaccines for humans are generally considered safe and highly effective. In areas where rabies is endemic, rabies titres should be checked every 1-2 years to ensure that protective immunity is maintained, with re-vaccination provided as required. For additional information on rabies vaccination in people, you are pleased to contact the medical airport service (see important phone numbers, page 2).

Tetanus: Although bites and scratches are very low risk for tetanus infection, cuts and scratches from other objects or soil contamination of puncture wounds are still a risk. Therefore, tetanus vaccination is indicated in veterinary personnel. Boosters are generally administered every 10 years.

Influenza: Human influenza is a common and highly transmissible disease, even though it is not transmissible to companion animals. Infected veterinary personnel can rapidly infect their colleagues and veterinary clinics could act as sources of community infection if infected employees are present. It is reasonable for veterinary clinics to recommend annual influenza vaccination of all personnel. Employees should also be encouraged to stay home if they are ill.

**All veterinary personnel including students that might have contact with animals should be vaccinated against rabies**

**Training and education of personnel**

Personnel training and education are essential components of an effective infection control program. All personnel, including temporary lay personnel, kennel staff, students and

volunteers, should receive education and training about injury prevention and infection control during their initial orientation and periodically thereafter. Additional training should be provided as recommendations change or if problems with infection control practices are identified. Training should emphasize awareness of the hazards associated with individual work duties, and prevention of zoonotic disease exposure. Staff participation in training should be documented by the infection control practitioner (ICP).

## 2.9 Client education

Client education is the responsibility of the entire practice team. By helping clients understand infectious and zoonotic disease risks and the basic steps they can take to protect themselves and their animals, they can live happier and healthier lives with their pets. Discussion of zoonotic disease risks should be a routine part of new pet examinations and new client visits. Client education must also occur when the veterinarian has a reasonable suspicion of a potentially infectious disease, and particularly if the disease is zoonotic. Notification of the owner to this effect must be documented in the patient's medical record. This documentation may also be very important legally, should an animal's infection result in human illness.

Items to discuss, information to provide to the client in print form, and/or information to document in the medical record may include:

- What disease is suspected or has been diagnosed
- How the disease is confirmed, if necessary
- How the disease is transmitted
- Risks to members of the household
- Risks to other in-contact individuals (e.g. elderly grandparents who live elsewhere)
- Risks to in-contact pets
- Symptoms in humans
- Clinical signs in animals
- How to prevent disease transmission from the pet to people and to other pets
- How the disease is treated in animals
- Public health enforcement issues such as quarantine, submission of tissues to labs, etc.
- Circumstances under which the client should seek medical attention, if applicable

## 2.10 Client visitation

Given the strong bond between owners and their pets, it is understandable when clients wish to visit their hospitalized pets. However, animals carrying transmissible infectious pathogens pose a potential risk to other animals at the clinic and at the owner's home, as well as to the clinic employees, the owner and other household members. As a policy, clients should not be

allowed to visit animals that are considered potentially infectious. Under extenuating circumstances, such as an animal whose condition is imminently life-threatening, owners may be allowed to visit their animal, but the use of proper personal protective equipment should be demonstrated to the clients and all infection control procedures should be followed, as for clinic personnel involved in the animal's care.

## 2.11 Clinic pets

It is common for many veterinary clinics to have resident animals. From an infection control perspective, these animals pose a potential risk for disease transmission, and from the health perspective of the clinic pet itself. Clinic animals that have free access within the clinic could be sources of pathogen transmission. Uncontrolled access to waiting room areas could result in a large number of contacts, with the corresponding potential for pathogen transmission. Although there are no objective data quantifying the risks to patients, people or clinic animals themselves, the theoretical risks and lack of a real need for clinic pets indicates a need for consideration of the cost-benefit of keeping clinic pets. Based on the potential risks, it is recommended that veterinary clinics do not keep such animals, and every attempt should be made to adopt out any existing pets.

While suboptimal from an infection control standpoint, if a clinic has a clinic pet, the following recommendations should be considered. The clinic pet should not have access to any patient treatment areas, patient housing areas, examination rooms, isolation, surgery or the patient waiting area. It should not be allowed to wander freely through the kennel/ward areas where it could cross-contaminate kennels. The animal should have a dedicated food and water bowl, litter box, toys, etc. The pet must also receive regular health checks and have an appropriate vaccination, deworming and external parasite control program. Clinic pets, particularly cats, should not be allowed to have unsupervised outdoor access because of the higher risk of exposure to (and subsequent shedding of) pathogens such as Salmonella and Toxoplasma from hunting birds and rodents.

**From an infection control standpoint,**

**veterinary clinics should never have a resident "clinic pet."**

## 2.12 Vector control

Some important pathogens can be transmitted by wild rodents (e.g. mice, rats) or insect vectors (e.g. fleas, ticks, mosquitoes, houseflies). A few of these pests can be true carriers of certain diseases, meaning they can be infected by or incubate particular pathogens, but many of them can also be non-specific mechanical vectors that simply move microbes from one area or surface to another. Pest management is an important aspect of effective prevention and control of infectious disease transmission.

Pest management practices include:

- Examination of animals upon arrival for ectoparasites such as fleas, and treatment with an adulticidal antiparasitic medication prior to admission if ectoparasites are detected.
- Storing food and garbage in metal or thick plastic containers with tight-fitting lids.
- Prompt disposal of food waste and other material (e.g. faeces) that may attract rodents or insects.
- Sealing potential pest points-of-entry into buildings. Common methods include the use of caulk, steel wool or mesh wire under doors and around pipes.
- Installation and maintenance of window screens to prevent entry of insects into buildings.
- Elimination of potential rodent nesting sites (e.g. clutter).
- Removal of standing water (e.g. empty cans, clogged gutters) outside buildings that can otherwise serve as breeding grounds for mosquitoes.

Additional measures may be warranted for the control of specific pests. Consultation with a pest control expert is recommended if a particular infestation is present, or for additional guidance and information. Further information can be provided by staff of department Dez E of the Justus Liebig University Giessen (https://www.uni-giessen.de/org/admin/dez/e/zust/e3).

# 3 Clinic design

Clinic design is critical to effectively implementing infection control measures. Unfortunately, infection control has not always been considered when designing clinics.

Commonly encountered problems include:

- High animal and personnel movement in areas where procedures are performed
- Use of flooring and kennel surfaces that are difficult or impossible to disinfect
- Inadequate (or absent) isolation facilities
- Lack of a separate area to examine or treat animals with potentially infectious diseases
- Lack of sinks in all examination rooms and treatment areas
- Lack of a separate area for diagnostic specimen processing
- Lack of a separate area for staff to store personal items and eat

In established clinics, correcting these deficiencies can be difficult or impossible, and often expensive. However, practical and cost-effective measures can often be estabished to improve infection control within an existing facility, e.g.:

- Place alcohol-based hand sanitizers in patient contact areas wherever sink access is inadequate.
- Provide separate refrigerators for diagnostic specimens, vaccines and medications, and food for human consumption.
- Alter personnel and animal movement patterns to reduce direct and indirect contact of relatively healthy patients with sick patients.

Infection control issues should be considered when designing new clinics or when undertaking renovation or expansion of existing clinics. An architect with experience designing veterinary clinics should be used, and infection control considerations should be emphasized. Consultation or review of preliminary plans by a veterinary infection control expert is also useful. However, critical assessment of plans with an infection control mindset can readily be performed by any veterinarian.

Special emphasis should be given to issues such as:

- Number and placement of sinks – a sink should be present in every examination and procedure room.
- Overall clinic flow from “clean to dirty”, with isolation areas well removed from other animal housing or procedure areas.
- Use of sealed flooring materials that are amenable to frequent cleaning and disinfection.
- Separation of animal procedure areas from areas where specimens (i.e. stool) are processed.
- Provision of a dedicated “personnel-only” space for breaks, food storage and consumption, and storage of personal items.

# 4 Notifiable diseases

Certain infectious diseases must be reported immediately to the local veterinary officer even at the time the disease is suspected but still not diagnosed. These diseases are listed in the "Verordnung über anzeigepflichtige Tierseuchen". For further information please visit the website of the Federal Ministry of Food and Agriculture (Bundesministerium für Ernährung und Landwirtschaft, BMEL)(www.bmel.de). Every veterinary clinic should have a list of notifiable and reportable diseases prominently displayed in an area easily accessible to clinic personnel. The clinic's Infection Control Manual should clearly state the required reporting procedures, including contact numbers for the appropriate veterinary and/or public health authorities.

# 5 References and Suggested Reading


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# 6 Annexe

## Annex 1 Relative Tenacity of Pathogens to Biocides

| Relative tenacity | Type of infectious agent |
|---|---|
| **Very susceptible** | Enveloped viruses<br>Some protozoa<br>Some Gram-positive bacteria (e.g. *Streptococcus* spp.) |
| **Susceptible** | Some Gram-positive bacteria (e.g. *Staphylococcus* spp.)<br>Gram-negative bacteria (e.g. *Salmonella* spp.)<br>Yeasts (e.g. *Candida* spp.)<br>Moulds (e.g. *Trichophyton* spp.) |
| **Resistant** | Non-enveloped viruses (e.g. Parvoviruses)<br>Protozoal cysts (e.g. *Giardia* spp.)<br>Acid-fast bacteria (e.g. *Mycobacterium* spp.) |
| **Very resistant** | Coccidia (e.g. *Cryptosporidium* spp.)<br>Bacterial spores (e.g. spores of *Clostridium* spp.) |
| **Extremely resistant** | Prions |

# Annex 2 Wirksamkeitsspektren von Desinfektionsmitteln

**Tabelle 1:** Wirksamkeitsspektrum, pH-Abhängigkeit und Milieueinfluss der wichtigsten Desinfektionswirkstoffe (nach Wallhäußer, K.H., Praxis der Sterilisation-Desinfektion-Konservierung, Georg Thieme-Verlag, 1996; modifiziert und ergänzt)

| Desinfektionsmittel | Reaktionsgeschwindigkeit | optimaler pH-Bereich (2 3 4 5 6 7 8 9 10) | Wirkungsspektrum: Bakteriengram-positive: Sporen | Bakteriengram-positive: vegetative Formen | Mykobakterien | gramneg. Bakterien | Pilze: Hefen | Pilze: Schimmelpilze | Viren | Beeinflussung durch das Milieu |
|---|---|---|---|---|---|---|---|---|---|---|
| Peressigsäure | S | | | | | | | | | stark |
| Chlor (Na-Hypochlorit) | S | | | | | | | | | stark |
| Chlorabspalter | S | | | | | | | | | stark |
| Jod | S | | | | | | | | | stark |
| Formaldehyd | L | | | | | | | | | stark |
| Formaldehydabspalter | LL | | | | | | | | | stark |
| Glutaraldehyd | S | | | | | | | | | stark |
| Phenol und Derivate | S | | — | | | | | | | gering |
| Alkohole* | S | | — | | | | | | | gering |
| quartäre Verbindungen | L | | — | | — | | | | | stark |
| Guanidine | S | | — | | — | | | | | stark |
| amphotere Verbindungen | L | | — | | | | | | | mäßig |
| Organische Säuren | S | | — | | — | | | | | stark |

gute Wirksamkeit, abnehmend
nur noch schwache Wirkung
gute Wirksamkeit
mäßig wirksam
— unwirksam
selektiv wirksam

S = schnell wirksam, L = langsam wirksam, LL = sehr langsam wirksam

**Quelle:** Empfehlungen des Friedrich-Loeffler-Instituts über Mittel und Verfahren für die Durchführung einer tierseuchenrechtlich vorgeschriebenen Desinfektion", Stand: 29.07.2020, https://desinfektions-rl.fli.de/de/home

# Annex 3 Recommended Disinfectants and Cleaning & Disinfection Procedures

Approved and listed disinfectants are recommended only.

| Field of application | Recommended disinfectants |
|---|---|
| Surface disinfection<br>Veterinary Institutes | Approved disinfectants according to the guidelines<br>– of the DVG, Part “Veterinary Practice and Animal Shelter” (http://www.dvg.net/index.php?id=169)<br>– of the RKI (https://doi.org/10.1007/s00103-017-2634-6) |
| Surface disinfection<br>Small Animal Clinics | Approved disinfectants according to the guideline of the DVD, Part “Veterinary Practice and Animal Shelter” (https://www.desinfektion-dvg.de/index.php?id=2151) |
| Surface disinfection<br>Large Animal Clinics | Approved disinfectants according to the guidelines of the DVD, Part “Animal Holding” (https://www.desinfektion-dvg.de/index.php?id=2150) |
| Hand sanitizers | Approved disinfectants according to the guidelines<br>– of the VAH, Part “Disinfection of Hands” (https://vah-liste.mhp-verlag.de/)<br>– of the RKI (https://doi.org/10.1007/s00103-017-2634-6) |
| Laundry | Approved disinfectants according to the guidelines<br>– of the VAH, Part “Disinfection of Laundry” (http://www.vah-online.de)<br>– of the RKI (https://doi.org/10.1007/s00103-017-2634-6) |

**Abkürzungen:**

DVG: Deutsche Veterinärmedizinische Gesellschaft e.V.
RKI: Robert Koch-Institute, Berlin
VAH: Verbund für angewandte Hygiene e.V.

For cleaning and disinfection procedures in veterinary fields of application, particularly in case of an outbreak of a notifiable disease, see also

“Empfehlungen des Friedrich-Loeffler-Instituts über Mittel und Verfahren für die Durchführung einer tierseuchenrechtlich vorgeschriebenen Desinfektion”
https://desinfektions-rl.fli.de/de/home

## Annex 4 Grundsätze der Händehygiene: **Vermeidung der Keimübertragungen durch die Hände**

| Ausgangssituation | Empfohlene Maßnahme |
|---|---|
| **Reduktion der Abgabe von transienten Mikroorganismen** | |
| Hände sind noch sauber | Hände sauber halten<br>Arbeiten mit *non touch*-Technik |
| Hände sind normal kontaminiert | Hände waschen |
| Hände sind (wahrscheinlich) mit Pathogenen kontaminiert | Hygienische Händedesinfektion |
| Berührung von Risikomaterial | Hygienische Händedesinfektion |
| **Reduktion der Abgabe von transienten und residenten Mikroorganismen** | |
| Operateur/Assistent vor einem chirurgischen Eingriff | chirurgische Händedesinfektion und sterile Einmalhandschuhe |
| Pflegender vor der Patientenpflege | hygienische Händedesinfektion und sterile Einmalhandschuhe |
| Besiedlung der Hände mit Pathogenen | Therapie und desinfizierende Hände-waschung und sterile Einmalhandschuhe |
| **Verhütung der Infektionsübertragung aus infizierten Handläsionen** | |
| Infizierte Läsion an den Händen | – Verbot von chirurgischen Aktivitäten<br>– Verbot von Tätigkeiten mit Risiko der Keimübertragung auf Tiere oder andere Personen |

(Quelle: W. Herbst, 2011, modifiziert)

## Annex 5 Procedure of Hygienic Hand Disinfection


**Source:** https://plum.eu/images/Viden_Om/UK/CorrecthandwashUK.pdf, March 10, 2021

## Annex 6 Mustervorlage Hautschutzplan der JLU Gießen

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

### Hautschutz- und Händehygieneplan

Für das ……personal der Justus-Liebig-Universität Gießen

| **Was**<br>Maßnahme | **Wann**<br>Indikation | **Wie**<br>Durchführung | **Womit**<br>Produkt |
|---|---|---|---|
| **Hautschutz**  | - vor Arbeitsbeginn<br>- nach Pausen<br>- vor Feuchtarbeiten | - Schmuck an Händen und Unterarmen ablegen<br>- Hautschutzcreme gründlich in die Hände einmassieren | Hautschutzcreme:<br>bei wasserlöslichen Stoffen:<br><br>bei wasserunlöslichen Stoffen: |
| **Handschuhe**  | Siehe Betriebsanweisung, Hygieneplan Arbeits-, Verfahrensanweisungen „Händehygiene“, etc. | Siehe Betriebsanweisung, Hygieneplan Arbeits-, Verfahrensanweisungen „Händehygiene“, etc. | Siehe Betriebsanweisung, Hygieneplan Arbeits-, Verfahrensanweisungen „Händehygiene“, etc.<br>unter Handschuhen: |
| **Händedesinfektion**  | Siehe Betriebsanweisung, Hygieneplan Arbeits-, Verfahrensanweisungen „Händehygiene“, etc. | Siehe Betriebsanweisung, Hygieneplan Arbeits-, Verfahrensanweisungen „Händehygiene“, etc. | Händedesinfektionsmittel:<br>Entsprechend Hygieneplan |
| **Händereinigung**  | - vor Arbeitsbeginn<br>- bei sichtbarer Verschmutzung<br><br>entsprechend Hygieneplan | - Händewaschen auf ein Minimum beschränken<br>- Waschlotion aus dem Spender auf den feuchten Händen aufschäumen<br>- gut mit Wasser abspülen<br>- Hände gründlich abtrocknen | Normale Waschlotion<br>bei mittlerer Verschmutzung:<br><br>bei starker Verschmutzung: |
| **Händepflege**  | - nach jedem Händewaschen<br>- zwischendurch bei Bedarf<br>- am Arbeitsende | - Pflegeprodukt gründlich in beide Hände einmassieren | Pflegelotion oder Pflegecreme z.B. |

AG – Hautschutz, B 3.2/ B 3.1 Stand:April 2009

**Quelle:** https://www.uni-giessen.de/org/admin/dez/b/sonst_jlu_intern/hautschutzplan-muster100318.doc/view, March 10, 2021

# Annex 7 Chemothermische Wäschedesinfektion

Wenn Infektionskrankheiten vorliegen, können die Erreger von den Patienten auch auf die Berufskleidung übertragen werden. Gebrauchte Berufskleidung und Schutzkleidung aus den Tierkliniken [1] ist daher grundsätzlich als kontaminiert einzustufen und einem chemothermischen Waschverfahren zu unterziehen.

Problematisch ist im Allgemeinen das Einsammeln und Transportieren der gebrauchten Wäsche. Gebrauchte Wäsche muss deshalb unmittelbar und ohne Zwischenlagerung in dazu aufgestellte Wäschesammler entsorgt werden. Wäschesammler sind Stoffwickelsäcke, die in fahrbare Gestelle eingehängt sind. Die Wäschesammler sind nach dem Befüllen ausschließlich mit den Verschlüssen, die von der Wäscherei vorgegeben sind, dicht zu verschließen.

Gebrauchte Wäsche muss mindestens einmal täglich vom Stations- bzw. Funktionsbereich durch den hausinternen Hol- und Bringedienst oder andere beauftragte Personen abgeholt und zum Wäschesammelpunkt transportiert werden. Die Wäschesammler sind dabei stets in geschlossenen Behältern zu transportieren.

Weiterhin ist zu beachten:

1. Mitarbeiter*innen und Patientenbesitzer dürfen keine persönliche Wäsche in die zentrale Wäscherei geben.
2. Bevor die Mitarbeiter*innen die Wäsche in den Wäschesammler geben, müssen sie gewissenhaft alle Fremdkörper entfernen, wie Papiertaschentücher, Kugelschreiber, Schlüssel, medizinische Schutzmasken und Ähnliches.
3. Nach dem Einsammeln darf die gebrauchte Wäsche nicht mehr sortiert werden, da die damit verbundene Infektions- und Verletzungsgefahr zu hoch ist.
4. Auch Säcke, die nicht ganz voll sind, müssen bei Betriebsende in geschlossene Behälter gegeben werden.
5. Frischwäsche ist nach der Anlieferung sofort aus dem geschlossenen Behälter zu entnehmen.
6. Die Behälter dürfen nicht als Zwischenlager verwendet werden.

Bei der Waschung der Kleidung sind Waschmittel zu verwenden, die nach den Richtlinien des VAH geprüft und für wirksam befunden wurden (siehe **Annex 2**). Waschtemperatur, Waschmittelkonzentration, Waschdauer und Flottenverhältnis sind den Gebrauchshinweisen der VAH-gelisteten Waschmittel oder der VAH-Liste oder der RKI-Liste [2] zu entnehmen.

In besonderen Fällen, ist es sinnvoll, die Wäsche bereits vor Ort chemothermisch zu desinfizieren oder einem anderen Dekontaminationsverfahren zu unterziehen, bevor sie zum Wäschesammelpunkt des Fachbereichs gegeben wird, z.B. bei Schutzkleidung aus gentechnischen Labors der Sicherheitsstufe 2 oder höher oder bei konkretem Verdacht der Wäschekontamination mit dem Erreger einer anzeigepflichtigen Tierseuche oder mit einem humanpathogenen Erreger.

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[1] Wäsche aus Instituten, in denen klinische Proben oder pathogene Mikroorganismen bearbeitet werden, ist Klinikswäsche gleichzusetzen.

[2] RKI (2017). Liste der vom Robert Koch-Institut geprüften und anerkannten Desinfektionsmittel und –verfahren; Stand 31. Oktober 2017 (17. Ausgabe). Bundesgesundheitsblatt 60: 1274 – 1297 (https://doi.org/10.1007/s00103-017-2634-6)

# Annex 8 Dampfsterilisation

## Definition:

Unter der Dampfsterilisation versteht man das Sterilisieren von Materialien mit reinem, gesättigtem Wasserdampf. Dieser Dampf muss für die Einwirkung auf den Oberflächen des Sterilisiergutes mindestens eine Temperatur von 121 °C erreicht haben. Die Dampfsterilisation ist in den Bereichen der Medizin, Veterinärmedizin und Mikrobiologie (inkl. Virologie und Parasitologie) das sicherste Verfahren. Daher sollte sie gegenüber allen anderen Sterilisationsverfahren bevorzugt werden.

Wenn das Sterilisationsgut porös ist (z. B. Textilien), muss es vollständig entlüftet werden, damit es der Dampf vollständig durchdringen kann.

## Einwirkzeit:

- Bei einer Temperatur von 121 °C beträgt die Einwirkzeit mindestens 15 Minuten.
- Bei einer Temperatur von 134 °C beträgt die Einwirkzeit mindestens 3 Minuten.

Von dieser Vorgabe nach DIN EN 285 und DIN 58951 kann nur abgewichen werden, wenn vorher eine Validierung stattgefunden hat.

## Fehlerquellen:

Damit die Luft aus Kammer und Sterilisationsgut vollständig entfernt wird und eine gleichmäßige Dampfdurchdringung stattfinden kann, setzt man heute fraktionierte Vakuumverfahren ein. Die Wirksamkeit der Dampfsterilisation kann durch mangelhafte Dampfqualität (nicht kondensierbare Gase, überhitzter Dampf, Nassdampf) sowie mangelhafte Entlüftung, Leckagen und Luftinseln beeinträchtigt werden.

### *Folgendes ist zu beachten:*

- Mängel, die nur hin und wieder auftreten, werden zuverlässiger durch chargenbezogene als durch periodische Kontrollen entdeckt.
- Es ist durch Kondensierung des Sterilisiergutes im Sterilisator sicherzustellen, dass die Sterilisation durch Kondensatbildung nicht beeinträchtigt wird. Wenn das Sterilisiergut richtig verpackt ist und die Sterilisierkammer sachgerecht behandelt wurde, darf das Sterilgut bei der Entnahme aus dem Gerät auf keinen Fall feucht oder nass sein. Ansonsten kann es nicht mehr verwendet werden.
- Bei Krankenhäusern werden Mischprogramme empfohlen, die sowohl auf Instrumente als auch auf Textilien angewendet werden. Die Vorgaben der DIN EN 554 sind dabei zu beachten.
- Einzelne Instrumente, die während des Eingriffes unsteril geworden sind, aber sofort wieder benötigt werden, können dezentral bei einer Temperatur von 134 °C in der Verpackung sterilisiert werden. Es besteht jedoch die folgende Ausnahme: Wenn bei Patienten der Verdacht besteht, dass sie an einer Form der Spongiformen Encephalopathie (Mensch: Creutzfeld-Jakob-Krankheit) leiden, können die Instrumente auf keinen Fall mehr wiederverwendet werden – es sei denn, sie werden einem speziellen Verfahren unterzogen: Dampfsterilisation bei 134 °C über mind. 60 Minuten. Wenn dieser Vorgang nicht möglich ist, kann man sie zunächst mit 1 molarer Natronlauge oder 2,5 bis 5 %iger Natriumhypochloridlösung über 24 Stunden chemisch desinfizieren. Anschließend muss dann eine Dampfsterilisation bei einer Temperatur von 134 °C mit üblicher Einwirkungszeit durchgeführt werden.

# Annex 9 Mustervorlage Hygieneplan

| JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN | Fachbereich 10 – Veterinärmedizin | Hygieneplan |
|---|---|---|

**Institut/Klinik/Professur für …….**

Frankfurter Straße ….., 35392 Gießen

(Name und Anschrift der Einrichtung)

| | | | |
|---|---|---|---|
| Erstellt am: | … | Bearbeitet von: | … |
| Letzte Änderung am: | … | Verantwortlicher: | … |

**INHALTSVERZEICHNIS**

# 1. Personalhygiene

## HÄNDEHYGIENE

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Händewaschung | – vor Arbeitsbeginn / nach Arbeitsende<br>– nach Verschmutzung | Hände nass machen und Waschlotion aus dem Wandspender entnehmen. Waschlotion auf den gesamten Handflächen gründlich einreiben, unter fließendem Wasser gründlich abspülen. Hände mit Einmalhandtuch abtrocknen. | Waschlotion,<br>siehe auch Annex 4. | Alle Personen |
| Hygienische Händedesinfektion | – vor Arbeitsbeginn / nach Arbeitsende<br>– vor / nach jedem Patientenkontakt<br>– vor Anlegen einer Infusion<br>– vor Injektionen<br>– nach Berühren von (mutmaßlich) kontaminiertem Material<br>– nach Toilettenbenutzung | 3 – 5 ml Händedesinfektionsmittel in die hohle Hand geben (i.d.R. 2 Hübe aus dem Wandspender) und für mindestens 30 Sek. in die trockenen Hände einreiben. Besondere Beachtung ist den Fingerzwischenräumen und den Fingerkuppen zu schenken. Die Hände sind währenddessen feucht zu halten. | Alkoholische Hände-desinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Annexe 3, 4 und 5. | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |
| Hygienische Händedesinfektion | – bei sichtbarer Kontamination | Wurden die Hände sichtbar oder merklich mit keimhaltigem Material (Eiter, Sputum, Stuhl, Exudat u. ä.) kontaminiert, so sind die beschmutzten Stellen mit einem mit Desinfektionsmittel getränkten Einmaltuch zu reinigen.<br>Anschließend erfolgt eine hygienische Händedesinfektion (siehe oben).<br>Hiernach können die Hände gewaschen werden.<br>Es schließt sich eine weitere hygienische Händedesinfektion an. | Alkoholische Hände-desinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Annexe 3, 4 und 5. | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Chirurgische Händedesinfektion | – vor chirurgischen Eingriffen<br>– vor Punktionen in Organe und Körperhöhlen | Hände und Unterarme mind. 10 min vor der Desinfektion waschen (siehe auch Abschnitt 1). Dazu Hände und Unterarme bis zu den Ellenbogen mit nach oben gerichteten Fingerspitzen und tief liegenden Ellenbogen über etwa 30–60 s mit einem Handwaschpräparat bearbeiten. Danach die Haut sorgfältig abtrocknen.<br>3 – 5 ml Händedesinfektionsmittel (HDM) in die hohle Hand geben (i.d.R. 2 Hübe aus dem Wandspender) und zunächst auf den Händen (10 sec), dann auf den Unterarmen (10 sec) lückenlos verteilen. Dann die Hände mittels Einreibetechnik desinfizieren (70 sec). Hauptaugenmerk: Fingerkuppen, Nagelfalze, Fingerzwischenräume. Alle Hautareale müssen mit dem HDM für die Dauer der deklarierten Einwirkungszeit (mind. 1,5 min) benetzt bleiben. Falls erforderlich, muss man dem Spender weiteres HDM entnehmen<br>Danach Hände lufttrocken lassen (1 min). | Alkoholische Hände-desinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Annex 3 und 4. | Wiss. Personal, med.-technisches Personal, Studierende |
| Haut- und Handpflege | – mehrmals täglich<br>– nach Arbeitsende | Hautpflegemittel aus dem Spender entnehmen und in die Haut gleichmäßig einmassieren.<br>Hautpflegemittel aus einem, von allen Beschäftigten gemeinsam benutzten Behälter ohne Dosiereinrichtung sind ungeeignet. Geeignet sind z. B. Tuben oder Direktspender. | Handcreme, Pflegeemulsion.<br>Siehe auch Hautschutzplan.<br>Siehe auch Annex 6. | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |
| Haare, Fingernägel | – täglich<br>– bei Bedarf | Lange Haare sind zusammenzubinden und evtl. hochzustecken.<br>Die Länge der Fingernägel darf die Fingerkuppen nicht überragen. Nagellack ist nicht zulässig. | | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |

## PERSONALSCHUTZ

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Berufskleidung | Während des Dienstes ist Berufskleidung zu tragen. | Die Einrichtung wird ausschließlich in privater Kleidung betreten und verlassen.<br>Die Berufskleidung muss geschlossen getragen werden und die Privatkleidung vollständig bedecken.<br>Die Privatkleidung ist getrennt von der Berufskleidung aufzubewahren.<br>Die Berufskleidung ist wöchentlich sowie bei Kontamination / Verschmutzung zu wechseln.<br>Über der Berufskleidung kann eine Schutzkleidung getragen werden.<br>Unmittelbar nach dem Ablegen von Berufskleidung, z.B. nach Dienstende, sind die Hände hygienisch zu desinfizieren. | Hemden, Shirts, Kasacks, Hosen.<br>Chemothermische Wäschedesinfektion.<br>Siehe auch Annex 7. | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |
| Schutzkleidung | Schutzkleidung ist zu tragen, ….<br>– bei allen Arbeiten, bei denen mit einer mikrobiellen Kontamination oder Keimverschleppung zu rechnen ist.<br>– bei Kontakt zu Patienten.<br>– bei Schmutzarbeiten<br>– bei Bedarf | Die Schutzkleidung, z.B. in Form eine Schutzkittels, ist über der Berufskleidung oder über der Privatkleidung zu tragen.<br>Die Schutzkleidung muss geschlossen getragen werden, die Kleidung darunter muss bis unterhalb der Knie vollständig bedeckt sein.<br>Die Schutzkleidung ist täglich sowie bei Kontamination / Verschmutzung zu wechseln.<br>Die Schutzkleidung ist abzulegen<br>– vor dem Betreten der Aufenthaltsräume bzw. vor dem Essen und Trinken,<br>– vor dem Verlassen der Einrichtung. | Schutzkittel<br>Chemothermische Wäschedesinfektion, ggf. vorherige Dampfsterilisation.<br>Siehe Annexe 7 und 8. | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Einmalschürzen | – bei Arbeiten mit besonderem Risiko der Verschmutzung oder Kontamination<br>– bei Schmutzarbeiten | Bei bestimmten Arbeiten ist über der Berufskleidung und/oder über der Schutzkleidung eine Einmalschürze zu tragen, z. B. wenn mit dem Verspritzen von Blut, Körperflüssigkeiten, Ausscheidungen oder kontaminiertem Material zu rechnen ist.<br>Einmalschürzen sind abzulegen<br>– vor dem Betreten der Aufenthaltsräume bzw. vor dem Essen und Trinken,<br>– vor dem Verlassen der Einrichtung. | Einmalschürzen.<br>Unschädliche Entsorgung mit dem infektiösen Abfall. | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |
| Röntgenschürzen | – nach jedem Patientenkontakt | Wischdesinfektion: mit einem mit Desinfektionsmittel getränkten Einmaltuch abwischen. | Flächendesinfek-tionsmittel gemäß VAH-Liste (siehe Annex 3). | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen |
| Einmal-handschuhe | – bei Infektionsgefahr<br>– bei Schmutzarbeiten | Einmalhandschuhe sind zu tragen:<br>– bei allen Arbeiten, bei denen eine Berührung mit Blut, Blutbestandteilen, Körperflüssigkeiten oder Ausscheidungen möglich ist,<br>– bei invasiven Maßnahmen zur Diagnostik oder Therapie (z.B. Katheterisierung, Drainagen),<br>– bei der Berührung der Schleimhaut, von nässenden oder blutenden Hautveränderungen, von Wunden.<br>– Bei Kontakt mit Patienten, von denen Infektionen ausgehen können.<br>Die Einmalhandschuhe sind nach Gebrauch bzw. nach dem Kontakt zu einem Patienten sofort wegzuwerfen. Das Tragen von Einmalhandschuhen entbindet nicht von der Pflicht einer hygienischen Händedesinfektion.<br>Einmalhandschuhe dürfen nicht wiederverwendet werden. | Nicht-gepuderte Einmalhandschuhe<br>Unschädlich entsorgen mit dem infektiösen Abfall. | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Schutz-handschuhe | – bei Reinigungs- bzw. Schmutzarbeiten | Beim Umgang mit Reinigungs- und Desinfektionsmitteln, v.a. mit den Stammlösungen, sind geeignete Schutzhandschuhe zu tragen.<br>Die Schutzhandschuhe sind nach Gebrauch sofort zu reinigen und zu trocknen.<br>Schutzhandschuhe sind alle 8 Wochen bzw. bei Beschädigung sofort gegen neue Handschuhe auszutauschen. | Flüssigkeitsdichte Gummi- oder Kunststoffhandschuhe<br>Desinfektionsmittel gemäß VAH-Liste, (siehe Annex 3) | Wiss. Personal, med.-technisches Personal, Tierpfleger*innen, Reinigungspersonal |
| Mund-/Nasenschutz, Schutzbrille | – bei Kontakt zu bestimmten Patienten<br>– bei invasiven Eingriffen | Ein Mund-/Nasenschutz sowie ggf. eine Schutzbrille sind korrekt zu tragen,<br>– wenn mit Aerosolbildung oder Verspritzen von Blut, Körperflüssigkeiten, Ausscheidungen oder kontaminiertem Material zu rechnen ist,<br>– bei Patienten, von denen Infektionen ausgehen können,<br>– bei Patienten, die vor Infektionen besonders geschützt werden müssen.<br>Die Maske muss Mund und Nase stets vollständig bedecken. Sie muss bei länger dauernden Eingriffen sowie bei Durchfeuchtung oder Verschmutzung gewechselt und sofort entsorgt werden. Anschließend sind die Hände zu desinfizieren. | Medizinische Maske (OP-Maske oder FFP2-Maske ohne Ventil) | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal, Besucher*innen |
| Schuhe | – täglich<br>– nach Verschmutzung | Während der Tätigkeiten in der Klinik, in Ställen oder im Labor sind geeignete Berufs- oder Arbeitsschuhe mit folgenden Eigenschaften zu tragen:<br>– vorderer Bereich geschlossen,<br>– Fersenhalt rutschhemmend,<br>– desinfizierbar.<br>Wischdesinfektion: mit einem mit Desinfektionsmittel getränkten Einmaltuch abwischen. | Flächendesinfektions-mittel gemäß DVG-Liste, (siehe Annex 3) | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Schmuck und Uhren | – während jeglicher Tätigkeiten in der Klinik, in den Ställen oder im Labor | Während der Tätigkeiten in der Klinik, in den Ställen oder im Labor dürfen an den Händen und Unterarmen keine Schmuckstücke (inkl. Eheringe, Freundschaftsbändchen) und Uhren getragen werden. Die Gegnstände sind vorher abzulegen und diebstahlsicher aufzubewahren. | | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |
| Essen, trinken, rauchen, schminken, u.ä. | – grundsätzlich | Essen, trinken, schminken, hantieren mit Kontaktlinsen und dergl. ist nur in den Aufenthaltsräumen und Büros ohne Publikumsverkehr gestattet. Lebensmittel und Getränke dürfen nur dort aufbewahrt werden.<br>Rauchen ist nur an den dazu ausgewiesenen Raucherplätzen gestattet. | | Alle Personen |

## 2. Flächenreinigung und -desinfektion

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Tischoberflächen, Untersuchungs- und Behandlungs-tische | – nach jedem Patienten<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung und -Desinfektion | Flächendesinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen |
| Tischoberflächen, Arbeitstische | – mindestens arbeitstäglich (nach Arbeitsende)<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung und -Desinfektion | | |
| OP-Tisch, OP-Einrichtung | – nach jeder OP<br>– mindestens arbeitstäglich (nach Arbeitsende) | Scheuer-Wisch-Reinigung und -Desinfektion | | |
| Möbeloberflächen | – 1 x/Monat<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Feucht abwischen; ggf. Scheuer-Wisch-Desinfektion | Haushaltsreiniger, ggf. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Reinigungspersonal |
| Medizinische Geräte und Monitore | – sofort nach Gebrauch<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort<br>– mindestens 1 x/Woche | Vorsicht bei stromführenden Teilen! Zuerst Netzstecker ziehen!<br>Feuchte Wisch-Desinfektion. Dabei darf keine Flüssigkeit in das Geräteinnere eindringen. | (Alkoholische) Flächendesinfektions-mittel gemäß VAH-Liste, (siehe Annex 3) | Med.-technisches Personal, Reinigungspersonal |
| Fußböden, glatt | – Reinigung arbeitstäglich<br>– Reinigung und Desinfektion jeden dritten Arbeitstag<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung und -Desinfektion | Haushaltsreiniger bzw. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Reinigungspersonal |

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Fußböden, textil | – Reinigung arbeitstäglich<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Saugen; ggf. Scheuer-Wisch-Desinfektion | Staubsauger, ggf. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Reinigungspersonal |
| Lichtleisten, Versor-gungsleisten | – Reinigung 1x / Monat<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung; ggf. Scheuer-Wisch-Desinfektion | Haushaltsreiniger, ggf. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Reinigungspersonal bzw. Vet.med. Personal |
| Wände, Decke | – bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung; ggf. Scheuer-Wisch-Desinfektion | Haushaltsreiniger, ggf. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Vet.med. Personal, Reinigungspersonal |
| Personal- und Besuchertoiletten | – Reinigung arbeitstäglich<br>– Reinigung und Desinfektion jeden dritten Arbeitstag<br>– bei sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung und -Desinfektion | Haushaltsreiniger bzw. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Reinigungspersonal |
| Hundebox und dergl. | – Reinigung arbeitstäglich<br>– Reinigung und Desinfektion nach jedem Patienten<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung; ggf. Scheuerwisch-Desinfektion | Haushaltsreiniger, ggf. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Tierpfleger*innen |
| Sonstige Flächen | – bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort | Scheuer-Wisch-Reinigung; ggf. Scheuerwisch-Desinfektion | Haushaltsreiniger, ggf. Flächen-desinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Wiss. Personal, med.-technisches Personal, Studierende, Tierpfleger*innen |

# 3. Instrumentenaufbereitung

## MANUELL

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Stethoskop, EKG-Elektroden, Thermometer | – mindestens arbeitstäglich (nach Arbeitsende)<br>– bei Kontaminationsverdacht oder sichtbarer Verschmutzung sofort<br>– nach Kontakt zu infektiösen Patienten sofort | Scheuer-Wisch-Reinigung und –Desinfektion oder Einlegen in Desinfektionsmittel | Desinfektionsmittel gemäß VAH-Liste, Rubrik Instrumentendesinfektion, (siehe Annex 3) | Wiss. Personal, med.-technisches Personal, Studierende |
| Gummi- und Kunststoffteile (Mehrweg-) | – nach Gebrauch | Gebrauchte Teile nur mit Handschuhen anfassen und in Desinfektionsmittelwanne mit Siebeinsatz und Deckel einlegen. Mindesteinwirkzeit beachten. | Desinfektionsmittel gemäß VAH-Liste, Rubrik Instrumentendesinfektion, (siehe Annex 3) | med.-technisches Personal, Studierende |
| Sonstige Instrumente desinfizieren | – nach Gebrauch | Gebrauchte Instrumente nur mit Handschuhen anfassen und in Desinfektionsmittelwanne mit Siebeinsatz und Deckel einlegen. Mindesteinwirkzeit beachten. | Desinfektionsmittel gemäß VAH-Liste, Rubrik Instrumentendesinfektion, (siehe Annex 3) | |
| Sonstige Instrumente manuell reinigen | – nach Ende der chemischen Desinfektion (s.o.) | Bürsten und spülen. | Kunststoffbürste oder –schwamm (keine Metallbürsten), Reinigungspistole | |
| Sonstige Instrumente reinigen mit Ultraschall | – nach Ende der chemischen Desinfektion (s.o.)<br>– oder direkt nach Gebrauch, wenn das Ultraschallbad mit Desinfektionsmittel gefüllt ist | In Ultraschallbad mit Reinigungslösung oder (kombinierter) Desinfektionsmittellösung beschallen. | Ultraschallbecken, Reinigungsmittel oder Desinfektionsmittel gemäß VAH-Liste, Rubrik Instrumentendesinfektion, (siehe Annex 3) | |

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Sonstige Instrumente spülen | – nach der manuellen Reinigung<br>– nach dem Ultraschallbad | Gründlich abspülen. | Demineralisiertes Wasser | |
| Sonstige Instrumente trocknen | – nach dem Spülen | Von außen mit Druckluft anblasen oder mit keimarmen, sauberen Tüchern abreiben.<br>Hohlinstrumente mit Druckluft durchblasen. | Druckluftpistole, keimarme Einmaltücher | |
| Sonstige Instrumente aufbewahren und sterilisieren | – nach vollständiger Trocknung | Hände hygienische desinfizieren und Instrumente in kontaminationsgeschützte Behälter legen.<br>Ggf. der Sterilisation zuführen. | Kontaminationsgeschützte Behälter | med.-technisches Personal, Studierende |
| Gummi- und Kunststoffteile (Mehrweg-) | – nach Gebrauch | Gebrauchte Teile nur mit Handschuhen anfassen und in Desinfektionsmittelwanne mit Siebeinsatz und Deckel einlegen. Mindesteinwirkzeit beachten.<br>Weitere Aufbereitung wie „Sonstige Instrumente“ | Desinfektionsmittel gemäß VAH-Liste, Rubrik Instrumentendesinfektion, (siehe Annex 3) | med.-technisches Personal, Studierende |

**MASCHINELL**

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Instrumente, thermostabile | – Nach Gebrauch trocken abgelegt | Evtl. zuerst in Einzelteile zerlegen.<br>Siebeinlage in den Reinigungsautomaten einlegen und thermisches Programm starten. | Reinigungsautomat | Wiss. Personal, med.-technisches Personal |
| Instrumente, chemothermisch stabile | – Nach Gebrauch trocken abgelegt | Evtl. zuerst in Einzelteile zerlegen.<br>Siebeinlage in den Reinigungsautomaten einlegen und chemothermisches Programm starten. | | |

## 4. Wäscheaufbereitung

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Medizinische Schutzkleidung, normal verschmutzt | – arbeitstäglich (nach Arbeitsende) | Taschen entleeren.<br>Kleidung in den dazu ausgewiesenen Sammel-Containern (inkl. Wäschesäcke) ablegen. Dort abgelegte Kleidung nicht noch einmal herausnehmen. Säcke nicht überfüllen<br>Container gut verschließen über die FB10-Wäschesammelstelle der Zentralwäscherei zu führen. | Chemothermische Wäsche-desinfektion (siehe Annex 7) | Reinigungspersonal |
| Berufskleidung, normal verschmutzt | – arbeitswöchentlich (nach Arbeitsende) | | | |
| Medizinische Schutzkleidung und Berufskleidung, mikrobiell kontaminiert | – bei Kontamination oder Kontaminationsverdacht sofort<br>– nach Kontakt zu infektiösen Patienten | Taschen entleeren.<br>Kleidung in den dazu ausgewiesenen Autoklavier-Eimer ablegen, Eimer verschließen und der Sterilisation zuführen.<br>Sterilisierte Kleidung danach wie normal verschmutzte Wäsche behandeln. | Dampfsterilisation (siehe Annex 8), danach chemothermische Wäschedesinfektion (siehe Annex 7) | Vet.med. Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |
| Sonstige Textilien | – nach jedem Patienten<br>– arbeitstäglich | Nicht auf den Boden werfen!<br>Textilien wie normal verschmutzte Kleidung weiterbehandeln (siehe oben). | Chemothermische Wäsche-desinfektion (siehe Annex 7) | Reinigungspersonal |
| | – nach Kontakt mit infektions-verdächtigen Patienten<br>– mit Blut oder Kot verschmutzt | Nicht auf den Boden werfen!<br>Textilien wie mikrobiell kontaminierte Kleidung weiter-behandeln (siehe oben). | Dampfsterilisation (siehe Annex 8), danach chemothermische Wäsche-desinfektion (siehe Annex 7) | Vet.med. Personal, Studierende, Tierpfleger*innen, Reinigungspersonal |

# 5. Hygienemaßnahmen bei der Diagnostik, Pflege und Therapie

## HYGIENE BEI EINFACHEN INJEKTIONEN UND PUNKTIONEN

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Hygienische Händedesinfektion | – vor dem Aufziehen der Spritze<br>– vor der Injektion oder Punktion | Siehe Kapitel 1 „Personalhygiene“ | Alkoholische Händedesinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Annexe 3, 4 und 5. | Tierärzt*innen, assistierende Personen |
| Hautdesinfektion | – unmittelbar vor der Injektion oder Punktion | An der vorgesehenen Injektions- bzw. Punktionsstelle satt aufsprühen und mit Tupfer auf der Haut verteilen.<br>Mindesteinwirkzeit beachten. | | |
| Vorbereitung | – vor der Entnahme der Lösung aus der Injektionsflasche | Einstichstelle desinfizieren, Mindesteinwirkzeit beachten, Desinfektionsmittel trocknen lassen<br>Mehrdosierbehältnisse (z. B. Aqua, NaCl etc.) sind max. ein Arbeitstag haltbar. | | |
| Gebrauchte Kanülen | – nach der Injektion oder Punktion | Gebrauchte Kanülen dürfen nie in die Schutzhüllen zurückgesteckt werden. Die Entsorgung erfolgt ohne jede Zwischenlagerung in das dafür vorgesehene Sammelgefäß | festes, durchstichsicheres, bruchfestes Behältnis (keine Glasflaschen). | |

## HYGIENE BEI PUNKTIONEN VON ORGANEN UND KÖRPERHÖHLEN

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Sterile Schutzkleidung | – bei erhöhter Gefährdung der Patienten | Vor der Händedesinfektion anlegen. | | Tierärzt*innen, assistierende Personen |
| Chirurgische Händedesinfektion | – unmittelbar vor der Punktion | Siehe Abschnitt 1 „Personalhygiene“ | Alkoholische Händedesinfektions-mittel gemäß VAH-Liste.<br>Siehe auch Siehe auch Annexe 3, 4 und 5. | |
| Hautdesinfektion | – unmittelbar vor der Punktion | An der vorgesehenen Punktionsstelle satt aufsprühen und mit Tupfer auf der Haut verteilen.<br>Mindesteinwirkzeit beachten (mind. 2 x 2,5 min). | | |
| Vorbereitung | – vor der Entnahme der Lösung aus der Injektionsflasche | Einstichstelle desinfizieren, Mindesteinwirkzeit beachten, Desinfektionsmittel trocknen lassen<br>Mehrdosierbehältnisse (z. B. Aqua, NaCl etc.) sind max. ein Arbeitstag haltbar. | | |
| Gebrauchte Kanülen | – nach der Injektion oder Punktion | Gebrauchte Kanülen dürfen nie in die Schutzhüllen zurückgesteckt werden. Die Entsorgung erfolgt ohne jede Zwischenlagerung in das dafür vorgesehene Sammelgefäß | festes, durchstichsicheres, bruchfestes Behältnis (keine Glasflaschen). | |

## HYGIENE BEI DER INFUSIONSTHERAPIE

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Hygienische Händedesinfektion | – vor der Vorbereitung<br>– vor dem Anlegen<br>– vor dem Wechsel<br>– vor dem Entfernen | Siehe Kapitel 1 „Personalhygiene“ | Alkoholische Händedesinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Siehe auch Annexe 3, 4 und 5. | Tierärzt*innen, assistierende Personen |
| Vorbereitung | – kurz vor der Verabreichung | Sichtkontrolle des Infusionsbehälters auf Beschädigungen oder Veränderungen der Lösung. Verfallsdatum beachten.<br>Medikamente erst kurz vor Gebrauch zumischen. Dabei Gummistopfen vor dem Zuspritzen mit Hautdesinfektionsmittel desinfizieren. | Infusionslösung, ggf. zusätzliche Medikamente | |
| Hautdesinfektion | – vor der Injektion oder Punktion | An der vorgesehenen Injektions- bzw. Punktionsstelle satt aufsprühen und mit Tupfer auf der Haut verteilen.<br>Mindesteinwirkzeit beachten. | Alkoholische Händedesinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Siehe auch Annexe 3, 4 und 5. | |
| Verabreichen der Infusion | – | Einmalhandschuhe tragen.<br>Verweilkanüle sorgfältig fixieren.<br>Bei Kurzinfusion Metallkanüle verwenden.<br>Bei Kunststoffkanüle Liegedauer von 72 h nicht überschreiten.<br>Dokumentation: Name des Patienten, Beginn und Dauer der Infusion, ggf. zugemischte Medikamente. | Infusionslösung, ggf. zusätzliche Medikamente | Tierärzt*innen |

## HYGIENE BEI DER WUNDVERSORGUNG

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Hautdesinfektion | – vor der Wundversorgung<br>– vor jedem Verbandwechsel | Desinfektionsmittel an der vorgesehenen Injektions- bzw. Punktionsstelle satt aufsprühen und mit Tupfer auf der Haut verteilen.<br>Mindesteinwirkzeit beachten. | Alkoholische Hände-desinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Annexe 3, 4 und 5. | Tierärzt*innen, assistierende Personen, Tierpfleger*innen, Tierarzthelfer*innen , Studierende |
| Versorgung der Wunde | – bei Indikation | Sterile Einmal-Handschuhe anziehen.<br>Wunde niemals mit Hand berühren (***non touch***-Technik), sterile Instrumente verwenden.<br>Benutzte Instrumente sofort aufbereiten. Gebrauchtes Verbandsmaterial sofort entsorgen.<br>Nach der Vorsorgung sind die Hände eine hygienische Händedesinfektion durchgeführt werden. | Sterile Einmal-Handschuhe, Verbandsmaterial, sterile Instrumente, alkoholische Händedesinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Annexe 3, 4 und 5. | |
| Verbandwechsel | – bei Indikation | Der Verbandwechsel sollte von zwei Personen durchgeführt werden.<br>Sterile Einmal-Handschuhe anziehen.<br>Verband unter Zuhilfenahme von sterilen Instrumenten wechseln. Wunde niemals mit Hand berühren (***non touch***-Technik).<br>Verbandwagen und Arbeitsfläche vor und nach dem Verbandwechsel desinfizieren.<br>Benutzte Instrumente sofort aufbereiten. Gebrauchtes Verbandsmaterial sofort entsorgen.<br>Nach dem Verbandwechsel Hände hygienisch desinfizieren. | Sterile Einmal-Handschuhe, Verbandsmaterial, sterile Instrumente, alkoholische Händedesinfektionsmittel gemäß VAH-Liste.<br>Siehe auch Annexe 3, 4 und 5. | |

# 6. Hygienemaßnahmen bei der Abfallentsorgung

## ALLGEMEINES

Die Abfallströme und die ordnungsgemäße Entsorgung von Abfällen sind an der JLU Gießen zentral geregelt. Eine Übersicht finden Sie auf der Website „Wohin mit dem "Müll" - kleines Abfall ABC“ (https://www.uni-giessen.de/org/admin/dez/e/3/Abfallwirtschaft/Abfalltrennung).

**Zuständigkeiten:**

**Siedlungsabfall** („**normaler“ Abfall, nicht gefährlicher Abfall**)

Zu diesem Abfall zählen z.B. Restmüll, Biomüll, Papier und Pappe, Wertstoffe des Dualen Systems Deutschland (DSD) etc. Für das Abfallmanagement an der JLU Gießen ist die Liegenschaftsabteilung (Dezernat E 3) der JLU Gießen zuständig, genauer das Sachgebiet E 3.6 „Logistik und Außenanlagen“. Der zuständige Sachbearbeiter ist unter der Rufnummer 0641-99-12538 oder -12617 erreichbar.

**Gefährlicher Abfall (chemischer Sonderabfall)**

Das chemische Zwischenlager des Dezernats B 3 entsorgt und koordiniert die Entsorgung gefährlicher Abfälle aus Einrichtungen der Universität einschließlich der Versuchsgüter und Kliniken sowie des Universitätsklinikums Gießen und Marburg (Standort Gießen), mit Ausnahme der radioaktiven Abfälle. Zuständiger Ansprechpartner ist Herr Ellinghaus (Dezernat B) unter der Rufnummer 0641/99-12214.

## EINRICHTUNGSSPEZIFISCHE MASSNAHMEN

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Mikrobiell kontaminierter Abfall, autoklavierbar | – arbeitstäglich<br>– nach Bedarf | Mülltrennung beachten.<br>Abfall in jeweils eigenen mit Autoklavenbeuteln bestückten Autoklaviereimern sammeln. Befüllte Autoklavenbeutel und -eimer der zentralen Vernichtungssterilisation durch Dampfsterilisation zuführen.<br>Autoklaven dürfen nur durch qualifiziertes u. eingewiesenes Personal bedient werden; spezifische Betriebsanweisung beachten.<br>Abfall abkühlen lassen und Eimer danach in die Restmüll-Tonnen entleeren. | Autoklavenbeutel, Autoklaviereimer aus Edelstahl mit gelochtem Falz; Stand- oder Tischautoklaven (z.B. mind. 121 °C, ca. 2 bar; mind. 15 min) | Alle Mitarbeiter*innen; Autoklaven-bedienung: nur durch qualifiziertes u. eingewiesenes Personal |
| Mikrobiell kontaminierter Abfall, nicht autoklavierbar [3] | – arbeitstäglich<br>– nach Bedarf | In Wanne mit Desinfektionsmittel legen.<br>Mindesteinwirkzeit beachten.<br>Danach in die Restmüll-Tonnen entleeren. | Flächendesinfektionsmittel gemäß DVG-Listen oder VAH-Liste, (siehe Annex 3) | Alle Mitarbeiter*innen |
| Papiermüll | – 2 – 3 x/Woche<br>– nach Bedarf | Mülltrennung beachten.<br>Papiermüll-Eimer in den Papiermüll-Tonne entleeren und reinigen. | Papiermüll-Eimer und –tonne, Haushaltsreiniger | Reinigungspersonal (bei Bedarf: sonstige Mitarbeiter*innen) |
| Restmüll/Hausmüll | – 2 – 3 x/Woche<br>– nach Bedarf | Mülltrennung beachten.<br>Papiermüll-Eimer in den Restmüll-Tonne entleeren, reinigen und mit neuer Abfalltüte bestücken. | Restmüll-Eimer und –tonne, Haushaltsreiniger, Abfalltüten | |
| Altglas, normal | – nach Bedarf | Mülltrennung beachten.<br>Glasmüll nach Farbe sortieren und in die Glasmüll-Tonnen entsorgen: weiß, grün und braun. Rotes, blaues und gelbes Glas in den Grünglas-Container. | Glasmüll-Tonnen: weiß, grün und braun. | Alle Mitarbeiter*innen |

[3] z.B. Nitrocellulose (entzündlich, explosionsgefährdet)

| WAS? | WANN? | WIE? | WOMIT? | WER? |
|---|---|---|---|---|
| Labor-Altglas<br>hitzebeständiges Glas, Borosilikatglas | – nach Bedarf | Z.B. Glas der Firmen Schott®, Duran®.<br>Mikrobiell kontaminiertes Glas und Glasbruch dekontaminieren (siehe oben).<br>Glas in den gekennzeichneten Sammelbehältern im Zentrallager Chemie (Flügel C und D) entsorgen.<br>Hitzebeständiges Glas darf NIE in die Glasmüll-Tonnen für normales Altglas entsorgt werden. | | Alle Mitarbeiter*innen |
| Organproben, Tierkadaver | – nach Bedarf | In dem gekennzeichneten Kadaver-Container deponieren.<br>Container-Inhalt bis zur Abholung gegen unbefugten Zugriff, Witterungseinflüsse und Tiere geschützt aufbewahren.<br>Container nach jeder Abholung reinigen und desinfizieren (siehe Flächendesinfektion, sonstige Flächen). | Kadaver-Container.<br>Flächendesinfektionsmittel gemäß DVG-Listen (siehe Annex 3) | Tierpfleger*innen |
| Sonstiger Abfall | – nach Bedarf | In Absprache mit dem zuständigen Sachbearbeiter im Dezernat E, Sachgebiet 3.6 ), 0641-99-12538 oder -12617. | | Alle Mitarbeiter*innen |
| Sondermüll | – nach Bedarf | In Absprache mit dem zuständigen Ansprechpartner Herr Ellinghaus (Dezernat B), Rufnummer 0641/99-12214 | | Alle Mitarbeiter*innen |

# Appendix to 6.2

## Details on IT-services at JLU Gießen

### Central services for all students at the JLU managed by IT Service Center (Hochschulrechenzentrum, HRZ)

**General services**

- Receiving and sending Email via webmail or with email clients like Outlook or Thunderbird
- Examination management system FlexNow
- Learning management and information systems Stud.IP, ILIAS, vet-learn, lecture video recordings
- Cloud storage (JLUbox), at the moment with a quota of 30 GB
- Access to public work stations*
- Access to the data network (wireless LAN, public data sockets)
- Access to electronic resources of the library system from home (e.g. bibliographical databases, e-books, e-journals)
- Server Storage for veterinary patient management software easyVet and PACS/DICOM medicinal images/videos database
- VPN usage**
- WLAN (EDUROAM) accessibility

**Chipcard-Services**

- Student identity card with picture
- Ticket for all means of transport (buses, regional trains, trams, underground) within the RMV and NVV networks (regional public transport systems)
- University library card
- Access to some university facilities and dormitories
- Cashless payment method in all student restaurants and cafeterias at JLU
- Cashless use (with a second electronic purse) of public printers and copiers at several sites at JLU

**Software**

- Different Campus licenses (e.g. Citavi)
- Software Support and free Courses (e.g. Windows, Office, Statistic Software, Bibliography Software)

**Helpdesk Services**

- help desk for students for general help with technical problems related to student affairs*

*some of the mentioned services are not available or limited during the COVID-19 pandemic situation.
**some of the mentioned services are still limited due to a security incident.

# Appendix to 10.1

## List of Institutes and Clinical Units

### List of Institutes and Clinical Units, professorial-, academic- and technical staff, highlights, major research areas and funding

**Status 5th July 2021**

| **Institute of Veterinary-Anatomy, Histology and -Embryology/Unit for Clinical Vet.-Anatomy** | | | |
|---|---|---|---|
| **Acting director** | Prof. Dr. Dr. Stefan Arnhold | | |
| **Professorial staff / academic staff with separate working group** | Prof. Dr. Dr. Stefan Arnhold (W3)***, Functional Veterinary Anatomy<br>Prof. Dr. Monika Kressin (C3), Veterinary Anatomy<br>Prof. Dr. Carsten Staszyk (W2), Veterinary Anatomy and Cell Biology<br>Prof. Dr. Sabine Wenisch (W2)**, Clinical Veterinary Anatomy<br>Privat. Dozent Dr. Daniele Fietz* | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money** | **Postgrad. students on academic/professional track** |
| 10 | 15 | 4 | 18 |
| **Special equipment and analytical methods installed** | • Transmission and scanning Electron microscopy<br>• Life Cell Imaging<br>• 3 D Cell culture<br>• Hypoxia incubator<br>• Genome editing (Crisp/Cas 9)<br>• Immunohistochemistry incl. morphometric analysis<br>• RT-qPCR technology including In-situ hybridization<br>• Hard tissue histology | | |
| **Major Research Areas** | • Characterization of Mesenchymal stem cells of different species<br>• Skeletal muscle stem cells<br>• Characterization and therapeutic effects of stem cell derived exosomes<br>• Cell-Biomaterial interaction<br>• Biocompatibility of bone substitutes in vitro<br>• Differentiation of haematopoietic stem cells into osteoclasts and/or foreign body giant cells<br>• Connexin 43 in the course of differentiation of mesenchymal stromal cells and osteoclasts<br>• Immune cell control of normal spermatogenesis and human testicular cancer<br>• Sperm motility and morphology in men and animals<br>• Sulfated steroids in reproduction | | |
| **Funding 2018-2020** | EU***, DFG***/**, IRTG1871*, Society for Horse Medicine (Gesellschaft für Pferdemedizin)***, Federal Ministry of Economics and Energy** (Bundesministerium für Wirtschaft und Energie), | | |
| **Nat./Int. recognitions** | Editor Stem Cells International*, Editor American Journal of Stem Cells*<br>Training center for national specialization in veterinary anatomy “(Fachtierarzt)" | | |

| Institute of Veterinary Physiology and Biochemistry | | | |
|---|---|---|---|
| **Acting director** | Prof. Dr. Rüdiger Gerstberger | | |
| **Professorial staff / academic staff with separate working group** | Prof. Dr. Martin Diener (W2), Physiology<br>Prof. Dr. Sybille Mazurek (W2), Biochemistry<br>N.N. (W2/W3), Biochemistry<br>e.o. Prof. Dr. Christoph Rummel, Physiology<br>e.o. Prof. Dr. Joachim Roth, Physiology<br>e.o. Prof. Georgios Scheiner-Bobis, Biochemistry | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money** | **Postgrad. students on academic/professional track** |
| 8 | 14 | 7 | 11 |
| **Special equipment and analytical methods installed** | • Electrophysiology (patch-clamp, microelectrodes, multi electrode recording, transepithelial voltage clamp)<br>• High Pressure Liquid Chromatography<br>• Hypoxia chamber<br>• Immunocytochemistry, Immunohistochemistry incl. morphometric analysis<br>• Life cell imaging (intracellular $Ca^{2+}$, $Na^{+}$, $Cl^{-}$ pH,)<br>• Molecular biology (RT-PCR, qPCR)<br>• Quantification of hormones, cytokines etc. (ELISA, RIA, Bio-Assay)<br>• Random access bench top analyzer<br>• Receptor-ligand binding kinetics *in vitro*<br>• Telemetry (instrumented research animals): core body temperature, activity, food and water consumption, metabolic rate, heart rate | | |
| **Major Research Areas** | • Enteric nervous system<br>• Epithelial transport<br>• Metabolism (tumor, parasite, stem cells)<br>• Neuro-immune interactions<br>• Receptor-ligand interaction<br>• Sickness behavior<br>• Spinal nociception<br>• Thermoregulation | | |
| **Funding 2018-2020** | EU (Marie Curie Actions ITN, DFG, DAAD-GSSP, IRTG1871, DRUID (LOEWE), Berger foundation, Bonhof foundation, Engemann foundation, Schaumann foundation. | | |
| **Nat./Int. recognitions** | Training center for national specialization in veterinary physiology “(Fachtierarzt)" | | |

<table>
<tr><th colspan="5">Institute for Veterinary Pathology</th></tr>
<tr><td colspan="2">Acting director</td><td colspan="3">Prof. Dr. Christiane Herden</td></tr>
<tr><td colspan="2">Professorial staff</td><td colspan="3">Prof. Dr. Christiane Herden (W2), Veterinary Pathology<br>Prof. Dr. Philipp Olias (W3) (SS 2022), Veterinary Pathology</td></tr>
<tr><td>Core funded NPSS</td><td colspan="2">Core funded ATS</td><td>NPSS/ATS from grant money</td><td>Postgrad. students on academic/professional track</td></tr>
<tr><td>5 (2 open)</td><td colspan="2">10.5 (1 open)</td><td>9</td><td>16</td></tr>
<tr><td colspan="2">Special equipment and analytical methods installed</td><td colspan="3">• primary cell cultures<br>• organotypic slice cultures,<br>• apotome microscopy (confocally aquivalent),<br>• slide scanning</td></tr>
<tr><td colspan="2">Major Research Areas</td><td colspan="3">• Zoonotic Bornavirus Consortium,<br>• Lung-brain axis,<br>• zoonotic and neurotropic viruses,<br>• reservoir-bounded viruses,<br>• Theileria, Toxoplasma, Protozoa</td></tr>
<tr><td colspan="2">Funding 2018-2020</td><td colspan="3">BMBF, FCMH</td></tr>
<tr><td colspan="2">Nat./Int. recognitions</td><td colspan="3">Training center for national specialization in veterinary pathology “(Fachtierarzt)" und " training center of the European College of Veterinary Pathologists (ECVP)“</td></tr>
</table>

| Institute of Hygiene and Infectious Diseases of Animals | | | |
|---|---|---|---|
| **Acting director** | Prof. Dr. Christa Ewers | | |
| **Professorial staff** | Prof. Dr. Christa Ewers (W3)*, Veterinary Bacteriology and Mycology nid. Animal Hygiene<br>Prof. Dr. Rolf Bauerfeind (C3)**, Epizootic Diseases Control and Zoonoses | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money** | **Postgrad. students on academic/professional track** |
| 6 | 7.5 | 2/2 | 17 |
| **Special equipment and analytical methods installed** | • Microbiological laboratories biosafety level 2;<br>• Laboratories approved for genetic engineering (safety levels 1 and 2);<br>• Biosafety cabinets class 2;<br>• Flow cytometry; several thermal cyclers,<br>• Light and fluorescence microscopy;<br>• Transmission electron microscopy<br>• Mammalian cell culture capacity<br>• Automated bacterial identification system (Bruker MALDI TOF mass spectrometer)<br>• Antimicrobial susceptibility testing systems (VITEC® 2 compact, Micronaut)<br>• systems for automated bacterial identification and/or antimicrobial susceptibility testing<br>• Software packages for *in silico* analysis of bacterial whole genome sequences (Ridom SeqSphere+ V.7.7.0; Geneious V.8.1.9) | | |
| **Major Research Areas** | • Etiology and epidemiology of infectious diseases of livestock and companion animals.<br>• Phylogeny and molecular epidemiology of antibiotic resistant Gram-negative bacterial pathogens including resistance plasmid analysis.<br>• Prediction of antimicrobial resistance and virulence mechanisms based on whole genome sequence data analyses.<br>• Development of innovative diagnostics and prophylactic measures including vaccines, probiotics and effective microorganisms. | | |
| **Funding 2018-2020** | BMBF, IDT Biologika GmbH/CEVA Tiergesundheit, Boehringer Ingelheim Vetmedica GmbH,DAAD, Evangelisches Studienwerk, Schaumann-, Engemann-foundation, German Academy of Animal Health | | |
| **Nat./Int. recognitions** | Speaker* of the veterinary expert committee of the Hessian network of multidrug resistant bacteria,<br>Deputy member** of the German standing commission on animal vaccines (StIKo Vet)<br>Training center for national specialization in veterinary microbiology “(Fachtierarzt für Mikrobiologie)”*,**"<br>Training center of the European College for Veterinary Microbiology (ECVM) (in evaluation)* | | |

<table>
<tr><th colspan="5">Institute of Parasitology</th></tr>
<tr><td colspan="2">Acting director</td><td colspan="3">Prof. Dr. Anja Taubert</td></tr>
<tr><td colspan="2">Professorial staff / academic staff with separate working group</td><td colspan="3">Prof. Dr. Anja Taubert (W3), Parasitology and Parasitic Diseases<br>Prof. Dr. Christoph G. Grevelding (W2)*, Parasitology and Parasitic Diseases<br>Prof. Dr. Franco H. Falcone (W3)**, Parasitology and Zoonoses<br>e.o. Prof. Dr. Carlos Hermosilla</td></tr>
<tr><td>Core funded NPSS</td><td>Core funded ATS</td><td>NPSS/ATS from grant money</td><td colspan="2">Postgrad. students on academic/professional track</td></tr>
<tr><td>4</td><td>6.19</td><td>11/3.625</td><td colspan="2">5</td></tr>
<tr><td colspan="2">Special equipment and analytical methods installed, services provided</td><td colspan="3">• Center for parasitological diagnostics<br>• 3D Life cell tomographic microscopy<br>• Confocal microscopy<br>• Seahorse-based respirometry<br>• Hypoxia chamber/hypoxia lab<br>• Flow cytometry<br>• Climatic chambers for gastropod cultures<br>• ClarioStar Plus spectrofluorimeter<br>• 2D Gel electrophoresis<br>• BioRad ChemiDoc MP Imaging System<br>• Mammalian suspension cell culture capacity<br>• ÄKTA start chromatography unit<br>• Particle Bombardment machine PDS1000<br>• 2100 Bioanalyzer (Agilent)</td></tr>
<tr><td colspan="2">Major Research Areas</td><td colspan="3">• Effector mechanisms of innate immune cells against protozoan and helminth parasite species and stages, especially molecular mechanism of parasite-triggered ETosis<br>• Coccidia-mediated modulation of the host cellular cholesterol metabolism<br>• Infection biology of canine and feline lungworms and related immune reactions in gastropod intermediate hosts<br>• Parasite infections in wild animals, e. g. marine mammals (wales, manatees, seals, sea lions) and wild carnivores (foxes, wolves, wild felids)<br>• Transcriptomics, functional genomics and cell culture development in schistosomes<br>• Target identification and characterization of anti-schistosomal small-molecule inhibitors<br>• Development of kinase inhibitors as new drugs against Schistosomiasis<br>• Mechanisms of host parasite interaction at the molecular and subcellular/cellular level in Schistosomiasis</td></tr>
<tr><td colspan="2">Funding 2018-2020</td><td colspan="3">DFG, BMBF, LOEWE, DAAD, FONDECYT, Bayer Animal Health, Wellcome Trust, TransMIT, ATSAF</td></tr>
<tr><td colspan="2">Nat./Int. recognitions</td><td colspan="3">Vice chairman* of the LOEWE-Centre DRUID; *Editorial board member of Parasitology Research and Frontiers in Endocrinology<br>Associate Fellow** of the Higher Education Academy (AFHEA), UK; Honorary Associate Professor** of Pharmacy, University of Nottingham, UK; Training center for national specialization in veterinary parasitology (“Fachtierarzt”) and " training center of the European Veterinary Parasitology College (EVPC)“</td></tr>
</table>

<table>
<tr><th colspan="5">Institute of Veterinary Food Science</th></tr>
<tr><td colspan="2">Acting directors</td><td colspan="3">Prof. Dr. Corinna Kehrenberg; Prof. Dr. Dr. habil. Ewald Usleber</td></tr>
<tr><td colspan="2">Professorial staff</td><td colspan="3">Prof. Dr. Corinna Kehrenberg (W3)*, Food safety<br>Prof. Dr. Dr. habil. Ewald Usleber (C4)**, Dairy Science<br>NN (W2), Food Hygiene</td></tr>
<tr><td>Core funded NPSS</td><td colspan="2">Core funded ATS</td><td>NPSS/ATS from grant money</td><td>Postgrad. students on academic/professional track</td></tr>
<tr><td>7.5</td><td colspan="2">10</td><td>6.75/-</td><td>9</td></tr>
<tr><td colspan="2">Special equipment and analytical methods installed</td><td colspan="3">• Meat hygiene hall for the training of students<br>• EU accredited refrigerated ware house<br>• Food diagnostics laboratory unit<br>• Diagnostics unit for microbiological and molecular analysis of foodstuffs. (accredited according to the ISO/IEC 17025)<br>• Technology unit</td></tr>
<tr><td colspan="2">Major Research Areas</td><td colspan="3">• Phenotypic and molecular characterization of antibiotic resistance in Gram-positive and Gram-negative bacterial foodborne pathogens.<br>• Development of intervention measures or safety concepts against foodborne pathogens (e.g. testing of alternative treatments, surface coatings).<br>• Development of rapid tests for pathogenic food microorganisms, occurrence studies<br>• Development and application of immunchemical methods for bacteria, bacterial toxins, fungal toxins and veterinary drug residues.</td></tr>
<tr><td colspan="2">Funding 2018-2020</td><td colspan="3">Federal Ministry of Education and Research (BMBF); Federal Ministry of Food and Agriculture (BMEL), German Academic Exchange Service (DAAD)</td></tr>
<tr><td colspan="2">Nat./Int. recognitions</td><td colspan="3">Accreditation of the diagnostic laboratory by the DAkkS and international acceptance by the International Laboratory Accreditation Cooperation (ILAC)<br>Member of DIN (food microbiology)*, Member of The DVG working group antibiotic resistance*<br>Editor in Chief Journal of Food Quality and Food Safety*<br>Editorial Board Antibiotics*<br>Member** of German “Official Methods of Analysis according to article 64 of German food and feed law (LFGB)”, working group on Mycotoxins in food, Member of the DVG workgroup antibiotic resistance**<br>Editor in Chief Mycotoxin Research**<br>Editorial Board Mycoses**<br>Head of section milk hygiene within DVG work area food safety and consumers’ protection**</td></tr>
</table>

<table>
<tr><th colspan="5">Institute of Pharmacology and Toxicology</th></tr>
<tr><td colspan="2">Acting director</td><td colspan="3">Prof. Dr. Joachim Geyer</td></tr>
<tr><td colspan="2">Professorial staff</td><td colspan="3">Prof. Dr. Joachim Geyer (W3)**, Veterinary Pharmacology & Toxicology<br>Prof. Dr. Melanie Hamann (W2)*, Experimental and Clinical Veterinary Pharmacology</td></tr>
<tr><td>Core funded NPSS</td><td colspan="2">Core funded ATS</td><td>NPSS/ATS from grant money</td><td>Postgrad. students on academic/professional track</td></tr>
<tr><td>4</td><td colspan="2">3.5</td><td>2.5/1</td><td>10</td></tr>
<tr><td colspan="2">Special equipment and analytical methods installed; services provided</td><td colspan="3">• Instrumentation for molecular biology and cell biology research (fluorescence microscopy, real-time PCR, LC-MS/MS analytics, HPLC, radioisotope laboratoty)<br>• Special instrumentation for behavioral analyses of laboratory rodents<br>• Center for veterinary pharmacogenetic diagnostics<br>• Center for pharmacovigilance<br>• Biosafety Level 1 and 2 laboratories</td></tr>
<tr><td colspan="2">Major Research Areas</td><td colspan="3">• Membrane transporters for drugs, bile acids and steroids<br>• Pharmacovigilance and pharmacogenetics<br>• Research on viral and cellular factors involved in RNA virus tropism and pathogenicity<br>• In-vivo pharmacology and behavioral analyses of laboratory rodents<br>• Refinement of animal experiments<br>• Veterinary medical product monitoring</td></tr>
<tr><td colspan="2">Funding 2018-2020</td><td colspan="3">DFG, LOEWE, BVL, UBA, Fraunhofer Society, Pharmaceutical Industry</td></tr>
<tr><td colspan="2">Nat./Int. recognitions</td><td colspan="3">Member of the Committee for Pharmaceutical and Feed/Food Law of the Veterinary Association Hessen*<br>Member of the Expert Committee for Pharmacologically Active Substances and Veterinary Medicinal Products of the German Federal Institute for Risk Assessment (BfR)*<br>Member of the Expert Committee of the “Federal Opium Agency” at the Federal Institute for Drugs and Medical Devices (BfArM)*<br>Representative Member* of the “Federal Drug Book” Expert Committee at the Federal Institute for Drugs and Medical Devices (BfArM)*<br>Training center for national specialization in veterinary pharmacology<br>“(Fachtierarzt)"<br>Editorial Board Member Tierärztliche Praxis (G) *<br>Organizer of the biannual international Transport Colloquium conference at Schloss Rauischholzhausen **<br>Spokesman of the GBM (Society for biochemistry and molecular biology) study group biomembranes**</td></tr>
</table>

| Institute for Virology | | | |
|---|---|---|---|
| **Acting director** | Prof. Dr. Friedemann Weber | | |
| **Professorial staff** | Prof. Dr. Friedemann Weber (W3)*, Virology<br>Prof. Dr. Benjamin Lamp (W2)**, Clinical and Veterinary Virology | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money** | **Postgrad. students on academic/professional track** |
| 4.5 | 5.5 | 5.45 | 4 |
| **Higlights of the Unit** | • 2 ultracentrifuges<br>• ÄKTA pure chromatography system<br>• Semi-automated DNA/RNA analysis workflow<br>• Biosafety level 2 and 3 laboratory facilities<br>• Biolayer Interferometry device (ForteBio) | | |
| **Major Research Areas** | • Bunyaviruses,<br>• Coronaviruses,<br>• Influenza viruses,<br>• Pestiviruses,<br>• Bee viruses,<br>• Innate immunity | | |
| **Funding 2018-2020** | BMBF, DFG, EU | | |
| **Nat./Int. recognitions** | EMBO fellow*<br>DFG-Fachkollegium (reviewer board)*<br>Editorial boards* Journal of Biological Chemistry, Journal of General Virology, and Journal of Interferon and Cytokine Research<br>Selection panel member* EVAg (European Virus Archive goes Global)<br>From 2009 to 2015 member* of the grants evaluation panel European Research Council (ERC), Infection and Immunity section<br>Board member of the European College of Veterinary Microbiology (ECVM)**<br>Member of the evaluation panel for the International Coordination of Research on Infectious Animal Diseases (ICRAD)** | | |

| Department of Veterinary Clinical Sciences (VTH) | | | |
|---|---|---|---|
| **Acting Director** | **Prof. Dr. Axel Wehrend** | | |
| | | | |
| **Clinical Unit** | **Clinic for Small Animals (Surgery/Neurosurgery/Diagnostic Imaging/Anesthesiology)** | | |
| **Head** | Prof. Dr. Dr. h.c. Martin Kramer | | |
| **Professorial staff / academic staff with separate working group** | Prof. Dr. Dr. h.c. Martin Kramer (C4)*, Small Animal Surgery<br>Prof. Dr. Martin Schmidt (W2), Neurology and Neurosurgery<br>e. o. Prof. Dr. Sabine Tacke (Anesthesiology) | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money-clin. revenues** | **Postgrad. students on academic/professional track** |
| 6 | 11 | 7/1 | 15 |
| **Special equipment and analytical methods installed** | • MRI (3T) – also for large animals incl. 3T anesthetic device Leon MRI & antimagnetic table for transportation of horses<br>• CT (16 slices)<br>• 3 x-ray machines (1 Fluoroscopy), 2 high end US-machines<br>• 8 full equipped modern surgical theaters & multiple instrument sets (various for special procedures) | | |
| **Major Research Areas** | • Neurology: hydrocephalus, Chiari like malformation, brachycephaly<br>• Diagnostic Imaging: nanoparticles & stem cells<br>• Surgery: MMP in small animals dentistery, Platelets rich Plasma, 3D Implants<br>• Anesthesiology: Jet Ventilation, Parasympathetic Tone Activity (PTA) | | |
| **Funding 2018-2020** | DFG, LOEWE, Industry, BMBF | | |
| **Nat./Int. recognitions** | Training center for national specialization in Small Animal Surgery/Diagnostic Imaging/Anesthesiology/Small Animals/Neurology<br>Training center of the European Veterinary Colleges of ECVS, ECVDI, ECVN<br>MS – Examination com. ECVN<br>President* German Veterinary Society (GVS = DVG)<br>Chair* Council Veterinary Establishments | | |

| **Clinical Unit** | **Clinic for Small Animals (Internal Medicine and Central Laboratory, Intensive Care Unit)** |
|---|---|
| **Head** | Prof. Dr. Andreas Moritz |
| **Professorial staff/academic staff with separate working group** | Prof. Dr. Andreas Moritz (W2)*, Clinical Pathology/Pathophysiology, Internal Medicine<br>Prof. Dr. Nadine Passlack (W1/W2)**, Basic Sciences in Int. Medicine<br>e.o. Prof. Mathias Schneider (Cardiology)<br>e.o. Prof. Natali Bauer (Laboratory Diagnostic Sciences) |

| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS grant money/clin. revenues** | **Postgrad. students on academic/professional track** |
|---|---|---|---|
| 7.5 | 11 | 9.5/5.5 | 9 |

| | |
|---|---|
| **Special equipment and analytical methods installed** | • internal medicine service with up to date equipment (e.g. endoscopy)<br>• catheter laboratory for interventional radiology<br>• intensive care unit (hemodialysis, mechanical ventilation)<br>• nuclear medicine service with scintigraphy and radioiodine treatment<br>• blood bank<br>• clinical pathology laboratory (e.g. coagulation analysis, immunology, flow cytometry)<br>• Evaluation of Veterinary haematology analysers (e.g. IDEXX LaserCyte and ProCyte DX, Sysmex XT2000 iV) |
| **Major Research Areas** | • reticulocytes and reticulocyte indices in inflammation<br>• acute phase proteins (dogs, horses, cats) and their connection to the coagulation system<br>• hyper- and hypocoagulability, quality of blood products, iron metabolism<br>• Impact of nutrition on the intestinal microbiota and the immune function of dogs and cats<br>• Novel diagnostic and treatment options for cardiac and vascular disease., treatment with interventional radiology<br>• Clinical and genetic aspects of feline and canine diabetes mellitus, clinical aspects of feline hyperthyroidism.<br>• Diagnosis and treatment of urinary tract, gastrointestinal and liver diseases with focus on non-invasive biomarkers, bile acid profiling and intestinal microbiome |
| **Funding 2018-2020** | revenues from faculty budget, Industry funding |
| **Nat./Int. recognitions** | President* German Small Animal Veterinary Association (GSAVA, DGK-DVG);<br>Co-leader* of the German internal medicine and clinical pathology association (InnLab)<br>Leader** of the subdivision Animal Nutrition of DVG<br>Editor in Chief* of the Journal: Tieraerztliche Praxis(K)<br>Member and deputy chair** of the "BfR Committee for Feed and Animal Nutrition (BfR: The German Federal Institute for Risk Assessment (BfR)<br>Head of the panel* "feed intended for particular nutritional purposes (PARNUTs)"<br>Member* of the ECVCP Lab Standards Committee<br>Training center for national specialization in Internal Medicine of Small Animals<br>Training center of the European Veterinary Colleges ECVIM, ECVIM-Cardiology<br>ECVECC (European College of Veterinary Emergency and Critical Care)<br>ECVD (European College of Veterinary Dermatology) |

| **Clinical Unit** | **Clinic for Ruminants (Internal Medicine and Surgery)** |
|---|---|
| **Head (interim)** | Prof. Dr. Axel Wehrend |
| **Professorial staff/academic staff with separate working group** | Prof. Dr. Axel Wehrend (W3), Clinical Reproduction<br>Priv. doz. Dr. Marlene Sickinger, Ruminants Surgery & Internal Medicine<br>NN (W3) |

| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money, clin. revenues** | **Postgrad. students on academic/professional track** |
|---|---|---|---|
| 5 | 5 | 2/- | 1 |

| | |
|---|---|
| **Special equipment and analytical methods installed** | • Diagnostics, treatment and consulting service for cattle, small ruminants (goat, sheep, alpaca, llama) and camelids<br>• Endoscopic surgery in small and large ruminants including camelids<br>• Standard laparotomic procedures in large and small ruminants<br>• Lameness diagnostics including orthopedic surgery |
| **Major Research Areas** | • Iron-deficiency and possible diagnostic markers in calves<br>• Neuropeptides in inflammatory diseases |
| **Funding 2018-2020** | revenues from faculty budget |
| **Nat./Int. recognitions** | Animal welfare project cattle<br>Bovine animal health consulting service<br>Training center for national specialization in Bovine Diseases (Internal Medicine, Surgery and Herd Health) |

<table>
<tr><td>Clinical Unit</td><td colspan="3">Clinic for Obstetrics, Gynaecology and Andrology of Large and Small Animals with an Ambulatory Service</td></tr>
<tr><td>Section Clin. Reprod. Medicine</td><td colspan="3"></td></tr>
<tr><td>Professorial staff/ academic staff with separate working group</td><td colspan="3">Prof. Dr. Axel Wehrend (W3)*, Clinical Reproduction Medicine<br>PD Dr. Rainer Hospes, Clinical Reproduction Medicine</td></tr>
<tr><td>Core funded NPSS</td><td>Core funded ATS</td><td>NPSS/ATS from grant money, clin. revenues</td><td>Postgrad. students on academic/professional track</td></tr>
<tr><td>7.5</td><td>11</td><td>3.7</td><td>2 x 0.5</td></tr>
<tr><td>Special equipment, analytical methods installed and services provided</td><td colspan="3">• ICU for neonates of different species with continuous positive airway pressure device<br>• Sperm bank for dogs, bulls, rams, stallions<br>• Insemination center for horses (EU standard)<br>• Diagnostics, treatment and consulting service for dogs, cats, cattle, small ruminants (goat, sheep, alpaca, llama), camelids, horses<br>• ultrasound diagnostic and x-ray</td></tr>
<tr><td>Major Research Areas</td><td colspan="3">• intensive medicine in neonates, colostrum<br>• animal welfare in farm animals</td></tr>
<tr><td>Funding 2018-2020</td><td colspan="3">DFG, Industry, Federal Inst. Agriculture and Nutrition</td></tr>
<tr><td>Nat./Int. recognitions</td><td colspan="3">Chairman* Academy Continuous Vet. Education<br>Editor in Chief* of the Journal Tieraerztliche Praxis (G)<br>Training center for national specialization in Reproductive Medicine<br>Training center of the European Veterinary College ECAR<br>Vorsitzender der Akademie für Tierärztliche Fortbildung</td></tr>
</table>

| **Section Mol. Reprod. Medicine** | | | |
|---|---|---|---|
| **Professorial staff/academic staff with separate working group** | Prof. Dr. Christine Wrenzycki (W3)*; Mol. Reprod. Medicine<br>e. o. Prof. Dr. Gerhard Schuler | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money** | **Postgrad. students on academic/professional track** |
| 1 | 3.5 | -/- | 1 |

| | |
|---|---|
| **Special equipment and analytical methods installed** | • Equipment to generate embryos in vitro (incubators with and without $O_2$ regulation, heated tables, etc.)<br>• Micromanipulation unit to perform embryo biopsies, ICSI, etc.<br>• Ovum pick-up (OPU) equipment to aspirate cumulus-oocyte-complexes from follicles<br>• Fluorescence microscope<br>• Endocrine isotope (H-3, P-32, S-35, I-125 laboratory with ß-scintillation counter (inhouse steroid radioimmunoassays)<br>• High Pressure Liquid Chromatography |
| **Major Research Areas** | • Impact of the environment on oocyte maturation, fertilization and subsequent early embryo development in vivo and in vitro<br>• Comparative endocrinology of female and male reproduction incl. placental and testicular steroidogenesis |
| **Funding 2018-2020** | Industry, Cattle Reprod. Organizations, Förderverein für Bioökonomieforschung |
| **Nat./Int. recognitions** | President* of the International Embryo Technology Society (IETS)<br>(Past)President of the German Society of Reproductive Medicine (DGRM)<br>Chair of the Advisory Board of the German Society for Animal Production (DGfZ)<br>Vice Chairman of the Scientific Advisory Board of the Leibniz Institute of Zoo and Wildlife Research (IZW)<br>Vice President of the German Society of Veterinary Medicine (DVG), Section Reproduction and disorders<br>Editorial board *: PLOS ONE, Reproduction in Domestic Animals (Editorial Advisory Board), BMC Developmental Biology (Associate Editor), Reproduction<br>Training center for national specialization in Reproductive Medicine |

| **Clinical Unit** | | **Clinic for Birds, Reptiles, Amphibians and Fish** | |
|---|---|---|---|
| **Head** | | Prof. Dr. Michael Lierz | |
| **Professorial staff** | | Prof. Dr. Michael Lierz (W3), Avian Disease and Poultry Hygiene | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money, clin. revenues** | **Postgrad. students on academic/professional track** |
| 4 | 7.5 | 8.4/1.5 | 22 |
| **Special equipment, analytical methods installed and services provided** | • Clinic with on farm service and its laboratory for diagnostic and research.<br>• Up to date molecular biology techniques.<br>• High end ultrasound diagnostic and endoscopy.<br>• DAKKS accredited laboratory | | |
| | • Native wildlife<br>• Avian Reproduction (Assisted reproduction)<br>• Avian Infectious Diseases (Avian Bornavirus, Sarcocystis calchasi, avian mycoplasmas)<br>• Poultry Diseases | | |
| **Funding 2018-2020** | DFG, Hessisches Umweltministerium, Bundesministerium für Umwelt | | |
| **Nat./Int. recognitions** | Training center for national specialization avian medicine<br>Training center for national specialization reptile medicine<br>Training center for national specialization microbiology<br>Training center for national specialization wildlife medicine<br>Training center for national specialization species conservation<br>Training center of the European College of Zoological Medicine (Wildlife Population Health)<br>Editor: PLOS ONE, Tierärztliche Praxis, Journal of Avian medicine and Surgery<br>Executive Board European Association of Avian Veterinarians | | |

| Clinical Unit | Equine Clinic, Surgery/Orthopedics and Ferrier Education | | |
|---|---|---|---|
| **Head** | Prof. Dr. Michael Röcken | | |
| **Professorial staff / academic staff with separate working group** | Prof. Dr. Michel Röcken(W3)*, Equine Surgery<br>Prof. Dr. Janina Burk-Luibl (W1), Equine Regenerative Medicine<br>Dr. habil. Claus P. Bartmann<br>PhD Antonio M. Cruz Madorrán LV, MSc, MVM, PhD, MRCVS, Dipl. ACVS, Dip. ECVS, Dipl. ACVSMR | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money, clin. revenues** | **Postgrad. students on academic/professional track** |
| 5 | 13 | 13 | 17 |
| **Special equipment and analytical methods installed** | • Cone Beam CT, Scintigraphy, Overground endoscopy<br>• Lameness Locator, Hoof Scan<br>• Equipment for minimal invasive surgery (Laparoscopy, Arthroscopy, Laser…)<br>• ICU | | |
| **Major Research Areas** | • Serum Amyloid A in equine surgical patients<br>• Gait analysis<br>• MSC basic research<br>• Minimal invasive equine surgery<br>• Cone Beam CT diagnostic imaging in horses | | |
| **Funding 2018-2020** | DFG | | |
| **Nat./Int. recognitions** | Chairman* section horse diseases DVG, and working group horses, BTK<br>Training center for national specialization in Equine Surgery, Equine Medicine, Reproductive Medicine, Equine Dentistry<br>Training center for the ECVS (Equine) | | |

| Clinical Unit | Equine Clinic, Internal Medicine | | |
|---|---|---|---|
| **Head** | Prof. Dr. Kerstin Fey | | |
| **Professorial staff** | Prof. Dr. Kerstin Fey (W3), Equine Internal Medicine | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money, clin. revenues** | **Postgrad. students on academic/professional track** |
| 3 | 4.5 | 2.75 | 11 |
| **Higlights of the Unit** | Inhalation equipment, Endoscopy, ventilated stalls | | |
| **Major Research Areas** | • equine endocrinology<br>• equine asthma,<br>• equine thrombocytes | | |
| **Funding 2018-2020** | revenues from faculty budget | | |
| **Nat./Int. recognitions** | Training center of the European College of Equine Internal Medicine (ECEIM) | | |

| | | | |
|---|---|---|---|
| **Clinical unit** | **Clinic for Swine (Internal Medicine and Surgery)** | | |
| **Head** | Prof. Dr. Dr. habil. Gerald Reiner | | |
| **Professorial staff/academic staff with separate working group** | Prof. Dr. Dr. habil. Gerald Reiner (W3), Swine Diseases<br>e. o. Prof. Dr. H. Willems | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money, clin. revenues** | **Postgrad. students on academic/professional track** |
| 3 | 0.5 | 1.5/0.5 | 1 |
| **Special equipment and analytical methods installed** | • Clinic with on farm service and its laboratory for diagnostic and research.<br>• Porcine herd health service (Hesse)<br>• Porcine health management<br>Up to date molecular biology laboratory | | |
| **Major Research Areas** | • Animal Welfare in Swine<br>• Molecular diagnostics, virulence and resistance<br>• PCV2, PRRSV, PTV, *Actinobacillus pleuropneumoniae, Mycoplasma hyopneumoniae*<br>• Comparison of vaccination regimens;<br>• Genetic disease resistance;<br>• Swine Inflammation and Necrosis Syndrome (SINS);<br>• Herd health management<br>• Diseases and population genetics in wild boar<br>• Population genetics in wildlife species (e.g. red deer) | | |
| **Funding 2018-2020** | DFG; Zoetis, Germany; Federal Agency for Food and Agriculture ; Federal Ministry of Food and Agriculture; NRW State Office for Nature; Tönnies Forschung; ATF; | | |
| **Nat./Int. recognitions** | Diplomate European College of Porcine Health Management | | |

<table>
<tr><td colspan="2">Clinical Unit</td><td colspan="3">Professorship Experimental Animal Science, Animal Protection and 3 R Center</td></tr>
<tr><td colspan="2">Professorial staff</td><td colspan="3">Prof. Dr. Stephanie Krämer (W2), Laboratory animal science and welfare, executive director of the 3 R Center “ICAR3R”</td></tr>
<tr><td>Core funded NPSS</td><td colspan="2">Core funded ATS</td><td>NPSS/ATS from grant money</td><td>Postgrad. students on academic/professional track</td></tr>
<tr><td>3</td><td colspan="2">4</td><td>1/2</td><td>-</td></tr>
<tr><td colspan="2">Special equipment, analytical methods installed and services provided</td><td colspan="3">• 3R Skills Lab<br>• Laboratory Animal Science courses (formely FELASA B course)<br>• Certificate Course “Animal Assisted Services”<br>• Animal Welfare Workshops concerning ethical approaches, Medical Training and severity assessment<br>• Lecture series “Just.Us and Animal Welfare”</td></tr>
<tr><td colspan="2">Major Research Areas</td><td colspan="3">• 3R-Education<br>• Refinement-techniques in the field of Laboratory Animal Science<br>• Severity assessment of Laboratory Animals<br>• Human-Animal-Relationships<br>• Culture of Care<br>• Quality of Life of dogs and cats with chronic progressive diseases,<br>• Medical Training,<br>• Transparency in the Handling of Laboratory Animals with the LIVE3R platform</td></tr>
<tr><td colspan="2">Funding 2018-2020</td><td colspan="3">SET Foundation, Boehringer Ingelheim, GKF, Kogge Foundation</td></tr>
<tr><td colspan="2">Nat./Int. recognitions</td><td colspan="3">Presenting the Ursula M. Händel Animal Welfare Award 2020 of DFG, German Research Foundation;<br>Member European Commission Expert Working Group (EWG) on Genetically Altered Animals (GAA) in the context of Directive 2010/63/EU;<br>Member Federation of European Laboratory Animal Science Association (FELASA), Severity Working Group;<br>Member of Expert Pool of German National Committee for the Protection of Laboratory Animals (Bf3R)<br>• Member of the working group Laboratory Animal Science of the Federal Veterinary Association<br>• Member of the working group Animal Welfare of the Federal Veterinary Association<br>• Deputy working group chair DVG Group Laboratory Animal Science<br>• Member of DVG Group Animal Welfare<br>• Representative for ICAR3R within Member of International Culture of Care Network<br>• Representative for ICAR3R within Member of the European Network of the 3R Centres and Societies<br>• Member of the Network “Veterinarian Ethic”<br>• Member of Hessian Animal Welfare advisory board (HMWK)</td></tr>
</table>

| Unit for Biomathematics and Data processing | | | |
|---|---|---|---|
| **Acting director** | Dr. habil. Kathrin Büttner | | |
| **Professorial staff** | - | | |
| **Core funded NPSS** | **Core funded ATS** | **NPSS/ATS from grant money** | **Postgrad. students on academic/professional track** |
| 1 | 2.125 | -/- | - |
| **Major services provided** | • Central contact for statistical consultation of scientists of the entire faculty of veterinary medicine comprising the experimental design, the statistical analysis of the data and assistance in the preparation of the research papers (The biomathematics and data processing team annually participates in about 60 new projects conducting the statistical analysis of the data).<br>• Administration of the clinical information and documentation system "easyVET" for all clinical and paraclinical units as a central platform for the management and exchange of patients data of the faculty of veterinary medicine (e.g. practice management, patient management, organisation tool, resource planning, billing system, image management) | | |
| **Major Research Areas** | • Further development of statistical evaluation methods for clinical and epidemiological studies, especially building of suitable statistical models for the planning and evaluation of the studies<br>• Application of network analysis in livestock science – insights in disease transmission and animal behaviour (cooperation with the Institute of Animal Breeding and Husbandry of Kiel University) | | |
| **Funding 2018-2020** | DFG, Schaumann Foundation. | | |
| **Nat./Int. recognitions** | Membership and participation in scientific associations:<br>– The German Region of the International Biometric Society (IBS-DR)<br>– German Association for Medical Informatics, Biometry and Epidemiology (GMDS) | | |

**Abbreviations:**
**e.o. Prof:** extraordinary professor
**BMEL:** Federal Ministry of Food and Agriculture
**NPSS:** Non Professorial Scientific Staff
**ATS:** Assistant Technical Staff
**BTK:** Federal Chamber of Veterinary Surgeons
**DFG:** German Research Foundation
**DVG:** German Veterinary Association
**IRTG:** International Research Training Group
**DAAD:** German Academic Exchange Service
**DRUID:** Program "Novel Drug Targets against Poverty-related and Neglected Tropical Infectious Diseases"
**LOEWE:** Program State Hesse „Landes-Offensive zur Entwicklung Wissenschaftlich-ökonomischer Exzellenz"
**BMFB:** Federal Ministry of Education and Research
**FCMH:** Forschungscampus Mittelhessen (Research Campus Central Hesse) ATSAF: Council for Tropical and Subtropical Agricultural Research (Arbeitsgemeinschaft für Tropische und Subtropische Agrarforschung)
**BMEL:** Federal Ministry of Nutrition and Agriculture
**DAKkS:** Deutsche Akkreditierungsstelle, Frankfurt
**BVL:** Federal Institute for Consumer Protection (Bundesamts für Verbraucherschutz)
**UBA:** Federal Environmental Agency (Umweltbundesamt)
**EMBO:** European Molecular Biology Laboratory Soc.

# Appendix to 10.3.2

## List of doctoral and PhD students 2018 – 2020

**Adams, Kevin**
Funktionelle Anatomie des equinen Kiefergelenkes: Kollagenfaserarchitektur und Histologie der Gelenkflächen

**Allugami, Ammar**
Vergleichende Ultraschalluntersuchungen der Urethra von kastrierten und von intakten Schafböcken

**Altmann, Hannah**
Bronchiektasien und ihre Diagnose bei Hunden mit Trachealkollaps - eine retrospektive Analyse von Prävalenz und Interobservervariabilität

**Amtsfeld, Linda**
Etablierung und Charakterisierung eines genetisch induzierten Mausmodells des kolorektalen Karzinoms

**Ballout, Jasmin**
Interaktionen zwischen Mastzellen und submukösen Neuronen unter Entzündungsbedingungen ex vivo und in vitro

**Bartholomeyzik, Jana**
Hepatische Arzneistoffe der Oatp 1 b-Subfamilie von Haus und Nutztieren: Klonierung, Polymorphismenanalyse und funktionelle Charakterisierung

**Bauknecht, Anna Sophia**
Untersuchungen zur Rolle der Bcl-2-Expression in felinen follikulären Lymphomen

**Bennien, Josefine**
Der Sodium-dependent Organic Anion Transporter SOAT: Substratspektrum, genetische Varianten im Menschen und Effekte in der Soat Knockout-Maus

**Bergermann, Christian**
Untersuchungen zur Tierseuchenausschlussdiagnostik beim Schwein anhand zielgerichteter Beprobung in einem Verarbeitungsbetrieb für Tierische Nebenprodukte (VTN)

**Bernklau, Elisabeth**
Untersuchung zur Gewinnung und Kryokonservierung kaniner Nebenhodenspermien

**Blad-Stahl, Nadja**
Flüssigkeitskonservierung boviner Embryonen - eine Alternative zur Kryokonservierung?

**Blaschka, Carina**
Impact of steroids and bile acids on follicular cells and the oocyte's developmental capacity in cattle

**Blim, Sarah**
Über das Geburtsgeschehen bei Schweinen einer hochproliferativen Linie unter verschiedenen Haltungsbedingungen: Quantifizierung der partusrelevanten Belastung anhand klinischer, stoffwechselbezogener und ethologischer Parameter

**Bonarius, Maria Sophie**
Einflus von polypherolhaltigen Futterkomponenten auf ausgewählte Parameter der Stressantwort und des Lipidstoffwechsels in der Leber beim Ferkel

**Bourg, Manon**
Virusökologische Untersuchungen zur Bornaschen Krankheit in Bayern

**Bovermann, Birte**
Oberflächenkontamination durch nosokomiale Problemkeime in der Intensivstation einer Kleintierklinik

**Brassel, Julia**
Untersuchungen zum Einsatz eines automatischen Brunsterkennungssystemes bei Milchkühen in Weidehaltung

**Brecht, Ramona**
Untersuchung der immunmodulatorischen Wirkung von 5-Fluorouracil und Gemcitabin im Panc02 murinen Modell des Pankreaskarzinoms Pankreasadenokarzinoms

**Chaves Ramirez, Andrea**
Investigation into Chelonid Alphaherpesvirus 5 Infection and Fibropapillomatosis in the Pacific Green

Turtle (Chelonia mydas agassizii) and the Olive Ridley Turtle (Lepidochelys olivacea) in the Pacific of Costa Rica and Nicaragua

**Chiappisi, Eleonora**
Auswirkungen von Stress des Endoplasmatischen Retikulums in Rindernierenzellen

**Conze, Theresa**
Die sonographische Volumenbestimmung der felinen und caninen Ovarien

**Cousin, Anne**
Rolle von astroglialen Dysfunktionen

**Cousin, Julia**
Die Wiederfindungsrate von ausgewählten Lebensmittelinfektions- und Intoxikationserregern in Rückstellproben der Bundeswehr gemäß DiN 10526

**Dimitriadis, Christian Ioannis**
Evaluation epigenetisch-basierter Therapiestrategien für diffuse intrinsische pontine Gliome

**Dülfer, Friederike**
Die Bedeutung von parakrin freigesetzter Zytokine adulter kardinaler Progenitorzellen für das Remodeling des insuffizienten Herzens

**Dziumbla, Sarah**
The role of omega-3 fatty acids in vascular homeostasis

**Ehmann, Rosina**
Ein revers-genetisches System für nicht kultivierbare feline Coronaviren als Grundlage für das Studium der felinen infektiösen Peritonitis

**Ehrmann, Nena**
Morphologische Untersuchung am atlanto-okzipitalen Übergang des Hundes

**Engel, Julia**
Mittel Multiplate®Analyzer bestimmte Thrombozytenfunktion bei Kleinpferden und Ponys sowie bei Equiden mit Systemic inflammatory Response Syndrome

**Engelen, Carolin**
De Novo Referenzintervallerstellung ausgewählter Parameter der plasmatischen Gerinnung von Katzen unter besonderer Berücksichtigung der physiologischen Inhibitoren

**Englisch, Lauritz**
Morphologische Untersuchungen an Pferdezähnen mittels Mikrocomputertomographie

**Farke, Daniela**
Suturen und Synchondrosen am Hundeschädel. Ein Vergleich meso- und brachycephaler Rassen mittels Magnetresonanztomographie, Computertomographie und Histologie

**Fischer, Dominik**
Untersuchungen zur minimalen Infektionsdosis, Diagnostik und Pathologie der Aspergillose bei Großfalken (Falco spp.) verschiedenen Alters mittels experimenteller Infektion

**Fluck, Alexandra**
Vorkommen von aviären Bornaviren bei Papageien mit neurologischen Symptomen und Rupfern

**Fraté, Pia-Alexandra**
Vergleichende Untersuchung über das Vorkommen von Aquaporin-4 und Aquaporin-11 im Gehirn von Hund, Rind, Schaf, Schwein und Vogel

**Freiin von Tiesenhausen, Karolina Sophie**
Nachweis von Gelatinase- und Kollagenase-Aktivität sowie von Matrix-Metalloproteinasen in der gingivalen Sulkusflüssigkeit bei der Parodontitis des Hundes

**Frieten, Dörte**
Effects of intensive milk replacer feeding and butyrate on growth performance and intermediary metabolism in calves

**Fuest, Christoph**
Genetischer Einfluss beim Caninusengstand im Milchgebiss (CE) beim Jagdspaniel

**Gluding, Dennis**
Populationsgenetische Aufarbeitung der Vererbung unterschiedlicher Typen von lumbosakralen Übergangswirbeln beim Deutschen Schäferhund

**Goffart, Laura**
Temporäre tarsale Arthrodese beim Hund Biomechanischer Vergleich zwischen der 4.5 AO/ASIF Korkalisschraube und dem ISOLOCK-Faden

**Gollwitzer, Andrea**
Bakterielle Oberflächenbelastung und Vorkommen nosokomialer Erreger in einer veterinärmedizinischen Anästhesieabteilung

**Grabbe, Niklas**
Zelluläre Charakterisierung des Renin-Angiotensin Systems sowie des Glutamatsystems im hypothalamischen Subfornikal-und Subseptalorgan

**Gu, Qinyong**
Structure biology of animal lentiviral Vif proteins

**Gutzmer, Constanze**
Die minimalinvasive Laseranwendung am Periost des Hüftgelenks beim Schwein: pathologische und histologische Auswirkungen

**Hackemack, Jan**
Entwicklung neuer Therapiestrategien zur Behandlung der experimentellen chronischen pulmonalen Hypertonie der Maus unter besonderer Berücksichtigung der Histologie und der Hämodynamik

**Hampe, Marian**
Untersuchung zur Sensitivität und Spezifität verschiedener Methoden der Immunglobulin G (IgG)-Messung beim neonatalen Kalb

**Hassan, Reham**
Mechanisms of activated hepatic stellate cell removal in acute and chronic liver injury

**Hauer, Jessica**
Aquaporin-1 und Aquaporin-4 im Liquor cerebrospinalis von Hunden mit idiopathischem Hydrocephalus internus vor und nach Implantation eines Ventrikulo-peritonealen Shunts

**Held, Lisa**
Ermittlung von Referenzintervallen der Thrombozytenfunktion mittels Multiplate® Analyzer beim klinisch unauffälligen Warmblutpferd

**Heß, Florian**
Sonographische Untersuchungen am Hoden des Alpakas (Vicugna pacos)

**Heuser, Katharina**
Beurteilung des Gerinnungsstatus bei hyperthyreoten Katzen vor und nach einer Radiojodtherapie

**Hindenberg, Sarah**
Ermittlung klinischer Entscheidungsgrenzwerte für die Plasmakonzentration des caninen C-reaktiven Proteins mit dem Ziel eines rationalen Einsatzes von Antibiotika beim Hund

**Hindricks, Esther**
Einfluss der Separationsart auf die Qualität von Blutprodukten beim Hund

**Hirz, Manuela**
Pathogenese epileptiformer Krämpfe bei TNF-transgenen Mäusen nach Borna disease virus-Infektion: Rolle von astroglialen Dysfunktionen

**Hofer, Armin**
Einfluss einer eCG-Applikation im Puerperium auf die Fruchtbarkeit von Feckvieh-Milchkühen

**Holbein, Lena**
Vergleichende Untersuchung des Processus coronoideus medialis ulnae des caninen Ellbogengelenks: histologische und computertomographische Befunde

**Holtemeyer, Matthias**
Untersuchung des Gallensäurestoffwechsel der Slc10a5 Knockout-Maus

**Hoock, Kerstin**
Untersuchung zur Wahrnehmung der Situation freilebender Katzen in Deutschland sowie einer Kastrations-, Kennzeichnungs- und Registrierungspflicht für Hauskatzen

**Hörste,r Julia**
Genexpression von Adipokinen in Abhängigkeit vom Gehalt an epiduralem Fettgewebe beim Cauda equina Kompressions-Syndrom des Hundes

**Hübers, Emma-Franziska**
Einfluss einer LPS-Gabe auf die zelluläre und plasmatische Gerinnung bei klinisch unaufälligen erwachsenen Pferden und Ponys
**Irrgang, Martina**
Charakterisierung des Knochengewebes nach Fragilitätsfraktur des Schenkelhalses mittels Mikro-Computertomographie
**Jäckel, Kathrin**
Untersuchungen zu Lungen- und Darmparasiten des Rotfuchses in Hessen, Thüringen und Rheinland-Pfalz
**Jahn, Kristina**
(19F) Bildgebung der Entzündungsreaktion nach akutem Herzinfarkt im Schweinemodell
**Jakel, Uta**
Humorale Immunität gegen Tollwutvirus bei Hunden, Katzen und Frettchen
**Jörling, Jessica**
Vergleichende Analyse der Multilokus-Sequenztypen und der Hämolysingene stark und schwach hämolysierender Brachyspira spp. unter Berücksichtigung ihrer hämolytischen und/oder zytotoxischen Aktivität
**Kaese, Miriam**
Polysialylierungsstatus am weiblichen Reproduktionstrakt der Katze und der Maus
**Keiner, Miriam**
"RETIC - HGB" (Hämoglobingehalt der Retikulocyten) als neuer, indirekter Parameter des Eisenstatus bei der Katze
**Kelleners, Nicola**
Kinematik des kraniozervikalen Übergangs beim Chihuahua - eine Untersuchung mittels biplanarer Röntgenvideographie und Scientific Rotoscoping
**Kempker, Karsten**
Coilembolisation des intrahepatischen portosystemischen Shunts beim Hund mit einem singulären Coil
**Kern, Lena**
Die neurovaskuläre Einheit bei proliferativer Retinopathie - Interaktionen von Inflammation und Angiogenese
**Keßler, Melanie**
Bedeutung der Retikulozytose bei der caninen und felinen Erythrozytose
**Kleinert, Nadine**
Etablierung von Nachweismethoden für Neutrophil Extracellular Traps beim Hund aus Vollblutproben
**Klotz, Peter**
Verbreitung von Actinetobacter-Spezies bei Rindern in Hessen unter Berücksichtigung der antimikrobiellen Resistenz
**Köhler, Lisa**
Haltungsbedingte Einflüsse auf die Entstehung von Pododermatitis purulenta bei einer französischen Eselrasse unter Berücksichtigung eines anamnestischen Erhebungsbogen, Härtemessungen, Bestimmung des Wassergehaltes und histologischen Untersuchungen am Hufhorn
**Kolb, Evelyn**
Beurteilung des Wachstumsverhaltens von nativen, humanen und porcinen Speicheldrüsenzellen auf einer Matrix aus dezellularisierter, porciner Speicheldrüse
**Kölbl, Maria-Katharina**
Genetische Untersuchungen an Abwurfstangen und Schädeln aus der Rehsammlung des Herzogs Albrecht von Bayern in Berchtesgaden
**Kopp, Katharina Isabel**
Kinematik des Beckens und der kaudalen Lendenwirbelsäule beim Deutschen Schäferhund - eine Untersuchung mittels biplanarer Röntgenvideographie und Scientific Rotoscoping
**Korst, Miriam**
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