JLU
NEUE WEGE. SEIT 1607.

JUSTUS-LIEBIG-
UNIVERSITÄT
GIESSEN

Faculty of Veterinary Medicine
Justus-Liebig-Universität Giessen

SELF EVALUATION REPORT

FOR THE EUROPEAN ASSOCIATION OF
ESTABLISHMENTS FOR VETERINARY EDUCATION

FULL VISITATION 24 – 28 JANUARY 2022

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Introduction

The origin of the Faculty of Veterinary Medicine dates back to 1777, when the first lectures in the field of veterinary medicine (animal healing) were offered by the Economic Faculty of the former "Ludwigs-Universität", the "Ludoviciana", the present Justus-Liebig-University Giessen. During its further development education in veterinary medicine was integrated into the Medical Faculty, with regular classes starting in 1828. Admittance to qualify for a higher veterinary education required a "highschool diploma" (Matura), at the same time the Medical Faculty was granted the right of promotion to a "Dr. in arte veterinaria". In 1914 the Faculty of Veterinary Medicine emerged as an independent faculty.

As a result of the political situation after World War II, the "Ludwigs-Universität" was suspended with exception of the Faculties of Veterinary Medicine and Agricultural Sciences, leading to the formation of a College for the Culturing of Soil and for Veterinary Medicine (Hochschule für Bodenkultur und Veterinärmedizin). This college formed a nucleus for restoration of the whole university, which was re-founded in 1957 and given the new name "Justus-Liebig-Universität Gießen" in honour of the great scientist Justus von Liebig, who acted as a professor in chemistry for 28 years from 1824 to 1852.

According to the Hessian University Law of 1971, the structure of universities into faculties was abandoned and replaced by the division into "Fachbereiche" (departments). However, other than most faculties, the Faculty of Veterinary Medicine maintained its integrity and only changed the name from "Faculty" to "Fachbereich". With the restructuring of the former Agricultural Faculty in 1985, the Institute of Animal Breeding and Genetics of Domestic Animals was moved from the Faculty of Veterinary Medicine to the Faculty of Agricultural Sciences, Nutritional Sciences and Environmental Management. These organisational changes, however, did not affect the ongoing involvement of this institute in the veterinary curriculum. This involvement is based on strong academic interrelationships. Similar interrelationships exist with other institutes of the Justus-Liebig-University Giessen which have led to a fruitful interdisciplinary cooperation.

The city of Giessen is located in the centre of Germany in the Federal state of Hesse with a population of about 90.000 inhabitants and about 40.000 students.

The Faculty of Veterinary Medicine of Justus-Liebig-University Giessen (JLU) is one of the five veterinary medical training and research facilities in Germany. Approximately 210 of the well over 1000 students admitted to German veterinary schools each year start their education at JLU Giessen. Most (85%) of our veterinary students are female and 180-190 pass their final exam each year.

The Faculty was first evaluated by the EAEVE from November 29th to December 2nd 1993, a second evaluation was from June 23rd – 28th June 2003 and a 3rd one from February 6th – 10th 2012, all three resulting in an "approval". The evaluation 2022 is based on the SOPs as approved by the EAEVE Executive Committee on 29 May 2019 and the General Assembly on May 30th at Zagreb 2019.

Main developments since the last Visitation

Premises

Substantial progress has been made by opening in January 2020 the new Clinical Unit for Small Animals (internal medicine and surgery) and the Clinical Unit for Birds, Reptiles, Amphibians and Fish, which. The old premises of the formerly joint clinical facilities for small animals and for horses were partially refurbished and made available for the Equine clinic. Due to financial restrictions the plan to build new facilities with operation theatres for horses is postponed.

After closure of the local abattoir, a new building for practical exercises in meat hygiene and meat inspection was opened in 2016. Thus, teaching and examination in meat hygiene is now possible independent of economic interests and can be performed in a modern, state of the art facility, unique in Germany.

Already in February 2012, shortly after the previous visitation, the BFS (Biomedical Research Centre Seltersberg) was opened. The BFS hosts – together with the institutes of Human Virology and Pharmacology - the Institutes of Veterinary Pharmacology, Vet. Virology and Vet. Parasitology. Cooperation between institutes is well established.

Curriculum

Whereas study subjects and their duration have virtually not changed since the last visitation, some improvements in contents were made:

- In the amendment of the Ordinance concerning the Certification of Veterinary Surgeons (TappV) in 2018, regulations related to oral and written examinations were modified (see Appendix. F).
- On decision by the Faculty, links between preclinical and clinical parts of the curriculum have been strengthened by creating new interdisciplinary courses.
- By the appointment of module coordinators for the organ-centred teaching modules the teaching content was harmonized.
- Clinical rotations - already introduced in 2006 - were adjusted to grant more time for electives and self-directed learning.
- For the extramural practical training (EPT) learning objectives have been defined and an evaluation system established.
- A skills lab has been opened in 2016 and training has been gradually introduced into the curriculum
- A broad range of E-learning modules with an increasing range of topics and ongoing projects (ILIAS) have been introduced.

Other issues of relevance

Animal welfare: A 3R centre was established in cooperation with the Faculty of Human Medicine. This not only strengthens the awareness of staff and students for animal welfare issues and the 3R concept, but it also offers the possibility that students and staff get trained according to the standards of the GV-Solas (society for laboratory animal science) to qualify for standard C set by the FELASA (Federation of European Laboratory Animal Science Associations). Another consequence is that, according to animal welfare law regulations the use of faculty-owned animals for student education was unfortunately strongly restricted.

Student selection: With the beginning of the winter term 2020, student selection is partially based on a written test [Test für Medizinische Studiengänge" (TMS)], which is commonly used by medical faculties throughout Germany and also by all five German veterinary establishments.

Qualification monitoring: The establishment participates in the Progress Test in Veterinary Medicine (PTT) that allows students to monitor their individual learning progression through the curriculum.

Staff Qualification: A university-based teaching qualification program [Hochschuldidaktisches Netzwerk Mittelhessen (HDM)] is a cooperation between the regional universities (Giessen and Marburg) and the university of applied sciences THM). It is available to interested staff since 2007. In recent years it has drastically been expanded and is increasingly used by the staff of the Faculty of Veterinary Medicine. Additionally, a "Day of Teaching" (Tag der Lehre) is offered once a year by the university with input lectures and workshops on specific topics in the field of teaching such as "digitalized teaching".

Major problems encountered by the Establishment

Some problems that were noticed during the 2012 and previous site visits are fundamental and cannot to be solved by the Faculty, but would only be partly solvable with considerable support from the JLU to reach agreement with the federal government.
Basic financing of the Faculty of Veterinary Medicine is limited, which includes financial means for maintenance and repairs of the modern research infrastructure.
There are problems with timely filling of open professorship positions with eligible candidates.
The regulatory link between available teaching capacity (core-funded staff), curriculum hours and number of students (capacity guidelines) does not allow to recruit additional staff for teaching or to change the number of incoming students.
The low number of permanent positions for non-professorial scientific staff (NPSS) impedes job perspectives of highly qualified young scientists.

Version and date of the ESEVT SOP which is valid for the Visitation

The Faculty of Veterinary Medicine of JLU Giessen is undergoing "Full Visitation". The SER follows the requirements as set out in ESEVT SOP Standards for Accreditation (as approved by the EAEVE General Assembly in Zagreb, May 30th, 2019, as amended by the EAEVE General Assembly in Turin, September 29th 2021).

Area 1: Objectives, Organisation and QA Policy

1.1 Mission statement and the objectives

In the Federal Republic of Germany, the veterinary profession is subdue to the Federal Veterinarian Order (Bundestierärzteordnung, BTÄO). According to § 5 of this order, veterinary education is regulated by the "Verordnung zur Approbation von Tierärztinnen und Tierärzten" (TAppV, Ordinance concerning the Certification of Veterinary Surgeons, see Appendix F) from July 27th, 2006 and as amended on August 15th, 2019, issued by the Federal Ministry of Nutrition and Agriculture (Bundesministerium für Ernährung und Landwirtschaft, BMEL). The objectives of veterinary education are clearly laid out in section 1, para1, TAppV:

"The objective of the training is an academically and practically trained veterinary surgeon who is capable of practising the veterinary profession responsible and independent within the meaning of Section 1 of the Federal Veterinary Code and of undergoing further training and ongoing advanced training.

a) The fundamental veterinary, the scientific, interdisciplinary and methodological skills,
b) practical skills,
c) spiritual and ethical foundations and
d) 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, taken special account of quality assurance."

The theoretical frame to achieve these objectives is outlaid in section 1, para 2, TAppV, where it is indicated that veterinary training shall comprise an academic-theoretical component with a total of 3850 hours of compulsory and elective courses and a practical component of studies lasting for 1170 hours. In accordance with these specifications the Faculty of Veterinary Medicine of JLU strives for excellence in research, teaching and services. Our objective is to develop sustainable veterinary medical science for animals and humans and to provide outstanding teaching and services. We aim to convey scientific knowledge, practical skills, intellectual and ethical fundamentals as well as a professional attitude committed to the well-being of animals, humans and the environment to our students. We encourage self-responsibility and self-reliant practices within the veterinary profession as well as lifelong learning.

Our activities are based on the unity of research and learning, that is, contemporary and progress-oriented veterinary medicine being of central relevance for animal welfare, human well-being and care for the environment ("One Health"):

- Optimal patient care by means of evidence-based veterinary medicine
- Ensuring the production of safe and high-quality food of animal origin
- Concern for the health and well-being of humans by controlling zoonotic diseases through research of fundamental disease mechanisms
- Scientific approaches to improve animal welfare
- Interdisciplinary engagement with other academic stakeholders

Our high standards of veterinary medical training provide excellent career opportunities in relevant professional fields for our students. We also offer a wide range of postgraduate training (academic track), as well as specialisation and continued education opportunities (professional track). Veterinary specialisation is nationally regulated (Fachtierärzte) and wherever possible integrated into the College system of the European Board of Veterinary Specialisation (EBVS).

1.2 Details of the Establishment

The Faculty of Veterinary Medicine (Fachbereich 10, FB10) is one of the 11 faculties of the Justus-Liebig-University Giessen (JLU). The JLU Giessen is a full university with a strong life science sector with study programs in human medicine, agricultural and nutritional sciences, biology and foodstuff chemistry. At present 28,500 students are enrolled at the JLU.

Details of the establishment	
Name	Faculty of Veterinary Medicine, FB 10
Address	Frankfurter Str. 94, 35392 Giessen
Phone	+49 641 99 38000
Fax	+49 641 99 38009
Email	Dekanat@fb10.uni-giessen.de
Website	www.uni-giessen.de/fbz/fb10
Establishsment's Head (Dean)	Prof. Dr. med. vet. Dr. h.c. Martin Kramer
Vice Dean of Study Affairs	Prof. Dr. med. vet. Dr. rer. medic. Stefan Arnhold
Vice Dean for Research	Prof. Dr. med. Martin Diener
Referent to the Dean	Dr. Christof Braun

1.2.1 List of councils, boards, committees

Faculty Council:

Members of the Faculty Council (Fachbereichsrat, FBR) are elected on a group basis. The Faculty Council deals with matters of fundamental importance. It decides within the degrees of freedom given on the study and examination order, it nominates candidates for appointments of professorships, it installs and suspends working groups. The Faculty Council also deals with matters like further development of the structure of the Faculty, the installation of particular courses of study and the installation and suspension of scientific and technical units. It is further responsible for the coordination of research projects. The Faculty Council also discusses the target agreements (Zielvereinbarung) to be reached between the Dean and the President.

It consists of the following members: Professorial staff (P) 7; non-professorial scientific staff (NPSS) 2; students (S) 3; administrative-technical staff (ATS) 1.

Deanery (Dekanat):

The Faculty is represented by the Dean who is responsible that the Faculty meets its teaching and examination duties.

The Deanery manages the Faculty, unless otherwise regulated. It prepares the proposals for decision of the Faculty Council and executes them. It is responsible for implementation of the target agreements on development of the Faculty with the Presidium (Zielvereinbarung) in 5 year intervals. It decides within the plan of the structural development of the Faculty about the distribution of funds within the Faculty, based on the total budget derived from state money and allotted to the Faculty by the Presidium. It further decides about the assignment of non-professional personnel to the various institutes and units, based on the budget available. It further decides on the percentage of the income from clinical services which is retained for financial support of central obligations of the Faculty (centralisation).

The Deanery is managed by an administrative officer (assistant to the dean).

The Deanery is supported by the following administrative structures:

- Office of Study Affairs (Studienkoordination; administrative staff: 2 persons)
- Office for Postgraduate Matters (graduation to a Dr. med. vet. or a PhD; administrative staff: 1 person)
- Support for teaching innovation (skills lab; administrative staff: 1 person)
- Student advice concerning IT-matters (self-learning centre; administrative staff: 1 person)

Faculty Committees

An obligatory committee according to the Hessian University Law of 1971 is the Committee of Study Affairs (Studienausschuss): It is headed by the Dean of Study Affairs. The members are as follows: P (3), NPSS (1), S (3). It meets regulatory during an ongoing semester. It collects all ongoing information and feedback concerning execution of the curriculum. Minor matters are settled by the Committee, more fundamental matters need approval of the Faculty Council.

It is within the autonomy of the University that the Faculty Council may inaugurate advisory sub-committees. They are composed of members out of the group of professors (P), the group of non-professional scientific staff (NPSS), the group of students (S) and in some cases the group of technical/administrative staff (ATS). All committees report to the Faculty Council (see Fig. 1.1). The following subcommittees have been formed:

- QSL-Commission (QSL-Kommission): The Faculty was provided with a special budget to improve study conditions. The QSL-Commission prepares the proposal on the use of this budget. It is headed by the Dean of Study Affairs. The members are as follows: P (3), NPSS (1), S (4)
- Committee for Strategic Planning of the Faculty (Planungsgruppe): The members are as follows: P (5), NPSS (2), S (2), ATS (1)
- Committee for Financial Matters (Haushaltsausschuss): The members are as follows: P (5), NPSS (2), S (1), ATS (1)
- Committee for Price-Granting (Preisverleihungskommission): The members are as follows: P (3), NPSS (1), ATS (1)

Additionally, an Ad Hoc Committee for Research Matters has been formed. Members are highly experienced researchers from the professorial staff.

Another committee is the Graduation Committee (Promotionsausschuss), implementing the order of graduation to a Dr. med. vet. and Dr. biol. anim. as passed by the Hessian Ministry for Science and Art on February 6th, 2002. Together with the Faculty of Medicine the Faculty of Veterinary Medicine has adopted a PhD-curriculum, leading to the degree of a PhD after a minimum of a 3 year study. The order has been approved by the Hessian Ministry of Science and Art, on March 14th, 2003.

State Examination Office

Separate to the faculty committees but in close cooperation with the dean and the committee for study affairs is the State Examination Office (staatliches Prüfungsamt). A distinction is made between the examinations to be taken after the 2nd and 4th semester (section 1, tierärztliche Vorprüfung) and the final examination (section 2, tierärztliche Prüfung). Each section is headed by a chairperson, with two vice-chairpersons in section 1 and four vice chairpersons in section 2; all chairpersons are recruited from the professorial staff. The administrative technical staff consists of 3 persons. For further responsibilities see Appendix to 1.2.1.

Extended Presidency and Central Administration:

The Extended Presidency (Erweitertes Präsidium) is the assembly of the 11 deans of the University and members of the Presidium [president, three vice presidents (VP 1,2,3), chancellor] and deals with common matters in respect to finances, human resources and management. Additionally, interaction of the Faculty with the Presidency and the central administration is on a daily case by case basis.

The Central Administration is headed by the Chancellor. It is structured into 4 main departments (Stababteilungen; Staff-divisions) plus several special units and sections serving the whole university. These are:

- StP: Unit Planning and Development (Stabsabteilung Planung und Entwiclung)
- StF: Unit Research (Stabsabteilung Forschung)
- StL: Unit Study Matters, Teaching, Continuous education, Quality assurance. Among other matters this unit is responsible for enrolment procedures (Stabsabteilung Studium, Lehre, Weiterbildung, Qualitätssicherung)
- StW: Unit Scientific Infrastructure (Stabsabteilung Wissenschaftliche Infrastruktur)
- AAA: Division for Foreign Student Affairs (Akademisches Auslandsamt)
- BfC: Office for equal opportunity (Büro für Chancengleichheit)
- WTT: Knowledge – and Technology Transfer (Wissens- und Technologietransfer)

Responsibilities for the veterinary curriculum and for the professional, ethical, and academic affairs of the Veterinary Teaching Hospital (VTH; Department of Veterinary Clinical Sciences)

Based on the above given information it is obvious that it is virtually impossible to name and give the degree of one person responsible for the veterinary curriculum and for the professional, ethical, and academic affairs of the Veterinary Teaching Hospital (VTH).
Overall responsibility for all matters is with the Dean in cooperation with the Faculty Council. On the management level the Dean of Study Affairs, Prof. Dr. med. vet., Dr. rer. medic. Stefan Arnhold, is responsible for the curriculum. Professional, ethical and academic affairs are handled by the Dean in cooperation with the central university administration.
The in loco responsibility in the Veterinary Teaching Hospital is with the professorial staff responsible for the respective clinical units.

1.2.2 Organizational chart, election pathways, responsibilities

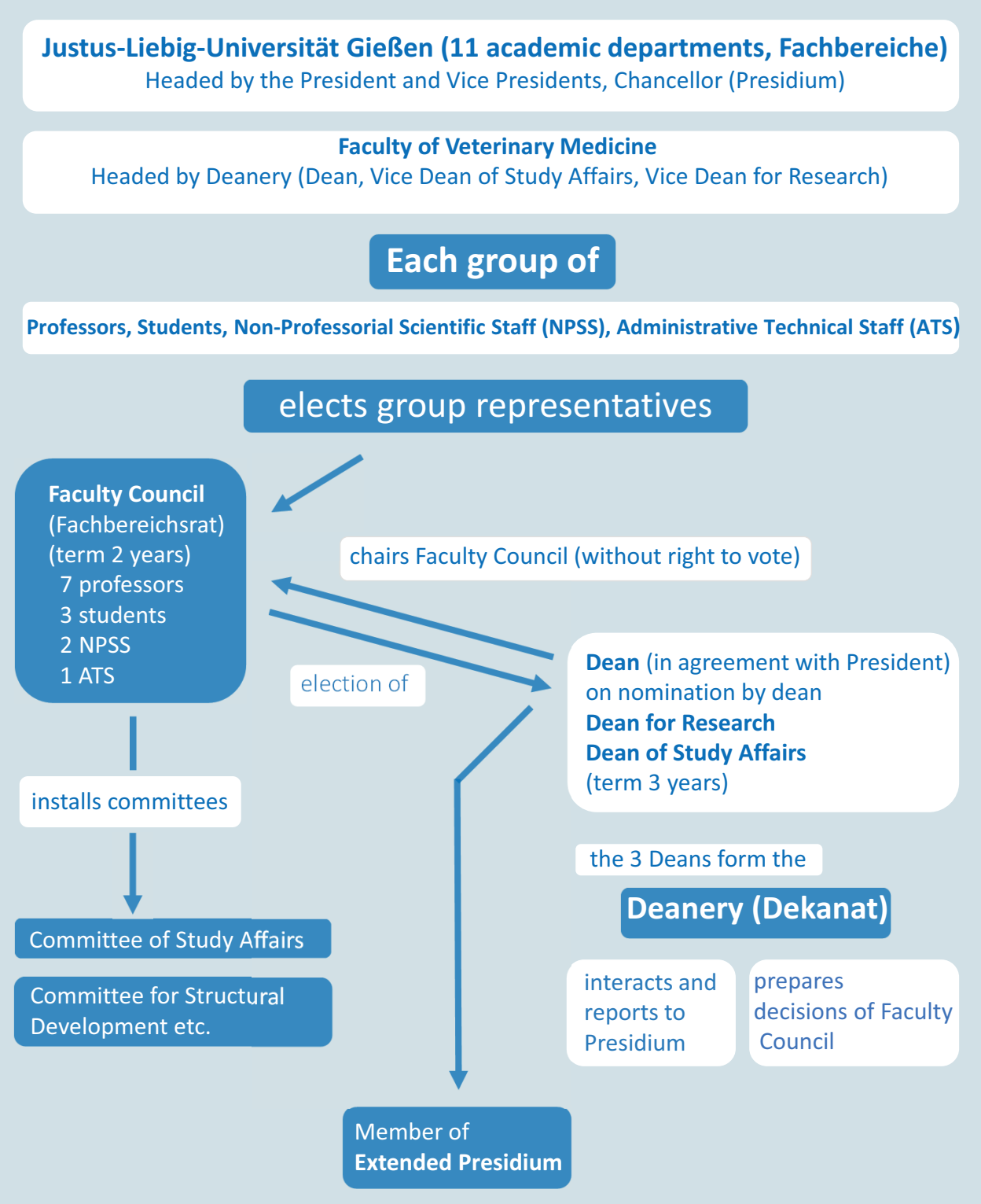

Figure 1.1 Organizational chart of the Faculty

1.2.3 Management of Faculty Departments/Institutes

Each department/institute is headed by an Acting Director (Geschäftsführender Direktor). He is elected for a 2 to 3-year period out of the group of professors by the directorium (body of unit representatives) of the respective department/institute. The directorium may also serve as a platform to discuss department/institute matters of general interest.

The Acting Director is responsible for running the institute/department, which includes that all teaching obligations are fulfilled. However, individual professorships may maintain a high degree of autonomy, particularly in the clinics and clinical subdivisions. Thus, depending on the arrangements made between the Deanery and the institute/department, the money allotted for research and teaching may either be under the responsibility of the institute/department (acting director) or a single professorship (Appendix 1.2 b).

The acting director reports to the Dean, all correspondence with the President and the central administration is through the Dean's Office.

Table 1.1 List of Institutes, Departments, special Units with academic staff on state budget (full time equivalents)

Institutes*	Academic staff
Institute of Veterinary Anatomy, -Histology and Embryology	W3: 1; C3: 1; W2: 2 (one open); NPSS: 4
Institute of Veterinary Physiology and Biochemistry	C4: 1; W3: 1, W2: 2 (one open); NPSS: 8
Institute of Veterinary Pathology	W3: 1; W2: 1; NPSS: 6
Institute of Veterinary Food Science	W3: 1; W2: 1 (open); NPSS: 7.5
Institute of Hygiene and Infectious Diseases of Animals	W3: 1; C3: 1; NPSS: 6
Institute of Virology	W3: 1; W2: 1; NPSS: 4
Institute of Parasitology	W3: 2; W2: 1; NPSS: 4
Institute of Pharmacology and Toxicology	W3: 1; W2: 1; NPSS: 4

Department of Veterinary Clinical Sciences*	Academic staff
Clinical Unit for Small Animals (Internal Medicine and Surgery)	C4: 1; W2: 3; NPSS: 12.5
Clinical Unit for Horses (Internal Medicine and Surgery)	W3: 2; W1: 1, NPSS: 7.5
Clinical Unit for Ruminants and Pigs (Internal Medicine and Surgery)	W3: 1 (open); W2: 1; NPSS: 6
Clinical Unit for Obstetrics, Gynaecology and Andrology of Large and Small Animals with an Ambulatory Service	W3: 2; NPSS 10.5
Clinical Unit for Birds, Reptiles, Amphibians and Fish	W3; 1 W2:1 (open); NPSS: 4
Professorship Clinical Anatomy and Experimental Surgery	W2: 1; technical staff 1
Professorship Experimental Animal Science, Animal Protection and 3 R Centre	W2: 1; NPSS: 1

***** This list does not account for personnel recruited from grant money, clinical or other non-university sources.

Central unit	Academic staff
Unit for Biomathematics and Data Processing	(NPSS: 1) For further information see Annex 1

Explanations: The letters C and W are indicative for the old (C) and present (W) system of ranking professorial staff. From 1975 until 2002 the C-system was applied. After an interim period, the W-system became mandatory in 2006. However, professors ranked according to the C-system could maintained their status.

- W3 (old system C4): Tenured professor, assigned NPSS: usually ≥ 2
- W2 (old system C3): Tenured professor, assigned NPSS: usually ≥ 1
- W1: Non-tenured (junior professor-ship for a 6 year term, assigned NPSS: usually ≥ 1 NPSS)

Special appointment regulations:

- W2/W3: 6 year term on a W2 position; after evaluation either nomination to W3 or end of contract
- W1/W2: 6 year term on a W1 position; after evaluation either nomination to W2 or end of contract

1.2.4 Collaborations with other Establishments

The veterinary faculties of Austria, Germany and Switzerland have formed the "Council of Veterinary Establishments" (Gemeinsamer Fakultätentag) which meets regularly once per year. Establishments are represented by the deans, vice deans, representatives of the professorial and non-professorial teaching staff and students. On invitation other veterinary organizations and representatives of the Federal Government may participate. The council develops “suggestions”.

The Faculty of Veterinary Medicine of the Justus-Liebig-University Giessen strongly supports international collaboration; agreements have been signed with veterinary establishments listed below; though there is a common frame allowing for exchange of students, teaching staff and development of joined research projects, implementation may vary as is indicated:

- College of Veterinary Medicine, University of Tennessee, Knoxville/USA; acceptance of Giessen students for Extramural Practical Training; coordinator: Prof. Stefan Arnhold.
- Ecole Nationale Vétérinaire de Nantes, Nantes/France; general student exchange; coordinator: Prof. Rüdiger Gerstberger.
- Uludag-Universität, Bursa/Turkey; exchange of students, NPSS, joint research projects; coordinator: Prof. Martin Kramer
- Universidad Austral de Chile (UACh), Chile; exchange of professorial staff and of NPSS; coordinator: Prof. Carlos R. Hermosilla.
- Universidad Nacional de San Marcos Lima/Peru; coordinator: Prof. Kerstin Fey.
- University of Georgia/Athens, Georgia, USA; acceptance of Giessen students for Extramural Practical Training; coordinator: Prof. Stefan Arnhold.
- Uniwersytet Warminsko-Mazurski w Olsztynie, Olsztyn/Poland; exchange of teaching staff, joined research projects; coordinator: Prof. Joachim Geyer.
- Veterinary and Animal Breeding Technology Faculty, S. Seifullin Kazakh Agro Technical University (KazATU), Astana, Kasachstan: exchange of academic staff; coordinator: Prof. Axel Wehrend.

1.3 Strategic Plan of the Establishment including a SWOT Analysis

The Faculty of Veterinary Medicine at the JLU Giessen is teaching and service-oriented, with research visible both nationally and internationally, competitive but overall very diverse. Main foci of scientific activities cover the following areas: reproduction, regeneration and immunity as well as wild life research. Challenges and expectations to the Faculty of Veterinary Medicine are met in close collaboration with JLU administration and which are laid down in the target aim negotiations

(Zielvereinbarungen) between the university and the Faculty, which are renewed every 5 years. Recruitments for new professorships are carried out according to these strategic aims. The following objectives are central elements according to the strategic orientation of the Faculty: offering an attractive curriculum of high quality, which is continuously evaluated and if necessary improved; aiming for excellence in research and teaching, providing continuing education for the veterinary profession; expanding the support of young scientists using the GGL facilities provided by JLU; providing services for high quality and excellent patient care and thus offering interesting cases to veterinary students.

The full SWOT analysis is provided in Appendix to 1.3. The summary reads as follows:

Strengths

- The Faculty of Veterinary Medicine has the advantage of being part of a university with an excellent international network, in part excellent and highly competitive national and international research programs as well as programs for further qualifications of academic teachers.
- Good contact to students, a coherent small campus, familiar atmosphere.
- State of the art managed skills lab (PETS).
- Broad, science-based modular curriculum with a wide spectrum of electives. Extensive extramural practical training in several fields of veterinary medicine including food production and food safety.
- Electronic Teaching and e-learning platforms of JLU (Stud.IP, ILIAS), further developed due to the Corona crisis.
- Systematic internal and external evaluations of research and teaching as requested by the presidency of the JLU (Rules for evaluation at the JLU).
- Students are represented in almost every faculty commission; 3 of the 7 members of the committee of Study Affairs are students.
- Great body of student trainees, who are well integrated in the procedures of institutes and clinical units.
- Very good library facilities with an extensive bibliographic collection, wide range of electronic journals.
- Extensive training of postgraduate students in the academic and clinical track. There is a joint PhD program with the Faculty of Human Medicine within the Giessen Graduate Centre for Life Sciences (GGL).
- In part highly modern teaching, research and clinical facilities.
- The Department of Veterinary Clinical Sciences with 5 clinical units provides a sufficiently high load of patients to secure teaching and clinical research.
- High number of students participate in ERASMUS exchanges (see Appendix 1.3 b).
- The Faculty is supported by its alumni organization (Verein der Freunde und Förderer der Veterinärmedizin in Giessen, VFFV).

Weaknesses

- Limited opportunities to substantially modify the curriculum due to national legislation.
- Fixed teacher/student ratio due to legislative link between core-funded teaching staff and student admission.
- Shortage of state funded financial resources to allow proper management of NPSS, ATS, maintenance of laboratory equipment and teaching facilities, resulting in limitations of strategic planning and shortages in technical staff
- Difficulties to fill professorial positions with highly qualified scientists.
- Problems in the recruitment of highly qualified non-professorial scientific staff (NPSS) at all levels.

- High complexity and centralization of administrative processes in the university result in long decision-making processes.
- In part, clinical and non-clinical facilities not meeting up to date standards.

Opportunities:

- The in part excellent research and clinical infrastructure provides career opportunities for junior scientists and supports attraction of excellent, board certified staff for teaching and research. An increase in the range of specialized clinical services can be expected.
- Coaching strategies and career outlooks provided by the JLU for younger scientific staff increase motivation.
- Access to a large number of qualification and support programmes to all staff provides the opportunity to increase individual qualification.
- The enhanced monitoring of the undergraduate progression provides information needed to further improve the curriculum.
- Development of additional online and blended training modules increases the learning outcome.
- A further strengthening of life-long education/learning in accordance with the demands of the profession will increase visibility of the Faculty.

Threats:

- Dependency on university budget allocations with the threat not to meet the increase in cost of veterinary education and clinical services.
- Threat that the increase in maintenance needs of the older infrastructure will not be covered.
- The aging of both academic and support staff creates foreseeable vacancies due to the shortage of qualified applicants for higher level teaching, clinical and research positions, resulting in positions remaining open for longer periods with consequently certain subjects not fully represented.
- Further decline in the number of farms in the region, which produce food of animal origin.

1.4 Outcome Assessment, QA and Quality enhancement mechanisms, study matters

Student Performance

The Committee of Study Affairs is the main body responsible for quality assurance of the teaching program and its outcome. The assessment is mainly based on the strict control and evaluation of the examinations as implemented according to the study order, provided by the Faculty, which has to fulfil the requirements of the Ordinance concerning the Certification of Veterinary Surgeons. All students are individually notified via the Stud.IP program on their examination dates and the outcome. All student records are stored electronically in a data base (Flexnow). In case of failure the repeat is scheduled, special arrangements are needed for a second repeat. The high efficiency of this system is documented by the fact that over 80 % of undergraduate students graduate within the time officially allotted to the study of veterinary medicine.

Examinations according to the Ordinance concerning the Certification of Veterinary Surgeons are “State examinations” (Staatsexamen) and appointment of qualified examiners is on behalf of the federal government. The Committee of Study Affairs continuously monitors the outcome of the examinations. In case of proportionally high failures the examiner is notified, questioned and suggestions for improvement are made. Furthermore, students may express their complaints concerning any aspect associated with the examinations as well as the curriculum.

The Committee of Study Affairs meets regularly during a semester or on demand. It reports to the Dean and Faculty Council.

Research

Research is an important matter and in the focus of the presidency (Vice President for Research). For the presidency, assessment of success in research is based on the funds acquired from acknowledged research organizations, e.g. the German Research Foundation (Deutsche Forschungsgemeinschaft). Once a professorship has been appointed, the Faculty has no further direct impact on the research program started. The Faculty may provide – together with the central administration of the university – administrative support or some limited extra financial support to get the program started. The research funds acquired by the Faculty and the number of postgraduates graduating to a PhD or a Dr. med. vet. positively influence the funds allocated to the Faculty by the presidency. Thus, research is under strict continuous monitoring on the Faculty level with individual assessment of the various research groups by internal and external evaluation at irregular time points. The most recent internal evaluation covered the period 2007 - 2018, the report is attached as part of Appendix 1.3a. From the report it becomes clearly obvious that the Faculty has a particularly strong profile on the field of infectious diseases.

Clinical and para-clinical services

The clinical services provided by the Faculty cover general, every day as well as highly specific indications, accompanied by a highly sophisticated "in house" clinical-chemical, microbiological, parasitological and pathological diagnostic service system. The services have a high acceptance rate as shown by the number of patients coming in, in spite of the high density of in part highly specialized veterinary clinics in and around Giessen. The type and number of patients and specimens coming in allows both, undergraduate and postgraduate student education. In case of food animals and the respective indications, particularly pigs, the Faculty takes special efforts to provide an environment for proper student education (see Area 4).

The services provided meet the Code of Good Veterinary Practice as developed by the Federation of Veterinarians of Europe. There is a general ordinance on hygienic measures, also those to be taken in case of an outbreak of notifiable animal diseases, an ordinance developed in cooperation with the state veterinary authorities.

When entering clinical rotations, students are provided with access to a complex, interactive patient recording system (Easy Vet). Furthermore, they are provided with written information about the peculiarities of each clinic/institute. Students have to confirm having received and read this information, which is based on the general information on conduct and hygienic measures to be observed.

General

It is the philosophy of the Faculty that all staff develops a high responsibility towards the need to assure a high level of quality within their respective specialisation.

The quality of teaching, clinical and para-clinical services and of research is under continuous review. In case of research the peer review system and the publication in internationally highly recognised journals provides excellent feedback on quality of science. Likewise, the passing or non-passing of students of the series of more than 30 state examinations reflects quality and success of teaching. Concerning clinical services and the involvement of stakeholders the Faculty considers the large number of referred cases as a confirmation of the quality it provides; to the best of the knowledge of the Faculty there seems to be no unemployment of the graduates from our Faculty.

The Faculty is convinced that it provides quality; there is an inherent check of all quality issues, in case of problems the Faculty in the past has always succeeded to solve them.

Compliancy with ESG Standards.

Yes

1.5 Interaction with Stakeholders and Others

Objectives

As stated above, in the Federal Republic of Germany veterinary education is regulated by the Ordinance concerning the Certification of Veterinary Surgeons (see Appendix F), issued by the Federal Ministry of Nutrition and Agriculture.

The present ordinance replaced the former ordinance from November 10th, 1999, following lengthy discussions with the Veterinary Profession, such as the Federal Veterinary Chamber, the Association of Practicing Veterinarians and the Council of Veterinary Establishments, the latter one guaranteeing student participation. Thus, the TAppV is a result of interactions of important stakeholders with the veterinary establishments being essential partners. The amendment in 2019 indicates, that this ordinance is updated when found necessary.

Concerning the Faculty of Veterinary Medicine at JLU Giessen, the Dean, Prof. Kramer, is President of the German Veterinary Association, Prof. Wehrend, head of the Clinical Unit for Obstetrics, Gynaecology and Andrology of Large and Small Animals and director of the VTH, is president of the Academy of Continuous Veterinary Education. Numerous Professors are nominated to contribute in state/federal legislative bodies or scientific organisations. Inherent to these positions is interaction with important stakeholders and wider society. Animal welfare, food hygiene and antimicrobial resistance are topics in focus and apart from acting on a federal level, faculty based local events are open to a specialized audience and the general public (Appendix to 1.5 a).

In particular the Faculty also tries to interact with the farming community, also with the intention to keep them as clients. The attached list shows the presentations given and practical courses held 2019 and 2020 (Appendix to 1.5 b).
Other events provided by the Faculty serve both, continuous education and interaction with veterinary community and other clients (Appendix to 1.5 c).

Information current student population, employment past students

Concerning employment, destinations of past students and the profile of the current student population the Faculty is not - and will not be - in a position to provide detailed information. University statistics allow a distinction between male and female students and their assignments to the various semesters (see Area 7).
The Faculty has no means – and does not find it necessary – to systematically collect information concerning job profiles of past students. Some information might be obtained from the alumni association of our Faculty, however, it would lack any statistical significance.
As can bet taken from German veterinary journals, eligible candidates for open veterinary positions are desperately sought, even new graduates. With 2.3% the number of unemployed veterinarians is considered very low. This situation allows the Faculty to conclude that its graduates have great chances on the job market in all fields of the veterinary profession.

1.6 Communication channels

All necessary information concerning the curriculum, post-graduate studies, the establishments ESEVET status and ongoing special events are provided on the Faculty´s website.
Interaction of P, NPSS, S and ATS are indicated under 1.2.1 and 1.2.2.

Concerning implementation of the curriculum and student information the situation is as follows:

- All students should have their own computer to get access to the university IT-system; students are provided with their individual password.
- The curriculum is available through Stud.IP and the Faculty´s website.

Success in research and teaching to almost 100% - is a matter of the professorial staff. Therefore, recruitment of professors must meet the strategic plan of the Faculty, which is mainly focused on research matters. There is a strong but lengthy procedure involving a national and international peer review process concerning the general and specific quality of likely candidates. At the required "in loco" presentations and hearings of the candidates student participation plays an important role.

The **Student Information Platform (Stud.IP)** provides the following information:

- all teaching personnel is requested to enter text, projections and accompanying information of their lectures.
- notification of short-term changes, e.g. change of lecture hall, change of group-assignment, changes due to the absence of a teacher etc..
- each semester has its own block of information.
- the **Flexnow system** is an examination administration system. A distinction must be made between examinations according to the Veterinary State Examination and attestations taken in practical courses. Concerning the Veterinary State Examination students are individually informed about the date they must take the examination, in case of failure they are informed about the date they can take the resits.
- in case of problems students can directly interact with the state examination office.
- individual students can retrieve the results of their examinations.

More than 80% of the veterinary students graduate within 11 semesters (see also Area 7); this is the best result of the 11 faculties of the JLU and clearly demonstrates that the educational system works despite numerous examinations.

Teaching quality is assessed every 3 years. Because of privacy protection reasons the outcomes of the evaluations cannot be communicated throughout the Faculty. Furthermore, the individual instructor may assess his teaching using questionnaires provided by the Office of Study Affairs as well as the Central Service Unit for Teaching Evaluation (Servicestelle Lehrevaluation). On the other side in case of problems concerning teaching, students can approach the Committee for Study Affairs (Studienausschuss) through their representatives. Such a move can be highly effective!

1.7 External Review through ESEVT

The Faculty was first evaluated by the EAEVE from November 29th to December 2nd, 1993, a second evaluation was from June 23rd – 28th June 2003 and a 3rd one from February 6th – 10th, 2012, (stage one) all three resulting in an “approval”.

The evaluation from January 24th to 28th will be the first evaluation by ESEVT.

Suggestions for Improvement on Area 1

- To overcome the weaknesses and threats identified by the SWOT analysis
- To really make use of the opportunities listed above

Area 2: Finances

Introductory remark

Please note: In contrast to other data in the report, which refer to the Academic year (e.g. academic year 2020 = winter term 2019/20 + summer term 2020), all data presented in the chapter "Finances" refer to calendar years due to the accountancy of the Faculty and the university administration.

2.1 General Financial Process of the Establishment

The regular funding of the Justus-Liebig-University by the Hessian Ministry for Science and Arts is based on the total number of students within the regular study schedule, weighted by a factor for "norm student costs per year". According to the discipline clusters [I (low) – X (high)] are formed. Veterinary medicine forms the second highest cluster (IX) next to medicine (X). This regular funding makes up about 80 % of the total funding of the university. It is supplemented by a success-based funding, which considers the aspects research, gender, teaching and internationalization.
After subtraction of the central costs of the university (e.g. for administration, buildings, energy costs…), the remaining amount provided by the ministry is distributed to the different faculties of the JLU using similar criteria as applied by the ministry.
The JLU participates in the program for reinvestments set up by the State of Hesse (HEUREKA) which allowed spending of 540 Mio € per year until 2020 for all educational institutions; the reconstruction of the Clinical Unit for Small Animals and the Clinical Unit for Birds, Reptiles, Amphibians and Fish (opened January 2020) was supported by this program.
Additional income (revenue from clinical and diagnostic activities) is retained by each institute or clinical unit, if invoices are classified as bills coming from the University. Two to 10 % of this income are "centralized" and put under the authority of the Dean to cover general matters of the Faculty. On average, this centralized money amounted up to 210,000 € per year between 2018 and 2020.
In the Department of Veterinary Clinical Science, a substantial part of this income is used to finance non-budgeted teaching/research staff positions.
From the income gained from invoices billed privately from professors, who are authorized to put forward private bills, 30 % are retained by the University as "facility and staff using costs". This retained money is used for project support within the whole University, so that part of it may flow back to projects in the Faculty. The remaining 70 % are to the disposal of the professor issuing the bill. Parts of this private income is also used to hire extra staff.
Some money to support research originates from two endowment funds donated to the Faculty (Engemann-Stiftung, Hilde und Ewald Berge-Stiftung). Their funding opportunities, however, where low in the past 3 years as only a low interest could be gained from the funding capital in the recent financial situation.

Percent (%) of margin paid as overhead

As shown in table 2.1.2, between 3.2 and 3.3 Mio € research grants are acquired annually by the Faculty. Depending on the funding source, an overhead of 10 - 25 % is retained by the University; thus, for example, grants from the German Research Foundation are automatically augmented with a 20 % surplus for general costs, i.e. as overhead. This overhead cost does not show up in table 2.1.2.

Tuition fee for national and international students

Students at JLU and generally in Germany do not have to pay any tuition fee, but there is a registration fee of 277.87 € per semester/per student. Decisions on the fees are made after negotiations between the University and the different bodies involved. They sum up as follows: 132.95 € for a local transportation ticket, 8.22 € for the student representation body at the university, 83.70 € for the student support office ("Studentenwerk", organizing e.g. student canteen and dorms), 50.00 € administration fees, 1.50 € semester ticket for the theatre, 1.50 € for renting bicycles from the university. These fees include an „accident insurance" covering accidents occurring during official study activities inside and outside of the university.

Continuing education

As continuing education in general is under the umbrella of the Academy for Continuing Education (ATF; see also Area 1), all income is with the ATF. If an event takes place at the facilities of the Faculty, fees for using the facilities are paid to the university, which partly and indirectly may be returned to the Faculty.

Tables 2.1.1, 2.1.2 and 2.1.3 show the annual expenditure, revenue and balance for the last three years.

Not included in the expenditure table 2.1.1 are

- The salaries paid to the professorial staff (about 3,585,000 € per year, not handled by the Faculty but the central administration)
- General costs for energy, central administration, IT infrastructure, which increase the income from public authorities by about 20 %, i.e. by about 3 million € per year (not handled by the Faculty but the central administration)

Table 2.1.1. Annual expenditures during the last 3 years (in Euros)

Area of expenditure	2020	2019	2018	Mean
Personnel*	18,179,117	19,918,127	19,886,690	19,327,978
Operating costs Maintenance costs Equipment	5,856,434	5,349,211	5,479,990	5,561,878
Total expenditure	**24,035,552**	**25,267,338**	**25,366,680**	**24,889,857**

* Does not include professorial staff (see below)

Table 2.1.2. Annual revenues during the last 3 academic years (in Euros)

Revenues source	2020	2019	2018	Mean
Public authorities	14,973,936	15,020,145	15,022,015	15,005,365
Clinical and Diagnostic services	9,599,206	7,619,000	7,336,523	8,184,910
Other services	-	-	-	
Research grants	3,239,490	3,214,550	3,307,792	3,253,944
Donations	-	-	-	
Total revenues	**27,812,632**	**25,853,695**	**25,666,330**	**26,444,219**

Table 2.1.3. Annual balance between expenditures and revenues (in Euros)

Academic year	Total expenditures	Total revenues	Balance
2018	25,366,680	25,666,330	299,650
2019	25,267,338	25,853,695	586,357
2020	24,035,552	27,812,632	3,777,071

2.2 Modus Operandi and Degree of Autonomy

According to the university law of the state of Hesse, the deanery has full autonomy to distribute the revenues from public authorities, including the financing of non-professorial staff.
However, according to recent regulation by the Hessian Ministry for Science and Arts, only 30 % of an annual revenue generated can be transferred into the next year.
Each clinical unit is fully responsible and has full autonomy in the management of its revenues and expenditures from clinical or diagnostic processes. The head of each clinical unit is allowed to employ staff from clinical income. Therefore, the number of Full Time Equivalents (FTE) paid by revenues from the state of Hesse is increased by about 25 % by staff paid by revenues from clinical or diagnostic income.
There are only two limitations to this autonomy. Thus, as mentioned above in average and depending on the needs of the Faculty a certain percentage of the income (amounting up to 210,000 € in the years 2018 to 2020) is centralized by the Deanery to cover general costs of the Faculty such as e.g. licenses for the electronic patient administration/documentation system, transport of large animals, management of waste and other disposals, car pool of the Faculty, support in professorial appointments, mail and other upcoming costs.
Another limitation results from a regulation passed by the Hessian Ministry for Science and Arts in 2019, which only allows 30 % of an annual revenue to be transferred into the next year. As there was no transition period when this regulation was implemented, the Faculty suffered from an "efflux" of 1,500,000 € in 2019 to the central university administration. However, as agreed on with the financial department of the JLU, part of this money may be used to support the establishment of research facilities in the Faculty.

2.3 Review of Resources Allocation

Allocation of investments and underlying procedures

The Faculty operates a list of measures of first and secondary priority which is developed by the Committee for Strategic Planning, which is composed of members of the professorial and non-professorial scientific staff, students and technical staff (see Area 1). Another advisory committee is the Ad Hoc Committee for Research Matters (see Area 1). Final decisions are made by the Faculty Council (see Area1). Thus, all groups of the Faculty participate in these processes securing the necessary communication among groups.
The dean has to forward and discuss decisions on mayor investments with the presidency of the university, largely in respect to their affordability (financed from the central budget of the university or by application for extra funding at the Hessian Ministry for Science and Arts).

Ongoing and planned major investments (first priority) for developing, improving and/or refurbishing facilities and equipment for the next 3 years are as follows:

- New building for equine surgery, estimated costs about 8 million €, financed by Hessian Ministry for Science and Arts.
- Renovation of the research facilities in the Institute for Veterinary Pathology. Estimated costs about 2 million €, financed by "surplus" money (see above) from clinical revenues and by the university.

Allocation of revenue for maintaining regular operations

The distribution of the revenue forwarded to the Faculty from the central administration of the JLU is under the responsibility of the Deanery. About 90 % of this income is used to cover cost for personnel. Personnel is allocated to the various institutions of the Faculty predominantly according

to their teaching obligations. The remaining budget is distributed according a scheme approved by the Committee of Financial Matters (see Area 1). This scheme considers the following criteria: number of personnel, third party funding, promotion of young scientists and therapeutic/diagnostic activities.
The flow (Figure 2.1) and the control (Figure 2.2) of the "regular" financial support (i.e. the support by the State of Hesse are depicted in the next two figures.

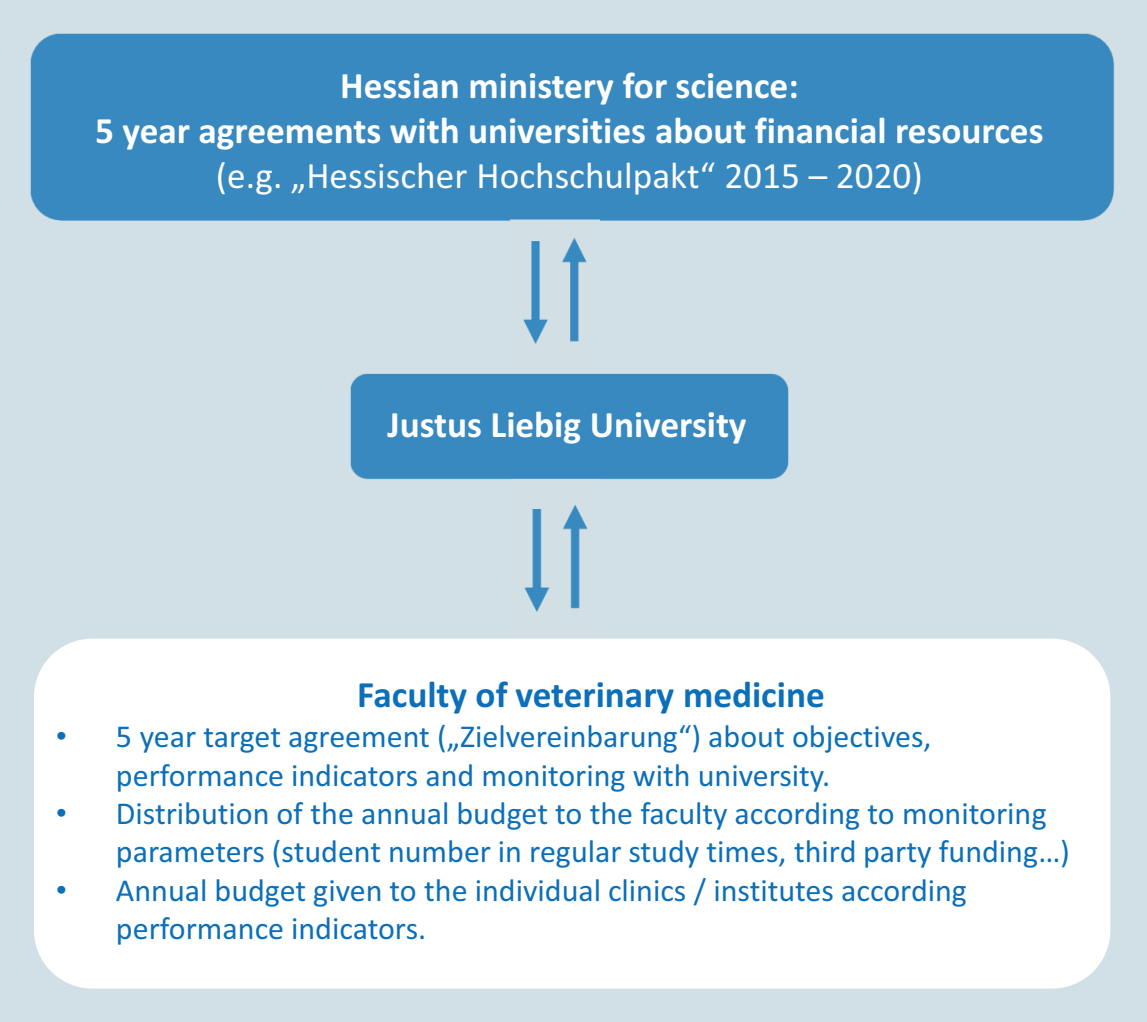

Figure 2.1: Flow chart of regular financial support

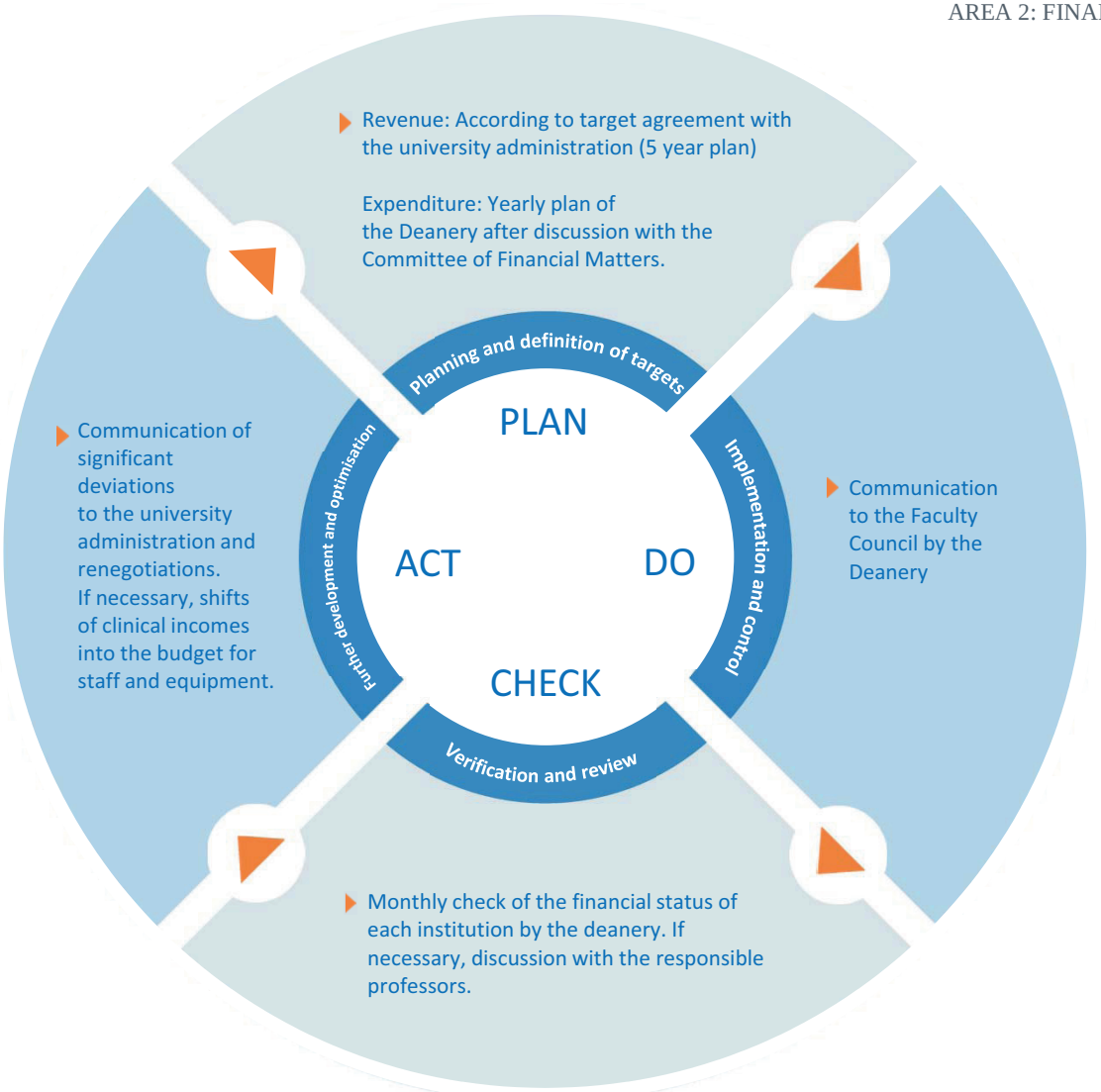

Figure 2.2: PDCA cycle of regular financial support

Comments on Area 2

Over the last years, the Faculty gained a large degree of autonomy in the administration and distribution of the funds coming from public authorities. For example, in contrast to former years, money can freely be changed between costs for personnel or operating costs. However, the basic shortage in the revenues provided, the increase in personal costs and the personnel law (Arbeitszeitschutzgesetz) continuously force the Deanery to compromise in appointing staff to vacant positions.
Provided that the income situation does not fall dramatically due to the Covid-19 pandemic or the concomitant economic disturbances, the finances of the Faculty are in a balanced state, allowing to maintain the present procedures.

Suggestions for Improvement on Area 2

The “safety margin” of 1.8 million €, which can be transferred from one year to another, is too small for our Faculty. During the corona pandemic, the salaries of the personnel paid by clinical revenues had to be paid regularly, but there was a drastic decrease in the income, especially in the Clinic for Small Animals. Furthermore, the Faculty expects a large need for reinvestments in the clinical diagnostic part, mainly magnetic resonance tomography, computer tomography or scintigraphy. In order to be able to renew this diagnostic equipment, a larger percentage of money has to be saved over 5 - 6 years in order to be able to cover the expected expenses.
Another basic problem results from the fact that the university law of Hesse does not consider the special needs of veterinary education in respect to patient care. To overcome this situation the university might adjust the internal criteria for distributing revenues to the faculties. Alternatively, initiatives should be taken to amend the Hessian University Law to meet these demands.

Area 3: Curriculum

3.1 The Veterinary Education Program at JLU Giessen

The Faculty of Veterinary Medicine at the JLU Giessen is one of five establishments for veterinary education in Germany. It offers a 5.5 year long state examination study program in veterinary medicine, which is fully compliant with the EU-Directives 2005/36 and 2013/55, as well as with national laws according to the "Verordnung zur Approbation von Tierärzten" (Ordinance concerning the Certification of Veterinary Surgeons (TAppV), see Appendix F), and the Federal Veterinary Regulation (BTÄO). The objective is to graduate scientifically and practically trained veterinarians capable of self-responsible and independent veterinary work and life-long learning (see Area 1).

3.1.1 Educational aims of the Establishment and the general strategy for the design, resources and management of the curriculum

In the course of the veterinary study program at the JLU Gießen, the basic veterinary, scientific, interdisciplinary and methodological knowledge, practical skills as well as the intellectual and the ethical basis for a professional attitude committed to the well-being of animals, humans and the environment are taught. At the Establishment, the TAppV, the associated Study and Examination regulations and a comprehensive subject-specific learning objective catalogue (ECTS catalogue, with references to "day one skills" of the EAEVE) defines the organizational and content framework of the implemented curriculum in order to meet the educational objectives.

The strategic organisation is based on the veterinary examination process in two steps with section I, the veterinary state examination after the 2nd and 4th semester ("tierärztliche Vorprüfung") and section II of the veterinary state examination ("tierärztliche Prüfung"), after the 5th, 6th, 7th, 8th and 10th semester often with scientific theoretical and practical parts.

Graduates are aware of their responsibility towards patients, clients and society and are familiar with the legal framework of regulations governing their professional activities. They recognise their affiliation to the veterinary profession and commit themselves to being the public face of veterinary medicine through their professional attitude. They are aware of the limits of their knowledge and proficiency and have gained sufficient insight into the structure of the veterinary health system to take appropriate action. Furthermore, they are conscious of the interactions between animals, humans, the environment and the associated systemic effects, and they are also well prepared to stand up for the well-being of animals.

The curriculum is based on the following principles:

The competence-based learning outcomes and the underlying curriculum and courses are defined and described in the ECTS catalogue (catalogue for ECTS credits according to lessons offered, see Appendix B)

- Teaching, learning and examination methods are constructively aligned to learning outcomes;
- Real-life situations are simulated for training in practical, social and scientific skills throughout the entire program;
- An interdisciplinary approach to teaching: subjects are integrated horizontally and vertically, from both non-clinical and clinical disciplines;
- Student-centred learning: students are encouraged to increase effort of their own learning, fostering transferable skills such as problem-solving, exploratory learning, critical and reflective thinking, and mature self-directed learning.

For self-evaluation of the individual learning progress throughout the curriculum, the Faculty annually offers the Progress Test Tiermedizin (PTT) to students of all semesters. This test was developed concomitantly with participation of the majority of German establishments for veterinary education as part of the "KELDAT" (Kompetenzzentrum E-Learning, Didaktik und Ausbildungsforschung in der Tiermedizin) project. It is now implemented at the Faculty of Veterinary Medicine for voluntary participation.

During the SARS-Cov-2 pandemic, teaching was organized as described in Appendices to 3.1.1 a and b.

3.1.2 Legal constraints and the degree of autonomy that the Establishment has to change the curriculum

As already indicated in Area 1, the TAppV as a Federal Law (see Appendix F) defines the educational goal, the significant teaching content, the subject-specific hours allocated to intramural and extramural training, the total duration of university studies, as well as the timing of formal examinations and the official time-period allotted to the study of veterinary medicine.
The national curriculum mainly defines the standard number of hours for each subject, however up to 20% of the total teaching load may be shifted between subjects by the establishments. Also the time periods for the extramural practical training is regulated by the TAppV, there is no flexibility. Concerning the curriculum at the JLU Giessen, the balance between theoretical and practical teaching is defined by Rules for Study and Examination (Studien- und Prüfungsordnung – StuPO-Vet, see Appendix H).

Cornerstones of the TAppV are:

- Total hours of training: 5,020 hours of training in 5.5 years (11 semesters, including the final examination period), which were exceeded by the Giessen curriculum by 120 hours (a reduction of curriculum hours and thus conformity with the TAppV was achieved with the introduction of the new rotation in 2020).
- Intramural scientific-theoretical training; 3,850 hours in first 4.5 years
- Mandatory extramural practical training: 1,170 hours (see Table 3.1.1 and Table 3.1.4)
- 29 official examination subjects, with fixed curricular hours assigned to each subject area (see Annex 1 of TAppV, Appendix F)

Changes of the TAppV are the responsibility of the Federal Ministry of Food and Agriculture (BMEL). Requests are communicated to the ministry by stakeholders such as the "Council of Veterinary Establishments" (Fakultätentag, see Area 1 and Appendix to 3.1.2). The ministry compiles these inputs and creates a draft legislation, that must pass the German Federal Council, (Bundesrat). The implementation of the TAppV in a curriculum is within the responsibility of the Faculty, which imposes the study and examination regulations. These regulations are subject to the QA processes of JLU Giessen. Deviations from the TAppV are open to legal challenges.

3.1.3 Description of how curricular misshaps are identified and corrected

Within the Faculty, the curriculum is established by the Committee of Study Affairs (Studienausschuss). Based on the degree of freedom (see above), the allocation of hours between the various subjects is primarily done by the Dean of Study Affairs, however, in general only after intensive discussion with the Committee of Study Affairs.
The curriculum for each semester is published in the internet (www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium/curriculumtest/curriculumtest).
All students of a year are assigned to one of four groups (group A to D). The distribution of all groups to individual courses is done centrally by the Office of Study Affairs (Studienkoordination). Organisation of courses (e.g. inscription or evaluation of courses) and distribution of teaching material for download is offered digitally on the student management and e-learning platforms Stud.IP (www.uni-giessen.de/studium/studinfo/studip) and ILIAS.
Also the organisation of all examinations is based on a computer program (FlewNow; www.uni-giessen.de/fbz/fb10/pruefungsamt/flexnow). For example, the institutes send the results of tests to the Office for Examinations (Prüfungsamt); the students can check their individual records for completeness. Furthermore, the size of the groups (i.e. ratio students : teacher) for each course is published on Stud.IP-platform.
Detailed information on the topic covered by the various subjects can be found in the ECTS brochure of our Faculty (see Appendix B). Semester plans are prepared by the Office of Study Affairs (Studienkoordination) and Dean of Study Affairs with input and feedback from the teaching staff of the Faculty; they are appraised by the Committee of Study Affairs, agreed upon by the Faculty Council and transferred to the electronic student management platform (Stud.IP), the electronic course catalog of JLU Giessen and the Faculty`s website.

Subject and module representatives are responsible for the development and coordination of learning objectives. They coordinate the process between relevant subject lecturers and are the maincontact persons for the Office of Study Affairs, the Dean of Study Affairs, lecturers and students. Students have the possibility to submit questions, suggestions and wishes to the subject and module representatives (see Appendix 3.1.3a) as well as to the Office of Study affairs and have thus the possibility to participate in the improvement process. In case of subject foci, the representatives have a fixed appointment at the end of each focus used for summarising the learning content and getting oral feedback from the students. All participating teaching staff is asked to attend this meeting in order to continuously improve the course content. Aim is to minimize overlaps and redundancies by several lectures. To deepen the acquired knowledge, however, some curricular overlaps and redundancies are deliberately introduced.

The Committee of Study Affairs is in charge for improvements of the course of study, but is not responsible for the content of the curriculum.

A newly designed, comprehensive, subject-specific learning objective catalogue (ECTS-catalogue, see Appendix B) is available, which, based on students' and instructors' feedback, will be updated bi-annually. The catalogue is accessible to all students and lecturers via the website of the Faculty (www.uni-giessen.de/fbz/fb10/studium-und-prufungen/zulassung-1/informationen/ectskatalog/view). It will help to avoid omissions and provide consistency. The development and coordination of the learning objectives catalogue is coordinated through the Dean and the Office of Study Affairs. They are responsible for the communication process between the relevant coordinators for the subject lecturers. Revision suggestions are presented to the Committee of Study Affairs and at frequent meetings, at least twice a semester, decisions are mede on their implementation in accordance with the QA processes on curricular development (Figure 3.1).

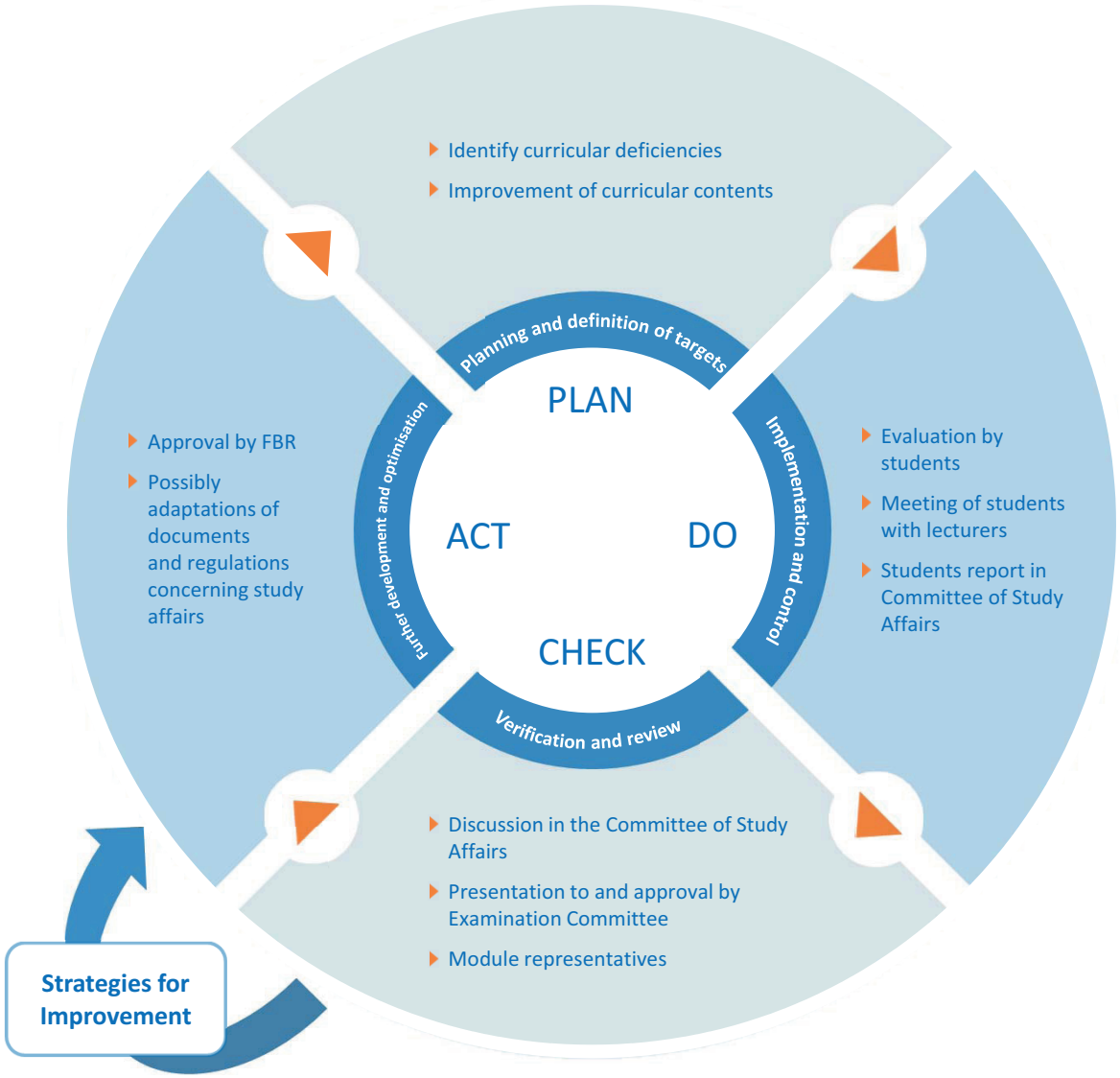

Figure. 3.1: PDCA cycle for the improvement of curricular deficiencies

Table 3.1.1. Curriculum hours in each academic year taken by each student

Year	lectures	seminars	supervised self learning	laboratory and deskbased work	non-clinical animal work	clinical animal work	others	total
1	401	66		131	84			685
2	408	23		79	98			608
3	536	56		108	10	55	8	773
4	687	90	12	38	32	27		886
5	5	34	34	54	10	584		721
6	First half reserved for final exams (Self directed learning as preparation for the examination)							
Total	**2037**	**269**	**46**	**410**	**234**	**666**	**8**	**3,670***
Electives								308
EPT					320	850		1,170
Total								**5,148***

* Total hours are reduced with the StuPO-Vet change of 12.02.2020, hours of internal rotation have been adjusted.

Table 3.1.2. Curriculum hours taken by each student

Subject	Lectures	Seminars	Supervised self learning	Laboratory and deskbased work	Non-clinical animal work	Clinical animal work	Others	Total (rounded)
Basic subjects	**195**	**52**		**75**				**322**
Medical Physics*	45			15				60
Chemistry (anorganic and organic)*	60	24		32				116
Animal biology, zoology and cell biology *	60							60
Feed plant biology and toxic plants*	30			28				58
Biomedical statistics		28						28
Specific veterinary subjects Basic Sciences	**918**	**83**		**261**	**182**		**8**	**1,449**
Anatomy, Histology and Embryology	124	14		42	142			322
Physiology	126			32	12			170
Biochemistry	84	23		33				140
General and molecular genetics	56				28			84
Pharmacology, pharmacy and pharmacotherapy	47			10			8	65
Toxicology	15,25							15,3
Pathology	90	43						133
Parasitology	39			28				67
Microbiology	81.15			50				131.2
Immunology	24.95			3				28
Epidemiology	25,6			1				26.6
Information literacy and data management	10.25			6				16.3
Professional ethics and communication	47							44
Animal health economics and practice management	12	2.75						14.8
Animal ethology Animal welfare	93							93
Animal nutrition	43			56				99
Clinical science	**561**	**134**	**60**	**56**	**20**	**630**		**1461**
Obstetrics, reproduction and reproductive disorders	48.25					1		49.3
Diagnostic pathology	7.2	2.2	10	28		67		114.4
Therapy in all common species	111.9	22.91				0.5		135.3
Internal Medicine	156.8	35.41		7		6		205.2
Anesthesiology	12	1				1		14
Surgery	106.4	16				2.5		124.9
Preventive medicine	27.95	2.2						30.2
Clinical practical training in common animal species	5	34	24	24	10	533		630
Diagnostic imaging	51.5	7.16						58.7

Subject	Lectures	Seminars	Supervised self learning	Laboratory and deskbased work	Non-clinical animal work	Clinical animal work	Others	Total (rounded)
Propaedeutics of common animal species	34	1			10	54		99
Animal production	**143**	**5**				**1**		**149**
Animal production, including husbandry and economics	99					1		100
Herd Health Management	43.8	4.85						48.7
Food Safety and Quality, Veterinary Public Health and One Health Concept	**223**	**7**	**12**	**15**	**32**			**289**
Veterinary legislation including official controls and regulatory veterinary services	86							86
Forensic veterinary medicine and certification,	19							19
Control of food, feed and animal by-products,	8		12	4	32			56
Zoonoses	13							13
Food hygiene and food microbiology, Food technology	97	7		11				115
Total (rounded)	**2037**	**269**	**46**	**408**	**234**	**668**	**8**	**3670**

***** subjects are taught via teaching import from other faculties of JLU (see Appendix to Table 3.1.2)

Table 3.1.3. In house clinical rotations under academic staff supervision (excluding EPT)

Types	Disciplines/Species	Duration	Year of programme
Intramural clinics	Equine Surgery	2 weeks (60 hours)	5
	Equine Internal Medicine	2 weeks (60 hours)	5
	Small Animal Surgery	4 weeks (120 hours)*	5
	Small Animal Internal Medicine	4 weeks (120 hours)*	5
	Birds, Reptiles, Amphibians and Fish	2 weeks (60 hours)	5
	Obstetrics, Gynecology and Andrology of large and small Animals	4 weeks (120 hours)	5
	Ruminants	2 weeks (60 hours)	5
	Pigs	2 weeks (60 hours)	5
	Pathology	1 week (30 hours)	5
FSQ/VPH	Bacteriology/ virology (either/or)	1 week (30 hours)	5
Ambulatory clinics (Farm visits during the clinical rotation)	• Clinical Unit for Obstetrics, Gynecology and Andrology of large and small Animals	8 hours	5
	• Clinical Unit for Ruminants and Pigs		5
	• Clinical Unit for Birds, Reptiles, Amphibians and Fish	5 hours	5

Students are supposed to spend around 30 hours per week in the intramural VTH and associated establishments. Shifting and voluntary extension of hours and thus a voluntary stay in the clinics is possible in order to deepen the knowledge and practical skills and to follow highly interesting cases. Training plans for the different clinics are published (Appendix 3.1.3b).

Table 3.1.4. Curriculum hours offered as electives

Electives/ Subjects	Lectures	Seminars	Supervised self learning	Laboratory and deskbased work	Non-clinical animal work	Clinical animal work	Others	Total
Animal production		44						**44**
Basic science	56	780	31	164	24	67		**1122**
Basic subjects		89						**89**
Clinical science	102	622	8	27.5	81	562	15.66	**1418.16**
FSQ	30	14	8				29	**81**
VPH		24						**24**
Total	**188**	**1573**	**47**	**191.5**	**105**	**629**	**44.66**	**2778.16**

According to TappV students have to take 308 curriculum hours from the elective courses offered, which means they chose from the above presented offer. There is a huge offer of elective courses to satisfy student`s interests and to enable students to deepen their knowledge in areas of their interest (see Appendix to Table 3.1.4).

Optional courses offered

Students are offered a number of additional courses on subjects such as computer literacy (MS Excel, MS Word, e.g. creating scientific papers, literature search, Power Point, etc.). Students may register for a wide range of open lectures at the university as well as courses on key skills such as communication and conflict management, stress reduction and numerous language courses.
The Career Services offers alumni lectures and an extensive program of application training. In addition, students can chose from many e-learning offers from the ILIAS learning platform, such as scientific work; arguing, presenting, lecturing; qualitative and quantitative research as well as learning and organizational techniques

3.1.4 Core clinical education prior to the start of the clinical rotations

Acquisition of clinical knowledge, skills and competences is a main objective throughout the entire curriculum. Prerequisite for the participation in the clinical rotation in the 5th year of study is the successful passing of the preceeding parts of the state examination until year 5.

- Core clinical training virtually starts in the 2nd year with general propaedeutics with theoretical and practical training on university owned animals and in the premises of the skills lab. It is carried out in small groups of students (5-10 students).
- In the 3rd and 4th year students are involved in clinical core subjects such as internal medicine and laboratory diagnostics, surgery and anaethesia, radiology, ophthalmology, clinical demonstrations, interdisciplinary teaching.
- After the 3rd year all students have to spend a 4-week (150 hours) EPT in a veterinary practice.

- In the 7th and 8th Semester clinical lectures are given as block lectures and seminars according to a concept of organ centered teaching.
- Students are obliged to use the skills lab (PETS; https://www.uni-giessen.de/fbz/fb10/studium-und-prufungen/pets), to learn and practice from the 2nd semester onwards. Theoretical and hands-on training, using various simulators is facilitated by tutors, peer tutors or by self-learning instructions (see Appendices 3.14 a and 3.1.4 b).
- Communication skills are conveyed in the setting of the skills lab to students of different semesters. Conversation is trained with patient owners. Simulation is realized with actors.
- Professional ethics training is provided during compulsory course on Ethics in Veterinary Medicine in 1st to 4th semester and within the animal welfare course in the 5th semester.

3.1.5 Core clinical rotations including emergency services

Clinical rotations are scheduled in the 5th year. All students rotate through all clinical units of the VTH as well as through the Institutes of Veterinary-Bacteriology (Hygiene) and -Virology and Pathology (see Table 3.1.3). In general, eight students are assigned to each station.

Within each station groups of 2-3 students are supervised by one member of the teaching staff, ensuring that every student receives individual feedback and that all students get hands-on experience across common domestic animal species. For the clinical rotations students are provided with a log book for each participating clinical unit or institute (see Appendix to 3.1.5a). Students are under strict supervision, they gain and improve their knowledge, abilities and skills in direct contact with patients (hands-on) and often with patient owners. Discussion of specific cases and clinical reasoning about case-specific backgrounds are highly valued in this context. Students receive a training plan for every participating clinical unit or institute (Appendix 3.1.5 b).

During rotation, students practice relevant hands-on skills by participating in regular clinical duties and patient care, including night and weekend services. They are also actively involved in ambulatory clinical work, attend seminars, rounds, exercises on practice-relevant topics and are encouraged to write case reports.

The aim is, that students apply their so far acquired knowledge in a problem-based approach, recognise clinical problems and develop a differential diagnostic approach and a therapeutic plan. Each student is required to accompany patients during their ambulant and stationary stay to practice their role as primarily responsible veterinarian. Students are always supported by veterinarians in charge when taking care of their cases. Accompanying includes ownership communication, billing and discharge of patients.

During the clinical rotation in the participating clinical units, students usually accompany one to two emergency services during the week (from 3:30 pm to 8:00 am of the next day) and participate in on call 24 hours emergency services during the weekend.

At the beginning of each rotation, students are instructed regarding biosecurity, hygiene and their duties and rights. Assessment tools are provided (e.g. student assessment cards) and students are required to assess the stations anonymously.

Students are requested to report to the clinical services wearing the appropriate clothing/protective gear according to the requirements of the different clinical rotation stations. All SOPs and biosecurity measures are informed to the students the first day of their rotation. Close supervision is also provided to help them follow the hygiene/safety rules (www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium/rotationsjah)

3.1.6 Meat and Food Hygiene

On the faculty level food hygiene is mainly taught by the staff of the Institute of Veterinary Food Science. The curriculum is in accordance with TAppV and corresponds with the teaching catalogue in Food-, Meat- and Dairy developed for Germany, Austria and Switzerland. This is the first European Teaching Catalogue in food hygiene related subjects of German speaking countries (www.dvg.net/index.php?id=1382) and is consequently in accordance with the present legal regulations.

The subjects Food Science and Food Hygiene including Food Legislation consists of intra- and extramural parts and is taught in the 6th and 8th semester with lectures and a practical course.

Meat Hygiene is divided into an intramural and an extramural section. Intramurally, the lectures given in the 6th and 7th semester in meat hygiene are based on the legal framework, trying to make official regulations like stunning before slaughter, carcass examination, meat inspection of different species, expectable alterations of carcasses, the underlying hygienic regulations etc. understood. In the 7th semester students have to pass a basic practical training which is held in the the premises of the new meat hygiene facility of the Faculty (an officially recogniced meat/carcass inspection station). Practical skills are taught in groups (8-15 students per tutor). Additionally, a lab-practical course in bacteriologic meat inspection and report writing must be passed. The extramural part consists of a mandatory three week practical training in an EU-approved abattoir for a minimum of 100 h, during which a full-time public health veterinarian is in charge of conveying the relevant aspects of ante-mortem animal and post-mortem animal/meat inspection including legislative aspects.

Food Science and Food Hygiene including Food Legislation also consist of an intra- and an extra-mural part. The intramural part comprises lectures on various areas of food science and food hygiene (including food microbiology and food legislation), during the 6th and 8th semester. These lectures give an overview on the different foodstuffs of animal origin, likely risks from quality problems, including microbiological challenges. In an accompanying practical course, students are also made familiar with sensory evaluation of food and report writing. Excursions to food processing plants are offered as elective courses.

As an extramural part students have to carry out a practical course in a laboratory in charge of food control and food hygiene for at least 75h. It can be carried out in an abattoir, in a food producing establishment, in public health authorities or even at the university. Another practical course has to be carried out for at least 75h in an authority of public veterinary service and administration.

According to the TAppV-regulations participation in the extramural practicals has to be certified by the respective head of the establishment; no further evaluation, either of the participating student or the establishment by the student, can be requested in Germany.

3.1.7 Electives and Optionals, preparation and encouragement of self-learning and life-long learning

The Facutly offers a large number of subjects and hours for electives and also optionals (see Appendix to Table 3.1.4 and www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium/curriculumtest/curriculumtest. The Faculty considers this as an important point to direct students to decide and to stress the importance of self-learning and continuous education. Similarly the students have the chance to test their specific interest in a given field and to make a choice for further post graduation education. As there are:

1st – 4th Semester (preclinical section) Students must attend at least 84 hours of elective coursework in the preclinical part. Students select a track out of four: macroscopic anatomy, neuroanatomy/histology, pathophysiology/biochemistry, exotic animals.

5th - 11th Semester (clinical section) The total number of elective course hours to be taken in clinical education is 224 h. There are sufficient courses and seminars available for all students. It is requested that students pick a first, second and third choice in order to prevent overcrowding.

Thus the total number of elective hours to be taken in the preclinical and clinical section sums up to 308 h (see Table 3.1.4 and Appendix to Table 3.1.4)

However, as some courses are more popular than others and due to limited resources for the participation of all students, in the individual institute it is decided by random selection if there are too many applicants. In addition to the obligatory electives, students are free to pick additional courses from all other electives or optionals on offer.

Within the framework of these events, internal and some external lecturers cover topics outside the regular curriculum as well as insights in ongoing research projects . They are not subject of examinations. In the majority, registration is managed via the learning platform Stud.IP.

3.2 Meeting of the Objectives by the Study Program, Assessment of Learning Outcome, Self Learning and Life-Long Learning

Objectives: The objectives of the study program are clearly layed out in Area 1. The TAppV as the legal framework for veterinary education in Germany secures that these objectives are met by each of the five veterinary establishments in Germany. These compulsory regulations of theTAppV build the basis for each veterinary student and are eforcable rights. They are finetuned for the local study program and special conditions at the Veterinary Faculty at the JLU Giessen, within the "Study and Examination Order" of the Faculty (StuPO-Vet, Studien and Prüfungsordnung Veterinärmedizin). The StuPO-Vet allows adjustment to actual developments in the various study and exanination formats, and pays attention to the ESEVT Day One Competences. This order, published on the homepage of JLU under: www.uni-giessen.de/mug/6/findex6.html/6_60_10_1, regulates the sequence and interlocking of lectures, seminars and practical courses throughout the whole curriculum. Moreover, it also regulates the sequence of examinations allowing the Faculty to test for building up knowledge and understanding by students.

Assessment: The Committee of Study Affairs, chaired by the Dean of Study Affairs (see Area 1) constantly monitors the outcome of the "State Examinations". More than 80% of the students having successfully made it into the 5th semester graduate within the 11 semesters allotted for the sudy of veterinary medicine in Germany. Faculty and University consider this as an excellent result.
Consequently, the success rate in passing examinations is considered as an important marker to assess didactic qualifications of the teaching staff.
We admit that the passing rate of examinations not necessarly indicates that the objectives of the study program have been met. However, there are inherent feedback mechanisms by the various stakeholders dealing with the aptitude and qualification of students, who after graduation enter their selected field of "Veterinary Medicine". There are no statistics available but on an inofficial level the Giessen-Graduates are well accepted by "the profession".

Self-and lifelong learning: High school graduates admitted to the study of veterinary medicine have passed a highly selective procedure; in general they are recruited from the top 5% because of the strict numerus clausus for veterinary medicine (see Area 7). These graduates are experienced to self

learnig and are well aware of the need for it to successfully manage a university study.
On top of that students entering the study of veterinary medicine are introduced into the academic environment before the first semester begins in a so called "introductory week (Studieneinführungswoche)". This week is organized by the central course guidance of the university and carried out by experienced students. Furthermore, during their first year, students are offered "study skill" courses, which aim in introducing learning strategies and to obtain time management skills in order to be well prepared for managing the acquisition of the enormous load of theoretical knowledge during the pre-clinical studies.

During their studies, students have the opportunity to carry out self-directed learning in the "Self Learning Center (Lernzentrum)" of the Faculty, where they have access to special self learning programs and other teaching material put on the intranet of the university. There is a small library and there are microscopes and the respective slides from anatomical and pathology histology in order to prepare for upcoming exams.
Due to the corona crisis most lectures – some of them interactive - are now available for students on the learning platforms Stud.IP or ILIAS, which may be accessed from their homes too.

The importance of evidence-based decision making and life-long learning is emphasized throughout the curriculum. Among other matters, this includes early exposure to biostatistics, research and clinical question formulation, bibliographical research and critical reading. During the clinical rotations, students are repeatedly asked to write case reports.
Students are made familiar with the fact that the license to work as a "veterinarian" is bound to participation in continuous education. In order to make undergraduate students familiar with this concept, they are regularly invited to participate in "on campus" offered continuing education which they join on individual basis, depending on interest and availability.

3.3 Program Learning Outcomes

As stated in Area 1 the study of veterinary medicine in Germany is a university based study. Students entering this study – apart from few exceptions - have passed a 9-year high school education. Once accepted by a university, sudents are expected to show a high degree of self-responsibiliy. Thus – for example – regular lectures are compulsory, but – other than in seminars or practicals – attendance of students is not controlled. It is up to the individual student how to gain the necessary knowledge and understanding to pass the various sections of the state examination. Thus, from the very beginning self-directed learning is an important issue.
As stated in Area 7, the Faculty and University offer a lot of support mechanisms for students asking for help. However, the Faculty and University do not feel obliged to push students through a curriculum who lack the necessary self-resposibility.
The learning outcome of the veterinary curriculum is clearly laid out in the TAppV (see Appendix F). As already indicated in Area 1 and 8, the TAppV and consequently the curriculum is regularly assessed by the stake holders and the veterinary establishments. Implementation of the curriculum is a matter of the establishment, however, the sequence of the various sub-state examinations dictates the basic set up of the curriculum as published in the TAppV.
The Faculty Committee of Study Affairs and the Vice Dean of Study Affairs secure a cohesive framework of the curriculum. As stated above, subject and module representatives (Appendix 3.1.3a) are responsible for the development and coordination of learning objectives and the examination subjects (Appendix f and G). Module representatives coordinate the process between relevant subject lecturers and are the first point of contact for the Office of Study Affairs, the Dean of Study Affairs, teaching staff and students.
The Study and Examination Regulations (Appendix G) and a comprehensive subject-specific learning objective catalouges (with references to "day one skills" defined by the ESEVET) define

the organizational content framework. This catalogue is publicly available in form of the ECTS brochure of the Faculty which is constantly updated and released (Appendix B).
The state examinations are the major points of assessment of the learning outcome. Since more than 80% of the students having made it into semester 5 pass within the official time allotted to the study of veterinary medicine, the Faculty is convinced that the study program offered is effective, meeting present needs of veterinary education.

Committee of Study Affairs

In Germany the TAppV (Appendix F) clearly defines the contents of the veterinary curriculum, the hours assigned to the individual subjects and the course of study. As indicated above and in Area 1, the TAppV is regularly adapted to present needs by interactions of the veterinary establishments with the relevant stakeholders and the Federal Government.
Implementation of the TAppV is a matter of the Faculty; on faculty level responsibility is with the Committee of Study Affairs with 3 students participating, 3P and 1 NPSS (Area 1). The Committee of Study Affairs is responsible for developing and updating of the local Study and Examination Regulations (StuPO-Vet).
By this the Committee of Study Affairs also secures a modern curriculum, which fulfils the requirements of veterinary practice as well as research with a clear didactic concept. Delivery of the teaching requirements is primarily a matter of the teaching staff. Prime responsibility is with the professorial staff. They are responsible for the various subjects of the veterinary curriculum. It must be stated that on appointment most of the professorial staff have also “habilitated”, which is an official certification for “a qualified” teaching. Additionally, during the application procedure all candidates for professorships have to provide a lecture to demonstrate their aibility for qualified teaching, which is also evaluated by students. Should there still be some problems with teaching, it is a matter of the Committee of Study affairs to deal with them.
If change of the StuP-Vet is needed, for example after an amendment of the TAppV, feedback from students, teaching staff, the chairpersons of the Examination committees and also from external experts is considered.. The Faculty Council must accept the suggested changes before they are submitted to the JLU by the “Senatskommission Studiengänge” (Commissission of the University Senate for Course of Studies) according to the Hessian University Act. Thus, revision of StuPO undergoes a multi-stage procedure.

3.4 Curriculum decision structure

Curricular matters are negociated in the the Committee of Study Affairs – headed by the Vice Dean of Study Affairs, which is responsible body for the quality assurance of the teaching programme and its outcome, as well as the management, monitoring and improvement of the curriculum. It is also responsible for the elaboration of the Study Regulations (StuPO-Vet). There are three students among the 7 members of the Committee. The Committee meets regularly or upon request, and reports to the Dean and the Faculty Council.

Subject and module representatives work on the development and coordination of learning objectives and are the main contact persons among the Office of Study Affairs, the Dean of Study Affairs, lecturers, and students. Students may submit questions, suggestions, wishes to the subject and module representatives and the Office of Study Affairs. There are meetings of each subject focus where they get oral feedback from the students. These meetings are attended by all the academic staff involved in the teaching of the subject.

There are mechanisms in place for the continuous improvement of the curriculum described under 3.1.3 and summarised in Figure 3.1 of the SER. Feedback from students, staff, chairpersons of examination committees, and external experts are considered by the Committee of Study Affairs.

Decisions may be made by the Committee in minor issues. Major issues are forwarded to the Faculty Council for approval, and some still further to the corresponding committee or the senate of the JLU. The ECTS catalogue is reviewed bi-annually and is subject to continuous improvement. Major changes are governed by the TAppV.

Most of the academic staff is habilitated. Though it is not mandatory, teaching staff is required to maintain and improve didactic competences. The JLU offers special courses in soft skill development and didactics, Human Resources, E-Learning & New Media support for teaching staff, and education in all matters of administration and personal development to support staff. Completion of the courses is certified.

The VEE is participating in the "KELDAT" (Kompetenzzentrum E-Learning, Didaktik und Ausbildungsforschung in der Tiermedizin) project. As part of this it contributes to the development of PTTs for self-evaluation.

3.5 External Practical Training (EPT)

Students of all German veterinary establishments organise their mandatory EPTs individually. There are no contractual agreements between the external training facilities and German veterinary faculties. The establishments therefore have no possibility to directly influence the content and quality of EPT (statement of German establishments for extramural veterinary education see Appendix to 3.4).

Clinical EPT: EPT has to cover the minimum durations as stated in Table 3.5.1. Concerning clinical EPT the association of practicing veterinarians (bpt) has developed a system of "teaching practices" with a mandatory program which is available to students through the bpt search tool (www.tieraerzteverband.de/bpt/Studenten/ausbildungspraxis/index.php). Also the recommendations of the German Veterinary Organization (DVG) are linked on the Faculty`s website as a service to the students (www.dvg.net/studiumberuf/praktikumsstellen). Students are assisted in identifying suitable training institutions.

Learning objective catalogues of the Establishment/evaluation forms were prepared by the EPT coordinator and are issued to the students with information on the legal framework and all evaluation forms (www.uni-giessen.de/fbz/fb10/pruefungsamt/studum/praktika/index_html.)

The Faculty of Veterinary Medicine at JLU Giessen also aims to work out cooperation aggreements with other international veterinary establishments to offer a structured EPT training on an international level; to be mentioned are the very successful cooperations with the College of Veterinary Medicine at the University of Tennessee, Knoxville, USA, and the College of Veterinary Medicine at the University of Georgia, Athens, USA (see also Appendix 1.3b)

EPT meat and food hygiene and public veterinary services (VPH): Full information is given in 3.1.6. The students are obliged to take a three-week (100 h) extramural practical course in an EU-certified abattoir. In addition, a two-week (75 h) practical training in a veterinary administration office as well as in a food hygiene surveillance section under supervision of an official veterinarian and the respective veterinary office has to be completed (see Table 3.1.4).

Evaluation: EPT providers confirm that JLU students have carried out their training in their premises. There are no official obligations for the EPT providers to issue student evaluation and their actual involvement in upcoming work. The Dean of Study Affairs (Prof. Dr. Dr. Stefan Arnhold) as well as the chairperson, section 2 tierärztliche Prüfung (Prof. Dr. Andreas Moritz) are responsible for the acknowledgement of EPT placements.

All clinical and VPH EPT are evaluated by the students with evaluation forms provided by the Office of Study Affairs. Evaluations are collected and summaries are presented to the senior specialist representatives (VPH, Meat Hygiene, Animal Hygiene) and the Dean of Study Affairs. However and unfortunately, due to data protection legislation, asessments of individual training institutions have to remain confidential.

Name of the academic person responsible for the supervision of the EPT activities:
Dr. Birte Pfeiffer-Morhenn (staff member, Student Services)

Table 3.5.1. Curriculum days of External Practical Training (EPT) for each student according to TAppV

Subjects		Minimum duration	Year of programme
pre-clinical	Agriculture (genetics, breeding, husbandry, milking techniques, etc.)	2 weeks (70 hours)*	In the 1st year (1st / 2nd semester)
clinical	Clinical training (private practice or clinic; companion animals or production animals)	4 weeks (150 hours)	After the 2nd year (5th /6th semester)
	Clinical training (private practice or clinic; companion animals or production animals)	16 weeks (700 hours)	In the 5th year (9th / 10th semester)
FSQ & VPH	Veterinary inspection offices regarding all issues of Veterinary Public Health	2 weeks (75 hours)	In the 5th year (9th / 10th semester)
	Food hygiene (hygiene control, food monitoring, food examination)	2 weeks (75 hours)	In the 5th year (9th / 10th semester)
	Abattoir, ante and post mortem meat inspection	3 weeks (100 hours)	In the 5th year (9th / 10th semester)

* Two weeks (70 hours) if done on the university agricultural training and research station; four weeks if done on a farm that is registered /certified to educate agricultural trainees (apprenticeship)

3.6 Contractual agreement with EPT providers

As stated above, students of all German veterinary establishments organise their obligatory EPTs individually. There are no contractual agreements between the external training facilities and German veterinary faculties.

3.7 Students Responsibility for their own Learning during EPT

Students are properly advised of how to organize their EPTs in a 1h event in the 6th semester. All students are adviced to keep proper records of their EPT. Carrying out these EPTs correctly is the prerequisite for being admitted to the final examinations.

Implications of students in the preparation, recording and assessment of their EPT:

As already mentioned the Faculty provides a list of teaching practices developed by and registered with bpt (www.tieraerzteverband.de/bpt/index.php). However, many students know non-listed veterinary practices or clinics in their home region where they will carry out their EPT. Student services, international relations and in some cases also the EPT coordinator support preparations for individual EPT at home or abroad and - if necessary - support students to circumvent any bureaucratic obstacles. If students wish to complete an EPT outside of Germany, this must be approved by the person in charge for student assessment before the EPT starts.

Complaint process in place concerning EPT

In the first instance students carrying out their EPT put their complaint to the vet in charge within the EPT establishment. If this is not successful students may forward their complaints and criticism concerning problems with their EPT to the person responsible for the supervision of the EPT activities (Dr. Pfeiffer-Morhenn), the chairperson, section 2 tierärztliche Prüfung (Prof. Moritz) as

well as with the Dean of Study Affairs (Prof. Arnhold). Problems are addressed on a case-by-case basis. Students also give a final report as part of their comprehensive assessment of the extramural practical training. Problems with one EPT establishment are furthermore communicated amongst students. However, the number of complaints relates to less than 1% of all EPT placements.

Comments on Area 3

- The veterinary curriculum in Germany prepares the students quite extensively for preclinical and paraclinical subjects, especially in food science, which covers a lot of additional hours according to the last revision of the national curriculum.
- The curriculum is checked each semester by the Committee of Study Affairs, in which the students have 3 from 7 positions.
- Intramural teaching is regularly evaluated in a fixed routine, by using the software Eva Sys (Electric Paper, Lüneburg, Germany). It allows that printed questionnaires are automatically scanned and evaluated. In former years, also an electronic evaluation (via Stud.IP; www.uni-giessen.de/cms/studium/studinfo/studip) was used. However, the yield of data is higher with Eva Sys, so that only printed questionnaires are used now (see also Appendix D).
- Extramural training can facultatively be evaluated by the students. Forms for the evaluation can be downloaded from the homepage of the office for examination (www.uni-giessen.de/fbz/fb10/pruefungsamt/studum/praktika/index_html). This form can automatically be scanned and evaluated using the program EvaSys. Furthermore, the national organisation of German practitioners (bpt) certifies veterinary practices for extramural training.
- The Progress Test for Veterinary Medicine (VMPT) is an important tool for students to receive feedback on their individual learning progress.The VMPT, an initiative of all German-speaking veterinary educational establishments, has been offered to students at JLU Giessen since 2013. Participation is voluntary, yet in 2018 more than 300 students participated. The VMPT refers to the Day One Competences as defined by the EAEVE and consists of 136 multiple-choice questions covering 34 undergraduate subjects. Students, who take part several times, get information about their improvement compared to previous tests.
- Substantial tracking (specialisation) within the undergraduate veterinary curriculum currently is not possible given the German legal legislation on veterinary education.
- Extramural internships (EPT) are required but explicitly outsourced to the veterinary profession. The veterinary faculties neither have a legal basis nor the resources to implement a high level of (quality) control.

Suggestions for Improvement on Area 3

There is not a lot of freedom to modify the content of the curriculum, because the main parts are regulated by a national law. However, several points are still suboptimal even from our own point of view, which should be changed in the near future. These points are:

- According to TappV the time students have to spend with basic natural science is very extensive. TappV should be changed so that lecture time in basic natural sciences is reduced in favour of basic, paraclinical and clinical, preferable “hands on” subjects.
- Together with the Federal Association of Practicing Veterinarians (bpt), further efforts to ensure standardizations and qualtity control of extramural clinical training will be undertaken.

Area 4. Facilities and Equipment

4.1 Physical Facilities

4.1.1 Location and organization of the facilities used for the veterinary curriculum

The main veterinary campus covers about 37,000 sqm and is located along the Frankfurter Strasse, limited by the streets "Am Steg" and "Hollerweg" and the railroad track system of the "Deutsche Bahn" (Appendix C). The area includes several lecture halls, seminar rooms and rooms for practical education. All clinical facilities, the Institutes of Veterinary Anatomy, Veterinary Physiology and Biochemistry, the Institute of Veterinary Pathology, the "Meat Science Section" of the Institute of Veterinary Food Science, the Professorship for Experimental Animal Science, Animal Protection and 3R Centre, the Skills Lab, a hall for self-directed learning (Lernzentrum) with parent-child room, the office of the Dean with associated administration as well as "immediate care" technical units are located on the main campus.
Located just across the Frankfurter Street are the Institute of Hygiene and Infectious Diseases of Animals, the hall for teaching meat hygiene and the Unit of Biomathematics and Data Processing.
The Institutes of Virology, Parasitology, and Veterinary Pharmacology and Toxicology are located - together with corresponding research institutes of other life sciences - in the Biomedical Research Centre Seltersberg (BFS), about 500 m up the road, Schubertstraße 81. The BFS is equipped with lecture halls, seminar rooms and rooms dedicated for laboratory practical work by students (see Appendix C).
The Institutes of Chemistry, Physics, Zoology and Animal Nutrition as well as a library, specialized on natural and veterinary sciences, are located about 2 km away on the campus of natural sciences of the JLU, (Heinrich-Buff-Ring). All facilities are connected by bus line 10 or can easily be reached by bike or car. The Professorship of Milk Science as part of the Institute of Veterinary Food Science is located near the main building of the university in the City Center (Ludwigstrasse 23), again about 2 km from the main veterinary campus, and connected by several bus lines.

Agricultural training is carried out in cooperation with the Faculty of Agricultural and Nutritional Sciences and Environmental Management, at the "Oberer Hardthof", about 5 km from the main campus, accessible with bus line 7.

4.1.2 Strategy and program for maintaining and upgrading current facilities and equipment

The University seeks to maintain an adequate infrastructure that meets the operational, legislative and security needs in the Veterinary Faculty – as well as in all other faculties. The buildings of the JLU Giessen are property of the federal state of Hesse and managed by the JLU, Division E1 - Premises Management and Division E2 - Construction and Engineering. Acting Directors and Heads of Clinical Units communicate directly with Division E, major investments are dealt with by the Dean. Regular checks and audits on facility maintenance, work safety, biosafety and environmental safety are carried out by internal and external auditors. Division E2 (Construction and Engineering) provides a 24h emergency online or phone service.
Upgrading of facilities, e.g. in cases of professorial appointments, is financed from revenues provided by the State of Hesse. Major investments, like the new building for the Clinic of Small Animals and Birds, Reptiles, Amphibians and Fish as well as planning new ones, have a lengthy lead preparatory period; such projects must be put on the list of priorities set by the university and approval of the state government and state parliament must be obtained. The federal government may provide financial support to the federal states for structural development of universities. In addition, the Faculty tries to overcome bottleneck situations by allotting revenues from clinical and diagnostic services to construction measures and equipment replacement/new acquisitions.
Equipment for lecture halls, seminar rooms etc., like beamers, speaker and webcameras, is provided by Division E and maintained by the IT Service Centre of the JLU. Laboratory and office equipment is purchased by the individual institute or unit/section, which are also responsible for its maintenance. Expenditure is controlled regularly by internal and external auditors.

4.1.3 Implementation of relevant legislation concerning physical facilities

The JLU Gießen complies with EU and national legal regulations. Responsible are Division E - (Real Estate) and Division B3 - (Safety and Environment). Legal requirements are laid out in the Act on the Implementation of Measures of Occupational Safety and Health to Encourage Improvements in the Safety and Health Protection of Workers at Work (Arbeitsschutzgesetz: ArbSchG) and the Act on Occupational Physicians, Safety Engineers and Other Occupational Safety Specialists (Gesetz über Betriebsärzte, Sicherheitsingenieure und andere Fachkräfte für Arbeitssicherheit: ASiG). The respective specialists belong to the workforce of the two divisions mentioned above. They perform regular inspections. Implementation of the ASiG is met by external specialists due to a contract of the JLU with the medical-airport-service (www.medical-airport-service.de/unternehmen/ueber-uns). It is the responsibility of the acting directors/heads to secure implementation of safety regulations and to report defaults.

4.2 Lecture Theatres, Teaching Laboratories, Tutorial Rooms, Clinical Facilities and other Teaching Spaces

4.2.1 Premises for lecturing, group work, practical work and skills labs

Lecture halls are named according to their location at the various institutions. Assignment of lectures and room booking is organized by the office of study affairs and published on the homepage of the Faculty at the beginning of each semester. With the opening of the Clinic for Small Animals and Clinic for Birds, Reptiles, Amphibians and Fish in January 2020, thirteen modern seminar rooms, which are variable in size, offer a total of about 250 more places for groups of 10 – 100 students. Furthermore, a surgical training center (97.8 sqm) was installed. A list of currently available rooms within the Veterinary Faculty is available under: www.studip.uni-giessen.de/dispatch.php/resources/search/rooms

Biomedical Research Center Seltersberg: This building provides about 200 places for practical laboratory education, e.g. in biochemistry and pharmacology as well as in veterinary parasitology and virology.

Skills lab: The central veterinary skills lab (Frankfurter Str. 110) occupies a total of 321.8 sqm, divided in 13 rooms for practical training, sized from 12.7 to 23.1 sqm, as well as corridors (fitted with lockers for students), storage room and a restroom. Further skills lab facilities are available in several clinical units. As an option, students can be trained in “Sterile Surgery” in cooperation with the Medical Faculty in their training center (for further information please refer to Area 6, 6.3).

Table 4.2.1: Lecture halls

Associated Institute / Clinical Unit	Frankfurter Street #	Room #	Seats/Places	sqm
Institute of Veterinary Physiology and Biochemistry	100	118	**201**	193.6
Institute of Veterinary Anatomy	98	6, 119	**70, 150**	88.8, 155.7
Equine Clinical Unit Animal Demonstration Hall	124	1	**140**	169.8
Clinical Unit for Obstetrics, Gynecology and Andrology	104/106	011, 211, 60	**140, 120, 80**	168.7, 178.4, 142.8
Institute of Hygiene and Infectious Diseases of Animals	87	1	**105**	125.9
Professorship for Animal Welfare	110	4	**90**	98.1
Institute of Veterinary Pathology	96	8	**74**	87.4
Institute of Veterinary Food Science	92	102	**94**	110.9
Biomedical Research Centre	Schubertstr. 81	B 16	**224**	220.0
Total		**11**	**1,261**	**1,740**

Table 4.2.2: Rooms for group work with students

Associated Institute / Clinical unit	Frankfurter Street #	Room #	Seats/ Places	sqm
Clinical Unit for Small Animals (since January 2020)	114	0039, 0040, 0041, 0042, 0043, 0048, 0049, 0050, 0051, 1037, 1038: 11 rooms (may be combined)	**250**	27, 21, 21, 26, 63, 62, 62, 62, 61, 22, 27
Clinical Unit for Birds, Reptiles, Amphibians and Fish (since January 2020)	114	3041	**41**	48.1
Clinical Unit for Ruminants	104	30	**12**	27.9
Institute of Veterinary Physiology and Biochemistry	100	220, 222, 116	**16, 16, 20**	47, 42, 33
Institute of Veterinary Pathology	96	101	**30**	67.6
Equine Clinical Unit	126	130	**25**	37.0
Institute of Veterinary Anatomy	98	102f	**20**	40.1
Institute of Animal Welfare	110	123	**20**	37.2
Unit of Biomathematics and Data Processing	95	006, 106	**10, 10**	27. 25
Institute of Hygiene and Infectious Diseases of Animals	89	121	**14**	31.2
Rooms for self-directed Learning (Lernzentrum)	98	35, 36	**40, 12**	59. 44
Clinic Unit for Swine	112	115a	**16**	25.9
Total		**25**	**536**	**1020.1**

Table 4.2.3: Rooms for practical work (e.g. laboratories, surgical teaching rooms…)

Associated Institute / Clinical unit	Frankfurter Street #	Room #	Seats/ Places	sqm
Institute of Veterinary Anatomy	98	003, 202	**32, 130**	202, 202
Institute of Hygiene and Infectious Diseases of Animals	87	101	**70**	124
Institute of Veterinary Food Science	92, 93	2, 1	**56, 64**	110.9, 62.9
Institute of Veterinary Physiology and Biochemistry	102	014, 111, 6, 108, 106	**25, 16, 10, 2,2**	76, 64, 31, 15.5, 12
Institute of Veterinary Physiology and Biochemistry	100	17, 117	**10, 20**	33.3, 54.3
Institute of Veterinary Pathology	96	9	**90**	94,4
Clinic Unit for Obstetrics, Gynecology and Andrology	104/ 108	213	**18**	66.4
Biomedical Research Centre	Schubertstr. 81	A6, A3.1, A3.2	**77, 30, 36**	220,114,100
Equine Clinical Unit (Farriers)	120	10, 105	**20, 15**	69.4, 47.7
Clinical Unit for Small Animals (since January 2020)	114	1033	**24**	97.8
Clinical Unit for Birds, Reptiles, Amphibians and Fish (since January 2020)	114	3.004, 3.005, 3.006, 3.007, 3.015a, 3.021, 3.022, 3.023, 3.050, 3.051, 3.056, 3.057, 3.058, 3.059, 3.060, 3.061, 3.064, 3.065, 3.066, 3.067, 3.068, 3.069.	**2, 2, 4 2, 4, 2 4, 4, 3, 3, 4, 4 8, 6, 6 4, 4, 4 2, 2,3, 3**	9, 10, 19, 11, 20, 10, 20, 20, 16, 15, 21, 22, 37, 30, 29, 22, 20, 21, 10, 10, 15, 15
Clinical Unit for Swine	114	2.094	**8**	23.5
Total		**38**	**524**	**1,671.2**

4.2.2 Short description of further selected premises:

Study and Self-learning Facilities: As indicated in Table 4.2.2, the on-campus facility for self-directed learning seats a total of 52 students. These facilities are available for all students any time. Students in clinical rotation have ample access to self-learning locations like the in-house libraries and seminar rooms of the institutes and clinical units, which are generally equipped with WLAN, allowing students as well as staff access online information, e.g. of numerous journals and text books, via eduroam. Additionally, the university library provides ample reading and learning spaces with online access to veterinary journals and textbooks. Sufficient hard copy textbooks for study at home are available too.

Catering, canteens: The Studentenwerk Giessen runs the main canteen (Mensa) and a number of cafeterias on the campus of the JLU. The main canteen is located on the campus Phil.1 (Otto-Behaghel-Straße 27) and can be reached by bus line 10. Within walking distance to the veterinary campus is the Cafeteria BioMediCa, located in the Biomedical Research Centre, the cafeteria Mensa Mildred-Harnack-Fish-Haus (MHFH), Leihgesterner Weg 16, and the Cafeteria CaRé, Heinrich-Buff-Ring 44. Furthermore, a food truck organised by the Studentenwerk has a daily stop at the Campus of the Faculty in the morning for 30 minutes to provide snacks and coffee.

Locker rooms, accommodations for on call students: All institutes and clinics where students must wear protective clothing provide changing rooms, lockers and bathrooms. In the VTH, students in clinical rotation are provided with the respective protective clothing. On call students share social rooms for cooking and leisure with staff members and have access to overnight accommodation.

Sanitary installations: All facilities are equipped with toilets according to the number and sex of students. Hand basins and disinfection are available across the facilities. Students on call have access to showers.

Leisure: Leisure is considered a private matter of the students. It is up to them to make use of the broad spectrum of activities the JLU offers, for example by the Institute for Sport Sciences. All students have access to the Botanical Garden of the University, which also serves to instruct veterinary students in botany. The City of Giessen itself offers a wide variety in free time activities.

4.2.3 Staff offices and research laboratories

The inventory of academic staff offices in general includes adequate IT equipment, internet and intranet access as well as usual office supplies. Online search in databases of veterinary, medical and life sciences (e.g. web of Science) as well as access to a wide range of online journals is provided by the university library, to staff as well as to students. A range of software licenses and services are provided by the university IT department (Area 6).

Laboratory equipment in research facilities highly varies and depends on the respective use (Appendix to 10.1).

4.3 Livestock Facilities, Animal Housing, Core Clinical Teaching Facilities and Equipment for Teaching Purposes

In Germany, animals used for veterinary teaching purposes are classified as experimental animals. Therefore, their use requires the same permissions as are required for animals used in research. Permissions are given by state authorities according to the Animal Welfare Act (Tierschutzgesetz as amended in June 2020), which implements the EU regulations on the use of animals for experimental purposes and according to the “Animal Husbandry Act” (Tierhaltungsverordnung).

Applications for housing and using healthy animals for teaching purposes must be supported by the animal welfare officers (Tierschutzbeauftragte) of the university, before they are forwarded to the responsible state authority. Learning outcomes and knowledge gain are weighted against the strain, inflicted on the animal by the relevant procedures. It must be shown that the learning outcome cannot be achieved through alternative methods. Permissions are quite restrictive, consequently the use of animals used solely for educational purposes has drastically decreased in the past years (Table 4.3.1).

For the accommodation of animals in the clinical units, the Faculty applies the concept of a "triple use": That is; stables, wards, boxes etc. which are permitted by the state to house teaching and/or (clinical) research animals may also be used for hospitalization of patients.

4.3.1 Healthy animals

For agricultural training, the Veterinary Faculty has access to the "Oberer Hardthof", a research and training station of the Faculty of Agricultural- and Nutritional Sciences and Environmental Management. Veterinary students are made familiar with the handling and management of farm animals (40 dairy and 15 suckler cows, 350 sheep and 30 goats, 112 breeding sows, about 20 rabbits and 50 hens of different breeds). Housing facilities meet common agricultural requirements with cattle and sheep held mostly in free range pens on about 280 hectares. As part of the supervision of swine husbandry, students are trained at the "Oberer Hardthof" in herd health management as well as in diagnostic and clinical issues during their intramural clinical rotation too.

Table 4.3.1: Number of animals per year used exclusively in veterinary education

Species	2016	2017	2018	2019	2020
Horses	8	6	5	5	2
Cattle	3	3	2	4	4
Goats	7	4	4	4	4
Sheep	20	15	12	13	5
Dogs	3	9	16	28	14
Cats	6	3	6	8	6
Birds	19	62	20	0	20
Reptiles	2	2	2	0	0
Rats	39	26	16	0	0
Mice	24	12	0	0	0
Total	**129**	**140**	**81**	**62**	**55**

In preclinical education, the Institute of Physiology has obtained permission to use a small herd of goats for blood sampling and evaluation of non-invasive parameters. For clinical teaching purposes, permission to house healthy animals (according to § 11 TierSchG) has been given to the new Clinical Unit for Small Animals and Clinical Unit for Birds, Reptiles, Amphibians and Fish; Clinical Unit for Obstetrics, Gynaecology and Andrology; Equine Clinical Unit and Clinical Unit for Swine.

4.3.2 Research animals

All facilities approved for housing animals solely used for teaching purposes, according to § 11, Animal Protection Act, are also approved to house research animals. Permission is always given for a maximum capacity of animals that can be housed. This requires not only species related rooms and equipment, but also specially educated staff for adequate care of the experimental animals.
The JLU provides a "Central Facility for Laboratory Animals (ZVTH)" with a capacity for about 11,000 small rodents. The Faculty of Veterinary Medicine itself runs a special building for parasitological research in calves and/or small ruminants; the permitted maximum total capacity is for 14 bovines of less than 400 kg bw, 30 sheep, 30 goats or – at special conditions – 60 pigs. Size of pens varies between about 13 to 20 sqm. A distinction is made between 3 pens for non-infected animals and 8 pens for animals after experimental parasitic infection.
Facilities provided by the Clinical Unit for Small Animal Internal Medicine and Surgery and the Clinical Unit for Birds, Reptiles, Amphibians and Fish see below. Facilities for pigs in research as well as for teaching purposes are located in the Clinical Unit for Swine (4 compartments with 2 bays of 4.4 m² each); the number of animals which may be housed is different according to their size/weight.

4.3.3 Hospitalised animals

In principle, with consent of the owners, all hospitalized animals may be used for teaching purposes. The Faculty has sufficient space to accommodate clinical patients, according to present legal requirements, especially in the new clinical building.

Table 4.3.2 Places available for "regular" patients and patients needing isolation

Species	Hospitalisation	Isolation	Research	Total
Clinical Unit for Small Animals, Surgery				
Dogs	29	10	refer to Internal Medicine	**39**
Cats	24	10	-	**34**
Other (pets)	4	-	-	**4**
Clinical Unit for Small Animals, Internal Medicine				
Dogs	51	10	40	**101**
Cats (or pets)	21	16	34	**71**
Clinical Unit for Birds, Reptiles, Amphibians and Fish				
Birds	24	7	6,678	**6,709**
Reptiles	22	10	50	**82**
Amphibians	14	-	-	**14**
Fish	14	-	10,000	**10,014**
Clinical Unit for Obstetrics, Gynaecology and Andrology of Large and Small Animals and Clinic for Ruminants				
Dogs	11	-	-	**11**
Cats	10	-	-	**10**
Equine	24	On demand	-	**24**
Large ruminants (including calves)	63	16	-	**63**
Small ruminants	66	On demand	-	**66**
Swine	8	2	-	**8**
Equine Clinical Unit, Surgery and Internal Medicine				
Equine	28	6	3	**37**

Due to the limited space in the other clinical units, some larger boxes and paddocks may be used as needed, either for food animals or horses, and for different numbers of animals; e.g. one pen may be used for one horse, or a mare with foal, or a cow (with calf), or for up to 4 sheep/ goats / new world camelids. The Clinical Unit for Ruminants shares the livestock facilities with the Clinical Unit for Obstetrics, Gynaecology and Andrology. Table 4.3.2 indicates the number of places that are available at the various clinical units for non-contagious patients and for patients needing isolation.

4.3.4 Premises and equipment for clinical activities

The most recent clinical facility of the Faculty became operable in fall 2020. It houses the Clinical Unit for Small Animals with a clinical pathology laboratory, CT and MRT (to be used also for large animals, e.g. horses), and the Clinical Unit for Birds, Reptiles, Amphibians and Fish.

Clinical Unit for Small Animals

In the Clinical Unit for Small Animals, there are 17 wards for hospitalized patients (9 for non-infectious, 8 for infectious animals with a hygiene lock). The capacity for large dogs is 47, there are 11 cages for medium sized and 49 cages for small animals. Each ward is equipped with an examination table and storing cabinets with instruments and drugs for immediate use. Nine wards for dogs have access to an outdoor roofed kennel for defecation and urination. In total, there are boxes for 175 in-house animals: 70 for dogs and 37 for cats/pets which suffer from non-infectious diseases, and 28 for dogs as well as 22 for cats/pets in isolation for animals with infections or

(suspected) contagious diseases. 30 more places are available for dogs/cats in intensive care. In addition, the clinic provides room for 40 research dogs and 34 research cats.

Small Animal Clinical Unit: Surgery, Neurology, Anaesthesiology & Diagnostic Imaging

The Clinical Unit for Small Animals (Surgery) has a total surface area of 1,332 sqm, serving as referral and surgical center for dogs, cats and small mammals, except obstetrics and gynecology. This includes 8 surgical suites of 238 sqm in total (emergency surgical procedures, soft tissue surgery, neurosurgery, orthopedic surgery, thoracic surgery, ophthalmology, highly sterile suite, e.g. for endoprosthetics, minimal invasive surgery) and one stomatology unit equipped with a dental station and a dental x-ray system (Resolution 4DC: iM3).

The small animal surgical equipment with multiple electrosurgical devices (diathermal Ligasure device, diode laser & electrosurgery devices for cutting & coagulation in each surgical suite), two fluoroscopy machines, a cell salvage (autotransfusion system), a mobile arthroscopic system (including multiple optics), several drilling machines & oscillating saws, multiple surgical & implants sets (incl. TPLO & TTA sets, Patella Groove Replacement set, Patella Ridge Stop, Total Elbow Replacement TATE, Total Hip Replacement Biomedtrix), Cora based levelling osteotomy, Proximal Abducting Ulnar Osteotomy, Double Pelvic Osteotomy, Ilizarov External Skeletal Ring-Fixateur, TA (Thoracoabdominal) & GIA Stapler as well as Liga Clip Applicators. We use the SUB system (Subcutaneous Ureteral Bypass) and the artificial urethral sphincter; for thoracic and abdominal surgery a pleuralport and a thoracoscopic & laparoscopic-set are available. For specialized diagnostics and monitoring of neurosurgical patients, an intracranial pressure measurement (Codmann, ICP Express Intracranial Pressure Monitor) as well as telemetric ICP surveillance for monitoring ventriculoperitoneal shunt patients are available. A Zeiss microscope for intracranial surgical procedures and a surgical ultrasound aspirator CUSA® ExcelElectrodiagnostic is used in oncosurgery for brain tumors. Companion animals with epilepsy can be examined using a EEG-holter system (Natus Holter EEG). Patients with muscular disease or peripheral nervous system disorders can be examined using a stationary electrodiagnostics unit, including ERG, NLG, repetitive stimulation, and BAER (Natus Electrodiagnostic).

An adequate equipped physiotherapy and rehabilitation unit including an examination room (28 sqm) und a therapy room (25 sqm) with an underwater treadmill and a motion analysis treadmill is available.

The state-of-the-art equipped cleaning, sterilisation and desinfection unit (54 sqm) is also directly adjacent to the surgery area.

Anaesthesiology has 117 sqm including two preparation rooms with 4 transportable tables, 1 recovery room with 5 cages for large, 5 cages for middle sized & 5 cages for small dogs, as well as a separate recovery room for cats (8 cages) are equipped with a central remote surveillance unit between the two recovery rooms.

Equipment includes state-of-the-art anesthetic devices and vital sign monitors in each surgical suite and at each induction place: 9 GE Carescape B650 (CO2, SpO2, spirometry incl. measurement of anesthetic agents, NIBP, IBP, ECG, Temp, CVP); 9 Ge Carescape B450 (CO2, SpO2, NIBP, IBP, ECG, Temp., CVP); 1 GE Carescape central Station; 1 SurgiVet transportable monitor (CO2, SpO2, NIBP, ECG) and 2 LifeVet CP SpO2 (Eickemeyer). Anaesthetic devices: 5 Stephan Akzent Color; 15 Stephan Portec mit ABV-U Respirator; 1 Löwenstein Leon MRI (3T). Devices needed in surgical procedures: 24 Scil InfuVet Infusomat; 20 Perfusor BBraun compact plus; 8 Astopad electronic warming mats; 6 BairHugger (Mistral Air Warming & BairHugger & Nellcor); a Cellsaver 5 & 5+ (Autotransfusions-processor, Haemonetics); a Parasympathetic Tone Activity Device (MDMS Physio Doloris); 2 Glucose-Checker (Contour & Contour next, Bayer). Devices needed in preparation & recovery rooms: 2 doppler devices; 1 Defibrillator Lifepak 20e (Medtronic); a Blood-Gas-Analyser Cobas 123 (Roche); Mikro-Hkt centrifuge (Hettich Hematokrit); Clinical Refractometer (Eickemeyer); 2 Cuff-pressure gauge VBM; 10 heat blasting devices for animals (Artas); 2 ventilators for hyperthermic patients (Honeywell) and a suction device Medap Venta MultiCare.

The Diagnostic Imaging service has 8 rooms (301 sqm) with a state-of-the-art equipment:

The cross sectional imaging suite includes a 16 slice CT scanner: SOMATOM Emotion 16 – CTF1292 (Siemens Healthcare GmbH), spotlight: Dura 422-MV, x-ray tube: M_CT 172 and a 3T MRI system for small and large animals (MAGNETOM Verio A Tim + Dot System eco DOT upgr., Siemens Health Care GmbH), field strength 3Tesla (70 cm open bore, gradient strength, VQ-engine 45mT/m, Slew rate: 200T/m/m, Field of View 45cm, Zero helium boil-off technology).
One X-ray fluoroscopy device (AXIOM Luminos dRF Max, Siemens Healthcare GmbH), a DR digital X-ray device (Multix Fusion, Siemens Healthcare GmbH), x-ray tube OPTITOP 150/40/80HC-100; and an additional CR digital x-ray device (Optimus RF, Philipps, x-ray tube SRO 3550).
Ultrasonography is performed using three different units: Ultrasound machine 1: Aplio A450, Canon, probes: convex 3,5MHz, microconvex 7MHz, linear 10MHz, linear 17MHz; Ultrasound machine 2: Logiq E9, GE, probes: convex 9MHz, sector 6MHz, linear 9MHz, linear 18MH; Ultrasound machine 3 (Station): Acuson X300, Siemens Healthcare, probes: convex 5Hz, linear 10MHz.
There are two dedicated reading rooms. One of them in the x-rays and ultrasound unit in the first floor and one in the CT/MRI unit in the ground floor. The readings rooms are equipped with computers (windows & mac), access to AHIS and PACS and a beamer for case discussion. Specialized software for imaging assessment and image processing are included.
A separate recovery room is available offering 6 boxes where the animals can recover after minor procedures with their owners (e.g. hip and elbow dysplasia x-rays, ambulatory surgical procedures with minor recovery risk). There are separate waiting rooms for dogs and cats and an additional examination room for emergency cases.

Small Animal Clinical Unit: Internal Medicine

The Clinical Unit for Small Animal Internal Medicine has 13 consultation rooms (213 sqm) with variable use, including cardiology, urology, dermatology, endocrinology, small mammals, gastroenterology and re-checks. The equipment includes treatment tables, desks with a computer, washing facilities and equipment for clinical examinations, ultrasound for echocardiography, and electro-diagnostic equipment. Cardiology includes an interventional catheter unit with most modern equipment (50 sqm). Inpatients are examined separately in additional 6 examination rooms (192 sqm) with appropriate furnishings, an additional isolation unit (96 sqm) for infectious animals is available with appropriate furnishings. Modern endoscopy and otoscopy equipment is available and these examinations are performed in 2 separate examination rooms (35 sqm). There are separate waiting rooms for dogs and cats.
The Intensive Care premises and equipment are used for critical care patients, overall size approx. 130 sqm. The equipment includes appropriate treatment and operation tables, washing facilities, equipment for clinical examinations, a warming cabinet, endoscopes, systems for haemodialysis, plasma exchange and mechanical ventilation. An emergency clinical pathology lab (14 sqm) with systems for haematology, urinalysis, blood gas analysis, electrolytes and coagulation (Coagulometry, TEG) and a blood bank (15 sqm) are attached next to the ICU.
Nuclear medicine procedures (scintigraphy of dogs, cats, small mammals and radioiodine treatment of cats and small mammals) are performed in the radioprotection area. The entire unit covers 76 sqm. There are two examination rooms and an isolation ward with five kennels equipped for long-term housing of cats, two boxes for small mammals, and one box for short-term-housing of dogs. Equipment includes a gamma camera with LEHR collimator allowing SPECT and planar images (for small animals and small mammals), an activimeter, a well counter, two contamination monitors, lead shielded safe and working stations, one plexi glass shielded working station, lead shielded waste container as well as shielding equipment for syringes and vials.

Clinical Unit for Birds, Reptiles, Amphibians and Fish

The Clinical Unit for Birds, Reptiles, Amphibians and Fish offers seven wards (152 sqm total) for birds, reptiles, amphibians and fish, including washing facilities and treatment tables. Two isolation

rooms of about 36 sqm and one room for physical therapy (15 sqm) are included in these wards. The physiotherapy includes a counter current pool for swimming birds and reptiles.
There are three treatment rooms (63.5 sqm), including all necessary equipment and warming lamps for emergencies. There are two operating surgery rooms (64.5 sqm) including laser surgery, full endoscopy equipment, surgical driller and video equipment to transfer the surgery in the lecture hall. Diagnostic imaging has two rooms, one with an ultrasound machine (GE- Logiq S7 Pro) (10 sqm) and one with x-ray (Agfa DX-S) (25 sqm). There are also laboratories including storage rooms and freezers. The laboratory equipment complies with the EN ISO/IEC 17025:2018 standards, including 3 Quiacube, 2 realt-time Rotogene systems and several conventionell PCR-systems. Also several incubators, room for media preparation and cell culture systems. The laboratory uses 434 sqm for bacteriology, serology, parasitology and histology, including a refrigerator room, incubator room and preparation rooms, fully equipped with diagnostic and research equipment, including fluorescence and phase contrast microscopes. There are also cell culture and molecular biology laboratories. In addition, there is an approx. 68 sqm post-mortem suite primarily used for accredited diagnostic services, but also for teaching and research activities. The equipment includes two necropsy tables, necropsy and sample collection tools, cleaning and disinfection tools, personal protective devices for students and staff, and diagnostic equipment.

Equine Clinical Unit: Surgery and Orthopaedics

The facilities comprise one surgery theatre for procedures under general anaesthesia, one surgery theatre for standing procedures, 27 boxes, including an intensive care unit, a farrier training centre for manufacturing basic and advanced clinical service i.e. fabrication of special orthopaedic horse shoes.
There are three examination rooms (56 sqm, 21 sqm, 16 sqm), two of them equipped with stocks. A 40 m long area is paved with non–slippery asphalt and allows lameness as well as neurologic examinations. A roofed arena (about 700 sqm) is available for lounging and riding. An adjacent farriery with several certified farriers provides basic and advanced services, special equipment. There is intense cooperation with veterinarians and trainees are educated and undergo state examinations.
Operating suite: There is one surgery room (34 sqm) that has to be used for both, clean and non-clean procedures. Decontamination and asepsis are maintained with appropriate cleaning and disinfection after each surgical procedure. The operating theatre is fully equipped with automatic operating and overhead lights, emergency lighting, access to pressurized oxygen, a room air–exchange–ventilation system, operating tables, storage cabinets and a draining system for faeces originating from enterotomies. There is just enough space for patients, surgical teams (staff) and students as well as equipment. A ceiling–attached heavy duty crane is used to transfer the anaesthetized patient in and out of the operating theatre. It is accessed through a preparation/dressing room, which is equipped with sinks, mirrors and storage cabinets for surgical caps, masks, sterile gowns and gloves. In the operating room, a modern anaesthetic machine that delivers isoflurane, supplies oxygen, and allows automatic positive pressure ventilation is stationed as well as CO_2–, ECG–, oxygen saturation and blood pressure measurement monitors. The operation room is equipped with an adjustable anaesthetic waste gas–exhaust system. X-ray fluoroscopy (GE OEC Fluorostar 7900 compact) can be used intraoperatively.
For standing surgical procedures, a spacious room (65 sqm) is available, equipped with stocks, ECG and blood pressure monitoring system, and access to pressurized oxygen for emergencies. A portable oxygen system that can be delivered to any area is available too. In addition, there is a room dedicated to teaching and surgical training on cadavers (38 sqm).
There are full sets for general, soft tissue, abdominal and orthopaedic surgery as well as for ophthalmologic and dental surgical procedures. There are always at least two identical instrument packs available for all general and specialized surgical procedures. The surgical equipment includes multiple electrosurgical devices (Ligasure device, electrosurgery devices) and GIA Stapler. Arthroscopic and laparoscopic sets are available. The clinic is also equipped with a laser–

/radiofrequency–assisted instrumentation. The most important technical devices and instruments are listed here: Arthroscopy and laparoscopy sets, Storz; Osteosynthesis set, Synthes; Stoll Buccotomy set; Diode-Laser, Medilas d 30 Vet, Donier MedTech; Co2 Laser, Bison; Ultrasound Wound debridement, Sonoca 185, Söring; Microperfusion measurement device, O2C, Lea-Medizintechnik; electrosurgery device with diathermic loop and blade (Storz, autocon III 300).
For perioperative care two recovery boxes adjacent to the operating suite for assisted recovery and with oxygen supply are available. In addition, a recovery sling can be used. If necessary horses can be supported by a Swing-lifter.
The main supply and sterilization area consists of a room that is equipped with an automatic instrument–cleaning machine, an instrument–packing/organization device, an autoclave and space for instrument storage.
The in-house laboratory equipment includes blood-gas analysis (cobas b123, Roche), haematology (Procyte, Idexx) and point of care assay for measurement of Serum Amyloid A (EQ-1, stablelab). The laboratory is also equipped to produce IRAP and PRP. In addition, the clinic offers an in-house stem cell laboratory.
The Diagnostic Imaging is performed with state-of-the-art equipment in a designed x-ray room and one room for orthopaedic ultrasound examinations (64 sqm). DR digital X-ray device (fujfilm, Siemens) and an additional mobile x-ray device (Gamma 2000, physea) are available. Ultrasonography is performed using three machines with different sets of probes, one of them with colour flow Doppler (GE Logiq E9, GE Logiq A5 pro, GE Logiq e Laptop). There is a dedicated reading room next the imaging room. A room for scintigraphy (37 sqm) (Equine scanner HR-scintron, MiE) with two separate boxes is used to perform around 50-60 bone scans per year. Since 2020 cone beam computed tomography can be used intraoperatively or in the standing surgical theatre in a purpose-built stock on the standing patient. MRI examinations of horses can be executed since 2020 with a three-tesla device (Siemens) in the new clinical building for the clinic of small animals. A recovery box for horses and a custom-made table for large animals as well as a large animal anaesthetic machine is installed.
Additionally, three airway endoscopes (Storz) in different sizes, a gastroscope (Storz), a dental endoscope (Storz) and an overground (Dr. Fritz) are available. For lameness examinations two Lameness Locator (Equinosis) and pressure measurement for gait analysis (Hufscan, Tekscan) are available. A modern shockwave (PiezoWave2, Wolf) for treatment of orthopaedic patients are present.

Equine Clinical Unit: Internal Medicine

The facilities of the Equine Internal Medicine unit are located in two buildings: Four large (15.5 sqm) and 3 small (6.2 sqm) boxes are used for non-contagious patients in one stable (Frankfurter Str. 112), and 6 isolation boxes, ranging from 15.5-18.2 sqm, are located in a building next to the stable, and used for (potentially) infectious patients. Three examination rooms ogf about 36 sqm, two of them equipped with standing stocks, a room for on-site laboratory diagnostics (16 sqm), a food preparing room (5 sqm) and four storage rooms complete the facilities used for patients. Students may use a locker room (25 sqm), a room equipped with 3PCs with access to patient documentation and internet (56 sqm) and a room for overnight accommodation is available.
Four sonographic probes as well as software for cardiac, abdominal and thoracic as well as transrectal ultrasonography are used routinely with two ultrasound systems (Vivid 7, Logic e, bothe GE Healthcare). Three video endoscopes (180 cm, 250 cm and 325 cm) for the examination of upper and lower airways, for gastroduodenoscopy and endoscopy of the urinary tract are available with a Storz system, as well as an over ground endoscope (optomed). For desinfection of the endoscopes, a washing machine is installed (BHT-Innova E3 DH). Electrocardiography, telemetric heart frequency measurements (TeleVet 100, Krutech), a high speed biopsy device (BIP Core Cut 2), video observation of two boxes and a horse weigh (Soehnle Professional) complete the diagnostic devices.
Routine and emergency laboratory diagnostics, e.g. hematocrit, total protein, blood gases, a range

of biochemical parameters (Fuji NX500i, VetStat IDEXX, Accutrend Cobas) urinanalysis, Diff-Quick-staining and microscopy (Leica DM500 with ICC camera module) are available on-site and are used by veterinarians and students. Two scil InfuVet infusion pumps, a piezo nebulizer (flexi neb®) and a haygain are routinely used for therapy.

Clinical Unit for Obstetrics, Gynecology and Andrology of Small and Large Animals

In 2018 the facilities of the Clinical Unit for Ruminants, Internal Medicine and Surgery, had to be merged with those of the Clinical Unit for Obstetrics, Gynaecology and Andrology. Consequently, facilities for stabling of ruminants s are used by both clinical units. Further on and as far as possible equipment for handling large and small ruminants, including animal surgery and sterilization, are used by both clinical units. The clinical unit runs its own pharmacy.

Clinical Unit for Reproductive Medicine: Facilities for small and large animals are separate. The small animal unit comprises two examination rooms, one room for x-ray and one for ultrasound examinations. There is a surgery room with up to date equipment, a recovery room and a "reserve" surgery room. There are cages for 11 dogs and 10 cats or other similar sized patients.

Patient admission, waiting and treatment rooms are on the same ground floor; the waiting areas for dogs and cats are separate.

For large (food) animal examinations and treatments five treatment rooms meeting the requirements of veterinary work on animal reproduction in horses and production animals are available. The number of places available for hospitalization is given in Tab. 4.3.2. There are two separate isolation facilities.

Additionally, there are two intensive care units, one for foals and one for puppies. The clinic has two laboratories (clinical laboratory, andrology laboratory) and two semen collection rooms, as well as storage rooms meeting EU requirements for intra-community trade of horse semen and embryos.

Molecular Reproductive Medicine: An endocrine laboratory equipped with automated enzyme-linked immunosorbent assay (ELISA) and RIA tools belongs to the clinic. Furthermore, laboratories for in vitro embryo production and sperm storage (Samendepot), fulfilling the EU requirements for intra-community trade of cattle-, sheep- and goat sperm and embryos are available. Equipment includes instruments for micromanipulation of embryos, for cryopreservation and for intracytoplasmatic sperm injection (ICSI). There are also two S1 laboratories for molecular biology analyses. The equipment includes apparatus for RT-qPCR, RT-PCR, electrophoresis, Western blotting and gel analysis.

Clinical Unit for Ruminants and Swine

The Clinical Unit for Ruminants serves as a referral, internal and surgical center for all ruminant species (cattle, sheep, goats, camelids, wild life animals). Facilities are shared with the Clinical Unit for Obstetrics, Gynecology and Andrology (see above).

The ruminant surgical equipment enables the clinic to cover all types of soft tissue surgery including ruminotomy and laparotomic as well as laparoscopic correction of displaced abomasums. Abdominal surgery in small ruminants as well as camelids includes therapy of obstructive urolithiasis by means of prepubic cathetercystostomy.

The cleaning, sterilisation and disinfection unit (23.2 sqm) is directly adjacent to the surgery area.

Anaesthesiology in small ruminants, new world camelids and calves is performed by inhalation anaesthesia using 2 anaesthetic devices and vital sign monitors (Dräger Sulla 808 and 909; Mindray iMEC8 with ECG, CO_2, SpO_2, spirometry, NIBP). Perianaesthetic infusion therapy protocols are performed with the help of Eickemeyer Infusomats. Control of body temperature during surgical procedures is ensured via electronic warming mats (WDT).

Emergency and SOP blood works are performed using an IDEXX ProCyte Dx Blood Analysis device; a Blood-Gas-Analyser RAPID Point 500e (Siemens); Mikro-Hkt centrifuge (Hettich Hematokrit), a ROTANTA 460 R centrifuge (Hettich), a Photometer 5010 V5+ (Riele KG) and two Clinical Refractometers (Eickemeyer).

Ultrasonography is performed using two different units: Ultrasound machine 1: Aplio A450, Canon, probes: convex 1.8-6.2 MHz, microconvex 1.8-6.0 MHz, linear 4.8-11MHz, linear 4.5-18.0 MHz;

Ultrasound machine 2: Mindray M5 portable device with two probes (convex 6 MHz; linear transrectal probe 5 MHz).
Large animal patient admission of the Clinical Unit for Obstetrics, Gynaecology and Andrology and the Clinical Unit for Ruminants occurs in proximity of the main entrance on the ground floor with examination rooms directly adjacent to the patient registration area.
The Clinical Unit for Swine has 4 boxes for clinical patients (Frankfurter Strasse 108), which cover a total area of 35.2 sqm. Attached are two preparation rooms (6.18 sqm and 14.4 sqm) for technical equipment), a room for examinations/surgery/claw care etc. (14.4 sqm) and a pharmacy (16.2 sqm). Minor procedures and claw care are performed within these rooms. For rarely necessary surgical interventions, usually in minipigs, the animals are referred to the Clinical Unit for Small Animals or for Ruminants. Generally, patients are examined and treated on an outpatient basis, i.e. directly on site at the respective farm.
A basement room is available for simple "on-site" haematological and clinical chemistry tests. Assigned to the Clinical Unit for swine is a modern S1 laboratory (Frankfurter Str. 114). Students in clinical rotation can examine the samples collected during herd inspections for swine pathogens with molecular biology methods (PCR, sequencing, electrophoresis).

4.3.5 Diagnostic Services including necropsy

The Clinical Pathology Platform provides modern systems for analysis in the main areas of veterinary clinical pathology, such as hematology and clinical biochemistry, coagulation analysis, and cytology. It uses state-of-the-art equipment which is constantly upgraded and works according to quality standards approved by the European College of Veterinary Clinical Pathology (ECVCP).

In the Clinical Unit for Obstetrics, Gynecology and Andrology, another up to date clinical-chemical laboratory is located, also serving the clinical unit for ruminants. An endocrine laboratory specialized in steroid hormone analysis offers diagnostic services to detect (reproductive) steroids in various matrices (e.g. serum, urine, etc.).

The laboratory of the Clinical Unit for Swine is certified in accordance with EN ISO 9001. Diagnostic tests are offered to detect antibodies of specific swine pathogens (ELISA) and determine the genomes of certain viral pathogens.

The Clinical Unit for Birds, Reptiles, Amphibians and Fish has a DIN EN ISO/IEC 17025:2018 accredited laboratory with diagnostic services including necropsies, microbiological, virological and parasitological examinations using various classical (incl. cell and egg cultures) molecular biological and serological methods. It offers service to owners and vets as well as to research projects in the field of birds, reptiles, amphibians, fish and free-ranging (wild) mammals.

The Institute of Pathology provides diagnostics, e.g. necropsies including gross and histological examinations, reading of tissue samples and biopsies from vertebrates as well as fewer avian and reptile species, immunohistochemical and molecular examinations. Furthermore, consultation and assistance with forensic issues is offered and the Institute prepares expert reports for court proceedings.

The Institute of Parasitology provides full diagnostic services based on classical parasitological examinations (e.g. serology, molecular biology, coprology, haematology, morphological specimen identification) for a wide range of parasitic infections in domestic and farm animals, including zoonoses. Furthermore, parasitological examination of terrestrial and marine wildlife and herpetological species (amphibians, reptiles), clinical parasitology and concepts/strategies for diagnostics and control of animal parasites (e.g. targeted selective treatments of equines, resistance development) are in focus of the Institute.

The Institute of Hygiene and Infectious Diseases of Animals offers molecular detection and typing of pathogens, innovative techniques for microbial species identification (MALDI-ToF MS) and virulence typing (PCR and whole genome sequence analyses), as well as susceptibility testing.
The Institute of Virology offers a wide range of virological tests for livestock as well as companion

and wild animals, including zoonoses. The spectrum of virological diagnostics comprises virus isolation, serology, molecular diagnostics including real-time PCR, nucleic acid sequencing, and electron microscopy. In addition, new tests are developed or refined. The diagnostic laboratory is accredited according to DIN EN 17025:2018. The laboratories have laminar flow devices, which allow sterile work up to BL-3**, as well as modern equipment for laboratory diagnostics and research. Non-infectious cell culture and master mix preparation for PCR are outsourced to clean rooms.
The Institute of Veterinary Food Science also has a diagnostics unit in which foodstuff is examined using microbiological and molecular biological methods. The diagnostics unit is subject to quality management and is accredited according to the ISO/IEC 17025 standard.

4.3.6 Equipment used for clinical services

Please refer to chapter 4.3.4

4.3.7 Premises used for FSQ and VPH

Intramural training

FSQ: After closure of the local abattoir, a new building for practical exercises in meat hygiene and meat inspection was opened in 2016. The hall offers excellent and most practical conditions for hands-on training in meat hygiene. In addition to modern locker rooms, the hall has a practice-oriented hygiene sluice and 4 compartments for teaching in groups of 8 students per lecturer (i.e. up to 32 students at the same time). It is approved as an EU cutting and cold storage facility, so that the carcasses used in the course of the training can subsequently be put back into circulation as foodstuffs, thus complying with the principle of sustainability. The teaching material (carcasses and organs) is ordered in advance by the lecturers as required (Table 5.1.8). It is delivered in the morning on the day of the course so that practice-oriented examination conditions can be provided, and it is picked up again directly after the class. There is a supply contract with a company for this purpose, so that sufficient teaching materials are always available.
Further training is in a “Food Processing Unit” comprising 2 rooms with a total of about 100 sqm, localized in the building Frankfurter Str. 92. In this facility technical equipment for sausage production, including packaging devices, cutter, tumbler, filling machine, ripening chamber, smoking unit, refrigeration room and freezing room for storing materials, is provided. The institute employees a qualified butcher, thus it is possible to produce material for the courses and examinations and to demonstrate the production of sausages etc. in practical sessions involving the students. Up to 45 students can attend classes at the same time. The students are allowed to help and carry out steps of sausage production themselves.
The institute also has a diagnostics unit in which foodstuff is examined using microbiological and molecular biological methods. The diagnostics unit is subject to quality management and is accredited according to the ISO/IEC 17025 standard. Students who have decided to enlist at the institute for the mandatory 75 h EPT in food control and food hygiene are introduced to food diagnostics and made familiar with the tasks and requirements of an accredited food hygiene diagnostics laboratory. The laboratory rooms have the necessary equipment (stomacher, incubators, glassware, etc.) to perform the examinations. Up to 3 students can participate in the examinations at the same time.
Further practical training in food (milk/meat) sciences is in the same building in an adjacent room allowing group working with up to 6 students.

Extramural training

See Area 3, 3.5

Visits of food processing plants

The Institute maintains close contacts to several food processing companies which regularly permit visits by groups of undergraduate students. Visits take place during regular elective classes and can be attended by up to 14 students at a time/ per semester.

4.4 Veterinary Teaching Hospital (VTH) - Organization and Management

Organisation of the VTH follows the system of functional organisation. Chief responsibility for a functional unit is with the head of the unit. As indicated in Area 2, units/professorships are directly provided with revenues provided to the Faculty by state funds, according to the established distribution key. Revenues from clinical and diagnostic services stay within the respective unit, apart from the percentage centralized and budgeted by the dean.
It is the responsibility of the heads/professorships to provide up to date services and to secure clinical teaching from the 5th to 8th semesters as well as to organise student integration in clinical rotation in the 9th and 10th semester (Area 3, 3.1.5 and Appendix to 3.1.5, check list clinical rotation).
It is the responsibility of the acting director to secure cooperation and interaction (where necessary) and to provide a platform to develop a common strategy and to deal with upcoming problems affecting the whole VTH. Final responsibility is with the Dean.

All clinical units provide 24h/365 days emergency services (for official office hours, Tab. 4.4.1). Depending on the qualification of the DVM on duty and the intensity, by which emergency cases have to be managed, in most clinics additional veterinarians are on call during off-hours.

Table 4.4.1 Official office hours on workdays

Official office hours on workdays are as follows, preferably on appointment:	
Clinical Unit for	
Small Animals, Surgery and Internal Medicine:	08:00 – 16:00
Birds, Reptiles, Amphibians and Fish:	08:00 – 13:00, 14:00 – 17:00
Equine: Surgery and Orthopaedics:	07:30 – 16:00
Equine Clinic: Internal Medicine:	07:30 – 16:30
Clinic Obstetrics, Gynaecology and Andrology of large and Small Animals:	07:30 – 17:00
Ruminants:	07:30 – 16:30
Swine:	Service provided on call

All clinical units operate separate patient registrations; however clinics and most institutes use the software EasyVet for patient documentation, owner communication and creating invoices. Students during clinical rotation routinely have access to this program.
Research is an important issue in all clinical units. Questions underlying ongoing research projects and the results obtained have a great impact on teaching students. Thus, it can clearly be stated that students encounter a research-based and evidence-based clinical training (see also Appendix to 4.2.3).
In summary, we are convinced that the services provided by the Faculty of Veterinary Medicine at JLU Giessen not only meet, but exceed the Code of Good Veterinary Practice as developed by the Federation of Veterinarians of Europe.
Access of all students to clinical facilities as well as to the participating institutes and the required equipment is secured during the final year while on intramural rotations. However, student activity is under strict supervision and the degree of student participation in hands-on patient care varies between clinics. Thus, their involvement in complex small animal and horse surgery may be reduced to being an observer, while – for example - in reproductive surgery and patient management, students are actively involved. This also applies to internal medicine where students actively examine and treat animals regularly “hands-on” but supervised.
With graduation, students are provided with a certificate of x-Ray qualification. Thus, in clinical rotations students are particularly made familiar with the handling, safety regulations and use of this equipment. Each clinical unit has a House Pharmacy which must meet the regulations of the Veterinary House Pharmacy Act as amended in February 2018. This Act is subject of the lectures given by the Institute of Pharmacology and Toxicology; in clinical lectures, during clinical rotations and in the Ambulatory Services students get familiar with the application of this Act.

In most of the clinical units of the VTH, point-of-care laboratory diagnostics are established and frequently used by students in their final year. During clinical rotation students routinely collect samples from patients, name the parameters to be determined, are introduced to the various diagnostic instruments and assess the results.
Additionally, many clinics and some institutes as well as the skills lab hire veterinary students either with tasks in patient care or to tutor other students. And last not least, some clinics and institutes offer places for EPT training as required by the TAppV for students from other faculties as well as for students from the Giessen Veterinary Faculty.

4.5 Diagnostic and Therapeutic Facilities

From a diagnostic perspective, there are modern facilities available for diagnostic imaging (sections 4.3.4 & 5.3.2), clinical pathology (section, 4.3.5) and necropsy (sections 4.3.5 & 5.1.4, Table 5.1.6, section 5.3.2). A comprehensive array of services is provided by experts in haematology, clinical biochemistry, cytology, histology, immunohistochemistry, microbiology, parasitology, endocrinology, serology and post-mortem examination. Many of the laboratories offering these services are accredited or certified. In addition to being used in the diagnosis of animal patients, laboratory services are used for student education and relied upon by internal and external researchers, industry and veterinary practitioners.
Compulsory courses are organised in centrally prepared timetables, ensuring that students have access to the relevant facilities and related training content. In addition, students are welcome to volunteer after consultation with the relevant facilities.

4.6 Isolation Facilities

Isolation facilities are a matter of the hygiene concept of the faculty. Each clinic provides the necessary facilities to separate infected from non-infected animals. For further details see Table 4.3.2. Designated areas for isolation of infectious patients are available in the clinic for small animals (46), Clinic for Birds, Reptiles, Amphibians and Fish (17), Clinic for Obstetrics, Gynaecology and Andrology (4), Equine Clinic (6) and Clinic for Ruminants (14 places, 9 of them vector-protected). The in-house ventilation in the clinic for small animals and birds etc. is regulated by a circulation air system. The large animal facilities have free air circulation. Students are involved in the care of infectious patients only after case-specific, personal and individual instruction of the veterinarian on duty.

4.7 Ambulatory Clinic; Herd Health Management, Field Veterinary Medicine

The Clinical Unit for Obstetrics, Gynecology and Andrology of Large and Small Animals offers an Ambulatory Service System which is considered extremely important for student education. The ambulatory service has developed from serving farmers and mainly large animal holders in the surroundings of Giessen to particularly serving sheep/goat herd owners and new world camelid holders, not only in the state of Hesse but also in the neighboring federal states. The responsible DVM has become the official for the sheep and goat health service in Hesse. The Ambulatory Clinic operates 2 vans, equipped with cooling facilities for vaccines etc. and a container to store deep frozen semen. In general, 2 students accompany the DVM on field tours, sometimes up to 4 students may go on such visits. All students in clinical rotations participate; assignment is either to the morning or afternoon round. Depending on the incoming calls, students may participate on several trips, student-volunteers may participate any time. The service is provided 24hrs/365 days, official office hours are from 6:00 -22:00 o´clock. The cattle Breeding-Hygiene-Consultation service is operated as part of the Ambulatory Clinic.
The Faculty officially participates in the state run Herd-Health-Service of the state of Hesse.
Thus, the clinical unit for swine participates in the Hessian Pig-Herd-Health system. Presently 7 farms and a wild pig facility are visited two times per year. This further secures the participation of

students in the subject of herd health management and their training in up to date swine medicine. The clinic runs its own van. Health monitoring is carried out with about 140 resp. 35 visits per year. Customers are breeding and fattening production farms. In general, 2 to 3 students participate in one visit, thus all students in clinical rotation are involved.
The sole responsibility for poultry is with the Clinical Unit for Birds, Reptiles, Amphibians and Fish. As indicated in Table 5.1.7, the average number of visits is around 1,380 per year. Students in clinical rotations are assigned to this service for one week, thus on average each student participates in 2 to 3 poultry health service trips.
The Clinical Unit for Ruminants, Internal Medicine and Surgery, participates in the Hessian Cattle-Herd-Health system. The requests for visits, however, have decreased in the past decade and a shift to the ambulatory service was observed. In the preceding "non-corona" years, 8 to 9 visits per year, accompanied by 2 students in clinical rotation, were the average.

4.8 Transport of Students, Live Animals, Cadavers

4.8.1 Transport of students

The only transport the Faculty supplies actively to students is within the frame of the ambulatory- and herd-health system. The city of Giessen runs a highly effective system of public transport, JLU - registered students have free access. Additionally, the JLU has established a "bicycle on demand" system, freely accessible to all members of the JLU.

4.8.2 Transport of live animals

The need for transport of live animals has drastically decreased in the past decade. Most livestock/horse owners have their own transporters to bring an animal in. Nevertheless, the Faculty still holds a car-trailer to meet the few situations where a food animal has to be brought in.

4.8.3 Transportation of cadavers/organs

Cadavers and organs are considered as animal by-products and must follow regulations according to the animal by-products disposal act (Tierische Nebenprodukte Beseitigungsgesetz), as amended in June 2020. Based on the permission given by the veterinary authorities from 27th July 2018, cadavers and organs are collected in special containers in a cold room (4 ^{0}C) and they are picked three times per week by a specially equipped truck of the carcass disposal facility.

4.9 Safety Management, Operational Policies and Procedures

Responsibility for Safety-Management is with the Central Administration, Division B3 "Safety and Environment" of the university. The main sectors with an assigned responsible officer are occupational health, biological safety and genetic engineering, protection from radiation and hazardous substances and fire protection.
The legal requirements according to the occupational health and safety act as amended in Dec. 2020, the radiation protection act as amended in April 2020, the animal disease act as amended in Nov. 2019, the genetic engineering law as amended in June 2020 and the animal by-products disposal act as amended in June 2020, must be met. Division B3 advices and controls; responsibility to meet the requirements, however, is with the head of the respective unit. In cooperation with each unit, Division B3 nominates local security officers according to the occupational health and safety law who report to the head of the unit.
In respect to radiation protection, official responsibility is with the president of the university who delegated this to the responsible officer. This officer nominates persons with the official qualification as "radiation protection officers"; qualification must be updated in 5-year intervals. Official appointment is by the Hessian state authorities.
Any type of work to be associated with genetic engineering is bound to laboratory facilities meeting the S1, S2 or S3 standards. The responsible officer is with sub-division B3.3 and - on behalf of the president - the representative for biological security. This person nominates project leaders who are

responsible for local security and who have to pass evaluations of their expertise in 5-year intervals. Their official appointment is by the Hessian state authorities. The project leaders and the respective facilities are observed by an independent local representative for biological security.

The Faculty has developed a Central Hygiene Plan (Appendix to 4.8) which is also available on the Faculty´s website:
www.uni-giessen.de/fbz/fb10/institute_klinikum/institute/vphysbio/allgemein/arbeitssicherheit_ jlu_ intern/ betriebsanweisungen/hygieneplan/view

At the beginning of their studies students are informed about laboratory safety and hygienic rules they have to observe. In the 5th semester, before mandatory practical training periods start, information about necessary insurances and professional confidentiality is given. When entering clinical rotation, each unit provides its own specific instructions in an introductory lecture, which is also available online and/or printed.

Comments on Area 4

More than 30 years ago in 1987, the external "SAPCO.Systemanalyse- and Projectcontrol GmbH" proposed a strategy for the long-term development of the Faculty of Veterinary Medicine of the Justus-Liebig-University Giessen. Client was the Hessian State Ministry for Science and Art. This report primarily dealt with further development of the clinical organization and further development of the facilities. The strategy was acknowledged by the State Ministry and is still the guideline for the development of the Faculty. However, there was a clear statement that discussions on projects needing financial support should only be held if a realistic chance to include such a measure in the state budget is seen.
The external experts supported to maintain the present location of the Faculty, also due to the excellent transportation links, and recommended to further develop the facilities by concentration, condensation and improvement of the structural conditions. A step wise procedure without stopping veterinary care and education was inherent to these suggestions. As a first step, the Clinical Unit for Obstetrics, Gynaecology and Andrology of Large and Small Animals was renovated and expanded to meet present day demands. Onset for the construction project of the Small Animal Clinical Unit was in 2002, but it took until 2010 to start with construction work and – due to unpredictable difficulties – until 2020 before the new facilities were put in use. Already the "SAPCO-opinion" clearly stated, that a) also the facilities of the Equine Clinical Unit must be renovated and expanded and b) a new lecture hall with further facilities (e.g. wet labs, seminar rooms, cafeteria, lockers) for students is dearly needed. Unfortunately so far no decision has been made to follow the suggestions made in the Sapco-expert statement.
Whereas many buildings and laboratories clearly need renovation or even renewal, on the other hand, the equipment of the clinics, number of patients, easy online access for students and staff to current veterinarian and related scientific literature, as well as to a range of software licences, provided by the university, are seen as a good basis for successful study.

Suggestions for Improvement on Area 4

The Faculty is aware of the restrictions of the state budget. However, it strongly requested that the university puts the measures to establish an up to date equine clinical unit on its list of top priorities, which was assured. Only with the backup of the JLU there is a chance to get consideration in the state budget. In the meantime, at least one more operation theatre for equines is strongly needed and the present facilities must be updated. Due to the high financial needs to improve infrastructure in many other university areas too, the Faculty is prepared for tough negotiations.
The plan to build a new larger lecture hall including a new large wet lab was cancelled. The lack of such a building is still compensated by the present structures; however, the infrastructure is clearly outdated and generates high maintenance needs. Particularly in respect to students (but to the staff as well), the demand for such a building is still great and it should also be given top priority.

Area 5. Animal Resources and Teaching Material of Animal Origin

5.1.1 Global Strategy of the VEE about the use of animals and material of animal origin for the acquisition by each student of Day One Competencies

The use of animals exclusively for teaching purposes, e.g. for propaedeutic instructions, needs approval according to the German Animal Welfare Act (Tierschutzgesetz as amended in June 2020, implementing the EU regulations on the use of animals for experimental purposes). Applications must be supported by the animal welfare officer of the university before it is forwarded to the responsible state authority. Permissions are very restrictive.

Using materials of animal origin is carried out in compliance with the rules of animal health control.

As stated in Area 1, the clinical units are organized according to animal species with one discipline clinic (Clinical Unit for Obstetrics, Gynecology and Andrology of Large and Small Animals with an Ambulatory Service). There are sufficient numbers of patients and in part excellently equipped clinical facilities for undergraduate and also postgraduate training (Tables 5.1.1 – 5.1.5). Furthermore, the university farm (pig, cows, sheep, goats) is used for training and research.

While the clinical units are committed to provide state-of-the-art hands-on clinical training and research-based education, they also ensure responsible care of animal patients when used for student education. In addition, the skills lab offers opportunities for students to practice in preparation or in parallel to the practical clinical training.

The strategic aim is that animals and patients as well as the animal material used, reflect the diversity of the situation in the field. For these reasons, there is an ongoing discussion of the Faculty with veterinarians of the various professional tracks and professional organizations (see Area 1) as well as animal owner organizations. Thus, for example, there is a meeting with cattle practitioners to discuss the requirements in practice twice a year. Similarly, there is an exchange with poultry practitioners every second year on the occasion of the meeting of Specialist Group Poultry Diseases of the German Veterinary Society (DVG-Fachgespräch Geflügelkrankheiten).

5.1.2 Specific strategy of the VEE in order to ensure that each student receives the relevant core clinical training before graduation

In principle, all patients are available for undergraduate education. The number of patients is considered sufficient for teaching all disciplines, also taking into account a balance between complex referral and first-opinion cases (Table 5.1.5)

For intramural training the specific course content related to the relevant DOCs is coordinated with institutes and clinical units and laid down in the description of learning objectives included in the ECTS catalogue of the Faculty (see Appendix B).

The subject coordinators for the relevant clinical subjects, propaedeutic, internal medicine and surgery, animal reproduction and herd health, coordinate the learning objectives between the subjects and institutions. Necessary changes are identified through existing feedback mechanisms (evaluation of students during clinical rotations, student and teaching staff feedback) and discussed with the Dean´s Office, the Committee of Study affairs and the institutions. To assess the availability of patients for clinical education, the caseloads in the different clinical units are evaluated on a regular basis. For this purpose, the number of patients is reported to the Dean's Office once a year.

As indicated in Area 8, during clinical training, particularly during clinical rotations, students play an active part in consultation and clinical rounds. Clinical rotations are organized in small groups of up to eight students who rotate between clinical units /institutes on a fixed schedule (Area 3, 3.1.4 and 3.1.5). Within the clinical units and institutes, this group is subdivided into smaller groups. Students receive a case-based and hands-on clinical training by guidance and supervision of experienced clinical teaching staff.

Students are trained on all relevant domestic animal species and there is explicitly no specialization during rotation. This includes individual clinical cases and herd health management with both referral and first-opinion cases.

Clinical training tries to secure a balance between first opinion and referral cases, between acute and chronic cases, between on day consultations and between hospitalizations. However, due to the status of most faculty clinics as referral centers, a bias towards seeing more complex cases during clinical rotations than in normal veterinary practice is unavoidable. However, the mandatory external practical trainings will compensate this for most students.
Herd health visits are with the ambulatory services of the Clinical Unit for Obstetrics, Gynecology and Andrology of Large and Small animals (incl. Small Ruminants and New World Camelids), the Clinical Unit for Ruminants and Pigs and the Clinical Unit for Birds, Reptiles, Amphibians and Fish (poultry health management) (see also Area 4, 4.7).
To ensure that DOC are trained with full respect for animal welfare, the faculty is constantly seeking for teaching innovations. In the skills lab and in the clinical units different simulators are used to develop student skills (see Area 4, 4.2.1).
The Faculty is aware of the fact that there are limitations in providing a fully satisfactory "in house" practical clinical training during undergraduate education. This is mainly due to the legally limited teaching capacity and the faculty alone is not able to solve this problem (see Introduction, Major problems encountered by the establishment) Thus, the Faculty considers it extremely important that further clinical hands-on training is provided during the EPT, to which the TAppV has allocated 850 hours. The Faculty is also aware of the fact that the numbers and quality of the cases seen will vary according to the practices or hospitals where EPT is performed. However, the ongoing discussion of the German veterinary establishments with practitioner organizations have considerably improved the awareness of the practices and hospitals participating in EPT to provide good to excellent practical clinical education. This is also reflected by the fact that a great number of practices and hospitals participating in EPT has gained the status of a "Teaching Practice (Lehrpraxis)". Students have to submit an anonymous report about their EPT (see also Area 3, 3.5).

5.1.3 Procedures developed to ensure the welfare of animals used for educational and research activities

In all projects in which patients are used for teaching or research purposes beyond medical treatment, animal care follows the rules of Good Scientific Practice as approved by the university Animal Welfare Officers (AWO) and the competent state authorities (Regierungspräsidium Gießen) (see also Area 4, 4.3) who are responsible for final assessment and permission according to § 7 (Interventions or treatments for experimental purposes) of German Animal Welfare Act.
The AWO assesses the applications submitted from a legal, statistical and scientific point of view and its main role is to advise on how best to implement the 3Rs (refinement – reduction – replacement). One of the AWO's central objectives is to promote the 4th R, Responsibility, at the university level, including a culture of care of animals used in teaching and for scientific purposes. For these purposes the AWO also offers project-independent or individual consulting and information services on request.
Technical and academic staff, who handle laboratory and teaching animals, receive regular training in the field of animal welfare and laboratory animal science. To this end, a series of advanced training courses has been set up, which regularly offer advanced training throughout the year. The relevant authority (Regierungspräsidium Gießen) verifies that the obligation to continued training (8 hours per year) is fulfilled.

Animals used for education only:

The use of animals for preclinical education is largely restricted. The Institute of Physiology has obtained permission to use four goats for blood sampling and evaluation of non-invasive parameters. Additionally, students volunteer to assess certain physiological parameters.
Similarly, the number of animals used for para-clinical and clinical education had to be drastically reduced in the past years due to the national animal welfare regulations (Tierschutzgesetz as amended in June 2020, implementing the EU regulations on the use of animals for experimental purposes). As indicated above, applications must be supported by the Animal Welfare Officer of

the university (EAWC) before it is forwarded to the responsible state authority (Regierungspräsidium Gießen). Learning outcomes and knowledge gains are weighted against the strain inflicted on the animal in each case. In case of teaching, it must be demonstrated that the learning outcomes cannot be achieved through alternative methods, i.e. without using animals. Permissions are very restrictive.
Animals kept for teaching purposes are also subdue to the "Animal Husbandry Ordinance (Tierhaltungsverordnung, Version of 15.04.2021)". In this respect the Faculty lacks adequate facilities to house a constant number of food animals for clinical training (see Table 4.3.1). Animals may become available for a limited period of time on a case-by-case basis.
Adequate facilities to house dogs, cats, poultry and fish are provided in the new building housing the Clinical Unit for Small Animal Internal Medicine and Surgery and the Clinical Unit for Birds, Reptiles, Amphibians and Fish (see Table 4.3.2).
The Faculty tries to place animals used for scientific purposes or student training in private care after use, provided that the conditions defined in the GAWA are fulfilled (rehoming).

Animals used for experimental purposes:
The use of animals for experimental purposes must meet the regulations of the German animal welfare act (Tierschutzgesetz as amended in June 2020, implementing the EU regulations on the use of animals for experimental purposes). A project proposal is submitted to the procedure as indicated above. Permission must be given before a project can be started. Approval of the EWAC must be obtained before permission by the relevant authority (Regierungspräsidium Gießen) can be seeked. A university independent Animal Protection Committee needs to approve before animals are allowed to be used for research or teaching procedures.

5.1.4 Handling of cadavers and material of animal origin for training in anatomy and pathology

Anatomy: The Establishment obtains its cadavers and material of animal origin for training from internal and external sources. Companion animals (mainly dogs) are obtained from the Clinical Unit for Small Animals and external veterinary practices. Bodies are initially stored in the clinic/veterinary practice itself and are transferred to the Institute of Veterinary Anatomy as quickly as possible. Other animal species or body parts (mainly from horse) are obtained from the Clinical Units of Obstetrics, Gynecology and Andrology, Ruminants and Birds, Reptiles, Amphibian and Fish. They may also be obtained from local farms (approved by Animal Welfare Authorities, 18/1 No. A3/2017). Storage is in formaldehyde or frozen. Official controls of the MAC-values by the Hessian Accident Insurance (Unfallkasse Hessen) and the local occupational safety authorities confirmed that MAC of formaldehyde levels were not exceeded (0.37ppm in 2019). The Institute of Pathology is responsible for disposal of the used materials of animal origin according to the Hessian State Law.
Pathology: Most of the material used for teaching (e.g., animal carcasses, organs, or tissue samples) originates from necropsy cases (from the VTH or from external senders such as veterinarians or private persons). Organ material from slaughterhouses is collected weekly during semesters for teaching purposes. The carcasses are stored in a dedicated locked cold room from the time of arrival until autopsy. Some of the animal carcasses delivered externally (in cases where prompt diagnosis is not required after consultation with the senders) are stored in freezers so that sufficient material is available for teaching purposes at all times. Disease-proof disposal is carried out by an external company (Secanim). Animal carcasses and body parts are stored in a cold room (4°C) and finally deposited in containers provided by the company, which are collected regularly (see also Area 4, 4.8.3). Alternatively, small animal carcasses are transferred to an animal burial or cremation company after autopsy at the request of the owner. Carcasses and body parts are never returned to private individuals. All handling of animal materials is done in compliance with legal regulations.

Table 5.1.1. Cadavers and material of animal origin used in practical anatomical training

Species	2020	2019	2018	Mean	Further remarks
Cattle	0	0	0	0	
Small ruminants	11	12	13	12	
Pigs	5	3	4	4	
Companion animals	8	9	8	8	
Equine	20	20	20	20	only parts of the cadaver: 20 forelimbs and hind limbs, 20 heads
Poultry and rabbits	19	19	19	19	
Exotic pets	0	0	0	0	
Other materials and other media used in practical anatomy training					
Live animals	0	0	0	0	
Organs or animal parts of horses, ruminants, pigs, and dogs, cats and chicken	798	815	763	792	10 organs/organ systems (hearts, lungs, stomach, intestines, liver, kidney, ureter/ bladder/urethra, reproduction organs, mamma, hoof/claw) from four species (horse, ruminants, pig, dog)
Bones and skeletons					
Complete skeletons	11	11	11	11	3 horses, 2 cattle, 4 small ruminants, 2 dogs
Complete forelimb skeletons	53	53	53	53	19 horse, 19 ruminant, 10 dog, 5 pig
Complete hind limb skeletons	53	53	53	53	19 horse, 19 ruminant, 10 dog, 5 pig
Single bones and mounted bone specimens (e.g. carpus / tarsus, spine)	722	722	722	722	95 spines from 5 species 19 hyoid bones 114 ribs from 3 species 19 sternum 95 skulls from 5 species 380 various individual bones from 5 species
Anatomical sections (plastinates or PEG-impregnated specimens)	35	35	35	35	
Models bought or in-house-made models of organs or animals	33	33	33	33	20 suspensory apparatus cattle and horse Whole body model cattle, horse, pig 2 inner ears dog heart dog and cattle eye 5 humanbrains
Rubber or plastic models molded from real specimens (e.g. brain, brain stem)	10	10	10	10	brain horse
Radiographs	12	12	12	12	
Anatomical plates	30	30	30	30	
Electronic resources					
Interactive e-learning programs	1	1	1	1	Virtual Microscopy
Videos	40	0	0	-	Videos have been produced beginning March 2020 due to Covid online teaching

Table 5.1.2. Healthy live animals used for pre-clinical training (animal handling, physiology, animal production, propaedeutic)

Species	2020	2019	2018	Mean	Remarks
Cattle	140	154	129	141	
Small ruminants	422	869	1236	842	*
Pigs	967	1033	964	1024	
Dogs	8	9	3	7	
Cats	4	6	3	4	
Equine	55	57	56	56	
Poultry	79	53	50	60	
Birds	30	30	30	30	
Rabbits	6	29	38	24	
Exotic pets	0	0	5	2	Bearded dragon
Camelids	0	3	0	1	

*The decrease in small ruminants is due to a reduction in herd size on the Education and Research Station Oberer Hardthof.

Table 5.1.3. Number of patients seen intramural in the VTH

Species	2020	2019	2018	Mean	Remarks
Cattle	643	639	865	715	
Small ruminants	609	532	444	528	
Pigs	61	78	41	60	
Companion animals	10976	11573	11931	11493	
Equine	4174	4661	4526	4453	inclusive farriers
Poultry	245	561	533	446	
Exotic pets (guinea pigs, ferret)	41	54	67	54	
Birds	410	936	990	778	
rabbits	124	152	137	137	
New world camelids	160	91	80	110	
Old world camelids	3	1	0	1	
Fishes	1	1	8	3	
Wildlife animals (birds, mammals)	347 111	570 89	717 127	544 109	
Others (reptiles, amphibian, chinchilla, hamster)	124 27	231 24	315 33	223 28	

Table 5.1.4. Number of patients* seen extramurally in the ambulatory clinics

Species	2020	2019	2018	Mean	Remarks
Cattle	4021	11172	13479	9557	large livestocks are visited (includes e.g. vaccinations)*
Small ruminants	11382	13871	8818	11357	
Pigs	44332	453164	475030	324175	
Companion animals	27	25	30	27	
Equine	306	321	311	312	Including fertility controlls
Poultry commercial	181	176	171	176	laying hens, rearing, turkeys, broilers,

Species	2020	2019	2018	Mean	Remarks
backyard	57	53	65	58	pigeons, parent stocks of laying hens and turkeys
Exotic pets	30	45	15	30	
Birds	1620	4815	4881	3772	raptors, parrots, and other birds
Rabbits	30	45	50	41	
Camelids	850	800	650	766	
Others (amphibians)	423	376	40	280	

* The decrease in 2020 is explained by the reduction in visits due to the corona pandemic.

Table 5.1.5. Percentage (%) of first opinion patients used for clinical training (both in VTH and ambulatory clinics, i.e. Tables 5.1.3 & 5.1.4)

Species	2020	2019	2018	Mean	Remarks
Cattle	80	100	100	93	
Small ruminants	80	100	100	93	
Pigs	20	39	30	30	
Companion animals	30	30	30	30	
Equine	70	70	70	70	
Poultry	40	95	95	77	*
Exotic pets					
Birds	20	98	98		*
Rabbits					
Camelids	80	100	100	93	
Fish	50	100	96	82	
Others (amphibian)	45	98	95	79	*
Wildlife animals	55	97	98	83	*

* Due to Covid-19 we couldn`t offer more patients for clinical training in 2020

Table 5.1.6. Cadavers used in necropsy

Species	2020	2019	2018	Mean	Remarks
Cattle	236	216	279	244	
Small ruminants and camelids	225	181	201	202	
Pigs	61	56	45	54	
Dogs	283	227	241	250	
Cats	169	201	156	175	
Equine	261	276	252	263	
Poultry	356	496	454	435	
Birds	102	124	114	113	
Rabbits	109	99	84	97	
Exotic pets					
Fish	25	17	23	21	
Wildlife animals	7	12	5	8	
Laboratory animals (mouse + rats)	199	199	290	229	

Table 5.1.7. Number of visits in herds/flocks/units for training in Animal Production and Herd Health Management

Species	2020	2019	2018	Mean	Remarks
Cattle	754	800	908	820	
Small ruminants	638	600	557	598	
Pigs	133	153	164	150	
Equine	41	49	55	48	
Poultry	1379	1388	1374	1380	laying hens, turkeys, broilers, pigeons, parent stocks of laying hens and turkeys
Birds	11	22	14	16	raptors, parrots, and other birds
Rabbits	4	2	2	3	
Camelids	134	120	100	118	
Fish	2	4	4	3	trout, sturgeons

Table 5.1.7a. Number of animals seen in herd/flock health training

Farm sizes poultry	
Laying hens	250-100,000; mean 5,000 (153 farms)
Layer rearing	500-40,000 (8 farms)
Layer parents	20,000-50,000 (6 farms)
Broilers	500-10,000 (5 farms)
Turkey fattening	15,000-30,000 (2 farms)
Turkey parents	6,000-10,000 (6 farms)
Quail	3,000 (1 farm)
Backyard poultry	chicken 50-1,500; pigeons 50-400; turkeys, pheasants, peafowl, quail etc. in small numbers
Farm sizes pigs	
Piglet producer	106-540 sows, mean 306; rearing unit 450-4,700, mean 1,859 (10 farms)
Closed herds	65-800 sows, mean 220; rearing unit 250-4,000, mean 1,157; fattening units: 250-3,000; mean 1,354 (8 farms).

Table 5.1.8. Number of visits to slaughterhouses* and related premises for training in FSQ

Species	2020	2019	2018	Mean	Remarks
ruminant Slaughterhouses	0	0	0	0	
pig Slaughterhouses	0	0	0	0	
poultry Slaughterhouses	0	0	0	0	.
Faculty meat inspection hall					
Pork halves Pork offal Pig heads Beef front quarters Beef hind quarters Beef heads Beef offal	188 16 24 16	184 70 24 8 8 32 96			
Others (specify)	2	2	1	1,7	visits to food processing plants

* Slaughterhouses are selected individually by students for mandatory EPT

5.1.5 Procedures for the provision of animals and material of animal origin for preclinical and clinical training and the clinical services

The institutes and clinical units are responsible for a sufficient number of patients. The provision of non-patient animals used for clinical and preclinical training is also with the responsibility of the respective head of the institute or clinical unit. The criteria laid out in 5.1.3 have to be met.
Concerning the number of patients presented the pre-Corona situation is considered highly satisfactorily. Likely future developments are regularly discussed with the Dean and the administration of the university and with the Committee of Study Affairs. Ongoing deviations are analyzed and discussed with the heads of the respective clinical units.
The number and type of patients used for clinical education and training and the student involvement are a constant matter of discussion between students and teaching staff; students provide course evaluation forms regularly to the office of study affaires. Feedback to the teachers is regularly communicated.

5.2 Practical Training at External Site

The Justus-Liebig-University operates the Education and Research Farm “Oberer Hardthof” as teaching and research facility in about 5 km distance from the Faculty with its own bus station. The farm is organizationally assigned to the Faculty of Agricultural Sciences, Nutritional Sciences and Environmental Management. Arrangements have been made on the use of the farm for educational purposes by the Faculty of Veterinary Medicine.
The farm has about 280 hectares of arable and grassland. There is a dairy herd, a swine production unit and sheep unit. After the 2nd semester students are assigned to a 2-week practical on this farm. Besides practical training in handling and managing farm animals, all students are involved in the routine work and their running (e.g. disbudding, milking techniques, feeding and data analysis) during their agricultural internship. All facilities provide enough space for students and supervisors to work in groups. The content of the 2-week courses is organized and adapted if necessary.
The sheep and the dairy herds are under veterinary care by the ambulatory service of the Clinical Unit for Obstetrics, Gynecology and Andrology, the swine section by the Clinical Unit for Ruminants and Pigs. This includes the application and implementation of diagnostics and monitoring, therapy, vaccination programs, pregnancy diagnostics and zootechnical measures. All applications are used to train veterinary students during clinical rotations (small groups, hands on). In addition, students learn basic skills in herd health management.
In spring during clinical rotations students assigned to the Clinical Unit for Obstetrics, Gynecology and Andrology are further involved in the monitoring and if needed, in assisted lambing.

5.3 Nursing care skills, problem-oriented diagnostic approach and decision making

5.3.1 Teaching and implementation of nursing skills

Initial skills are trained during the agricultural internship at the university farm (farm animals) and in the propaedeutic courses during semester 5. Students are trained to become familiar in handling, care and monitoring of animals. Further, students gain and improve nursing skills during their clinical EPTs and the year of clinical rotation. These skills are trained under supervision of the academic and non-academic (professional animal care takers) clinical staff. In addition, there are many elective courses in which students in earlier years can get involved in clinical work and nursing.

5.3.2 Group size for for the different types of clinical training

The group size during clinical training under immediate supervision of the faculty teaching staff is summarized in Table 5.3.1

Table 5.3.1 Types and group sizes during clinical training

Species	2020
Propaedeutics	4-8 depending on the clinic
Clinical rotation	2 students in the ICU (Clinic for Small Animals)/ Emergency Ambulatory Clinic or night service Otherwise 2-4 students at the same time
Extramural practical training during the ambulatory service	2 on half day trips 4 on all day trips

5.3.3 Hands-on involvement of students in clinical procedures

Clinical training starts with propaedeutic instructions in the semester 5. Students are individually trained in small groups in hands on clinical examinations and handling of animals.
When entering clinical rotations in semester 9, students are first introduced to the code of conduct. This includes protective clothing, biosecurity procedures and specific organization of the respective clinical unit/institute. This information is available in written form, in the intranet of the faculty (Stud.IP) or via the website of the faculty (www.uni-giessen.de/fbz/fb10/studium-und-prufungen/SichHyg). Where appropriate (e.g. during farm visits, when entering or leaving isolation facilities, necropsy rooms), specific biosecurity procedures have to be observed.
During clinical rotations, students are integrated in the routine clinical work and are required to carry out hand-on procedures under the guidance and supervision of clinical lecturers. Individual students or groups of 2 - 4 students are assigned to the different services and become involved in daily medical care of transit patients and inpatients, e.g. surgery and internal medicine, diagnostic imaging, clinical pathology, intensive care, anesthesia, reproductive medicine, management of emergency cases. They get involved in client communication, review of the medical history, decision on clinical examinations, diagnostic and therapeutic procedures and documentation. A big emphasis is placed on instructions on evaluation of diagnostic imaging data at the Clinical Unit for Small Animal Surgery; thus, the entire group of up to 8 students will participate in the routine clinical consilium and on special instructions. In the farm animal clinical units students are involved in farm visits and herd health service. Apart from participation in getting the extended history and creation of a therapy plan, students are also involved in individual animal examinations and treatments, if cattle and small ruminant herds/ farms are visited (see Area 3, 3.1.3).
As far as pathology is concerned, students first learn and practice the technique of animal necropsy and the basics of organ evaluation. Finally, the students participate in everyday diagnostic pathology for one week in small groups, if possible, also concerning some of the patients they might have seen during clinical rounds (see also Area 3, 3.1.5).

5.3.4 Arrangements to allow all students to spend extended periods in discussion, thinking and reading to deepen their understanding of the clinical case and its management

The clinical rotation runs according to a timetable with times in which the student is assigned to clinical work (usually from 07:30 to 13:00) and times when students have to participate in special clinical instructions or which are freely available. Rooms and computers are available to students for literature research. The students also have access to the patient record system EasyVet. Therefore, they get access to specimens and diagnostic findings from pathology and different laboratories.
During clinical rotation students may be assigned to specific cases, which they have to present to other students and clinical teachers. All relevant literature on special diseases, management, nutrition and hygiene, is available via the University and in-house libraries.

The clinical teaching staff may be addressed any time by students involved in clinical rotations.

5.4 Patient Record System

Since 2006 all patient files are stored in an electronic commercial data system, called Easyvet (VetZ, Isernhagen, Germany), which underwent many adaptations to meet the diverse needs of the clinical units and institutes. The system is used to register and retrieve patient records and handle sample administration for the diagnostic facilities. Easyvet is used in all clinical units and diagnostic facilities except the Institute for Virology. All patient data are available at about 370 PCs on campus. During clinical rotation students have access to Easyvet via student accounts. This makes it possible to check the list of appointments with patients and to prepare students for cases before they get in contact with a specific patient. Concerning inpatient management, administration of stables and wards, the system provides precise, up-to-date information concerning the admitted patients and easy access to their medical records. Patient records encompass all kinds of documentation, including registration, case history (including signalement), daily findings, diagnosis, prescriptions, laboratory, surgical and treatment reports, as well as data sheets for specific examinations, images and videos. During clinical rotationsstudents examine patients and records in Easyvet. The data entered are verified and discussed, requests are sent to care providers. As soon as the requested examination has been carried out, the validated result is sent back.
Moreover, Easyvet facilitates the registration of services and financial processing. Whenever possible the system generates the assigned services automatically by opening an examination protocol and choosing specific entries. Services and medicines can also be chosen from the appropriate catalogue, from which students learn about the costs.
During working hours a specialist is available at the faculty to answer questions about the system.

Comments on Area 5

As all clinical units of the VTH use the same patient information system, it allows the rapid extraction of patient data and data on the number of patients attended to or treated annually in the respective clinical units.
The number of animals and material of animal origin is considered sufficient for preclinical and clinical training. Maintaining these numbers is within the responsibility of the respective institutions.
Animal welfare regulations mandate the reduction of animals used in teaching to the necessary minimum.

Suggestions for Improvement on Area 5

More large animal facilities should be provided for animals used in teaching.
The teaching farm of the university (Oberer Hardthof) should be better equipped with modern sensor system to allow the monitoring of defined animal parameters and to make students familiar

Area 6. Learning Resources

6.1 State-of-the-Art Learning Resources and Procedures

The JLU Giessen strategic objective is to ensure that learning resources offer excellent education and research opportunities as well as a stimulating learning environment for students and employees of all faculties. These learning resources include a library service, which is open to students and staff of all faculties and hosts media for all subjects taught at JLU.
The HRZ (Hochschulrechenzentrum) provides access to the IT-service and a PC pool accessable to students of all faculties. There is an extensive eduroam Wi-Fi network with access points installed in all main lecture halls and seminar rooms. JLU Giessen hosts two student learning platforms (Stud.IP and ILIAS), to which students get access as soon as they have enrolled. These learning platforms host learning materials provided by the teaching staff and allows communication beween teachers and students in a protected environment (Stud.IP). The platform LIAS allows upload of teaching material with a much higher data capacity such as videos and animations.

Students are offered a variety of supporting elements: a welcome package, access and information concerning the administration platform (FlexNow), the university website including a list of all links to the information systems, several IT Services (e.g. e-mail, a cloud service JLUBox and a range of software for free for students and staff) e-learning courses, an e-learning website (Stud.IP), video tutorials and FAQs. Staff can regularly undertake IT and e-learning training through the Staff Development Unit.
Every staff member automatically gets access to all learning resources as soon as the working contract is signed. An email address is established and access to the IT services with an access code and a password is granted. There is a help desk for questions relating to central e- learning resources in the IT department of the University.
Newly enrolled students will go through an introductory week before the actual study program starts. During this week the newcomers are shown around by more experienced students (mentors) and they are made familiar with all the resources, including teaching resources, which are available at JLU. Students receive a multifunctional identity chip card, which grants their access to the library, the PC-pool and other facilities such as the university cafeteria.

Decisions on introducing major campus-wide systems, technologies and software are made by the Presidency of JLU upon recommendations given by project teams, usually consisting of experts from the specialist departments involved and from IT Services.
Information about IT changes is disseminated via different channels in various ways (e.g. social media, direct personal emails, website, e-learning platforms such as Stud.IP and ILIAS). Telephone helplines are installed to address questions about central e-learning and IT resources. Members of the University (including students) can use a dedicated remote access service (VPN client) to access e-resources (e-journals, e-books and databases) off campus.
Stock selection and deselection in the University Library is regulated by a “Collections Policy” based on the current needs of researchers, teaching staff and students. All literature orders relating to print or electronic media are managed by the University Library. Library coordinators in the organizational sub-units liaise with the University Library on acquisitions. Students and staff can submit requests online to purchase new monographs. Library specialists in the University’s research areas acquire new publications. Regular updates about new acquisitions are published on the website. The head librarian is responsible for the development and maintenance of literature holdings. He/she works closely with the decentral faculty based library representatives. The library representative is a professor and member of the Faculty and is elected by the Faculty Council. The head of the library and the library representative report to the Dean’s Office and Faculty Council.
The library representative of the Faculty of Veterinary Medicine is Prof. Kerstin Fey.

6.2 Library and IT Services

Since several years the situation has developed that virtually all students enrolled in veterinary medicine are equipped with their own computer/laptop. Thus the computers provided on campus have lost their central importance, however, for self-directed learning and for getting access to the easyVet system they make student life easier for getting quick and ad hoc information. Due to this situation the Faculty could rather easily meet the demands for "virtual teaching" during the Corona pandemic in 2020/21.

Library: The University Library is the central service provider for electronic and print media, learning facilities and modern computers. The library currently employs 111,75 Full Time Equivalents (FTE), well-trained staff members and is managed by a head and assistant head librarian. The annual budget of the University Library in 2019 was € 4.434.318. The main library is open from Monday through to Saturday from 8:30 am to 9:00 pm all year round.
The library is organized centrally but split into several branch libraries. The main library building, which also provides computer access, is situated in about 5 km distance to the veterinary campus and is presently under reconstruction and can be easily reached by bus No. 10.
A branch library, headed by an assistant head librarian, for the life sciences, also equipped with computer access for students, provides service for veterinary medicine, medicine, biology, chemistry and physics and is located about 2 km from the campus of the Faculty of Veterinary Medicine. This library provides an extensive collection of books and journals relevant for life sciences. There is on site access to computers and current journals. Text books are available to lend. Veterinary students account for about 30% of the users of this library. The budget for the veterinary branch of the library is about 135,000 €/year.
The library service has established an advanced electronic information system which provides an electronic catalogue (OPAC) and allows online access to electronic publications from any networked personal computer (www.opac.uni-giessen.de). A digital library (www.dbs.ub.uni-giessen.de/digibib.php) allows access to all electronic material licensed by the university. Access from home is possible using a virtual private network connection (VPN; www.uni-giessen.de/cms/fbz/svc/hrz/svc/netz/cam-pus/vpn/vpn) to the servers of the university. The library in Giessen itself is networked with the other universities of the federal state of Hesse (HeBIS) as well as nationwide.

Students can use the online catalogue for literature search including PubMed, Web of Science, CABI Compendia Collection. Students and teachers have access to the VetCenter of the publisher Thieme, with offers electronic media for veterinary purposes. It currently consists of 108 e-books, four e- journals and other data base offers. Multiple (3-30) copies of textbooks in German and English are available. E-textbooks on site can be used in the library and outside the library using VPN (see above). The collection of the branch library consists of 21,200 printed books and 535 printed magazines

In addition to the main library there are 15 subsidiary libraries of varying size on the veterinary campus. The total number of books is about 48,000 and the average budget is about 80,000 € including journal subscriptions. The collections of the departmental libraries are listed in the main electronic catalogue. The majority of these libraries are open to students and faculty members during office hours in general from 8:00 – 16.00. The departmental libraries do not loan textbooks to students. The library system is organized by the head of the main library and the head of the branch library for the life sciences.

A collection of current textbooks is operated by the students organisation (Fachschaft) under the supervision of one staff member of the Faculty and is located in the Student learning centre (Studentisches Lernzentrum) on the main veterinary campus.

Equipment: 60 networked computers are provided to students of all departments by the University's Computing Centre (Hochschulrechenzentrum, HRZ). 35 networked computers are accessible in the main library (5 km to veterinary campus), and 13 networked computers are accessible in the subsidiary life science library (2 km to veterinary campus).
On the veterinary campus, 12 computers with internet connections are provided for students in the Student learning centre, 13 in the division of biomathematics, and 10 in the Institute for Veterinary Physiology and Biochemistry. The computers in the student learning centre are accessible via chip card daily from 06:00 – 22.00. The others are accessible during office hours (8:00 – 16:00) on work days.

IT facilities: The Computing Centre of the JLU HRZ (with 85 staff positions), which is in 2 km distance to the veterinary campus, is responsible for all IT-services provided, resp. the comprehensive services and support to students and staff regarding e-mail, data storage, VPN and eduroam capability, and the university Content Management System (see Appendix to 6.2).
It offers personal assistance, video tutorials, guidance notes, training, FAQs, and a help desk (open Monday–Friday, 9 am to 3 pm). IT Service also maintains Eduroam, as well as a local access network with more than 1.300 Wi-Fi access points (with more than 9.500 simultaneous Wi-Fi user). The computers, printers and other client devices in the university network are connected to more than 44.000 active data outlets. For information on the e-learning platform see 6.3 below.

Access for staff and students to electronic learning resources both on and off campus:
Via the IT-network established (number of Wi-Fi access points see above) all staff members and students are provided with an E-mail account, unlimited access to the university network and its information system as well as licensed electronic learning resources. A cloud system (JLU box) allows for secure storage of files for remote access. Wi-Fi accesspoints are established in every lecture hall and seminar room. Wi-Fi access is also provided in the "Lernzentrum" where students have access with their individual chip card.
VPN services for staff facilitate access to resources from outside the campus (VPN; www.uni-giessen.de/cms/fbz/svc/hrz/svc/netz/cam-pus/vpn/vpn).

6.3 Access to Learning Resources and Equipment for the Development of Procedural Skills

Books and other media: Concerning hardcover versions the library holds 4.500 veterinary text-books and 17 periodicals relevant for veterinary medicine. The number of veterinary e-books is 1.113 and there are 60 additional e-periodicals. All together the number of monographs for all subjects taught at JLU is 1.155.399 and that of periodicals and partially (e)-periodicals is 53.568.

JLU invests considerably in blended/online learning formats through funding and technical support. The extensive range of learning resources in use includes the upload of teaching material on the StudIP and ILIAS platform. Students find information about their courses and lectures there. Students can read texts and download presentations, video and audio files, animations or interactive modules. They can also test their knowledge by carrying out self-assessments. Round-the-clock access to different learning resources is provides using web based technology.Via ILIAS mainly videos and streams of lectures but also other electronic learning material is offered.

Main categories under which electronic learning is offered, are:

- Anatomy, Histology and Pathology: Virtual microscope with all slides used in the course of histology.
- Veterinary Biochemistry: Selected intermediate pathways and training units
- Pathophysiology and Pathobiochemistry: Clinical cases of selected diseases with anamnesis, clinical examination results, diagnostics, pathophysiology and pathobiochemistry of the disease, and therapy.

- Clinical examinations: video clips for clinical examinations, use of microscope in the pathological department, atlas of blood cells of different animals.
- Laboratory animal science: video clips for application of drugs in mice and rats.

Skills Lab:students can train their practical skills in a realistic setting in the Clinical Skills Lab PETS (Practical Experience of Technical Skills), which was opened in 2016. In its training facilities, which are still growing, students can learn and practice in 12 stations spread over 300 m². Students have access to low and high fidelity simulators and dummies and can practice clinical procedures and simulate everyday situations in veterinary practice in obligatory courses and self directed practice lessons. Numerous exercises are assigned to the subject areas of laboratory diagnostics (including producing and dying blood smears in order to do a differential, assess main clinical pathologic parameters and testing urine). Furthermore, first day skills such as injections, suturing, intubation, auscultation and resuscitation, handling and labeling, application of bandages, sterile work can be practiced. An equine colic simulator, a gynaecologic dummy, a dummy for practicing insemination in cattle are available. Simulated consultations with pet owners using peer-feedback are carried out in a set up consultation room within the communication station. In the 2nd and 3rd semester, students have the option of taking an elective course or, from the 2nd to the 11th semester, of booking individual stations during free practice sessions.
The skills lab was firmly established in the curriculum through compulsory courses as preparation for clinical propaedeutics in the 4th semester and in the clinical rotation (9th and 10th semester).
Course contents and manuals for all stations are available at the stations themselves or online via Stud.IP. A well-founded teaching concept was developed on the basis of two scientific studies. The skills lab is supervised and managed by a DVM and a research assistant. In addition, 10 student tutors are employed.
In the years 2017 to 2020, 160 students visited the Skills Lab as part of the elective and 1022 students as part of the compulsory courses. From the beginning of free practice sessions in the winterterm 19/20 up to the cyber attack / corona pandemic (January 2020), 1223 students took advantage of the offer (see Appendix 3.1.4 a and b).

Comments on Area 6

Veterinary textbooks are exceedingly expensive which does not allow all students to purchase the full set of required books. Therefore the loan of textbooks is very popular especially before the examinations. Veterinary students account for more than 18,000 loan operations per academic year. There is no shortage of information material. However, the location and atmosphere at the subsidiary library does not provide an optimal learning environment. On the other hand most students prefer to learn at home or at the main library. Together with the availability of online access to the Thime Vet Centre e-journals and catalogues of the library information system is very helpful and overcomes these limitations to a large extent.

The IT facilities on the veterinary campus are not equipped for electronic examinations, because a room with a capacity of at least 180 PC places is missing. However, written examinations on paper are still preferred by many students. If the need for electronic examinations rises, facilities of other faculties might be shared in future.

Suggestions for Improvement on Area 6

- Further expansion of the Skills Lab is planned, both in terms of physical space, additional simulators and by implementing doctoral research projects. Furthermore, establishment of 3R based simulators is planned.
- A new IT and IT safety strategy is currently being developed with external consultants. This will ensure a stable and safe IT infrastructure in future.

Area 7. Student Admission, Progression and Welfare

7.1 Information about Pre-defined and Published Regulations

Requirements and formal procedures to enrol in the study of veterinary medicine in Germany and information on the specific situation of the Faculty of Veterinary Medicine, JLU-Giessen, including the study program is published on the website of JLU and the web page of the faculty (www.uni-giessen.de/studium/bewerbung/erststudium/medizinen/gruppea/verfahren). Furthermore, there is information on subjects, content and learning outcomes in the ECTS brochure published by the faculty (see Appendix B). Once a year, there is an information day (Hochschulinformationstage, HIT) for those who are interested in the veterinary profession and who would like to take up their studies at the JLU. Information about the admission procedure, the curriculum and the veterinary profession are highlighted in this open house event. Individual consultation for prospective students is either offered by the central student consultation service of the JLU and – on the faculty level - by the Office of Study Affairs as well as by the Dean of Study Affairs. Detailed curricula in the current semesters are published too (www.uni-giessen.de/fbz/fb10/studium-und-prufungen/studium/curriculumtest/curriculumtest).

The relationships and collaborations of the Faculty of Veterinary Medicine at JLU Giessen with other establishments and organizations are described in Area 1.

7.2 Student Admission and Number of Students Admitted

Introductory remarks: In Germany public universities – like the JLU – do not request tuition fees (see Area 2). Thus, from the financial point of view there is no recruitment of a specific cohort of students.

The number of students applying for veterinary education by far exceeds the number of study places available; all veterinary establishments in Germany are subdue to a numerus clausus (NC). Thus, the selection of students and their assignment to one of the five veterinary establishments in Germany fully results from the centralised admission procedure by the "Foundation for University Admission" (see below).

In general, and as a result of this selection, only the better of the high school graduate applicants has a chances to get admitted. However, this does not necessarily reflect any specific qualification for veterinary education. Yet, as experienced in the past decades, most students are very dedicated to veterinary education and to become a professional in one of the many fields of veterinary medicine. For the special admission procedures see below (7.3).

Admission procedure: Admission is controlled on the federal level by the „Foundation for University Admission" (Stiftung für Hochschulzulassung), application is through "www.hochschulstart.de" (Onset of University Study).
"Hochschulstart.de" is the central platform for handling the applications as well as admission of all future veterinary students in Germany. This applies to German applicants, but also to citizens from EU member states and foreign applicants with German university entrance qualifications. The application process for non-EU-citizens is through Uni Assist: www.uni-assist.de.

The number of students admitted as a result of the numerus clausus (NC) regulations is annually recalculated by the University administration on the basis of the Hessian Capacity Regulation (KapVO). According to this regulation the total number of teaching hours in the curriculum, the

fixed number of core funded academic staff in lectures, seminars and practicals and the resulting teaching capacity are the key factors for calculation of the number of students to be admitted each year (see also Area 9, 9.2). There is no flexibility!

The number of students admitted varies between the five veterinary establishments in Germany. For the Veterinary Faculty at the JLU the number calculated is 182. However, due to the regularly observed drop outs in the first two years and in order to avoid law suits, which try to prove that there are still open places, the Faculty in general accepts 210 students in the first year; the first semester is always a winter semester.

Tables 7.2.1 to 7.2.4 give details on the exact number of students admitted, the number of students graduating and the average duration of veterinary studies

Table 7.2.1. Number of new veterinary students admitted by the Veterinary faculty at the JLU Giessen

Type of students	2020	2019	2018	Mean
Standard students	229	211	214	218
Full fee students	n.a.	n.a.	n.a.	n.a.
Total	**229**	**211**	**214**	**218**

n.a. not applicable, as there are no tuition fees in Germany

Table 7.2.2. Number of veterinary undergraduate students registered at the Establishment

Year of programme	19/20	18/19	17/18	Mean
1	229	211	214	218
2	200	192	190	194
3	189	192	193	191
4	187	183	187	190
5	179	180	178	179
6	178	179	182	180
Total	**1162**	**1137**	**1144**	**1152**

Table 7.2.3. Number of veterinary students graduating annually

Type of students	19/20	18/19	17/18	Mean
Standard students	158	167	172	166
Full fee students	n.a.	n.a.	n.a.	n.a.
Total	**158**	**167**	**172**	**166**

Table 7.2.4. Average duration of veterinary studies

	< 5.5 yrs	5.5 + 0 yrs	5.5 + 1 yrs	5.5 + 2 yrs	5.5 + 3 yrs	5.5 + > 3 yrs
% of students	0	94,9	3.2	1.9	0	0

The total duration of the studies matches the minimum number of years of the programme (5.5 years)

Table 7.2.5. Number of postgraduate students registered at the Establishment

Type of students	19/20	18/19	17/18	Mean
PhD students	56	61	66	61
Residents	65	64	73	67
Interns	19	17	15	17
Total	140	142	154	145

Prospective number of new students admitted

In 2020 the number of applicants per study place at the Faculty of Veterinary Medicine, JLU-Giessen, was 4.5. Thus, according to the NC-regulations and as long as the number of applications

per study place in Veterinary Medicine in Germany will exceed the number of study places available, no changes in the number of students admitted is expected.

7.3 Selection Process and Criteria

7.3.1 Selection criteria

Beginning with the winter term 2020/21 new regulations had to be implemented concerning the NC and further selection criteria. Specific requirements are published under www.uni-giessen.de/studium/bewerbung/erststudium/medizinen/gruppea/verfahren. Prerequisites to enter veterinary education in Germany are a) the higher education entrance qualification, b) meeting the admission requirements of "Hochschulstart.de" and c) those of the veterinary faculties. Basically, the precentages of all veterinary study places need to be distributed as follows:

a: advance quota

- 5% for foreign (non German) students
- 3% for students seeking a graduation in veterinary medicine as a second degree
- 5% for students suffering from an extreme hardship

b: the remaining places are assigned according to the following three categories

- 30% according to grades obtained in the high school diploma (in Germany students attend school for a minimum of 13 years, with high school education lasting for 9 years. As school education is with the autonomy of the Federal States, the Foundation for University Admission applies a system to correct for State effects and the state population, resulting in a fixed number of students per state admitted to start veterinary education).
- 10% additional Aptitude Rating (Zusätzliche Eignungsquote);
  The criteria applied are a) the waiting time, b) pool test results of an especially composed test for applicants of medical study programmes and c) professional qualifications [e.g completed apprenticeships (e.g. veterinary assistant, laboratory assistant, experimental animal technician etc.).
- 60% Admission according to specifications by the university (AdH Auswahl-verfahren der Hochschulen).

The criteria applied for the 60% admission quota must be taken from a nationwide list. They are as follows: final highschool grades, results of the test for applicants of medical study programmes as well as professional qualifications. A list of applicants is created based on their individual scores. Depending on their performance, applicants can receive a maximum of 49 points for the university entrance qualification and a maximum of 31 points for the test for applicants of medical study programmes.
In addition, applicants receive 10 points if they have completed a recognized apprenticeship and further 10 points for exercising this profession for a period of at least 12 months.

Admission is according to the sum of points obtained in the three categories. Thus, the maximum number achievable are 100 points and admission will be granted according to the individual score points until all study places are filled.

Applicants may also give a ranking of their desired study location. Assignment of students tries to meet these wishes.

7.3.2 Policy for disabled and ill students

Handicapped and ill applicants can apply for a reduction (Stiftung für Hochschulzulassung) in the waiting period and/or grade requirements. For students with disabilities, the first choice University is respected (see above, advance quota).

Once admitted, students with disabilities or chronic illnesses can contact the JLU-Central Office for Students with special needs. Personal and individual counselling is available, covering the following topics: chances of access, applications for hardship cases, compensation for disadvantages and flexible composition of the course of study.

7.3.3 Composition and training of the selection committee

As neither the Faculty nor the University have any influence on the outcome of the admission procedures there is no need for a Selection Committee at the faculty or university level.

7.3.4 Appeal process

Students not admitted to the study programme receive a rejection letter from the Foundation for University Admission (Stiftung für Hochschulzulassung). It is possible to appeal this notification at the administrative court of Giessen within one month.

7.3.5 Advertisement of the criteria and transparency of the procedures

The procedures and requirements are available in both German and English on the websites of hochschulstart.de, JLU, and the Faculty of Veterinary medicine (see above). The Office of Study Affairs can be contacted, should individual specific questions pertaining to applications and admission arise. The criteria by which 60% of selected students were evaluated or chosen by way of selection by the university can be reviewed at the same location.
As mentioned above, all criteria for admission of students are published on the website of the establishment (JLU and Faculty of Veterinary Medicine). Furthermore, they are also communicated to the staff and students during conventions of the faculty council. Any changes of these procedures which are within the responsibility of the Faculty have to be discussed and regulated with the central administration of JLU.

7.3.6. Full fee and standard students

There are no full fee students admitted at JLU, as there are no tuition fees at German public universities (see introductory remarks).

7.3.7 Number of admitted students and available educational resources

As indicated above, currently the number of students admitted each year is based on the calculation of the University administration on the basis of the Hessian Capacity Regulation (KapVO). According to this regulation teaching hours in the curriculum, student-teacher ratio in the various courses and number of core-funded academic staff influence the number of students to be admitted each year. According to this regulation 182 students have to be accepted annually. However, in order to avoid law suits concerning the identification of a still open place, the Faculty in general accepts about 210 students per year. This regulation does not account for the teaching facilities, other structural resources or the number and type of patients available for student education. It is up to the Faculty and University to secure a proper teaching environment with the officially assigned no. of teachers based on the KapVO (see Areas 4, 5).

7.3.8 Biosecurity, welfare requirements

Biosecurity, student health and their welfare are of central importance to the Faculty. Laboratory facilities, including those for student practicals, are under permanent supervision of the university safety officer. “In loco” security officers for particular laboratories have been appointed. Working with radioactive materials needs a special permission and training of the respective security officer; appointment must be renewed after 5 years. Staff must be instructed once a year.
According to university regulations first aiders must be trained and are placed across the campus to serve staff and students.

To secure biosecurity a Central Hygiene Plan was developed, which regulates working with likely infectious materials for all faculty institutions. Additionally, each affected institution has in loco regulations. Students in clinical rotations are properly informed at the beginning of the clinical training.

The Central Hygiene Plan as well as the "in loco" regulations and the information provided to the students are available on the homepage of the Faculty, (see also Appendix 4.9).

Since 2016 there has been an investigation concerning the development of allergies amongst veterinary students at the Faculty of Veterinary Medicine carried out by the Institute of work security of the University of Bochum together with Unfallkasse Hessen. First results are already published (documents will be provided to the reviewers at the occasion of the onsite visitation).

7.4 Disabilities and Illness

See above (7.3.2).

7.5 Decisions on Progression and Availability to the Students

7.5.1 Progression criteria and procedures for students

The TAppV as well as the study and examination orders of the Faculty (Studien- und Prüfungsordnung, StuPOVet) regulate the monitoring of students. Successful participation in all practical courses (exercises, seminars, electives, demonstrations, rotations etc.) is documented in the FlexNow, Examination Management System (see Area 3, 3.1.3). Students can check their status in "FlexNow". Once eligible, students are invited by the State Examination Office to take the respective examinations. The sequence of exams is given in the TAppV and the examination orders of the Faculty (see also Area 8) and timing is organized by the Examination Office.

7.5.2 Remediation and support for students who do not perform adequately

General academic advising is carried out by the Central Study Counselling of the JLU and by psychological counselling at the Faculty of Psychology of the JLU Giessen. Specific advising regarding the veterinary curriculum is available by the Office of Study Affairs and the members of the examination boards. Examination progress is monitored by the State Examination office. Students not sufficiently progressing are invited by members of the examination board to a counselling session.

7.5.3 Advertisement to students and transparency of these criteria/procedures

The examination process including criteria for expulsion are laid out in the TAppV and StuPOVet and are repeatedly communicated to students; all information is available through the Homepage of the Faculty.

7.5.4 Rate and main causes of attrition

As part of the QA process the university annually compiles key figures on academic progress in a quality report. At the Faculty of Veterinary Medicine the number of students remaining within the regular study time stays constant between 75-85%. This is the highest rate achieved for the 11 faculties of the JLU.

According to the annual university student survey, the main reasons for thinking about deregistration are pressure to perform and doubts about personal suitability.

But it is also conceivable that some students decide to leave JLU Giessen to continue their studies at another veterinary establishment.

7.6 Exclusion Mechanisms, Appeal Process

Students who do not pass the second resit examination (third attempt) in an individual subject receive a written notice of final examination failure from the chair of the examining board and are excluded from further veterinary studies in Germany.

Students may lodge an objection in writing within one month to the chair of the examining board. If this is rejected the action may be brought to the administrative court of Giessen.

7.7 Provisions to support Physical, Emotional and Welfare Needs of Students

A broad range of services related to registration (matriculation office, study office), teaching administration (study office), mentoring and tutoring, careers advice, listening and counselling, assistance in case of illness, impairment and disability are available both, at the University and the Faculty level: www.uni-giessen.de/studium. Furthermore, the Dean of Study Affairs and the Chairpersons of the Examination Committee are available for consultation and counselling.

The University also offers assistance in the form of counselling, short-term loans and subsidies. Subsidies are granted primarily to foreign students during examination periods and in cases of illness, and to single parents while taking their final examinations. Additionally, general social counselling (for example concerning housing subsidies, study financing, health insurance, etc.) and counselling for students with children is offered by the Studentenwerk Giessen-Fulda. For questions, suggestions and complaints concerning study matters as well as personal problems, e.g. in cases of overwork or conflict with teachers, students can address their concerns to the respective contact points at the Faculty or University.

The Faculty has a parent-child room in the “Lernzentrum” in the basement of the Department of Veterinary Anatomy, managed by the Student Council. Childcare facilities are available from 7:30 am - 6:30 pm.

During study-activities, in and outside the JLU, all students are accident insured. At the occasion of the Covid-19 pandemic the friends` association of the Faculty (VFFV) offered a financial support for those students being in financial despair.

7.8 Mechanisms Allowing Students to provide their Needs, Complaints, Comments and Suggestions to the Establishment

Students who encounter any grievances can complain firstly with the lecturers and the head of departments, where disturbances occur. If this is not successful or they fear consequences, they can talk to representatives of the student association, who will forward any complaint - if desired anonymously - to either the Office of Study Affairs or directly to the Dean of Study Affairs. Finally, the Dean of Study Affairs will clarify the reason for the grievances with the respective lecturer. Concerning examinations students may complain to the chair of the Examination Office.
In addition to the procedure mentioned above, students can submit their wishes as active and voting members of various committees, such as the Faculty Council or the Committee of Study Affairs.

Comments on Area 7

- The various advisory institutions of the university and the faculty are closely networked with each other. This ensures that the students receive the best possible advice for their personal situation.
- The university administration provides numerous brochures and websites for students with special needs. These brochures are also available in the Faculty's office of Study Affairs.
- To protect pregnant students, the risk evaluation for each course was carried out by the respective institutes. If possible, protective measures were defined.
- The contact between students and the dean of study affairs is maintained through regular feedback discussions.

Suggestions for Improvement on Area 7

- Revision of the list of apprenticeships recognized for the application process regarding the relation to veterinary profession is needed.
- Conceptual revision of the faculty homepage with web links to central university advice centers, e.g. for disabled students or students with children needs to be better maintained.
- Easily accessible information on participation in courses during pregnancy
- Student information about professional possibilities could be improved by better contacts to alumni of the faculty.

Area 8. Student Assessment

8.1 General Student's Assessment Strategy

The Faculty of Veterinary Medicine of the JLU Giessen follows an assessment strategy, which allows to determine whether students have acquired specific and relevant knowledge and the skills required for working as a professional veterinarian. Moreover, with graduation students are expected to be familiar with the wide range of veterinary disciplines and to possess the ability for advanced studies and further qualifications, e.g. clinical specialization, graduation to a Dr. med. vet. or a PhD.
In view of the responsibility of the Federal Republic of Germany concerning public health the task to secure the provision of safe food of animal origin to society has been assigned to the veterinary profession. For these reasons "public health aspects" are an important issue in veterinary education. Consequently, the examinations are "state examinations", based on the TAppV and graduates must gain approval before they can enter professional life.
The general student's assessment strategy is in accordance with the Amendment of the Ordinance concerning the Certification of Veterinary Surgeons (TAppV 2018) and the regulations related to oral and written examinations are laid down in the Studien- und Prüfungsordnung für den Studiengang Tiermedizin (StuPoVet, see Appendix G).

As already indicated in Area 3 the examinations according to the Ordinance concerning the TappV are state examinations (Staatsexamen). The examinations are supervised by the Hessian state authority (Regierungspräsidium Giessen) and coordinated / organized by the State Examination Office (staatliches Prüfungsamt). The regulations for the "Studies and Examinations of veterinary medicine", at the Faculty of Veterinary Medicine, JLU Giessen (StuPoVet) are in accordance with the legal framework of the TAppV and the sequence and the formal aspects of the state examinations.
According to the TAppV a distinction is made between the examinations to be taken after the 2nd and 4th semester (preclinical section I, tierärztliche Vorprüfung) and the final examination (clinical section II, tierärztliche Prüfung). Each section is headed by a chairperson: section I by Prof. Dr. Carsten Staszyk with two vice-chairpersons and section II by Prof. Dr. Andreas Moritz and four vice chairpersons; all chairpersons are recruited from the professorial staff. The administrative technical staff consists of 3 persons.

The preclinical section I, part 1, includes the basic scientific disciplines e.g. Physics including basic aspects of radiation protection, Chemistry, Botany and Zoology, whereas part 2 includes the disciplines Anatomy, Histology and Embryology, Physiology, Biochemistry, as well as Animal Breeding and Genetics.
The clinical section starts with the 5th semester and ends after the 11th semester with the last examinations. Students are not allowed to start the clinical part of their study until they have passed all examinations of the preclinical part (section I).
Examinations in the clinical part (section II) are organized in 5 blocks.

Block 1: After the 5th semester examinations in: bacteriology and mycology as well as virology, each with subject related immunology; clinical propaedeutics; general pathology; pharmacology and toxicology.

Block 2: After the 6th semester examinations in: animal feed science; parasitology; animal drug legislation; prescription, manufacture of animal drugs; cross sectional subject clinic with surgery internal medicine (1st multiple choice questions (MCQ) and animal nutrition.

Block 3: After the 7th semester examinations in: animal protection and ethology; first section surgery, anaesthesiology and internal medicine (2nd MCQ); radiology; milk science.

Block 4: After the 8th semester examinations in: cross sectional subject reproductive medicine, internal medicine, surgery (3rd MCQ).

Block 5: After the 10th semester examinations in: general and specific pathology; meat hygiene, food science including food hygiene; poultry science; clinical cases in reproduction; surgery and anaesthesiology, internal medicine.

Students need to pass all preceding examination before they are allowed to start their final examinations after the 10th semester.
Professorial staff is expected to have the inherent qualification as examiner. To act as an examiner appointment by the respective state authority (Regierungspräsidium) is required in Germany. To act as an examiner from the group of non-professorial academic staff, the respective head of the unit forwards the name and position of a highly qualified person to the State Examination Office, final appointment is by the local state authority. The appointed examiners constitute the preclinical and the clinical examination board.
All details of examinations are designed by the appointed examiners of the institutes or clinical units, regarding the discipline-specific requirements in order to guarantee an optimized assessment of the students' capabilities and potentials. In order to provide a continuous feedback system during individual courses for the students, formative assessments are used. This instrument does not only document the current students' progress and knowledge, it also allows to adjust and optimize the teaching strategies for further teaching modules in order to optimally prepare the students for the examinations.
Prior to the preclinical examinations and clinical examinations, preliminary performance in the form of exercises and tests must be achieved in many subjects. If poor examination performance is observed measures are taken to support the student. For example, additional revision courses are offered in physics before the preclinical examination and semester-long tutorials are organized in chemistry.

Description of the specific methodologies for assessing the acquisition of:

a) Theoretical knowledge is either tested by written examinations or by oral examinations. In case of written examinations, the individual institutes and clinical units determine the amount and type of questions according to their discipline-specific requirements, e.g. to access cognitive and/or procedural knowledge.

Figure 8.1: PDCA cycle for evaluation and improvement of MCQ examinations

The written questions in internal medicine and surgery are checked at least twice by the representative for the development of clinical MCQs (Prof. Kerstin Fey) to guarantee optimal formats and scientific correctness (content check). It is checked after each exam if a question shows an unexpected performance or annotations of students raise this concern with the respective examiner.

In oral examinations students are asked to explain and/or to demonstrate the theoretical knowledge in form of a scientific discussion starting with a question of the examiner. In a step-by-step procedure the examiner comments on the students answers and creates new questions on this basis.

b) Pre-clinical practical skills are continuously exercised in the institutes during practical courses. The assessment of the status of the acquired and trained pre-clinical practical skills is assessed either by formative test formats accompanying specific courses and / or by summative assessments within the state examinations. Several examinations include practical parts.

c) Clinical practical skills are assessed summarily in oral-practical formats.

Assessment starts at the end of 5th semester, following propaedeutic instructions including teaching of the subject dependent, standard clinical examination procedures on animal models Faculty owned animals and patients.
During clinical rotation students are supervised when performing anamnestic evaluations, physical-clinical examination, establishment of a list of case related problems with priorisation and likely differential diagnoses. They have to come up with a plan for further investigations and finally with a summary of the clinical findings, the final diagnosis and the management of the case. In the final examinations the problem-oriented case management is assessed.
d) Concerning soft skills (e.g. communication skills, team player, dealing with pressure, strong work ethic, positive mental attitude, flexibility, time management, self-confidence, dealing with criticism) a longitudinal communication curriculum is partially implemented. The communication and social skills are examined formative as individual feedback. These skills are not mandatory elements of the state examinations.

8.2 Assessment tasks and grading Criteria/Procedures

8.2.1 Processes for ensuring the advertising and transparency of assessment criteria

The criteria and procedures of the assessments are specified in detail in the Ordinance concerning the Certification of Veterinary Surgeons (TappV, see Std. 1) and in the Regulation for Studies and Examinations of Veterinary Medicine at the Faculty of Veterinary Medicine, JLU Giessen (StuPoVet, see Appendix G)] . These documents are available for all students on the homepage of the Faculty (www.uni-giessen.de/fbz/fb10/pruefungsamt). Moreover, examination formats and regulations are explained in detail by the lecturers within the individual disciplines and normally at the start of each course.
The State Examinations Office compiles an overview of subject- and student cohort-specific examination results which are analyzed at least once a year by the chairpersons of the preclinical and clinical part of the State Examination. In case of obvious inconsistencies or visible trends, reasons and measures are discussed with the Dean's Office, in particular with the Dean of Study Affairs, and members of the respective examination board. Summaries are then presented to the Committee of Study Affairs, which – if agreed on – cares for implementation of the necessary measures.

8.2.2 Processes for awarding grades

The criteria for awarding the different grades are also documented and explained in the Ordinance concerning the Certification of Veterinary Surgeons (TAppV) and in in the Regulation for Studies and Examinations of the Faculty of Veterinary Medicine, JLU Giessen (see Appendix G).
The examination grades are as follows: grade 1 (excellent), grade 2 (good), grade 3 (satisfactory), grade 4 (adequate). Grade 5, insufficient; grade 5 indicates failing.
All results and a protocol of the examination are transferred to the State Examination Office and recorded in the software system "FlexNow".
From the single grades obtained for the different subjects assessed in section I (tierärztliche Vorprüfung) and the final examination section II (tierärztliche Prüfung) a mean value is calculated, indicating the final grade obtained.
Students receive a certificate for each section of their exam showing the grade per subject and the calculated mean grade.

8.2.3 Processes for providing students a feedback post-assessment and a guidance for requested improvement

Oral, practical or combined examinations include a final discussion in which the examiner announces the grade and explains strength and weaknesses of the students' performance. Examination content and results are documented in an examination protocol (see above).
The results of written examinations are provided within 21 days. On request students are welcome to inspect their evaluated examinations.

8.2.4 Description of the appeal processes against assessment outcomes

Students have the opportunity to contact the examiner in order to clarify open questions or to officially appeal.
An appeal may be filed with the chair of the examining board; if not accepted it may be forwarded to the legal department of the respective State Authorities, Giessen, or to the Administrative Court Giessen.

8.3 Assessment Procedure, Review of Teaching Outcomes and Mechanisms to change Assessment Strategies

As indicated in 8.2.1 the basis of the assessment procedure and hence the strategy is clearly laid out in the TAappV. As indicated in Area 1, virtually all relevant stakeholders are involved in setting up the TAppV which is regularly evaluated and – if considered necessary – amended. The TAppV has been set up to secure that the learning outcome covers the full range of professional knowledge, skills and competences of a veterinarian.
Detailed regulations are documented in the Regulation for Studies and Examinations of the Faculty of Veterinary Medicine, JLU Giessen (StuPoVet). Based on the learning outcomes, examiners and lecturers may evaluate teaching / learning strategies and adapt assessment designs if required.
In accordance with the TAppV, minor changes (e. g. switch from an oral examination format to a written format), are suggested by the institutes / clinical unit and are discussed in the examination board. A recommendation of the examination board is submitted to the Committee of Study Affairs. If accepted, the recommendation needs approval of the Faculty Council, the Committee for Degree Courses of the JLU (Senatskommission Studiengänge) and finally of the Senate of the JLU.

8.4 System to certify Student Achievement of Learning Outcomes

Almost all students start their studies with the strong motivation to become a graduated Veterinarian having reached the qualification to receive the state license to work as a veterinarian (Tierärztliche Approbation). At this point it must be stated that the degree course of Veterinary Medicine is straight forward and that it does not foresee graduation to a bachelor after a given number of semesters.
This strong motivation is reinforced by several teaching strategies, e. g. the learning contents are directly connected to specific medical issues. Students receive continuous feedback in their courses, partly in terms of formative assessments. Achievements as well as grades are documented and available in the FlexNow software. This platform is available for all students and allows them to individually overview their recorded achievements and grades. This strategy encourages students to question and improve their responsibility for their own learning.
Further, the Establishment participates in the Progress Test in Veterinary Medicine (PTT) that allows students to monitor their individual learning progression through the curriculum.

8.5 Assessment Methodology to ensure that every Graduate has achieved the minimum Level of Competence, as described in the ESEVT Day One Competences

As indicated above clinical practical skills are assessed summarily in oral-practical formats. Assessment starts at the end of 5th semester, following propaedeutical instructions with teaching of the subject related standard clinical examination procedures, partly on Faculty owned animals and animal models, including anamnestic evaluations.
In the 9th and 10th semester clinical practical skills are assessed summarily and formatively (through supervision and feedback) in courses with continuous assessment, Clinical Rotation and Ambulatory Clinics.

During clinical rotation students are supervised when performing anamnestic evaluations, physical-clinical examinations, establishment of a list of case related problems with priorisation and likely differential diagnoses. They have to come up with a plan for further investigations and finally with a summary of the clinical findings, the final diagnosis and the management of the case.
The clinical examinations inherently assess Day One Competences on real or simulated patients or on animals kept for demonstrating clinical questions or specific veterinary skills, such as injections, repositioning, or surgery. The candidate takes on the role of an assistant on his/her first day at work.
In the final clinical examinations in the 11th semester, assessment of the problem-oriented case management is of paramount importance.

Comments on Area 8

The Faculties assessment strategy is supplemented by a clinical skills lab where self-directed learning and training of different clinical assessments is possible.

Suggestions for Improvement on Area 8

Further development of online contents focused on self-assessment applications.
Establishment of tutorials (especially for first year students) in which assessments strategies are explained and assessments can be simulated / trained.
Students are requested and encouraged to intensively use the provided log books.
Student assessment is mainly based on numerous examinations. Exam design in some subjects should be modernized, e.g. by OSCEs or even in clinical subjects by checking on entrustable professional activities.
More simulations of client (examiner) – veterinarian (student) situations to give better feedback to soft skill competencies.

Area 9. Academic and Support Staff

9.1 Appointment and Qualification of Academic Staff involved in Teaching

In general, there is no distinction between research and teaching staff at German Veterinary Establishments, all research-employees on state money have to teach.

Professorial staff: Appointment of professors is regulated through the Hessian University Law. Following an agreement of the president that a professorial position may be filled, an appointment committee must be set up. It consists of 5 professors, with one delegated from a neighbouring faculty and another one from the neighbouring Phillips University Marburg, 2 non professorial scientific staff (NPSS) members and 2 students. The central and decentralised women's and gender equality representative (Frauen- und Gleichstellungsbeauftragte) are invited to all sessions, the Dean is an inherent advisory member. The position must be posted nationally and in general also internationally. After receipt of applications the appointment committee makes a ranking with the top 3 to 5 applicants being submitted to an external peer review by 2 - 3 reviewers. It is a rare exception that the commission nominates only one or an in-house applicant. The Faculty Council must agree on the list prepared. Following a ranking by considering the outcome of the review process, in general the top 3 to 5 applicants are invited for a public scientific presentation and a teaching sample, the latter one also assessed by the local student body. Applicants from German speaking countries in general have habilitated, which is an official acknowledgement of their teaching and scientific qualification. However, equal qualifications must also be considered (e.g. prior appointment as a professor in the UK or USA and the scientific output). A final list with optimally three applicants, ranked 1 to 3, must be confirmed by Faculty Council, the University Senate and the President. Following the offer to accept the posted position by the president of the university, all further negotiations are with the Dean and the President. These regulations result from the Hessian University Law (Hochschulgesetz).
Exceptions from these routine appointment procedures may apply in the case of special professorships financed by extramural funding. Thus, through the program “Novel Drug Targets against Poverty-Related and Neglected Tropical Infectious Diseases DRUID” such a professorship was assigned to the Faculty in 2019.
The 35 professors at the Faculty are responsible for their teaching and the qualification of the NPSS assigned to their position (see below).

NPSS: Members of the **NPSS** with teaching duties are generally appointed by the head of the respective unit. Having graduated to a veterinary diploma, some of them are either on the academic or professional track for further qualification, some may also have already reached the respective qualification, also the Habilitation. The latter ones represent the pool of young academic scientists ready to continue their academic career at another place. There is a further small group of NPSS who is on a tenured position and who has reached a high academic and professional qualification.
To keep and to further support exceptionally successful young scientists the Faculty may also arrange that their teaching load is decreased; such a position is at the Institute for Physiology and Biochemistry.

Further teaching qualification: Open to all (including tutors which may be students) are “ZfbK-Kurse for Didaktik” “how to lead a course”.

9.2 Academic and Non-Academic Staff, Qualifications

General

Teaching staff members must be familiar with the curriculum and the interconnections of the topics/courses they have to teach.

There is no mandatory special program but all teaching staff is requested to maintain and to further develop their qualifications and skills by intramural or extramural training offered by the JLU. This includes soft skill development didactics, Human Resources, E-Learning & New Media support. These matters particularly concern staff on the academic and professional post-graduation track. This is also in accordance with the regulations of the State Veterinary Chamber and the "points" gained must be documented.

Performance of teaching staff is appraised through formal evaluations by students and should occur at least every 3rd year. A non-formal way to appraise good teaching but similarly effective is the selection of the "best teacher of the year" by the students.

The Faculty is also engaged in the trainee program for animal caretakers and veterinary assistants, leading to a final graduation. This is a positive challenge to the permanent staff, which is well reflected by the selection of the "best animal caretaker of the year" by the students.

In summary, the academic and non-academic staff "Faculty of Veterinary Medicine" is highly competent to successfully meet the challenges of "good teaching".

Table 9.2.1 Academic staff (P and NPSS)

Type of contract	2020	2019	2018	Mean
Permanent (FTE)	120.1	121.6	125	122.2
Temporary including PhD (FTE)	31.0	26.9	25.9	27.9
Interns (FTE)*	9.5	8.5	7.5	8.5
Residents (FTE)*	32.5	32	36.5	33.7
Practitioners (FTE)				
Others				
- PD external (FTE)	1.75	1.7	1.7	1.7
- teaching contract (FTE)	4.36	4.8	3.7	4.3
-research assistants (FTE)	24.7	21.7	24.7	23.7
Total (FTE)	**223.95**	**217.4**	**225.1**	**222.1**

*Interns and Residents are calculated with a 0.5 FTE contract

Table 9.2.2 Percentage of veterinarians on the academic staff

Type of contract	2020	2019	2018	Mean
Permanent	77	78	78	77.6
Temporary	87	88	90	88.3

Table 9.2.3 Support staff (ATS)

Type of contract	2020	2019	2018	Mean
Permanent (FTE)	157.7	159.4	161.1	159.4
Temporary (FTE)	3.3	3.5	1.5	2.8
Total (FTE)	**161.0**	**163.0**	**162.6**	**162.2**

Table 9.2.4 Research staff

Type of contract	2020	2019	2018	Mean
Permanent (FTE)	5	2	0	2.3
Temporary (FTE)	22.9	22.1	24.3	23.1
Total (FTE)	**27.9**	**24.1**	**24.3**	**25.4**

Due to the legal link between the number of students enrolled and the teaching capacity of the Faculty no changes in the number of "FTE academic staff" is expected for the next three years (see also Area 1). In respect to the financial situation of the University and consequently the Faculty, unfortunately also no changes in the next 3 years for the number of "FTE support staff" can be expected.
The number of "support staff" positions is regularly assessed by the Dean`s office. The need for and function of permanent positions are regularly evaluated and may be reallocated, based on the Development Plan of the Faculty. The number of support staff is limited as it must conform with the personnel budget assigned to the Faculty by the Presidency. Thus, further positions, in particular in research and clinical units, must be financed by acquired third-party funding and other service income.

Recruiting procedures

Professorial staff: The basic procedure for recruiting professorial staff is outlined above (see 9.1). However, 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, a "selection of the best", who meet the demands of the faculty in respect to teaching, research and needed clinical expertise, is hardly possible. This is in part due to the fact, that highly qualified graduates rather start their research career in institutes, e.g. the Max-Planck-Institutes, which are usually 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. In addition, "head hunting" has been introduced, also trying to recruit people who meet the spectrum of research 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 considering inter-faculty cooperation and the target agreements with the President.

In a further step, the faculty has also defined which out of the 35 professorial positions may be filled with non-veterinarians (see Appendix A). In case of more than one professorship per institute, the faculty tries to maintain at least a balance between veterinarians and non-veterinarians. Presently 7 professorships are held by non-veterinarians, with one of them being a research position only.

NPSS: Agreement by the Dean must be reached to start the procedure to fill an open position. It must be posted within the university, in printing and on the various websites, but may also be posted in the respective veterinary journals. The head of the respective unit, in cooperation with the staff advisor, the disabled person commissioner and women's and gender equality representative, interviews the applicants and makes a decision based on the job description published.

Support staff (ATS): Whether a position can be occupied or not depends on the decision of the Dean who is responsible for the personnel budget of the Faculty. The appointment procedure itself is ruled by law of Hesse, the collective agreement of public service employees of Hesse and the regulations of the Justus-Liebig University. The job requirements must to be described in detail, public advertising of vacancies is obligatory. Selection is then by the respective institute or clinic. The head of the unit where the position is located usually conducts interviews, in cooperation with

the staff advisor, the disabled person commissioner and equality officer, and selects the best candidate based on the job description.
Support staff hired usually has graduated in the selected field (e.g. office clerk, animal care taker, veterinary assistant, chemical technical assistant, farrier) after a 3-year training period; a certificate of qualification, also showing the grade obtained, is issued. This certificate is an essential criterion for a first placement. In case of a change of jobs qualified certificates of employment must be issued.

Generally, the selection of a candidate (NPSS, ATS) needs approval by the Equal Opportunity Officer.

Outside work

The Hessian University Law permits members of the professorial staff to develop expert statements, also in case of court cases. In principle, all employees of the university can apply for a special permission for outside work, e.g. consulting, private practice or engagement as an academic teacher in another University (participation in continuing education is not affected). Permission is governed by a stringent directive, also requesting that any extra income made is reported to the university, which may charge for a usage fee. Decision criteria include possible conflicts of interest and time required.

9.3 Working situation of the Academic Staff

Professorial staff: In general, professorial staff being in the category W3 and W2 (see Area 1), Faculty Departments/Institutes) are tenured civil servants. There is an official teaching load of 8 hours per week (SWS); this means, that each student must be exposed to 8 hours per week of this particular lecturer. The official calculation is that with preparations and post-processing the total time allotted for teaching is about 20 to 25 hours per week; there is a reduction of 2h/week if clinical and diagnostic services have to be provided. The remaining time should be devoted to research and involvement in academic matters of the Faculty/University. For professorial staff there is no further working time regulation. The W-pay systems honours extra engagements; thus, special engagements in academic matters or outstanding success in research may result in a temporary salary increase within the same basic salary grade. Professorial staff on the W1 payment level are usually not tenured, but they may become tenured and – depending on the contract - upgraded to a W2 professorship following a successful evaluation after 3 and 6 years (success in teaching and in meeting the target agreements made with the president as assessed by internal and external reviewers).
Otherwise a further promotion within academia requires appointment as a W2/W3 professor, usually at another university.

Non professorial scientific staff (NPSS): The great majority of NPSS are employees with a contract of a minimal duration of 3 (+ 2) years and a maximal duration of 12 years; extension of another three years is possible in case of clinical positions. During the first 5 years graduation to a Dr. med. vet. or PhD (see Area 1) should have been achieved, the postdoc-period may last for another 6 years leading to the Habilitation; the following 3 years are to allow for clinical specialisation (Fachtierarzt, European Diplomat). The official teaching load is 8 SWS, in case of part time employment there is the respective reduction. Payment is according to the hessian public service collective wage agreement system. The faculty provides coaching for both, the academic and professional track.
There is a small number of highly qualified civil servants on permanent positions among the NPSS; they are the backbone of continuously upcoming service demands, e.g. biomathematics and statistical approaches, radiological and other diagnostics (see 9.1).

All: The Justus-Liebig University is certified as a Family-Friendly University. Staff can ask for individual advice, coaching, training and further education at the Justus-Liebig-University at any time. Occupational, physical and mental health services are also provided. Moreover, the Justus-Liebig-University has access to certain kindergarten places and provides day care and excursions/courses for older children during school holidays. Newly appointed professors receive double career support. Employees with a disability or chronic illness can consult central contact persons at the university. Necessary adaptations in the workplace are made.

9.4 Programs for the professional growth of Academic and Support Staff

Academic staff: Following graduation and having obtained the "Approbation", each veterinarian is requested to participate in continuous education. Previously obtained certificates, e.g. to perform X-Ray examinations, must be renewed in 5-year intervals. According to qualification, all veterinarians in Hesse have to proof at least a mean of 20 h to 40 h per year. Meeting these requirements is controlled by the State Veterinary Chamber Hesse (Landestierärztekammer Hessen). This regulation also applies to university staff.
The Faculty itself particularly cares for staff on the academic track. The conditions to enter the program to achieve graduation to a Dr. med. vet. were strengthened, clearly describing the responsibilities of the supervisor(s) and the graduate. Additionally, a strictly structured PhD-program was installed in 2003 in cooperation with the Faculty of Medicine. Since 2018 this program also contains the track "Clinical Scientist", it further offers the possibility to graduate after having achieved clinical qualification (e.g. national specialist (Fachtierarzt), Diplomat of a European College).
In Germany the "Habilitation", is still considered the essential criterion to be qualified to become appointed as a professor. This academic grade may be reached after having graduated to a Dr. med. vet. or PhD and confirms that the person is qualified to perform independent research and research based academic teaching. To make this track more attractive, the Faculty has established a program to support young scientists with "seeding money" (2 x 20.000 €) in order to support applications for research funds. Since the program has been established two applications were granted. In one case this was followed by successfully acquiring a DFG grant. To increase the attractivity of the academic career for junior scientists, the Federal Republic of Germany and the State of Hesse have created W1 professorships as temporary positions financed by the federal government for 6 years with the perspective to enter the tenure track system. Specifically, the JLU and the person appointed as junior professor arrange a target agreement which requires evaluations after 3 and 6 years. If positive, the W1 professor may be promoted directly to a higher position (W2 professorship).
Furthermore, the Justus-Liebig University offers a wide spectrum of interdisciplinary training for all teaching personnel. On request, they organize specific didactic courses for the required speciality. This includes soft skill development and didactics, Human Resources, E-Learning & New Media support. With successful completion of the courses teaching staff can obtain certificates.

Support staff (ATS): The JLU offers education for support staff in virtually all matters of administration and personnel development. The program is open to all faculty employees. Also, qualification as first aiders may be obtained (8 h training/year).
There are no special programs to improve very specialised professional skills, e.g. in laboratory work. However, for special training employees can be delegated to different places. Depending on the extra skills developed during professional life a higher grade in the public service wage system may be reached. The final decision is made by the personnel department of the JLU.

9.5 System for Assessing of Teaching Staff

A system for assessing the teaching staff is in operation; a formal appraisal of the performance of all teaching staff is carried out by students through an anonymous evaluation of the courses and teaching; such appraisal should occur at least every 3 years. The evaluation sheets are developed by the office of Study Affairs of the Faculty.
Teachers are not forced to submit themselves to the evaluation, however they are strongly encouraged to do so. In addition to that, good teaching is also appraised in a non-formal way – but reportedly effective - which is the selection and the appointment of the "best teacher of the year", done by the students. The results of the evaluation are conveyed to the teachers, and in case of a "non-satisfying" outcome, an improvement is usually observed. The dean can call upon for personal hearings those teachers with "non-satisfying" outcomes, but these are exceptions and such procedure is rarely implemented.
Another method that the VEE has adopted to evaluate the quality and success of teaching is the passing or non-passing of students of the series of more than 30 state examinations; in case of proportionally high failures, the teacher/examiner is notified, questioned and suggestions for improvement are made.
Complementary information on the system put in operation by the VEE for the assessment of teaching staff are available at par. 9.2.1

Comments on Area 9

The performance of all teaching staff members is appraised through course and teaching evaluations by students. The evaluation sheets are developed by the office of Study Affairs of the Faculty. Teachers, however, are not forced to submit themselves to such an evaluation, yet they are strongly encouraged and evaluation has become routine. The results are conveyed and usually in case of a "non-satisfying" outcome an improvement is observed. Hearings with the Dean are the exception.
Participation of students pulls like a red thread not only in teaching evaluation but through all academic matters.

Suggestions for Improvement on Area 9

Due to the legal regulation of "calculated teaching capacity of the Faculty" and the "number of students admitted per academic year" as well as in respect to the "physical capacity" of the Faculty, it is most unlikely that the number of FTE will increase in the near future.
The regulation that most NPSS is on a non-tenured position with clear deadlines concerning the employment periods is codified in the University Law of Hesse and the federal states in general. It has the advantage that incrustation of the academic support staff can widely be avoided, it has the drawback that some highly qualified young scientists have to leave the faculty when the deadlines have been reached. More flexibility would help to avoid such situations. Also, the creation of positions not adding to the number of FTE, e.g. postdocs or clinical experts, would help to improve the academic and professional post-graduation track.
We do not suggest to further formalize the evaluation procedures. The whole system relies on the fact, that all academic staff develop a high responsibility towards their assignment; so far, our experiences are good.

Area 10. Research Programs, Continuing and Postgraduate Education

10.1 Research Activities of Staff and its Contribution to Research-Based Veterinary Education

The Faculty is involved in high-quality basic research, translational and clinical research well recognized at national and international levels. In the latest report of the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG), the University Giessen is ranked at place two in the sector Agriculture, Forest Sciences and Veterinary Medicine (www.dfg.de/sites/foerderatlas2018/).

The principle of research-based teaching and integration of recent scientific data is central to the veterinary training program at the Faculty. This is assured by the fact that in Germany academic teaching staff is obliged to perform high quality research and to apply recent scientific knowledge to their lectures, seminars and courses.

The spectrum of research activities of the Faculty is widespread and covers virtually all disciplines of veterinary medicine (see Table 10.1.1 for ongoing third party-funded projects). It ranges from the molecular analysis of membrane transporters or toxins/microbes in food to the pathophysiology of diseases and the development of new diagnostic or therapeutic strategies. Main foci of scientific activities (as indicated by third party funding) cover the following areas:

- Infection (mainly by viruses or parasites) and immunity
- Regeneration
- Reproduction
- Wild life

Scientific working groups of the faculty are integrated into larger research networks such as:

- Collaborative Research Center (Sonderforschungsbereich SFB 1021), German Research Foundation (Deutsche Forschungsgemeinschaft, DFG); Topic: RNA viruses
- International Research Training Group (Internationales Graduiertenkolleg) Giessen – Monash University-Australia (IRTG 1871) of the German Research Foundation; Topic: Molecular pathogenesis of male reproductive disorders
- Hessian excellence in science and economy center (LOEWE, Landes-Offensive zur Entwicklung wissenschaftlich-ökonomischer Exzellenz); Topic: Novel drug targets against poverty-related and neglected tropical infectious diseases (DRUID)

Total third-party funds acquired in 2018, 2019 and 2020 were 3.307, 3.214 and 6.117 million € (Tab. 2.1.2). Table 10.1.1 lists all research programs ongoing in 2020 with a funding of more than 10,000 €/year.

Table 10.1.1. List of research programs ongoing during the last full academic year prior the Visitation (2020) funded with grants > 10,000 €/year.

Scientific topic	Grant/year (€)	Duration (years)
Wild life protection: Garden dormouse	213,146	6.50
Tenogenic matrix-remodeling in tendon diseases	173,017	3.00
Standardization of diagnostics in resistance against antibiotics	159,666	3.00
Coccidia-induced NETosis	152,383	3.00
Modern approaches for developing antivirals against SARS-CoV2	150,000	4.00
Immune pathogenesis and diagnostics of Sarcocystis calchasi in doves	148,783	3.00
Sex-interactions in Schistosoma mansoni	147,575	3.00
Innate immunity phenotype of viruses	133,493	3.00
Health monitoring of New World Camelids	132,639	2.00
Automatic evaluation of immunohistochemical data	124,515	1.50
Zoonotic Borna viruses (ZooBoCo)	115,920	3.00
Anti-schistosomal biarylalkylcarbonic derivatives	112,833	3.00
Genetic variability and swine inflammation necrosis syndrome	107,853	3.00
Scientific web zoonotic infectious diseases	106,286	1.75
Comparison of catching methods /swine	103,346	2.00
Functional comparison of the NSs virulence factors from Phlebovirus	100,980	4.00
Open Corona	100,000	2.00
Monitoring as basis for hunting small game	97,678	3.00
Prevalency of shigatoxin-forming E. coli in weaning pigs	95,800	3.00
Animal welfare cattle	84,705	3.00
Surveillance of antimicrobial resistance in broilers (one health concept)	81,643	3,00
Parasite-induced modulation of host epithelial metabolism	75,010	4.00
Ecological impact of raccoons in the region of Wetterau	72,000	2.08
Environmental effects of drugs: interviews/risk assessment	70,000	1.50
Antiviral factors type I – Interferon systems of small animals	69,583	3.00
Nitroxyl in the regulation of gastrointestinal motility	69,167	3.00
MICRO-Jet -N (artificial lung ventilation)	67,000	3.00
The healthy pig tail: action plan	62,948	2.33
Scientific evaluation of teaching methods in the Skills Lab	60,846	4.00
Urinary detection time of firocoxib and meloxicam in dogs	60,000	0.50
Pathogenesis of feline infectious peritonitis	59,950	4.00
CCH Vaccine	58,047	6.00
Coordination of glutaminolysis and glycolysis in cancer cells	56,900	4.00
Schistosoma mansoni: Therapeutic action sites	56,750	4.00
Sperm morphology and motility in mice and men	55,881	4.50
Human testis cancer and spermatogenesis control by immune cells	51,674	4,50
Monitoring of wild geese at the river of Werra	49,801	3.00
Culture of Care as 3R principle	49,457	0.58
Transmission of cultured psitticine primordial germ cells (PGCS)	46,667	3.00
Hepatitis-B- and D-virus: receptor blockade as therapeutic strategy	45,000	2.00
Platform drug testing worm parasites	45,000	4.00
Replacing PMSG/eCG in porcine medicine	40,725	2.00
Intralesional therapy of equine tendons with mesenchymal stem cells	37,770	3.00
HBV/HDV entry inhibitors from the group of betuline derivatives	35,000	1.00
Distribution of European wildcate in Hessen	34,800	1.50

Scientific topic	Grant/year (€)	Duration (years)
Neuro-immune Interactions in neuro-inflammation	31,200	5,00
Interactions of hepatitis D virus with its helper virus HBVm B08	29,300	4.00
Handling canine thrombocyte concentrates	29,000	1.00
Testicular immunological barrier	22,222	4.50
Lung-brain axis in health and disease	22,200	1.50
Vertical transmission of Psittacine Bornavirus in Parrots	18,000	1.00
Live quality of animals in clinical field studies	17,680	3.00
Neuro-immune interactions in the gastrointestinal tract	16,800	1.00
Zoonotic potential of Borna viruses	16,200	1.00
Evaluation of the laser-based Point of Care hematology analyzer	15,009	1.33
Angiostrongylus vasorum in intermediate hosts	15,000	3.00
Histology swine inflammation necrosis syndrome	14,155	2.33
Exosomes for therapy of osteoarthritis	12,448	1.00
Pharmacophore Modelling for novel HBV/HDV entry inhibitors	12,000	1.00
Molecular epidemiology of Strangles in Germany	12,000	2.00
Equine thrombocytes for supplementing cell cultures	12,000	2.00
Autophagy-related genes in Schistosoma mansoni	12,000	3.00
Environmental effects of drugs: emissions/risk assessment	10,680	1.00
Equine caries	10,000	2.00

Most of the scientific staff paid by research grants is also involved in teaching undergraduate students, mainly in seminars or practical training, which provides a direct personal contact for undergraduate students with persons involved in basic and clinical research. Data obtained during these research activities are permanently integrated in the lectures and seminars of the individual subjects in order to keep the information given to students on an up to date scientific evidence-based level. Research foci of all institutes and clinics are compiled in Appendix 10.1.

The Faculty also provides an exchange program with the University of Athens, Georgia, USA to cover the stay of one student per year solely for conducting research over several months. This research grant for undergraduate students, sponsored by industry, is commissioned in a competitive manner by the deanery.

10.2 Participation and Training of Students in Research Programs

According to the certification of veterinary surgeons (TAppV), a master thesis is not part of undergraduate veterinary education in Germany. In order to achieve deeper scientific competences and to quality to bear the title “Dr. med. vet.” or “PhD”, graduation is a requirement. However, all students are made aware of the importance of evidence-based medicine in all subjects of their clinical-, para- and preclinical training. Special emphasis on therapeutic strategies based on state-of-the art clinical studies (such as prospective double-blind studies) is laid e.g. in pharmacology and toxicology and all internal or surgical subjects. In a large number of lectures and seminars (see below), bibliographic search, scientific methods, research techniques, statistical methods and writing are taught.

Students are made aware of the importance of Livelong Learning already during the first year of study in the subject “Professional ethics and communication”. Furthermore, students have the possibility to participate at ongoing continuing education programs offered by the faculty to practitioners, either as free participants or as payed support staff giving them the possibility to get direct insight into modes of livelong learning.

The TAppV does not foresee an obligatory active involvement of undergraduate students in

research, thus the TAppV does not provide times for individual research projects for undergraduate students. This accounts for the fact that each student has to attend an average of at least 30 hours of classes per week. However, the Faculty is open to allow student participation in research activities during their undergraduate education. There are two possibilities to achieve this: firstly, according to the TAppV, 350 hours of the compulsory 1170 hrs of extramural practical training may also be spent at an institute of a university with a scientific medical discipline (e.g. Inst. of Virology). Students choosing this type of practical instructions are automatically involved in ongoing research projects. Secondly, those students who decide to take their practical training in a university veterinary hospital have access to ongoing research projects. However, it is up to the individual student to take advantage of these chances.
About 100 students per year receive a contract as a student aid (studentische Hilfskraft). Hiring is mainly by the clinical institutions of the Faculty, but also by the para-clinical and pre-clinical institutions. In general, these students are asked to provide specific services; depending on their own interest they may also get involved in research projects carried out by the institution.
As requested by the TAppV the veterinary curriculum in Giessen offers a wide spectrum of elective courses. A small but distinct number of these courses are highly research orientated.
These courses are listed in Table 10.2.1.

Tab. 10.2.1 Electives offered with a strong research background

Offered by	Title	Intended for
Clinical Unit for Birds, Reptils, Amphibians and Fish	Wildlife research (colloquium)	5.-8. Sem.
	Research in wild living animals (seminar and practical training)	5.-8. Sem.
	Avian physiology (seminar)	5.-8. Sem.
	Research and diseases of reptiles and amphibia (seminar and practical training)	5.-8. Sem.
	Species conservation of Salamandra salamandra (project group)	5.-8. Sem.
Equine Clinical Unit	Equine internal medicine (seminar)	4.-10. Sem.
	Science in motion: Pathophysiology of musculoskeletal systems (seminar)	6.+8. Sem.
	Stem cells and equine regenerative medicine (seminar)	5.+7. Sem.
	E-training: Equine exercise physiology and pathophysiology (seminar)	6.+8. Sem.
	How to start a dissertation (seminar)	6.+8. Sem.
	Equine surgery journal club	10. Sem.
	Recent cases in equine surgery: Scientific backgrounds	10. Sem.
	Equine pathology (seminar)	10. Sem.
Clinical Unit for Reproduction	In vitro production of bovine embryos (seminar)	5.-8. Sem.
	Modern techniques in reproduction technology (during clinical demonstrations)	8. Sem.
	Assisted reproduction techniques (seminar and practical training)	9.-10. Sem.
	Hormone analytics and endocrinology of reproduction (seminar)	9.-10. Sem.
	Reproduction: Sampling of background literature to selected clinical cases and presentation as written report	5.-10. Sem.
Clinical Unit for Small Animals	Journal club for students: Recent literature small animal medicine	5.-8. Sem
	Interpreting data from clinical laboratory diagnostics	5.-8. Sem
	Interpreting data from canine and feline clinical chemistry	5.-8. Sem
	Student aids to support scientific studies (e.g. for performing immunohistochemistry)	5.-8. Sem.
Clinical Unit for Pigs	From the stable to the genetic laboratory	6.-8. Sem.

Offered by	Title	Intended for
	Laboratory unit with research aspects during clinical rotations	9.+10. Sem.
	Conservation medicine (lecture with strong references to own actual research)	6.-8. Sem.
Institute for Parasitology	Selected parasitary zoonoses (seminar)	5.-8. Sem.
	Parasitological science reports (seminar)	5.-8. Sem.
	Cell and molecular biological aspects of parasitic organisms	5.-8. Sem.
	Parasitology: Practical lab training (over 4 weeks)	5.-8. Sem.
	Parasitology: Practical lab training in biochemical and molecular biological methods (over 3 months immediately after 11. Sem.)	11. Sem.
Institute for Pharmacology and Toxicology	Experimental methods in pharmacology and pharmacogenetics (seminar with practical training)	5.-8. Sem.
	Pharmaceutical drug development – Excursion to CSL Behring GmbH (seminar)	1.-8. Sem.
Institute for Veterinary Anatomy, Histology and Embryology	Cell culture techniques (together with Eucomor students)	5.-8. Sem.
	Stem cell module (together with Eucomor students)	5.-8. Sem.
Institute for Veterinary Pathology	Veterinary pathology journal club	9.-10. Sem.
	Methods in veterinary pathology and molecular biology (seminar)	9.-10. Sem.
	Pathology: Doctorand seminar	9.-10. Sem.
Institute for Veterinary Physiology and Biochemistry	Pathophysiology 1 + 2 (seminar)	3.-4. Sem.
	Physiology of excitable cells (seminar with simulation of experiments, together with students of human medicine)	3.-4. Sem.
	Pathobiochemistry and regulation of metabolism (seminar)	3. Sem.
	Clinical chemistry for dogs and cats (seminar)	5.+7. Sem.
	Practical biochemistry behind the lab parameters (seminar)	3.-4. Sem.
	Biochemistry: Insight into the day-to-day research (practical training)	9.-10. Sem.
Institute for Virology	Virology: Exotic epidemics	5.-8. Sem.
	Selected virus diseases	5.-8. Sem.
	Virology - science day (during clinical rotation)	9.-10. Sem.
Institute of Hygiene and Infectious Diseases of Animals	Practical training in microbiology	5. Sem.
	Immunology: Repetitorium	5. Sem.
	Bacterial and mycotic zoonoses (seminar)	6. Sem.
	Actual topics in infection biology (seminar together with doctoral students)	6.+8. Sem.
	Rare and exotic animal epidemics (seminar)	6.+8. Sem.
	Theory and praxis of modern control of animal epidemics (seminar)	8. Sem.
	Laboratory diagnostical training in infectious diseases (during clinical rotation)	9.+10. Sem.
	Hygiene and infectious diseases of farm animals (seminar together with agricultural students)	6. Sem.
	Hygiene: Practical training in scientific methods	9.-10. Sem.
	Insight and optional cooperation in research projects and scientific literature in food science (during practical training in hygiene)	5.-8. Sem.
Institute of Veterinary Food Science	Actual literature topics as replacement/substitute slaughter house (during practical training slaughter house)	5.-8. Sem.
	Doctoral-student seminar in Food science	5.-8. Sem.

Offered by	Title	Intended for
	Scientific food analysis (during practical training)	9. Sem.
	Microbial toxins (seminar)	6.+8. Sem.
	Scientific aspects of animal welfare (seminar)	7. Sem.
Professorship for animal welfare and laboratory animal sciences	Discussion platform animal welfare (seminar)	1.-8. Sem.
	Species and natural protection	7. Sem.
	Animal protection: Pets (seminar)	1.-8.Sem.
	Aspects of aggressive canine behavior (seminar)	5.+ 7. Sem.
	Biostatistics (seminar)	2.Sem
Unit for Biomathematics and Data Processing	Design and statistical analysis of clinical studies (seminar)	5.-7. Sem.

10.3 Advanced Postgraduate Degree Programs

10.3.1 Professional tracks

The Faculty provides training for veterinary specialization on the national level (Fachtierarzt/Veterinary specialist) as well as on the international level (European Diplomate). The following table (Table 10.3.1) indicates for the years 2018, 2019 and 2020 the number of graduates enrolled in each program.

Table 10.3.1. Number of students registered at postgraduate clinical training

Type of Training Internships	2020	2019	2018	Mean
Internship in Equine Internal Medicine	3	2	1	2.00
Internship in Equine Surgery	3	2	1	2.00
Internship in Neurology	1	1	0	0.67
Internship in Reproduction	3	2	3	2.67
Internship in Small Animal Medicine	8	8	8	8.00
Internship in Veterinary Pathology	1	2	2	1.67
Total no. internships	**19**	**17**	**15**	**17.00**
Residencies according to EBVS				
European College of Animal Reproduction (ECAR)	2	2	3	2.33
European College of Equine Internal Medicine (ECEIM)	1	1	1	1.00
European College of Veterinary Anesthesia (ECVA)	0	1	0	0.33
European College of Veterinary Clinical Pathology (ECVCP)	1	1	1	1.00
European College of Veterinary Diagnostic Imaging (ECVDI)	3	2	3	2.67
European College of Veterinary Emergency and Critical Care (ECVECCS)	1	1	2	1.33
European College of Veterinary Internal Medicine-Companion Animal (ECVIM-A) Cardiology	1	1	1	1.00
European College of Veterinary Internal Medicine-Companion Animal (ECVIM-CA) Internal Medicine	5	2	2	3.00
European College of Veterinary Neurology	2	2	2	2.00
European College of Veterinary Pathologists	2	2	2	2.00
European College of Veterinary Surgeons (ECVS)	3	3	4	3.33

European College of Zoological Medicine, Specialty Wildlife Population Health	0	2	2	1.33
European Veterinary Parasitology College (DipEVPC)	1	1	1	1.00
Residencies according to national regulations				
Fachtierarzt Anästhesie (Specialist for anesthesia)	3	3	2	2.67
Fachtierarzt Bildgebung (Specialist for diagnostic imaging)	6	8	7	7.00
Fachtierarzt Chirurgie (Specialist for surgery)	10	8	10	9.33
Fachtierarzt für Fische (Specialist for fish)	0	0	1	0.33
Fachtierarzt für Innere Medizin der Klein- und Heimtiere	23	25	22	23.3
Fachtierarzt für klinische Labordiagnostik (Specialist for Clinical Laboratory Diagnostics)	6	8	8	7.3
Fachtierarzt für Mikrobiologie (Specialist for microbiology)	5	3	4	4.00
Fachtierarzt für Physiologie (Specialist for physiology)	3	3	3	3.00
Fachtierarzt für Reptilien (Specialist for reptiles)	0	0	1	0.33
Fachtierarzt für Schweine (Specialist pig medicine)	3	5	5	4.33
Fachtierarzt für Wirtschafts-, Wild- und Ziergeflügel (Specialist for poultry diseases)	12	11	11	11.33
Fachtierarzt für Zoo- und Gehegetiere (Specialist for zoo animals)	1	1	1	1.00
Total no. residencies	**65**	**64**	**73**	**67.33**

Postgraduates enrolled in clinical training programs strongly contribute to clinical teaching, especially the mediation of practical expertise, to undergraduate students, especially during the last year of the study program, i.e. during the clinical rotation. There is a clear definition by German law that undergraduate students without the professional license to practice (Tierärztliche Approbation) are only allowed to treat animals under the supervision of a person with this professional license. In case of conflict, e.g. when undergraduate students have the impression that they should be more involved in case management, ad hoc decisions by the leader of the respective clinical unit (specialist in the respective discipline) are made to balance the interests of both groups. Expected development: Training capacity of the Faculty for clinical specialization is adapted to patient and teacher numbers. An increase in training capacities is at the moment not intended.

10.3.2 Academic track

The faculty offers two degrees of postgraduate veterinary education, the degree of a Doctor in medicinae veterinariae (Dr. med. vet.) and a Ph.D. Both tracks require that undergraduate education has been successfully completed. For all postgraduate students (mandatory for PhD students, elective for Dr. med. vet. students) a structured training program in life sciences is offered by the Giessen Graduate School for the Life Sciences (GGL) (www.uni-giessen.de/fbz/zentren/ggl/index_html). The Faculty also offers the possibility for non-veterinarians to graduate to a Dr. biol. anim. For a list of doctoral and PhD students having completed their dissertation projects in the years 2018-2020, see Appendix to 10.3.2.
Students willing to enter the tracks "Dr. med. vet." or PhD must meet the criteria laid down in the order of the Faculty for these graduations. Relevant for admission are the past study records, one (Dr. med. vet. program) or two (PhD program) supervisors are nominated and an outlay of the intended research project and its feasibility must be submitted.

The training program for PhD students consists of three parts:

- Doctoral development program (i.e. general skills such as good scientific practice, bibliographic search, analysis of and presentation of data),
- Scientific training program (weekly seminars, practical courses, lab rotations),
- Reports: Retreats, annual conference and thesis.

The training program is offered in an interdisciplinary manner by researchers from all fields of live sciences at the JLU (medicine, dental medicine, veterinary medicine, biology, chemistry, agriculture, nutritional sciences, environmental sciences, psychology, sport sciences). The scientific program is organized in 10 scientific sections, in five of them, i.e. Nutrition and Metabolism (section 1), Infection and Immunity (section 2), Neurosciences (section 5), Reproduction in Man and Animals (section 6), and Clinical Sciences (section 10), researchers of the Faculty are members.
Students in the PhD program undergo an interdisciplinary, concisely structured program lasting for 3 years with core courses and lectures, as well as optional and elective lectures. The minimum requirements are 135 h in the area of basic molecular biology, cell biology and statistics as well as an additional 165 h of optional or elective courses from in Anatomy, Cell Biology, Biochemistry and Molecular Biology, Genetics and Gene Technology, Internal Medicine, Microbiology, Virology, Parasitology, Reproductive Medicine and Biology and/or animal models and Laboratory Animal Handling. The program starts on October 1st every year. Students with a master degree or veterinary graduates may apply, the selection procedure is largely based on the past study records. At the end or the program, a defense of the PhD thesis and examination is conducted by 4 examiners, one of them in general being an external one. Students participating in the program must show that they are adequately funded.

The section Clinical Sciences was founded in 2018 and is intended to offer not only training programs for doctoral students (Dr. med. vet. or PhD) but also to establish a strong postdoc program for the continuous scientific training of clinicians on the postdoc level.

Table 10.3.2. Number of students registered at postgraduate research training (here: number of students entering the graduate program):

Degree	2020	2019	2018	Mean
PhD	2	3	6	3.7
Dr. med. vet.	57	69	79	68.33
GGL section Clinical Science*	7	3	1	3.67

As the entry into and the exit from the post-graduation education to a Dr. med. vet. is not bound to fixed dates, the number of participants per year fluctuates and no constant numbers valuable for one year can be given. Therefore, the number of students entering the Dr. med. vet. program is given in table 10.3.2. Since it takes about 3 - 4 years to finish this program (median: 44 months as analyzed from the latest 180 dissertations), the number of total students enrolled can be estimated with 240 - 300.

Expected development: Based on data obtained over the last 10 - 15 years, we estimate that about 30 - 40 % of the graduates, i.e. 60 – 75 students per year, will enter a postgraduate scientific program to obtain a Dr. med. vet. or PhD degree.

10.3.3. Distance Learning

The faculty does not offer external or distance learning courses for postgraduate students.

10.3.4. Continuing education

In Germany veterinary surgeons are obliged to participate in continuing education. The hours to be taken per year are 20 for veterinarians with no special accreditation and 25-40 for those with specialization (e.g. Fachtierarzt). All events/courses officially offered for continuous education must get accreditation by the Academy for Continuous Veterinary Training (Akademie für Tierärztliche Fortbildung, ATF, Berlin) which includes the fixing of hours accredited. Evaluation by the participants is requested and consequences if critical points are revised. Only those events get accredited which are made public in the relevant media, i.e. veterinary journals and homepages of the relevant organizations.The total number of courses (face to face events) directly offered by the ATF in 2018 and 2019 was 3107 and 3368, respectively. In many instances the Faculty provided the necessary platform, particularly in respect to clinical training.

The courses originating in the Faculty in 2018 - 2020 are listed in Table 10.3.4. As is evident the faculty offers a broad spectrum of continuing education courses covering all fields of veterinary medicine. For a list of lectures and seminars offered as continuing education at the Faculty of Veterinary Medicine at JLU see also Appendix to 1.5 a-c.
The program for continuing education originating in the faculty is permanently adapted to the needs of the profession. This is achieved in cooperation with the Federal Veterinary Chamber (Bundestierärztekammer, BTK), the State Veterinary Chamber (Landestierärztekammer), the German Society for Veterinary Medicine (Deutsche Veterinärmedizinische Gesellschaft), the Federal Association of Veterinary Practitioners (Bundesverband Praktizierender Tierärzte, bpt), the Federal Association of Veterinariy Officers (Bundesverband Beamteter Tierärzte) and national and international professional societies of the respective medical disciplines.
Apart from organizing Faculty based continuing education the teaching staff of the Faculty is involved to a considerable percentage in continuing education offered by the ATF and other organizations.
Furthermore, members of the Faculty frequently follow invitations to lectures and seminars by practitioners, industry and others, who organize courses on a more local level.

Table 10.3.4. Courses and number of attendees to continuing education courses provided by the Faculty

Course	Number of Attendees		
	2020	2019	2018
3R principles: ethical, law and practical aspects	51		
Actual aspects of bovine reproduction		50	
Actual topics in infection biology	10	12	10
Age-dependent changes in pharmacotherapy			150
Anaesthetics	300		
Animal pharmaceutical drugs	0	115	
Animal pharmaceutical drugs in food			50
Animal pharmaceutical drugs: EU law 2019/6		100	
Animal pharmaceutical drugs: numbers and facts		200	
Animal protection week with the BVVD	100		
Annual meeting work group embryo transfer (AETd)	100		
AO base course Bones	45	50	50
Autumn small animal evening		75	75
Bee diseases: Diagnostics, therapy and legal aspects	57		
Bee modul: Biology, breeding and husbandry		69	
Bovine reproduction biotechnology			50
Castration of dogs and cats		134	
Clinical-pharmacological and legal aspects of therapy of small mammals			150
Control of veterinary pharmacies		300	
Donkey seminar		15	
Equine colic treatment		50	
Equine lameness	15		
Equine reproduction medicine (online)	156		
Equine shoeing		35	35
Equine teeth and paws		15	
EU legislation of veterinary drugs		50	
FELASA law training	193	317	107
FELASA practical training	29	60	33

Course	Number of Attendees		
	2020	2019	2018
Genetic evaluation of farm animals: A practical approach	20		
Giessen Winter Symposium		120	120
Giessen Small Animal Evenings (3 times per year) Kleintierabend		210	210
Haematology and blood biochemistry in equine medicine		120	
Legal seminar for veterinarians involved in reviewing			45
Legal aspects of veterinary pharmacies			100
Legal aspects of veterinary pharmacies: Small rodents		120	
Medication of pets by the owner - limits and possibilities			60
Medication of pets by the owner - limits and possibilities	80		
Online seminar: Applying the new legislation of veterinary pharmacies (Novelle der Tierärztlichen Hausapothekenverordnung)			500
Online seminar: Changes in legislation of veterinary pharmacies (Novelle der Tierärztlichen Hausapothekenverordnung)			300
PM-Seminar Equine health		15	
Porcine diseases		35	
Procedures on animals used for scientific purposes (6 x per year)	110	100	90
Radiation course (4 x per year)	50	50	50
Radiation protection			40
Reproduction medicine horse, small ruminants camelides (Online)			36
Sampling and diagnostics of bacterial infections		150	
Seminars in avian and exotic animal medicine	40	39	42
Shoing festival Nice to schmied you		45	
Spring small animal evening		80	80
The horse in animal experiments (12 x per year)	15		
Veterinary drugs: Numbers and facts	200		
Vet-Pharm Symposium		80	
West Nile Virus Infections		90	
Wildlife biology seminars	100	100	100
Total	**1671**	**2893**	**2375**
Mean no. participants per event	**75.6**	**90.4**	**140**

10.3.5 Quality assurance of research-based education

Undergraduate teaching: The Dean of Study Affairs is responsible for the coordination of teaching, also in respect to research bound education. The Committee of Study Affairs (see Area 1) is the relevant body to deal with these aspects. The strong contribution via regular feedback/evaluation in Stud.IP or in personal meetings of students allows a fast feedback about the quality of teaching in the individual subjects, including research- and evidence-based education.

As is indicated under 10.2, undergraduate students are offered several possibilities to familiarize with veterinary research programs. The concept of "Research and Teaching" of German universities automatically implies that academic teaching is a research-based education. The Faculty concept of "organ-based-teaching-modules" strongly requires interaction of the academic staff involved, meeting the constant need to update lectures and seminars based on the most recent established scientific findings, which also might arise from own research.

Postgraduate scientific education: Research programmes within the Faculty usually are organized "bottom-up", i.e. interested researchers cooperate within the Faculty and with researchers of other faculties at JLU Giessen, often in close cooperation with the Philipps University Marburg and the University for Applied Sciences (THM, Giessen), and apply for common funding. If possible, these activities are supported financially by the deanery, e.g. by intramural funding for postdocs. In a few cases, planning of research activities is performed "top-down", when general funding programmes are offered to the universities. An example was the establishment of the new professorship for equine orthopaedics and regenerative medicine, where the Faculty decided that the professorial position, for which the Faculty could apply in a competitive manner, should cover this subject in order to strengthen research and teaching in stem cell therapy. This process was prepared by the Committee for Structural Development (Strukturkommission), discussed with the deanery and finally decided by the Faculty Council.

The frame and formal criteria to be met are as follows: The Graduation Committee of the Faculty (3 P, 2 NPSS with a Dr. degree, 1 doctoral student) is responsible for the admission of doctoral students. Each postgraduate student applying for admission to the Dr. med. vet. program has to give a written layout of the study planned including scientific background, clear definition of the scientific questions asked, the methods to be used and the presumed time plan. This committee is also responsible for proposing changes in the order for doctoral degrees (Promotionsordnung) and proposes these changes to the Faculty Council for implementation. If approved, the change must be proposed to the senate of the university and after acceptance published in the official announcement of the university (Mitteilungen der Universität Giessen, MUG, https://www.uni-giessen.de/mug)

A similar function has the PhD Committee (PhD-Ausschuss), with members of the faculties of human and veterinary medicine, who together organize the PhD studies. This committee consists of 4 professors (2 from each faculty) and 2 NPSS with a Dr. degree (1 from each faculty). This committee is also responsible for proposing changes in the order for doctoral degrees and proposes these changes to the Faculty Councils of both faculties for implementation. If approved, the change must be accepted by the senate and published in the official announcement of the university (Mitteilungen der Universität Giessen, MUG).

The education programme of the Giessen Graduate School for Life Sciences (GGL) is supervised by the education committee of the graduate school (consisting of the speaker and the managing director of the GGL and one representative from each faculty of Life Sciences of the JLU) meeting once per semester to assure quality of the offered courses. Changes, e.g. implementation of new courses are decided by this committee in cooperation with the board of directors of the GGL and the speaker of the respective scientific section of the GGL. This committee also discusses changes in the general curriculum and proposes them to the council of the GGL (consisting of 2 professors and 1 student from each faculty of life science at the JLU and supplemented in total by 2 NPSS with a Dr. degree and 1 administrative member of the GGL). If approved, the change must be accepted by the senate of the university and published in the official announcement of the university (Mitteilungen der Universität Giessen, MUG). Fig. 10.1. schematically indicates the underlying cycle for the decision making and control processes.

10.4 System of QA for the Evaluation of Research Activities

The Dean of Study Affairs is responsible for the coordination of teaching, also in respect to research-based education. The Committee of Study Affairs is the relevant body to deal with these aspects, too. The strong contribution via regular evaluation by students allows fast feedback about the quality of teaching in the individual subjects, including research- and evidence-based education.

Figure 10.1: Quality assessment cycle for the development and adaptation of teaching or research activities connected to teaching perspectives (e.g. graduate colleges, research related elective courses).

Comments on Area 10

As indicated above, the present Ordinance concerning the certification of veterinary surgeons has only little intentions to practically involve undergraduate students in their own research projects. This conforms with the Ordinance concerning entering the post-graduate education to obtain the degree of a doctor in medicinae veterinariae (Dr. med. vet.) or Ph.D., which requires that undergraduate education has been successfully completed. Between 2018 and 2020, in total 496 students finished their study of veterinary medicine successfully. During the same 3 year period, 174 students successfully finished their post-graduate education with the degree of a Dr. med. vet. or Ph.D (see to Appendix 10.3.2). Thus, about 35 % of our students have successfully finished such a post-graduate education. This highly qualified cluster of junior researchers is the pool for recruitment of academic and scientific staff for university and non-university institutions.

Suggestions for improvement on Area 10

It is intended to more selectively stimulate the interest of students in veterinary science by offering selective, research-oriented classes during undergraduate education and during the rotation period. One way to establish this is the development of a program within the faculty, where undergraduate students with a prominent interest in research are offered a seminar and/or course for selected methods in basic and clinical veterinary medicine including the possibility to spend some time periods within research laboratories of the Faculty.

Area 11: ESEVT Indicators
Factual Information

ESEVT Indicators

Calculated Indicators from raw data		Establishment values	Median values[1]	Minimal values[2]	Balance[3]
I1	n° of FTE academic staff involved in veterinary training / n° of undergraduate students	0,137	0,15	0,13	0,011
I2	n° of FTE veterinarians involved in veterinary training / n° of students graduating annually	0,889	0,84	0,63	0,256
I3	n° of FTE support staff involved in veterinary training / n° of students graduating annually	1,100	0,88	0,54	0,560
I4	n° of hours of practical (non-clinical) training	702,000	953,50	700,59	1,410
I5	n° of hours of clinical training	1572,000	941,58	704,80	867,200
I6	n° of hours of FSQ & VPH training	299,200	293,50	191,80	107,400
I7	n° of hours of extra-mural practical training in FSQ & VPH	250,000	75,00	31,80	218,200
I8	n° of companion animal patients seen intra-murally / n° of students graduating annually	69,129	62,31	43,58	25,549
I9	n° of ruminant and pig patients seen intra-murally / n° of students graduating annually	7,644	2,49	0,89	6,754
I10	n° of equine patients seen intra-murally / n° of students graduating annually	27,021	4,16	1,53	25,491
I11	n° of rabbit, rodent, bird and exotic seen intra-murally / n° of students graduating annually	12,709	3,11	1,16	11,549
I12	n° of companion animal patients seen extra-murally / n° of students graduating annually	0,162	5,06	0,43	-0,286
I13	n° of individual ruminants and pig patients seen extra-murally / n° of students graduating annually	2873,482	16,26	8,85	2864,632
I14	n° of equine patients seen extra-murally / n° of students graduating annually	1,859	1,80	0,62	1,239
I15	n° of visits to ruminant and pig herds / n° of students graduating annually	9,359	1,29	0,54	8,819
I16	n° of visits of poultry and farmed rabbit units / n° of students graduating annually	8,241	0,11	0,04	8,197
I17	n° of companion animal necropsies / n° of students graduating annually	2,588	2,11	1,40	1,188
I18	n° of ruminant and pig necropsies / n° of students graduating annually	2,868	1,36	0,90	1,968
I19	n° of equine necropsies / n° of students graduating annually	1,579	0,18	0,10	1,479
I20	n° of rabbit, rodent, bird and exotic pet necropsies / n° of students graduating annually	1,712	2,65	0,88	0,832
I21*	n° of FTE specialised veterinarians involved in veterinary training / n° of students graduating annually	0,403	0,27	0,06	0,343
I22*	n° of PhD graduating annually / n° of students graduating annually	0,462	0,15	0,07	0,392

1 Median values defined by data from Establishments with Accreditation/Approval status in May 2019
2 Recommended minimal values calculated as the 20th percentile of data from Establishments with Accreditation/Approval status in May 2019
3 A negative balance indicates that the Indicator is below the recommended minimal value
* Indicators used only for statistical purpose

Comments on Area 11

Indicator 13: as students are involved in ambulatory services the number of individual animals seen is hard to specify as partially large livestocks are visited.
Indicators 12 and 14: The clinical unit for small animals and the equine clinical unit do not provide out-patient ambulatory services. The numbers given are based on the animals treated by the Clinical Unit for Obstetrics, Gynecology and Andrology of Small and Large Animals. The number of seen epuine patients extra-murally includes fertility controls.

Suggestions for Improvement on Area 11

Not applicable

Glossary

BFS	Biomedizinisches Forschungszentrum Seltersberg
BMEL	Bundesministerium für Ernährung und Landwirtschaft (Federal Ministry for Food and Agriculture)
bpt	Bundesverband praktizierender Tierärzte (Association of VeterinaryPractitioners)
BTÄO	Bundes-Tierärzteordnung (Federal Veterinary Regulation)
DVG	Deutsche Veterinärmedizinische Gesellschaft (German VeterinarySociety)
EBVS	European Board of Veterinary Specialization
EPT	Extramural Practical Training/Internship
FB	Fachbereich (Faculty)
FBR	Fachbereichsrat (Faculty Council)
GGL	Giessen Graduate School for the Life Sciences
HRZ	Hochschulrechenzentrum (Central University IT Unit)
JLU	Justus-Liebig-University
KELDAT	Kompetenzzentrum für E-Learning, Didaktik und Ausbildungsforschung der Tiermedizin (Competence center for E-Learning, didactics and educational research in veterinary medicine)
MCQ	Multiple Choice Questions
OHG	Oberhessische Gesellschaft

PETS	Practical Experience of Technical Skills
PTT	Progress Test Tiermedizin (Progress test in veterinary medicine)
QSL	Qualitäts-Sicherung der Lehre Quality Assurance of Teaching
RP	Regierungspräsidium
SOP	Standard Operation Procedures
StuPOVet	Studien- und Prüfungsordnungordnung Veterinärmedizin (education regulation)
SWS	Semester week hours (1 SWS = 14 hours within one semester)
TAppV	Verordnung zur Approbation von Tierärztinnen und Tierärzten (Ordinance concering the Certification of Veterinary Surgeons)
VPH	Veterinary Public Health
VTH	Veterinary Teaching Hospital

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