

**Curriculum
of the core subjects**

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In this booklet you'll find the curriculum of the core subjects. It is a detail from the report written for the follow-up visitation of the E.A.E.V.E. (European Association of Establishments for Veterinary Education) in 2004 for the international accreditation of the Faculty of Veterinary Science, Budapest.

Note: EU-listed subjects are underlined, while the names of subjects that differ from the EU-list but actually are taught within the national curriculum are in *italics* in the following list.

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Secretariat of International Study Programs

A. Basic subjects

Anatomy (semesters 1-3.): Traditional division of the subject to locomotor apparatus (osteology, arthrology and myology), splanchnology (digestive, respiratory and urogenital apparatus), angiology, nervous system with sensory organs and the common integument is applied. The three semesters of functional anatomy are followed by Topographic and Applied Anatomy. Histology serves as the foundation for both clinical and pathological studies. It is taught in the second and third term, divided into the histology of ground tissues and histology of organs, respectively.

Biochemistry (and molecular biology) (semesters 3-4.): The aim of the course is to describe the special biochemical events of different organs and tissues. At the same time, the students get acquainted with those biochemical processes the failure of which results in pathological symptoms. List of topics: structure and properties of biological membrane, internal environment, protein biochemistry, enzymology, nucleic acids and the most important processes of inheritance and protein synthesis, biological oxidation, intermediary metabolism including carbohydrate, fat and N-metabolism, biochemistry of vitamins.

Biology (semester 1.): This EU-listed subject comprises two separate subjects in the national curriculum, i.e. *Biology* and *Zoology* both in the 1st semester. *Biology* is the subject where students (usually just having left secondary education) learn professional terminology and a different way of looking at the living environment. Molecular biological background the basis for histology, physiology, biochemistry and pharmacology is provided, too. With references to embryology, the development of organs and matters of reproduction are better understood.

Zoology (semester 1.) provides comprehensive information on the animal kingdom and reveals comparative features of categories that may be important during later studies. After an introduction general zootaxonomy is discussed, focusing on important phyla of protozoa, and then on those of multicellular animals, including porifera, cnidaria, flatworms, roundworms, annelids, molluscs, arthropods, echinoderms and vertebrates (fish, amphibians, reptiles, birds, mammals). This is followed by an insight into evolution biology, ecology, population biology, supra individual organization and ethology. Zoology is essential as a prerequisite to parasitology and other subjects.

Biophysics (semesters 1-2.): The general task of biophysical instruction is to provide the physical (biophysical) knowledge required by basic and clinical subjects in veterinary training. In addition to the direct professional benefits, the study of biophysics, also significantly contributes to the development of scientific reasoning.

Biomathematics (Biostatistics) (semester 1.): This subject gives information about the following topics: sets, functions, modelling with functions, the derivative and its applications, the integral and its applications, ordinary differential equations with applications, population dynamics, matrices and linear programming, elements of probability, descriptive statistics, estimations,

testing hypotheses, analysis of variance (ANOVA), regression- and correlation analysis.

Chemistry (semesters 1-2.): A solid knowledge of chemistry is provided that is needed for a wide spectrum of subjects of the subsequent studies: biochemistry, physiology, histology, pharmacology, animal nutrition, clinical diagnostics, food chemistry, etc. The teaching program puts emphasis on developing the ability of exact scientific thinking, and on practical training in order to provide skill and competencies in laboratory work, forming a realistic view on the role and use of chemicals in medicine, in agriculture and in every day life.

Epidemiology (semester 9): General epidemiology is the introductory chapter of the subject *Infectious diseases* in the national curriculum (semesters 9 and 10). The source and spread of infections, conditions of infectious diseases, and effects of the pathogen, the host and the environment are discussed. Pathogenesis, diagnostics, treatment, prevention and control of infectious diseases including immuno-prophylactic methods, and eradication are analyzed.

Genetics (semester 4.): This subject deals with the function of hereditary material in cells, tissues, organs and both in healthy and diseased organisms (mainly in domestic animals) at molecular, individual and population levels. The subject matter is co-ordinated with physiology, biology (cellular biology), biochemistry, pathophysiology and pathology departments and, of course, animal husbandry.

Immunology: Introductory immunology is taught in physiology and the topic is essentially addressed as a major sub-discipline in microbiology (see under Physiology and Microbiology).

Microbiology (semesters 3-5.): Veterinary microbiology comprises four main fields of microbiology; bacteriology, mycology, virology, and immunology. It summarizes the main characteristics of bacteria, fungi and viruses including their morphology, resistance, molecular structure, virulence factors, antigenicity, and animal and human pathogenicity. The subject introduces the protective functions of the hosts to different microbes, and the humoral and cellular immune system, and provides the theoretical background of immune-prophylaxis against infectious diseases. Microbiology is based on the knowledge taught within chemistry, biochemistry, biology, histology and physiology. It provides a basis of the discipline of infectious diseases and helps students to better understand pathology, food hygiene, animal hygiene, clinical subjects, state veterinary medicine, and forensic veterinary medicine.

Parasitology (semesters 6-7.): This subject, consisting of theoretical and practical courses, is intended to familiarize students with the essential facts and concepts of veterinary parasitology, thus enabling them to control and prevent economic losses and parasitosis, and to improve animal welfare. The lectures discuss principal endo- and ectoparasites of domestic animals, which are of national or international importance to veterinary medical practice. Emphasis is placed on basic knowledge of parasite biology, epidemiology, pathogenesis, diagnosis, chemotherapy, and control of parasitic infections. The purpose of the practical courses is to highlight and expand knowledge on

important parasites presented in lectures, especially identification and diagnostics. During the practical work which follows the lectures the students become familiar with the methods of diagnosis, including the interpretation of results. They observe stages of parasites in blood, fecal samples and they prepare a range of specimens.

Pathological anatomy (macroscopic & microscopic) (semesters 5-8.): Emphasis is put on the close connection existing between functional and morphological changes and on etiological factors upon which basis these changes develop. General pathology describes the causes and the common nature of disease processes including the genetic and immunological disorders, inflammation, neoplasia, and malformation. Systemic pathology discusses the pathological changes of specific diseases according to the organ-systems and the whole pathology of certain infectious and non-infectious diseases in detail (e.g. fowl cholera, swine dysentery, etc.). Practical work (necropsy, histopathology, etc.) serves not only for demonstration, but students actively participate in this work with the aim of acquiring the necessary knowledge and skill to make a diagnosis and write records.

Pharmacology and Pharmacy (semesters 5-6): Veterinary pharmacology serves as a bridge between the basic and clinical subjects. Emphasis is put on the mechanisms of action (pharmacodynamics) and fate (pharmacokinetics) of the drugs and groups of drugs in the body, rather than, on factual knowledge (e.g. the dose, physical, and chemical characteristics, etc.) of the individual remedies. Interspecies variations in responses of the host to drugs are strongly stressed. Topics comprise drugs acting on the autonomous and central nervous system, circulation and respiration, digestive tract, excretion, endocrine system, and inflammation. A greatly accentuated part of the subject deals with chemotherapy (antineoplastic, antibacterial, antifungal, antiparasitic agents). Pharmacy (mainly as practical work) is incorporated into pharmacology and provides information about drug formulations, special drug delivery systems, drug handling and storage, development of drugs, and drug prescribing. Practical work also serve to endow the students with the basic skill in drug application and to perform pharmacokinetic experiments. One of the major goals of the subject is to help the students in orienting themselves in the plethora of drugs.

Physiology (semesters 3-4): The aim of physiology is to acquaint the student with the functional aspects of cells and organs, pinpoint species differences, and empower the student with the ability to decide whether or not a finding is normal or abnormal. In addition manual and problem solving skills are focused on. Topic list: physiology of blood, immunology, cardiovascular system, respiration, kidney, digestion, metabolism, endocrinology, reproduction, muscle, bone, nerve and the physiology of acid-base balance. Theoretical lectures, practical work, plus self directed education (SDE) are the forms of training applied.

Physiopathology (semester 5.): This subject is a bridge between basic studies and clinical subjects. It teaches the basic principles of diseases, and is divided in two parts: General and Specific Physiopathology. Theoretical lectures start with

the changes of homeostasis and the intermediary metabolism and continue with the specific changes of different organ functions. Theoretical lectures explain the pathological mechanisms occurring in large and small animals and in poultry species, as well. Examples are taken from clinical cases. Practical lessons include both demonstrations of the theoretical lectures and some details on clinical laboratory diagnostics (this is so because *Applied laboratory diagnostics* is only an elective subject not chosen by all students)

Scientific and technical information and documentation methods (semester 4.): This subject gives information about the following topics: Informatics, history, hardware and software, operating systems, Windows, word processing, spreadsheets, databases, presentations and graphics, utilities, networks, the Internet. (See *1a) remark to Table 4.1.3)

Toxicology (semester 7.): Toxicology deals with basic toxicological knowledge and the toxicokinetic profile and deleterious effects of xenobiotics on living systems. Among xenobiotics, the metals and metalloids, pesticides, feed-, water- and industry-related toxicants, household and commercial products, toxic gases, poisonous plants, and poisonous and/or venomous animals are discussed including their possible sources, mechanism of action, toxic effects (clinical signs, post-mortem findings), the diagnosis and differential diagnosis, and the treatment principles. It is a multidisciplinary subject which primarily encompasses areas of pharmacology, chemistry, physiology, biochemistry, pathophysiology, botany and pathology, and serves with information and factual knowledge clinical disciplines and food hygiene.

B. Animal production

Agronomy: The subject is taught in the national curriculum as *Botany* (semester 3.). The aim of the subject is to acquaint students with the most important poisonous plants and fodder plants, as well as with the basic plant taxonomy, which helps students to find out themselves in the world of plants. Furthermore, it provides basic knowledge on plant cultivation, conditions and requirements of plant-nutrition, on the biological role of mineral elements, on symptoms of their deficiency and on the fundamentals of soil science (origin, structure, livings, main types of soil and some practical problems /humus, pH, acidification, melioration/), common types of organic and inorganic fertilizers (benefits and disadvantage, main ecological factors affecting plant production, law of Liebig and of Mitscherlich, new perspectives and problems of plant biotechnology, methods, benefits and disadvantages of micropropagation, transgenic plants, GM-plants.

Animal behavior (incl. behavioral disorders) (semester 6.): This EU listed subject is taught under the name of “*Veterinary applied ethology*” by the Department of Animal Hygiene, Herd Health and Veterinary Ethology. *Veterinary applied ethology* is the branch of animal science, which on the basis of the description of the innate behavior of farm animals and pets, studies the behavior of animals kept in intensive farming systems or, in the case of companion animals, kept in the close vicinity of humans. It also studies the effects of housing, nutrition, and attendants’ care on the establishment of behavioral patterns. This subject also deals with the formation, prevention, and treatment of abnormal behavior (misbehavior, ethostasis) and describes ethical aspects of animal welfare. Veterinary applied ethology sets the foundation for *animal hygiene* (see later).

Animal husbandry (incl. livestock production systems) (semester 5.): Animal husbandry is a branch of applied biology including clinical genetics, breeding, improvement and management of farm, companion and pet animals with the goal of profitable animal production and improved health status. The course in animal husbandry teaches the general and specific significance of cattle, swine, sheep, goat, horse, poultry, dog, cat and fur animal breeding in the world and particularly in Central Europe. By the end of the course students will know the main productive characteristics of the internationally recognized breeds and types of the above mentioned species. The various methods of applied breed improvement and heritable diseases are discussed in detail according to the different species. The local aspects and facilities receive particular emphasis. The protection of the biodiversity and that of the local breeds receives emphasis. A two-week-long summer practice completes the teaching process. The subject is based on the general biological, biochemical and physiological knowledge taught in and during the first five semesters of the veterinary studies.

Animal nutrition and feeding (semesters: 6-7.): The subject consists of instruction in the field of the basics of animal nutrition, characteristics of feedstuffs, animal feeding, and nutrition. Students have to evaluate the effect of different feedstuffs and feed additives on the animals' health, production, and

reproduction, and should be able to formulate a balanced ration for all animal species; and also should be able to perform special consultancy in the field of extension service and clinical nutrition. The legislative aspects at the European level are a consistent part of the teaching material. A two-week-long summer practice completes the teaching process. Special emphasis is given to the veterinary clinical nutrition (dog, cat, horse) as well as to the nutritional elements of the herd health (pig, poultry, cattle, sheep, goat, fish). The approach is, in these cases, problem oriented teaching. Students are expected to know the most important trade marks in the field (synthetic amino acids, nutraceuticals, dog and cat commercial diets).

Animal protection and welfare: The EU-listed subject *Animal protection and welfare* is embedded into the following subjects from the national curriculum: 6 h lectures from State Veterinary Medicine and Forensic Veterinary Medicine (semester 9.), and 8 h lectures from Animal Hygiene (semester 8.).

In the eight lectures given by the staff of the Department of Animal Hygiene, Herd Health and Veterinary Ethology the undergraduates are instructed on the ethical liabilities of veterinarians. A survey is given on the present animal welfare acts of EU countries with which the Hungarian Animal Welfare Act is in full compliance. The Hungarian act is discussed at length (including e.g. welfare rules of keeping calves, pigs, minimum requirements for keeping laying hens, rules of plucking and force feeding, veterinary interventions permitted with no anesthesia, etc.). Four lectures are devoted to the rules of humane slaughter and the transport of animals.

Environmental protection: The EU-listed subject *Environmental protection* is part of the subject Animal Hygiene in the national curriculum with 14 h lectures. In the teaching curriculum of *Animal hygiene* (semesters 8-9.) 4 h lectures are devoted to describing air pollution and emissions from livestock systems with special emphasis on opportunities for reduction. The remaining 10 lectures deal with waste management of livestock operations, including the handling and treatment of high risk materials, classification and further treatment of rendering materials, and methods of manure handling. Special attention is paid to public health aspects and the sustainability of animal agriculture. Discussion of these items is in harmony with the relevant EU regulations, decisions, and directives.

Preventive veterinary medicine (incl. Health monitoring programs): The EU-listed subject *Preventive veterinary medicine* (incl. Health monitoring programs) is part of the subject *Animal hygiene* (semesters 8-9.) in the national curriculum with 44 h lectures. By definition, *Animal hygiene* is the branch of veterinary science which, relying on the knowledge of physiological and ethological (behavioral) demands of animals, describes the preconditions of health preservation and investigates the pathophysiological changes brought about by adverse environmental effects in order to gain information on the etiology and pathomechanism of multifactorial diseases.

On this basis, *Animal hygiene* systematizes the preventive veterinary measures with special reference to their economic consequences. *Animal hygiene* deals primarily with herds and health protection of the herds, therefore the subject is

more or less is equivalent to the subject “*Herd health*” taught in a number of veterinary colleges in the western hemisphere. *Animal hygiene* is an interdisciplinary science that bridges animal husbandry and veterinary medicine. Its curriculum includes the management and nutrition technologies of farm animals. The discipline also describes the multilateral effects of housing and nutrition on the health, and inherited behavioral characteristics of farm and companion animals, on the economy of their production, and on the rural environment. Based on this knowledge, undergraduates are trained to be able to critically analyze housing systems and nutritional regimes, to understand the etiology of management related diseases prevailing at herd level, and to apply methods of herd health management in order to prevent and control of multifactorial diseases of high economic consequences. It is seen from the foregoing that the teaching curriculum of *Animal hygiene* embraces *Animal protection and welfare*; *Environmental protection* and *Preventive veterinary medicine*.

Reproduction (incl. artificial breeding methods): To avoid repetition the description of this subject is given under the heading of Clinical subjects.

Rural economics: This EU-listed subject is built into *Agricultural economics* (semesters: 2-3.) in the national curriculum with 10 hours. The course hand-out covers the knowledge expected from students about rural economics and development. Part of the factual material changes yearly due to the EU joining process of Hungary. *Agricultural economics* is a special composition of classical agricultural economics and veterinary aspects. It provides special up-to-date knowledge to students in order to enable them to make decisions in or take a position on economic and management problems within the scope of veterinary activities, and it helps them to provide more effective services.

C. Clinical subjects

A general remark regarding clinical subjects: Practical work is organized both in the three Small Animal Clinics (main campus), and at the Large Animal Clinic at Üllő and involves the teaching staff of both locations. Lectures are also held by the staff of the Small Animal Clinics.

Anesthetics (as part of Surgery, semester 7.): The main topics of the subject are the followings: pre-anaesthetic examination, anesthetic risk, narcosis techniques, pre-medication, intravenous anesthesia, inhalation anesthesia-anesthetic machines, local anesthesia, principles of analgesia, and anesthesia of different species.

Clinical examination and diagnosis and laboratory diagnostic methods (= *Clinical diagnostics*) (semester 6.) covers: clinical examination methods, the main symptomatology of internal diseases, diagnostic process, report writing and presenting veterinary certificates of diseased animals. Practical work both on large and small animals is a strong part of this subject, greatly preferred by the students because they are becoming acquainted with living animals. Certain parts of Physiopathology (veterinary hematology, clinical biochemistry, diagnostic cytology, urinalysis, analysis of the ruminal fluid) contribute to the subject. Clinical examination methods on surgical and obstetrical patients are part of the relevant subjects (lectures and clinical work). Surgical diagnostic topics are taught in the framework of the General surgery (semester 8.) block (principles of surgical diagnostic procedures, specific methods of surgical diagnostics, general and detailed examination, and emergency patient examination).

Clinical medicine (= *Internal medicine*) (semesters: 7-9.): The major goal of this subject is to acquaint the students with the most relevant diseases, to teach how to master the diagnostic work-up of clinical cases, with special regard to the problem-solving approach, and to be able to apply the most important diagnostic and therapeutic interventions.

Lectures are aimed to provide information on (non-infectious) internal diseases (aetiology, pathogenesis, and therapy) of large animals (horse, ruminants, swine) and small animals (dog, cat). Clinical demonstrations on small animal patients are regularly provided during lectures. Practical work and demonstrations are organized to practice the most important therapeutic and diagnostic procedures. Clinical demonstrations for student groups are also held. The main aspects of infectious diseases are taught by epidemiology, whilst symptomatology, diagnosis, and therapy are discussed in the framework of internal medicine.

The following subjects of the national curriculum are parts of Clinical medicine.

Diseases of exotic pet animals (semester 8.): Lectures deal with the basic knowledge of keeping, housing and feeding birds, rodents and small mammals, and reptiles. The main aspects of this subject are the clinical examination and the diagnostic procedures (radiography, ultrasound, endoscopy etc.) of avian and exotic animals. The treatment of infectious diseases and non-infectious ones is

also addressed. Practical work is organized in the Division of Avian and Exotic Animals in the Clinic of Internal Medicine.

Fish diseases (semester 6.): Topics are technological aspects of fish production, as well as etiology, pathogenesis, diagnosis, therapy, and prophylaxis of fish diseases. (This subject is taught by a specialist in fish diseases)

Honey bees diseases (semester 7.): This subject is offered by the Department of Parasitology and includes the keeping and managing of honey bees, as well as etiology, pathogenesis, diagnosis, therapy, and prophylaxis of bee diseases.

Diagnostic imaging (=Radiology) (semester 7.): This subject is taught together with Anesthesiology including both the lectures and practical work. The main topics of the subject are the physical principles of radiology, radiation safety, small animal radiography of the vertebral column, the head, the extremities, the thorax, the abdomen, and radiography of large animals. Basic techniques in ultrasonography are part of the subject *Clinical diagnostics*. The ultrasonography of the genital organs is the focus of obstetrics.

Obstetrics. Reproduction (incl. artificial breeding methods). Reproductive disorders (semesters 8-10): Introductory lectures are given on the neuro-endocrine control of male and female reproduction. Further topics are the species-oriented discussion on female reproduction (including the cycle, pregnancy, and the course and care of delivery), obstetrical problems and neonatology, genital diseases (including the mammary gland) and malfunctions, as well as the herd-health aspects of their management (cattle, small ruminants, horse, swine, dog and cat). Andrology, artificial insemination and other related methods of assisted reproduction are also summarized.

The practical work and clinical demonstrations involve the manual aspects of gynecological, obstetrical and andrological examinations (including the genitals' ultrasonography), and the respective therapeutic approaches (including genital surgery and artificial insemination).

State veterinary medicine, zoonoses, public health and forensic medicine: This EU listed subject comprises the following subjects in the national curriculum.

Infectious diseases (semesters 9-10.): is taught as a synthesizing subject. After an introductory chapter on general epidemiology, all infectious diseases of animals caused by bacteria, viruses and prions are discussed. Occurrence, etiology, epidemiology, pathogenesis, clinical signs, pathology, diagnosis, differential diagnosis, treatment, prevention, control and eradication of the different diseases are summarized but aspects of food hygiene, veterinary administration, forensic veterinary medicine, and public health significance are mentioned, as well. The main aim of the subject is to develop the competence of recognition, diagnosis and control of infectious diseases. To reach this goal 135 lectures and 35 hours of plenary sessions are devoted to differential diagnosis of the diseases of the most important animal species.

State veterinary medicine (semesters 9-10.): During the lectures the structure and function of state veterinary services and the work and duties of veterinarians in the prevention and control of infectious and contagious diseases are

presented. Rules governing the use of veterinary medicinal products, the structure of laboratory systems, and aspects of veterinary public health are also dealt with. General preventive and controlling measures laid down by international organizations are discussed as well as animal health and animal welfare rules of animal keeping and domestic and international trade in live animals and animal products. The control and eradication of the most important identifiable infectious diseases are presented in detail.

Forensic veterinary medicine (semesters 9-10.) is a subject that applies veterinary knowledge from the point of view of jurisdiction. It encompasses legal and veterinary principles that are necessary for prospective veterinarians to be able to conduct their professional activity in such a way that the chance of litigation in connection with their service is minimized, to play an active advisory role aimed at preventing legal actions, and to participate effectively in legal proceedings as a forensic veterinary expert. The task of the subject is to provide students with some basic concepts about the role and functioning of the legal system in a civilized society in general, and to highlight the areas of special importance to veterinarians in particular. In addition to the theoretical basis of how expert activity is to be conducted, specific animal health problems are addressed and court cases or practical, real-life examples are utilized to illustrate the taught principles.

Surgery (semesters 8-10.): The major goals of the surgery course are to demonstrate and to provide practice in the most important diagnostic techniques and operation methods, especially those that can be performed in an everyday practice. General Surgery covers surgical diagnostics, shock, emergency patient examination, and wound management along with Radiology and Anesthesiology. Soft tissue surgery of small and large animals involves principles of operative surgery, surgery of the head and neck, thoracic and abdominal surgery, and surgery of the urinary system. Small and large animal orthopedics deals with surgical diseases of the bone and joints. Under the chapters on neurology the most relevant information on neuro-diagnostics and neurosurgery is provided.

Ophthalmology (semester 7.) of large and small animals includes both lectures and practical work to demonstrate to students and let them practice the basic methods of ophthalmologic examination and aspects of eye diseases.

Therapeutics: No such subject per se is included in the curriculum, rather therapeutic procedures and therapeutics are incorporated in the subject *Internal medicine*. In addition, basic information is provided within the obligatory subject *Pharmacology*, and in the elective, *Pharmacotherapeutics*. Epidemiology covers the control and prevention of infectious diseases, including immunotherapy topics, which also belong to therapeutics.

D. Food hygiene (semesters 8-10.)

This comprehensive subject aims to teach the theoretical knowledge and skills, which are indispensable for veterinarians to ensure and control adequate safety and quality of food in the whole food chain (primary production, food processing, distribution, and sale). Special emphasis is laid on the paramount concern of protecting human health (veterinary public health), the importance of risk based self-check programs, and the general and specific requirements of official controls at all stages of the food chain.

The EU-listed subject of Food Hygiene is taught in four interrelated parts including Fundamentals of Food Hygiene, Milk Hygiene, Meat Hygiene and Official Controls in Food Hygiene. A brief description of the teaching program is as follows:

Fundamentals of food hygiene: essentials of microbial growth, main pathogens in food, chemical food safety, food spoilage, principles of technology of food of animal origin, EU and national legislation, processing hygiene, and HACCP. The topics are taught in theoretical lectures (30 h) and in practical lessons (15 h).

Milk hygiene: basic knowledge of milk composition, microbial and chemical contamination of milk, hygiene of milking, technology and hygiene of milk and dairy production, and related regulations. This is taught in a series of lectures (15 h) and practicals (15 h).

Meat hygiene: composition, organoleptic properties and the quality of meat, meat plant construction and equipment, the technological hygiene of cattle, pig and poultry slaughter, veterinary ante and post mortem inspection, judgment of infectious diseases, parasitic infectious and metabolic disorders, inspection of rabbits, hares and game, fish and eggs, production technology, and the examination of meat products. The topics are taught in a series of lectures (45 h) and practically in a course (30 h).

Official controls in food hygiene: legislative background, main types and elements of official controls, approval of food establishments, veterinary controls on farms, establishments and during the marketing of products, and certification in food controls. This part is taught theoretically in a series of lectures (15 h).

E. Professional knowledge

Veterinary certification and report writing: Report writing and presenting veterinary certificates of diseased animals is an important part of the subject *Clinical diagnostics* (semester 6.). In addition, students have to write and present case reports on pathology during (semester 7-8.), surgery (including ophthalmology), and internal medicine (semesters 7-8.). Having performed the month long extramural summer clinical practice, students have to present two reports on the cases they handled of internal medicine and surgery, respectively. The teachers of the relevant departments evaluate these reports and certificates, and the student's achievement is taken into account during the final examination. The summertime clinical practice is extended also to the currently available obstetrical cases and veterinary interventions on genital organs, but writing a case report is not obligatory in this field.

Practice management: Practice management is an important part of the subject *Veterinary economics, management and ethics* (semesters 8-9.). This subject provides special up-to-date knowledge to veterinary practitioners in order to enable them to make decisions in or take up a position on economic and management problems within the scope of veterinary activities, and it also helps them to provide more effective services. The subject provides a solid framework of concepts, procedures, and data to support the decision-making process in optimizing animal health management. The main goal is to equip students with adaptable economic knowledge and perspective of veterinary practice (economic and environmental conditions of the veterinary business, the basic elements of veterinary business management and marketing, different management and marketing strategies of veterinary business, steps of the management process of veterinary business, the main elements of a business plan, basic elements of the balance making, marketing aspects of the veterinary business, the creation of the image of veterinary business, communicational methodologies, conflict management in veterinary business, financial and taxation aspects of veterinary business, etc). Teaching enables future veterinarians to:

- be able to recognize, analyze and use the economic principles which are valid in animal health work;
- be able to use in a progressive way the categories of a market economy, the principles in its functioning, thus ensuring practitioners the ability to shape their own lot and reach a higher income level;
- earn a better position in society and in the labor market by possessing business and organizational skills and concepts;
- be able to give financial and economic advice to livestock farmers and to be able to make decisions professionally on issues of development.

Professional ethics: Professional ethics is taught in different subjects. Five lectures are devoted to the topic in the framework of *Veterinary economics, management and ethics* ((semesters 8-9). Other topics of this subject are addressed in *State Veterinary Medicine and Forensic Veterinary medicine* (semesters 9-10.).

Veterinary legislation: Demonstration of the veterinary legislation process of Hungary and EU – as law, administration of justice, courts of law, law of contracts, warranty, law of torts, damages, legal proceedings in criminal and civil cases, evidence, the veterinarian as a witness, expert witness, expert report etc. are important parts of the subject *Forensic Veterinary medicine* (semesters 9-10.)

The semester covers 15 weeks, one unit of instruction is a 45-minutes period.
 PCG – Practical course grade; SFE – Semi-final examination, FE - Final examination

1st semester (1st year, Winter-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|-----------------------------|----------|-----------|-------|--------|
| Chemistry I. (inorganic) | 45 | 45 | SFE | 5 |
| Biophysics I. | 18 | 30 | PCG | 3 |
| Anatomy I. | 30 | 45 | SFE | 5 |
| Biology | 30 | 0 | SFE | 2 |
| Zoology | 30 | 0 | SFE | 2 |
| Biomathematics | 30 | 30 | SFE | 3 |
| History of Vet. Medicine | 15 | 0 | Sign. | 1 |
| | 198h | 150h | | 21 |

2nd semester (1st year, Spring-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|----------------------------------|----------|-----------|------|--------|
| Chemistry II. (organic) | 45 | 30 | FE | 6 |
| Biophysics II. | 30 | 0 | FE | 3 |
| Anatomy II. and Embryology I. | 30 | 45 | SFE | 5 |
| Histology I. | 30 | 30 | SFE | 3 |
| Botany | 45 | 45 | SFE | 4 |
| | 180h | 150h | | 21 |

3rd semester (2nd year, Winter-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|---------------------------------|----------|-----------|------|--------|
| Anatomy III. and Embryology II. | 30 | 45 | FE | 7 |
| Histology II. | 30 | 45 | FE | 5 |
| Biochemistry I. | 30 | 23 | PCG | 3 |
| Physiology I. | 60 | 23 | PCG | 3 |
| | 150h | 136h | | 18 |

4th semester (2nd year, Spring-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|--------------------------------------|----------|-----------|------|--------|
| Topographic & Applied Anat. | 15 | 30 | SFE | 3 |
| Biochemistry II. | 60 | 30 | FE | 6 |
| Physiology II. | 60 | 30 | FE | 6 |
| Animal Breeding and Genetics I | 30 | 30 | SFE | 3 |
| Informatics | 15 | 30 | SFE | 1 |
| Microbiology I+II (Bacter.+Virology) | 90 | 30 | PCG | 3 |
| | 270h | 180h | | 22 |

5th semester (3rd year, Winter-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|----------------------------------|----------|-----------|-------|--------|
| Animal Breeding and Genetics II. | 60 | 30 | FE | 6 |
| Pharmacology I. | 45 | 30 | PCG | 2 |
| Pathology I. | 60 | 30 | SFE | 4 |
| Microbiology III. (Immunology) | 45 | 30 | FE | 5 |
| Patho-physiology | 45 | 30 | SFE | 4 |
| Library informatics | 0 | 30 | Sign. | 1 |
| | 255h | 180h | | 22 |

6th semester (3rd year, Spring-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|---------------------------------|----------|-----------|------|--------|
| Pharmacology II. | 30 | 30 | FE | 7 |
| Pathology II. | 30 | 45 | PCG | 2 |
| Parasitology I. | 45 | 30 | PCG | 2 |
| Animal Nutrition + Dietetics I. | 38 | 30 | SFE | 3 |
| Clinical Diagnostics | 37 | 30 | SFE | 4 |
| Applied Ethology | 30 | 0 | SFE | 2 |
| | 210h | 165h | | 20 |

7th semester (4th year, Winter-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|--|----------|-----------|------|--------|
| Parasitology II. | 30 | 30 | FE | 5 |
| Animal Nutrition + Dietetics II. | 45 | 30 | FE | 6 |
| Pathology III. | 15 | 45 | PCG | 2 |
| Surgery I. (Gen. & Anaesth. & Radiol.) | 36 | 30 | SFE | 3 |
| Veterinary Medicine I. | 45 | 30 | PCG | 2 |
| Toxicology | 30 | 0 | SFE | 1 |
| Fish Hygiene and Diseases | 24 | 0 | SFE | 2 |
| Bee Hygiene and Health | 12 | 0 | SFE | 1 |
| | 237h | 165h | | 23 |

8th semester (4th year, Spring-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|---------------------------------|----------|-----------|------|--------|
| Pathology IV. | 15 | 45 | FE | 8 |
| Surgery II. (soft tissue) | 36 | 30 | PCG | 2 |
| Veterinary Medicine II. | 52 | 30 | PCG | 3 |
| Obstetrics & Reproduction I. | 45 | 45 | SFE | 3 |
| Animal Hygiene + Herd Health I. | 30 | 30 | PCG | 2 |
| Pet Animal Diseases | 24 | 0 | SFE | 3 |
| Food-Hygiene I. | 45 | 30 | SFE | 3 |
| Agrareconomics | 45 | 0 | SFE | 2 |
| | 292h | 210h | | 26 |

9th semester (5th year, Winter-term)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|---|----------|-----------|-------|--------|
| Surgery III. (Ophthalmology) | 12 | 30 | PCG | 2 |
| Veterinary Medicine III. | 36 | 15 | FE | 8 |
| Obstetrics & Reproduction II. | 45 | 45 | PCG | 2 |
| Animal Hygiene + Herd Health II. | 60 | 0 | FE | 4 |
| Food-Hygiene II. | 15 | 30 | PCG | 1 |
| State Vet. Medicine I. | 30 | 0 | Sign | |
| Forensic Vet. Med. I. | 15 | 0 | Sign. | |
| Epizootiology & infectious diseases I. | 75 | 15 | Sign. | |
| | 288h | 135h | | 17 |

10th semester (5th year, Spring-term)

(The semester covers 10 weeks of teaching at the campus followed by an extramural practice.)

| SUBJECT | LECTURES | WORKSHOPS | EXAM | Credit |
|---|----------|-----------|---------------|--------|
| Surgery IV. (Orthoped., Neurol.) | 24 | 30 | FE | 8 |
| Obstetrics & Reproduction III. | 30 | 30 | FE | 8 |
| Forensic Vet. Med. II. | 20 | 0 | FE | 4 |
| State Vet. Medicine II. | 30 | 0 | State exam | |
| Food- Hygiene III. | 30 | 0 | State exam | |
| Epizootiology & infectious diseases II | 60 | 20 | State exam | |
| | 194h | 80h | | 20 |

Extramural practicals following

- Semester 4: Animal breeding, 2 weeks
- Semester 6: Animal nutrition, 2 weeks
- Semester 8: Polyclinical pract., 4 weeks
- Semester 10:
 - Food Hygiene, 3 weeks
 - Laboratory diagnostics, 3 weeks
 - Vet. Administration, 2 weeks