UNIVERSITY OF BELGRADE

FACULTY OF VETERINARY MEDICINE

Bulevar oslobodjenja 18, 11000 Belgrade

SYLLABUS

SPECIALIST ACADEMIC STUDIES

OF VETERINARY MEDICINE

Belgrade, 2020

Study programme: Specialist academic studies of veterinary medicine

Course title: Methodology of investigations

Lecturers: Vitomir Ćupić, Full Professor; Milorad Mirilović, Full Professor; Sonja Radojičić, Full Professor; Vojislav Ilić, Full Professor

Course status: Obligatory

ECTS credits: 3

Prerequisites: Enrolled Specialist Academic Studies

Course aims are to provide basic knowledge regarding current methods in investigations, enabling students for a quick and easy approach in solving professional problems, to make them capable for making investigations plan, conducting and presenting results including its publishing.

Course outcomes Students shold be capable for individual creating and conducting investigations and experiments and for individual interpreatation of the results. The should also be able to present their results at professional mmetings and to prepare manuscripts for publication in professional and scientific journals.

Course content

Lectures

Selection of topic and problems for investigations. Trial and investigations. Professional and scientific problem – definition and subdivisions. Computer usage in investigations. Fundamental professional and scientific informatics, internet explorers, data bases for professional and scientific information, approach to documents and downloading. Introduction to statistics. Methods of data collecting. Statistical elements, descriptive statistical parameters, significance of differences and basic methods for their estimation. Investigations in clinical pathology and therapy of animals. Basical clinical disciplines. Modes of clinical investigations. Compatibility of animal's species. Clinical investigations planning and performing. Investigations in pharmacology and epizootiology. Classical (standard) sources of scientific and professional information. Fate of professional and scientific information. Manuscript publishing. Sections of professional papers and specialist thesis. Writting professional reports. Elements of text entry, processing and saving documents. Models of reference citing. Text corrections and correction symbols. The most frequent mistakes in professional texts writting. Creating PPt presentations and instructions for thesis defending.

Practicals

DON (additional forms of teaching)- Interactive lecturing on trial examples – preparing and investigatins design, statistical data processing, writting reports, text processing and presentation design.

Recommended literature

Savić J: Kako napisati, vrednovati i objaviti naučno delo u biomedicini, Kultura, Beograd, 1995.

Marušić Matko: Uvod u znanstveni rad u medicini, Medicinska naklada, Zagreb, 2008.

Pantelić D: Naučni metod, Vojnoizdavački zavod, Beograd, 1997.

Hours	**Lectures:** 2	**Practicals :** 0

Teaching methods Theoretical lectures and interactive teaching accompanied by audio-visual methods (PPt and films), practical work based examples from defined projects in which students were engaged.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	70
Participation in practicals	10	Oral exam	
Colloquium	10		
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Ethics and welfare

Lecturers: Marijana Vučinić, Full Professor; Vladimir Nešić, Full Professor

Course status: Obligatory

ECTS credits: 3

Prerequisites: Enrolled semester in which the course is taken

Course aims

Training of veterinarians to recognize conflict situations in society and veterinary practice that may disturb or actually disturb animal welfare, to resolve ethical dilemmas in the field of animal welfare in society and veterinary practice and to apply mechanisms to improve the welfare of different categories of animals.

Course outcomes

After completing the course, the trainee will be able to1) independently identify the conditions and situations in society and veterinary practice that may disrupt or disrupt animal welfare; 2) to resolve ethical dilemmas in veterinary practice and society that may disturb or disturb animal welfare; 3) to independently decide on certain mechanisms for improving animal welfare and to apply them in order to improve or preserve it, and 4) to independently decide on a vet role in society that would contribute to the improvement of animal welfare

Course content

Lectures

Different approaches to animal welfare. The concept of "One welfare". The scientific basis of animal welfare. Sociological foundations of animal welfare. Ethical foundations of animal welfare. Different approaches to animal welfare assessment. Conflict situations in society and veterinary practice that disrupt animal welfare and their resolution. The role of veterinarians in animal welfare.

Recommended literature 1) British Veterinary Association, 2016. Vets speaking up for animal welfare BVA animal welfare strategy. https://www.bva.co.uk/media/3124/bva-animal-welfare-strategy-final-version.pdf - 2) Lord KL, Millman ST, Carbone L., 2017. A model curriculum for the study of animal welfare in colleges and schools of veterinary medicine. JAVMA, 250 , 6, 632-640. – 3) Pinillos RG, 2018. One Welfare: A Framework to Improve Animal Welfare and Human Wellbeing 1st Edition. CABI. 4) Hernandez L., Fawcett A., Brouwer E. et al., 2018. Speaking Up: Veterinary Ethical Responsibilities and Animal Welfare Issues in Everyday Practice. Animals 8, 15; doi:10.3390/ani8010015. – 5) Meijboom FLB, 2018. More Than Just a Vet? Professional Integrity as an Answer to the Ethical Challenges Facing Veterinarians in Animal Food Production. Food ethics 1, 209–220. – 6) Vieira AP., Anthony R., 2020. Recalibrating Veterinary Medicine through Animal Welfare Science and Ethics for the 2020s. Animals 10, 654; doi:10.3390/ani10040654. – 7) Criscuolo F, Sueur C., 2020. An Evolutionary Point of View of Animal Ethics. Front Psychol. 11:403. doi: 10.3389/fpsyg.2020.00403. – 8) Gremmen B, 2020. Ethics views on animal science and animal production, Animal Frontiers 10, 1, 5–7.

Hours	**Lectures:** 2	**Practicals:** 0

Teaching methods

Theoretical classes with interactive work, group discussions, ethical discussions and workshops

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendance	30	Written exam	
Participation in practicals		Oral exam	70
Colloquium			
Seminars			

Knowledge assessment methods: Assessment of activities in theoretical classes, in group discussions and workshops

Study programme: Specialist academic studies of veterinary medicine

Course title: Standards of good clinical, veterinary, practice

Lecturers: Vojislav Ilić, Full Professor

Course status: Elective

ECTS credits: 8

Prerequisites: There are no conditions

Course aims

Introduction to soft skills and their place in the functioning of modern veterinary, kilnica, practice. Introduction to the basics of the skill of precise and efficient direct, face to face, communication. Introduction to the skill of persuasion and communication with dissatisfied "difficult" clients. Introduction to marketing and most resold, sales and after-sales activities. Introduction to the behavior of goods and services in the market and the concept of added value in the placement of goods and / or services. Introduction to the concept of "Continuous education dvm" source of need and ways and methods of realization of this concept.

Course outcomes

Students will have the basics of these skills at their disposal and will have reasons to curse, depending on their needs and capacities, skills that can improve the work of their business entities.

Course content

Lectures

Principles of andragogical and heutagogical methods in perfecting existing and mastering new skills, either hard or soft veterinary. Definition and elements of the communication process. Persuasion as the most important soft skill in communication with a specific client. Communication and how to prevent and / or remedy poor communication and customer dissatisfaction. Marketing, the oldest activity on the market. Elements of resale activities, market analysis, opportunities and impact on developments in a specific market of veterinary goods and services. Differences in the behavior of goods and services in the market and their characteristics that induce these differences. Promotional activities. Sales as a complex marketing activity. After-sales activities. Translating regular clients into the status of loyal clients and their importance for the growth of veterinary practice. Source and purpose of generating added value in the placement of veterinary goods / services.

Practicals

DON (additional forms of teaching)

SIR (study research work)

Resommended literature

Bransford J.D., Brown Ann and Cocking R.R., How People Learn, Nationla Acacemy Press, Washington D.C., ISBN 0-309-07036-8 2000; Silverman J, Kurtz S and Draper: Skils for Communicating with Patients, Redclif Publshing Ltd, Oxford, UK ISBN 1 85775 640 1, 2009; Jerving-Bäck Caroline and Bäck E., Managing a Veterinary Practice 2nd edition, Elsevier, Philadephia, USA, ISBN 10 0 7020 2820 7, 2007; Mercader P., Managment Solution For Veterinary Practices, ISBN 978-84-92569-58-8, 2012; Lee D., VeterinaryClincs, Small Animal Practica, Practice Management, ISBN 1-4160-3582-6, 2006; Schmidt Peggy, VeterinaryClincs, Small Animal Practica, Practice Management, ISBN 1-4160-4384-5, 2007 ;; Material available online (https://www.dvm360.com/). Explicit citation of sources could lead students to reach for the same sources and thus only consume the material offered in lectures. With this procedure, they are forced to find "their" sources and to critically incorporate them into their attitudes and answers on the exam.

Hours	**Lectures:** 4	**Practicals :** 2

Teaching methods

Classical lectures, preparation of seminar papers, short homework assignments, surveys. Discussion of the received answers, confrontation of attitudes of participants on those concepts which locate as especially important for their understanding and use.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	90
Colloquium	10		
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Standards of good laboratory practice

Lecturers: Dejan Krnjaić, Full Professor; Sonja Radojičić, Full Professor; Neđeljko Karabasil, Full Professor; Jakov Nišavić, Full Professor; Silvana Stajković, Assistant Professor; Slađan Nešić, Assistant Professor

Course status: Elective

ECTS credits: 8

Prerequisites: Enrolled semester in which the course is taken

Course aims

Acquiring knowledge about standards of good laboratory practice (primarily standard SRPS ISO / IEC 17025: 2017 - General requirements for the competence of testing and calibration laboratories), as well as their importance in veterinary medicine and veterinary public health.

Course outcomes

The candidate should be able to independently implement in practice the requirements of standard SRPS ISO/IEC 17025: 2017 - General requirements for the competence of testing and calibration laboratories, including general requirements, structure requirements, resource requirements, process requirements, and management system requirements.

Course content

Lectures

Standards - SRPS ISO/IEC 17025: 2017, SRPS ISO 9001:2015 Quality management systems — Requirements, SRPS ISO 17020:2012 Conformity assessment — Requirements for the operation of various types of bodies performing inspection, National legislation of the Republic of Serbia in the field of veterinary medicine and food and feed safety.

Practicals - fulfillment of requirements SRPS ISO/IEC 17025: 2017:

- general requirements - impartiality and confidentiality,
- structural requirements,
- resource requirements - general; personnel; facilities and environmental conditions; equipment; metrological traceability; externally provided products and services,
- process requirements - review of requests, tenders and contracts; selection, verification and validation of methods; sampling, handling of test or calibration items; technical records; evaluation of measurement uncertainty; ensuring the validity of results; reporting of results; complaints; nonconforming work; data management and information management,
- management system requirements - management system documentation; control of management system documents; control of records; actions to address risks and opportunities; improvement; corrective actions; internal audits; review by management review.

Recommended literature

SRPS ISO / IEC 17025: 2017 - General requirements for the competence of testing and calibration laboratories

SRPS ISO 9001:2015 - Quality management systems — Requirements

SRPS ISO 17020:2012 Conformity assessment - Requirements for the operation of various types of bodies performing inspection

Hours	**Lectures:** 4	**Practicals:** 2

Teaching methods

Formal lecture and Practical work

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	60
Participation in practicals	20	Oral exam	
Colloquium			
Seminars			

Knowledge assessment methods: written exam

Study programme: Specialist academic studies of veterinary medicine

Course title: Veterinary management

Lecturers: Drago N. Nedić, Full Professor; Milorad Mirilović, Full Professor; Spomenka Đurić, Assistant Professor; Branislav Vejnović, Teaching Assistant PhD

Course status: Elective

ECTS credits: 8

Prerequisites: No prerequisites

Course aims

The student should get acquainted with modern principles and methods of planning, organization, management and control in veterinary medicine, with the organization of production on the farm, with the economics of animal husbandry and management of epidemiological measures, animal health control and economic damage in veterinary medicine.

Course outcomes

After attending classes and passing the exam, the student will be able to make the right decisions in establishing and successfully conducting veterinary practice, to help farmers improve production on the farm, to manage epidemiological measures to control animal health and reduce economic damage from disease.

Course content

Lectures

The importance of the application of management in veterinary medicine, productivity control and animal health protection. Client management - the relationship of practice to the client and the patient, communication between veterinary legal entities, professional associations, local government and government agencies. Client management - assessment of client satisfaction and his role in promoting veterinary practice. Practical examples and application of basic management functions - planning and organizing. Practical examples and application of basic management functions - leadership and control. Legal conditions for opening a veterinary practice. Change management, significance and types of changes in veterinary practice, business culture and changes. Management and determination of efficiency in the work of veterinary subjects - income statement and balance sheet. Management and determination of efficiency in the work of veterinary subjects - cash flow and financial analysis. Application of financial management in the work of veterinary practice, management of cash, receivables and stocks. Veterinary services market management - service portfolio, method of financing veterinary services, price formation, determining the financial effect of the work of veterinary entities. Strategic management, predicting the future, defining the mission and goals of the development of veterinary practice. Investment management - determining the effectiveness of investments in the implementation of animal health control programs. Business decision making, application of certain tools and methods in strategic analysis and planning of animal health control - herd level and national level. Growth and development of veterinary practice in conditions of market competition. Organizing farm production in rural areas. Implementation of regular and extraordinary epidemiological measures for animal health control with an emphasis on zoonoses. Assessment and analysis of economic damage in the event of disease and implementation of veterinary measures.

Practicals

Development of a veterinary practice work plan, preparation of an organizational scheme, determination of the manner of conducting veterinary practice, simulation of control, simulation of relations with clients and relations of employees within the collective, farm management.

DON (additional forms of teaching)

Visit to veterinary practice: large, mixed and small practice. Tour of cows, pigs, sheep and poultry farms in order to acquaint students with experiences in organizing, planning, leading and controlling.

Recommended literature

1. Milan Tešić, Drago N. Nedić (2011): MANAGEMENT OF VETERINARY PRACTICE, textbook, Faculty of Veterinary Medicine, Belgrad.
2. Fejzić Nihad and Sabina Šerić, 2004, Animal Health Economics, University of Sarajevo, Faculty of Veterinary Medicine, Sarajevo;
3. Tešić M. Milan, Nedić N. Drago (2015): VETERINARY ECONOMICS. Textbook. Faculty of Veterinary Medicine, Belgrade;
4. Milan M. Tešić, Drago N. Nedić, Nada Tajdić (2013): Veterinary Economics - practicum. Textbook. Faculty of Veterinary Medicine, Belgrade;
5. Maggie Shilcock Georgina Stutchfield, 2008, Veterinary Practice Management, 2nd Edition, A Practical

Guide, Saunders Ltd., 256 pages			
Hours	**Lectures:** 2	**Practicals :** 1	**DON:** 2

Teaching methods

Theoretical classes with interactive learning, with the application of audiovisual techniques (Power Point, Keynote, ZOOM, Teams), practical classes through teamwork to solve set thematic tasks and DON visits to specific subjects in the field.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	15	Written exam	25
Participation in practicals	15	Oral exam	30
Colloquium and Seminars	15		

Knowledge assessment methods: Assessment of knowledge (max. No. 100 points): for teaching 10 points, for seminary work 20 points, on the test 70 points (min. 36). Points ratio and final grades: 51-60 (6), 61-70 (7), 71-80 (8), 81-90 (9), 91-100 (10). The method of knowledge assessment can be different: (written exams, oral exam, project presentation)

Study programme: Specialist academic studies of veterinary medicine

Course title: Biotechnology

Lecturers: Vladimir Dimitrijević, **Full Professor**; Mila Savić, Full Professor; Miloš Pavlović, Associate Professor; Zoran Stanimirović, Full Professor; Ružica Trailović, Associate Professor; Jevrosima Stevanović, Associate Professor; Anita Radovanović, Full Professor; Dragan Šefer, Full Professor; Radmila Marković, Full Professor

Course status: Elective

ECTS credits: 8

Prerequisites: Enrolled in the first semester

Course aims

To train students to apply natural principles and technological achivments into animal breeding, reproduction and control of animal health and to obtain knowlwdge on modern technologz in production of food of animal origineand environmental protection. Also students would gain knowlege in the field of modern tech nologies in Pedigree / Parentage and identity control.

Course outcomes

Student should aquire knowledge and skills in:

- Natural principles used in development of biotechnology
- Aquire knowledge on practical aplications and ethical implications of biotechnology applied in animal breeding and veterinary medicine
- To enable students tfor practical application in selective breeding, animal reproduction, nutrition, wellfare microbiology, veteriinary forensics and environmetal preservation,

Course content

Formal lecture

Introduction and historical development of biotechnology. Biotechnology in animal breeding and veterinary medicine. Genetic variability: sources, division, and methodology of assesment.Genetic markers applied in identification and parentage / pedigree testing. Gene diagnostic and therapy. Marker Assisted Selection (MAS) and quantitative traits. Basic principles of genetic engineering. Genetically Modified Organizms (GMO) method of production. Transgenic animals: bioreactors in pharmaceutical industry. Biotechnology of animal reproductioon: AI, MOET, embryo clonning, semen and embryo sexing. Genetic improovment of the breed. Effects of outbreeding and inbreeding. Biotechnology and conservation of biodiversity. Biotechnological alternatives and growth stimulation in animals (probiotics, prebiotics, phytobiotics, acidifying agents). Biotechnology and functional animal nutrition goaling for better quality of food of animal origine. Biotechnology and food supplementation in environmental protection (organic ligated microelements, essential fat acids). Social and ethical aspects of applied biotechnology.

Practicals

Introduction to laboratory for genetic manipulation. Introduction to genetic implications of application of different reproductive technologies. Introduction to molecular methods applied in parentage testing and identification. Molecular genetic methods applied in gene diagnostics and therapy. Modern methodology for domestic animals breeding value assesment. Practical work in the field animal food monnitoring in acredited laboratory for animal food evaluation.Biotechnological supplementation and optimization of animal nutrition.Molecular methods applied in health control of reproductive animals, esspecialy in genomic animals (producers of semen, ova and embryos)

DON (additional forms of teaching)

Upon elective field of specialization and personal interest of each student individual/small group workshops in selected field of biotechnology in aim to profound knowlege of interest.

Recommended literature

1. Vladimir Dimitrijević, Mila Savić, Ružica Trailović, Zsolt Becskei: Stočarstvo-farmske i socijalne životinje, FVM, Beograd, 2020.
2. **Niemann** Heiner,**Wrenzycki** Christine: Animal Biotechnology 1 Reproductive Biotechnologies, Springer International Publishing, 2018.
3. Ashish Verma, Anchal Singh: Animal Biotechnology 2nd Edition, Academic Press, 2020.
4. Naaz Abbas: DNA FORENSICS:Use in Animals, VDM Verlag Dr. Müller, 2010
5. Hasan Khatib: Molecular and quantitative *animal genetics,* John Wiley & Sons, Oxford, 2015.,
6. Heather Miller Coyle: Nonhuman DNA Typing: Theory and Casework Applications. International Forensic

Science and Investigation Series, CRC Press, 2007.
7. Nicholas FW: Intruduction to Veterinary Genetics, 3rd Edition, John Wiley & Sons, Oxford, 2009.
8. Radmila Marković, Branko Petrujkić, Dragan Šefer: Bezbednost hrane za životinje, drugo izmenjeno i dopunjeno izdanje, FVM, Beograd, 2018.

Hours	**Lectures:** 2	**Practicals :** 1	**DON:** 2

Teaching methods

Interactive lectures with audiovisual presentations; practicals in molecular-genetic laboratories, centres for AI and MOET, work with mentor

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	55
Participation in practicals	25	Oral exam	
Colloquium			
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Structure and function of cells, tissues and organs in physiological and pathophysiological conditions

Lecturers: Natalija Fratrić, **Full Professor;** Danijela Kirovski, Full Professor; Dragan Gvozdić, Full Professor; Milica Kovačević-Filipović, Full Professor; Sanja Aleksić-Kovačević, Full Professor; Darko Marinković, Associate Professor; Ivana Vučićević, Assistant Professor; Anita Radovanović, Full Professor; Danica Marković, Associate Professor

Course status: Elective

1. **ECTS credits:** 8

Prerequisites: Enrolled the first semester

Course aims
Connecting morpho-functional characteristics of the cell and tissue types of disorders that occur in them

Course outcomes
The student should understand the relationship between structure and function of appropriate types of cells and tissues as well as the mechanisms of formation and type of disorder that can develop in them. You must be aware of the basic control mechanisms involved in regulating the activity of cells and tissues in normal and pathological conditions. The student should also consider the dependence of the change of the molecular to the macroscopic level in certain types of disorders in organ functions.

Course content
Lectures
Morpho-functional characteristics of different types of tissue cells and intercellular interactions. Basic metabolic pathways in cells and tissues of mammals. Antioxidant cellular mechanisms. Histocompatibility complex (Major Histocompatibility Complex). Receptor system in the organism and signaling molecules. The cell cycle and its disorders. Degeneration and cell death. Inflammation and proinflammatory cytokines. Mutations and oncogenesis. Basic elements Neuroimmunomodulation. Morpho-functional changes in certain diseases of the digestive, respiratory, cardiovascular, nervous, urinary, reproductive, endocrine and hematopoetic system.
Practicals
Comparative analysis of microscopic tissue samples of healthy and altered tissues and organs in various animal species. Introduction to the basic methods of determining the antioxidant status of cells. Methods for the determination of certain cytokines. Methods for the analysis of numerous hematological parameters. The basic methods of laboratory diagnostics of particular organ disorders.
DON (additional forms of teaching)

Recommended literature
Stojic V, Veterinarska fiziologija, Naučna KMD, Belograd, V izdanje, 2010.
Sjastaad OV, Hove K, Sand O: Physiology of domestic Animals, Scandinavian Veterinary Press, Oslo, Norway, 2nd edition, 2010

1. Tizard IR: Veterinary Immunology, 10th edition, 2017.
2. Božić T, Gvozdić D, Kovačević-Filipović M, Jovanović I, stevanović J, Kirovski D, radovanović A, Andrić N, Trailović D: patološka fiziologija domaćih životinja, Naučna KMD, Beograd, 2012
   Kovačević-Filipović M, Gvozdić D, Sapasojević-Kosić Lj, Andrić-Francuski J, Božić T: Praktikum iz patološke fiziologije domaćih životinja, naučna KMD, Beograd, 2016
   Ross M.H., Pawlina W.: Histology: A Text And Atlas With Correlated Cell and Molecular Biology, 6th edition, Lippincott Williams & Wilkins, Baltimore;Wolters Kluwer business. Philadelphia, 2011
   Pathologic Basis of Veterinary Disease, 6th ed, Zachary J (editor), Elsevier, 2016
   Jubb, Kennedy and Palmer's: Pathology of Domestic Animals, 3-Vol. Set, 6th ed, Maxie G (editor), Elsevier, 2015
   Jovanović M, Aleksić-Kovačević Sanja, Knežević M: Specijalna patologija, udruženje veterinarskih patologa, Serbia, Beograd, 2019.

Hours	**Lectures:** 2	**Practicals:** 1	**DON:** 2

Teaching methods
Theory lessons with interactive learning with the use of audiovisual methods, practical education in laboratories (experimental biochemistry, physiology, cell cultures, histology, pathology), independent research.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	20
Participation in practicals	20	Oral exam	20

Colloquium	20		
Seminars	10		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Infection and mechanisms of defense against infectious agents			
Lecturers: Nenad Milić, Full Professor; Dejan Krnjaić, Full Professor; Zoran Kulišić, Full Professor; Dušan Mišić, Full Professor; Jakov Nišavić, Full Professor; Marina Radojičić, Associate Professor; Andrea Radalj, Assistant Professor			
Course status: Elective			
ECTS credits: 8			
Prerequisites: Enrolled semester in which the course is taken			
Course aims Acquiring knowledge about the process of infection, etiopathogenesis and defense mechanisms against bacterial, viral, fungal and parasitic infections.			
Course outcomes The student should be able to explain the role of pathogenic microorganisms and parasites in the etiopathogenesis of infections in animals; immune responses to antigens of microorganisms and parasites during infection and after vaccination; basic principles of vaccine and hyperimmune sera preparation; basic methods of microbiological and parasitological diagnostics and to be able to apply appropriate diagnostic methods for the identification of infectious agents and parasites.			
Course content *Lectures* Infection; basic characteristics of the most important bacterial, viral, fungal and parasitic infections of animals; Natural (non-specific) resistance to infection; Immunity, acquired (specific) resistance to infection; Immune reactivity in bacterial, viral, fungal and parasitic infections; Methods of laboratory diagnostics and immunoprophylaxis of infectious diseases of animals. *Practicals* Serological reactions and biological examination in the diagnosis of infectious diseases of animals and determination of infectious agents using polymerase chain reaction. *DON (additional forms of teaching)* 30 class hours			
Recommended literature 1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd. 2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd. 3. Abbas A., Lichtman A. H., Pillai S. (2017) Cellular and Molecular Immunology, 9th Edition, Elsevier. 4. Tizard I. (2017) Veterinary Immunology, 10th Edition, Saunders. 5. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier. 6. MacLachlan N.J., Dubovi E.J. (2016) Fenner's Veterinary Virology, 5th Edition, Academic Press. 7. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier. 8. Roberts L. S., Janovy J., Schmidt G.D. (2008). Foundations of Parasitology, McGraw-Hill			
Hours	**Lectures:** 2	**Practicals:** 1	**DON:** 2
Teaching methods Formal lecture, Practical laboratory work			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	60
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	20		
Knowledge assessment methods: seminar paper, written exam			

Study programme: Specialist academic studies of veterinary medicine

Course title: Composition and properties of foods

Lecturers: Dragan Vasilev, **Associate Professor**; Snežana Bulajić, Full Professor; Mirjana Dimitrijević, Full Professor; Neđeljko Karabasil, Full Professor; Radoslava Savić Radovanović, Assistant Professor; Silvana Stajković, Assistant Professor; Nikola Čobanović, Teaching Assistant PhD; Branko Suvajdžić, Teaching Assistant PhD; Tijana Ledina, Assistant Professor

Course status: Elective

ECTS credits: 8

Prerequisites: Enrolled first semester

Course aims

Student deepen specific knowledge about the composition and properties of meat, milk, fish, game meat, honey, eggs as well as their products, which are acquired during basic studies and to enable their efficient application in the preparation of specialist work and further professional work.

Course outcomes

Upon successful completion of classes, students should be able to:
- Describe the composition and properties of meat, milk, fish, game meat, honey, eggs and their products.
- Know the quality parameters of food of animal origin which are defined by appropriate regulations.
- Know the principles of food labeling.
- To interpret the results of testing the food quality parameters and content of the food labels in accordance with the relevant regulations.

Course content

Lectures

Structure and composition of meat, postmortem changes of skeletal muscles, meat maturation, properties of meat and meat products. Division of meat products and quality parameters of minced meat, meat preparations and meat products. Composition and properties of milk and milk products, division and quality parameters of milk products. Structure, composition and properties of edible tissues of fish and fish products. Meat of game and exotic animals. Structure, composition and properties of eggs and egg products. Composition and properties of honey. Food labeling.

Practicals - DON

Assessment of food quality parameters in accordance with appropriate regulations. Checking the correctness of food declarations in accordance with the relevant regulations.

Recommended literature

1. Teodorović V., Karabasil N., Dimitrijević M., Vasilev D., 2015, Higijena i tehnologija mesa, Fakultet veterinarske medicine Beograd. 2. Teodorović V, Bunčić O, Karabasil N, Dimitrijević M, Vasilev D., 2012, Higijena i tehnologija mesa, Praktikum, FVM, Beograd. 3. Vuković, I, 2012, Osnove tehnologije mesa, 4. izdanje, VKS, Beograd; 4. Katić V. i Bulajić S., 2018, Higijena i tehnologija mleka, Fakultet veterinarske medicine Beograd. 5. Teodorović V: 2007, Higijena mesa divljači i egzotičnih životinja, FVM, Beograd. 6. Baltić M, Teodorović V: Higijena mesa riba, rakova i školjki FVM, Beograd, 1998. Cesarettin Alasalvar, Kazuo Miyashita, Fereidoon Shahidi, Udaya Wanasundara, 2010: Handbook of Seafood Quality, Safety and Health Applications, 2010, Wiley-Blackwell.

Hours	**Lectures:** 2	**Practicals:** 1	**DON:** 2

Teaching methods

Theoretical classes using Power Point presentations. Practical classes in food production facilities and laboratories.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	80
Participation in practicals	10	Oral exam	
Colloquium			
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Introduction to the reproduction of farm and social animals

Lecturers: Miloš Pavlović, Associate Professor; Slobodanka Vakanjac, Full Professor; Vladimir Magaš, Associate Professor; Milan Maletić, Assistant Professor; Miloje Djurić, Assistant Professor; Ljubodrag Stanisić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 15

Prerequisites: Attended classes of compulsory subjects and elective subjects of the first semester

Course aims

Introduction to the basics and specifics of physiology and pathology of reproduction of farm and social animals.

Course outcomes

Students will acquire the following knowledge: knowledge of sexual cycles of domestic animals, endocrinology of pregnancy, specifics of parturition by species, specifics of sterility in ruminants, ungulates, pigs, carnivores, dogs and cats, basic quality parameters of sperm and sperm preservation.

Course content

Lectures

Principles of physiology and neuroendocrine regulation of reproduction, sexual cycle, hormonal status in pregnancy, pregnancy diagnosis, parturition, stages during parturition and their specifics in different species, causes of sterility in female domestic animals, andrology, sperm quality analysis and methods of sperm conservation in domestic animals.

Practicals

SIR, Practical review of the ultrasound application in diagnosis of physiological and pathological conditions of domestic animals. Analysis and evaluation of the quality of fresh and deep - frozen sperm/semen, determination of the phase of the estrus cycle of bitches, review of clinical obstetric cases.

Reccomended literature

1. Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
2. Hafez B, Hafez E.S.E.: Reproduction in farm animals Lea&Febiger, 2000.
3. Pavlović V, Pavlović M, Vakanjac S: Dijagnostika graviditeta domaćih životinja, 2010.
4. Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
5. Pavlović V et al.. Porodiljstvo, sterilitet i veštačko osemenjavanje, 2018.

Hours	**Lectures:** 4	**Practicals :** 2	**DON:** 4

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the ultrasound cabinet, cytology and andrology laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Instrumental methods of diagnostics and therapy of animal diseases

Lecturers: Nikola Krstić, Full Professor; Mirjana Lazarević Macanović, Full Professor; Vanja Krstić, Full Professor; Marko Mitrović, Assistant Professor; Predrag Stepanović, Associate Professor

Course status: Elective

ECTS credits: 15

Prerequisite: Attended classes in compulsory courses and two elective coursesof free choice in the first semester

Course aims

Introduction to practical aspects of application of modern instrumental techniques andmethods in clinical diagnosis and treatment of diseases of small animals and horses. These aspects also expand knowledge about the physical principles and techniques of performing numerous imaging diagnostic and physical procedures, as well as their possibilities and limitations in the diagnosis and treatment of various pathological conditions. In addition, the goal is to provide postgraduate students with more detailed and broader knowledge about the effects of ionizing radiation at the molecular level, radiological reactions, as well as about the factors that affect the degree of damage to the organism.

Course outcomes

Upon completion of the course, students should have a comprehensive knowledge of the principles of functioning of individual devices and technical systems used in the diagnosis and treatment of various diseases of small animals and horses, andthey should also acquire operational knowledge and skills necessary to work with biomedical instrumentation (systems for computerized x-ray and tomographic diagnostics, ultrasound diagnostics, electrodiagnostics, endoscopic diagnostics, as well as physicaltherapy).

Course content

Lecures

X-ray room (basic principles of construction). X-ray device (basic and auxiliary parts). Nature and formation of x-rays. Basic properties of x-rays. Interaction of x-rays and matter. Biological effects of x-rays. Radiological damage at the cell level: changes in the membranes; sail sensitivity; chromosomal aberrations; synthesis processes; cell division; lethal effects. Effect of radiation on tissues. Division of biological effects of ionizing radiation: somatic effects of radiation; teratogenic effects; genetic effects; stochaistic and nonstochaistic effects. Principles of protection from ionizing radiation and from high voltage. The origin and characteristics of x-ray image.

Basic and special imaging techniques in diagnostic radiology. Native and contrast methods of x-ray examination, basics of interpretation of x-ray image. Fundamentals of x-ray anatomy. Fundamentals of x-ray physiology. Elements of x-ray pathology. Possibilities and limits of x-ray examination. Digital radiography (computerized and direct digital radiography). Scintigraphy, computerized tomography, magnetic resonance imaging. Physical properties of ultrasound, interaction of ultrasound and matter. Ultrasound devices, types of ultrasound probes. Ultrasound image (ways of displaying of the image on the display, orientation, balancing and interpretation of the image). Artifacts in ultrasound imaging. Basic principles of Doppler ultrasonography. ECG (performance technique and interpretation). Endoscopy. Basics of physical therapy and mechanisms of application of different types of energy. Devices for electrotherapy, magnetotherapy, phototherapy and ultrasound therapy.

Practical classes. Mode of work in the x-ray room, handling of an x-ray device. Influence of imaging parameters (Kv, mA and exposure time) on the x-ray image quality. Patient positioning during x-ray examination. Radioscopy. Radiography. X-ray constants (focus-object distance, focus-film distance and object-film distance). Digital radiography. Alternative imaging techniques. Computed tomography. Native imaging. Contrast-enhanced imaging, Ultrasonic device handling and image orientation and interpretation. Recognition of artifacts in ultrasound imaging.

Basics of Doppler ultrasonography, mastering the technique of electrocardiography andECG interpretation. Mastering the technique of endoscopy. Tissue samplingduring endoscopy.

Application technique of low frequency (direct and pulse), medium frequency and high frequency currents, galvanofaradization, diadynamic currents, sinusoidal modulated currents, TENS currents, ultra-rise currents and interference currents. Clinical application of inhomogeneous low frequency magnetic field. Application technique of stimulated light (laser), linear-polarized light (bioptron lamp) and ultrasonic waves. Application technique of infrared and ultraviolet light.

Recommended literature

1. Bockstahler, B, Levine, D, Millis, D. (2004), *Essential Facts of Physiotherapy in Dogs and Cats – Rehabilitation and Pain Management*, Babenhausen: BE VetVerlag
2. Burk, R. R, Ackerman, N. (1996), *Small Animal Radiology and Ultrasonography – A Diagnostic Atlas and Text*, Philadelphia: W. B. Saunders Company
3. Krstić N, Lazarević Macanović, M. (2002), Practicum in Radiology for Students of Veterinary Medicine, Belgrade: publishers authors
4. Krstić, N, Lazarević Macanović M, Milošević, H. (2014), *Physical Principles of Radiological and Ultrasound Diagnostics*, Belgrade: publishers authors
5. Nyland, T. G, Mattoon, J. S (2002), Small Animal Diagnostic Ultrasound, Philadelphia: W. B. Saunders
6. Tams, R. T (1999), *Small Animal Endoscopy*, Philadelphia: Mosby
7. Thrall, D. E. (2013), Textbook of Veterinary Diagnostic Radiology (6th ed.), Philadelphia: Saunders
8. Tobias, R, Nautrup, C. P (2000),*An Atlas and Textbook of DiagnosticUltrasonography of the Dog and Cat*, Boca Raton: CRC Press
9. Šehić. M. (2014), *Physical Therapy and Rehabilitation of the Dog*, Zagreb: Faculty of Veterinary Medicine

Hours	**Lectures:** 4	**Practicals:** 2	**DON:** 4

Teaching methods

Theoretical teaching with interactive learning with the application of audio-visual methods (PowerPoint presentations, films, radiographs and ultrasonograms), practical work incabinets for radiology, physical therapy, endoscopic and ultrasound diagnostics.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	60
Participation in practicals	30	Oral exam	
Colloquium		...	
Seminars			

Knowledge assessment methods: can be differentand only some of themare listed in the table (written exams, oral exam, project presentation, seminars, etc.)

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical pathology of social animals

Lecturers: Milica Kovačević Filipović, Full Professor; Sanja Aleksić Kovačević, Full Professor; Dragan Gvozdić, Full Professor; Olivera Valčić, Assistant Professor; Darko Marinković, Associate Professor; Svetlana Milanović, Associate Professor; Jelena Francuski Andrić, Assistant Professor; Natalija Milčić Matić, Research Fellow; Milena Radaković, Research Fellow

Course status: Elective

ECTS credits: 15

Prerequisites: none

Course aims

Systematization of hematological, biochemical, endocrinological and cytological changes that occur during various diseases in order to establish a correct diagnosis of the disease.

Course outcomes

Students are expected to 1. practically perform manual hematological methods, urine examination and cytological preparations; 2. interpret the obtained results in the light of the clinical decision on therapy; 3. devise a further laboratory diagnostic plan; 4) draw up a plan for checking the quality of laboratory results and ensure the safety of work in the laboratory.

Course content

Lectures

Laboratory methodology, analysis of anemia, polycythemia, leukogram, hemostasis disorders. Artifacts of laboratory analyzes of blood and urine. Determination of blood groups. Neoplasms of the hematopoietic system. Differential diagnosis of dysproteinemia, dyslipidemia. Cytological diagnosis. Effusion analysis. Clinical enzymology. Analysis of hematological and biochemical changes during diseases of the endocrine, digestive and urinary tract. Diagnosis of disorders of water, electrolytes and acid-base balance. Hematological and biochemical changes in the most common poisonings.

Practicals

Proper sampling for hematological and biochemical tests and urine tests. Making a buffy-coat. Blood count analysis. Plate agglutination test. Analysis of hemostasis disorders. Analysis of serum and plasma biochemical test results as part of case analysis. Analysis of urine and feces, analysis of body fluids. Analysis of hormonal status results. Electrophoresis analysis. Making cytospin preparations without cytocentrifuge. Analysis of cytological preparations. Urine sediment analysis. Electrophoresis analysis. Creating algorithms for diagnosing individual disorders.

DON (additional forms of teaching) Daily work in the laboratory for clinical pathology with laboratory stuff

SIR (study research work) Work with a mentor in the field of clinical pathology

Reccomended literature

1. Harvey JW: Veterinary hematology, 5th Edition Elsevier Saunders, 2012.
2. Meyer DJ, Harvey JW: Veterinary laboratory medicine, 3rd Edition, Saunders, Philadelphia, 2004.
3. Duncun and Prasse's: Clinical pathology, 5th edition, Wiley-Blackwell Publishing, 2011.
4. Weiss DJ and Wardrop KJ: Schalm's veterinary hematology, 6th edition, Wiley-Blackwell, 2010.

Hours	**Lectures:** 4	**Practicals :** 2	**DON:** 4

Teaching methods

Theoretical teaching with interactive learning, with the application of audio-visual methods (PowerPoint presentations, films), demonstrations and practical teaching in the laboratories of the faculty.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	60
Participation in practicals	20	Oral exam	
Colloquium	10		
Seminars	10		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Health care and management of farm animals

Lecturers: Ivan Vujanac, Associate Professor; Radiša Prodanović, Assistant Professor; Jovan Bojkovski, Full Professor; Danijela Kirovski, Full Professor; Radmila Resanović, Full Professor; Milorad Mirilović, Full Professor; Dragan Šefer, Full Professor

Course status: Elective

ECTS credits: 15

Prerequisites:

Attended classes in compulsory subjects and elective subjects in the first semester, Standards of good clinical practice, Structure and function of cells, tissues and organs in physiological and pathophysiological conditions and Infection and mechanisms of defence of the organism from infectious agents.

Course aims

The aim of the course is to acquire specialist knowledge in health care and clinical pathology of farm animals, to consider and diagnose health problems of the entire herd as one patient, with special emphasis on animal health during high pregnancy and early puerperium (transition period), health and upbringing of newborns and young. . The aim of the course is to educate students for proper management and leadership of production - reproductive processes in organised farm production. Application and use of digital technologies in order to control health status and production results. Introduction to economic indicators important for assessing profitability in organised farm production. Acquiring additional knowledge about modern scientific norms on farm animal nutrition.

Course outcomes

Upon successful completion of this course, the student should recognise and diagnose health disorders that reduce the profitability of farm production and should be able to apply preventive and therapeutic measures; Develop a plan and program of immunoprophylactic measures; Correctly interprets and uses data on organic constituents of milk and assessment of physical condition for the purpose of assessing the energy and health status of farm animals; Independently assesses the economic profitability and profitability of organised farm production.; Analyses and corrects the meal for a given animal species and production category and applies dietary measures in solving health problems.

Course content

Lectures

Classification and determination of economic damage, Importance of economics in animal health control and herd productivity, Economics of veterinary - sanitary measures on farms, Economic analysis and management in mass production, Physiological features of nutrition of different production categories and types of farm animals, Utilisation and choice of nutrients , The most common nutritional and metabolic disorders and dietary measures, Pro-nutrients in the diet of farm animals, Health status of cows in the permpartum - transition period, Physiological mechanisms of adaptation of cows to high milk yield, Assessment of health and energy status of high-milk cows based on assessment of physical condition and organic components of milk, Assessment of vitality and health status of newborn calves and heifers before mating (development of immunoprophylaxis plan), Preventive measures for health care on pig farms (development of immunoprophylaxis plan), non-specific factors on the health status of ruminants and pigs in farm production, Assessment of the health status of sows before and after farrowing.

Practicals

Practical calculation of economic effects in mass production (Excel), Determining the needs for certain species and production categories of farm animals, Use of nutritional tables of different nutrients, Composition of meals, Analysis and correction of meals, Corrective nutrition in nutritional and metabolic disorders. Work with subject teachers and associates on ruminant and pig farms.

Recommended literature

Tešić M. Milan, Nedić N. Drago, 2015, Veterinary Economics. Textbook. Faculty of Veterinary Medicine, Belgrade;

Marković R., Petrujkić B., Šefer, D .: Animal food safety, Faculty of Veterinary Medicine, 2018.

NOVUS: Nutrition of hyperprolific sows, Novus International, Editorial Agricola Espanola, S.A., 2019.

Radostits Otto M., Clive C. Gay, Kenneth W., Hincheliff, and Peter D .: Veterinary medicine, A textbook of disease of cattle, horses, sheep, pigs, and goats, Saunders Elsewere, 2010.

AndrewsA.H., BloweyR.W., BoydH., EddyR.G. Bovine MedicineDiseases and Husbandry of Cattle. Blackwell

Science Ltda Blackwell Publishing Company, 2004. Second edition.
Swayne DE, Boulianne M, Logue CM, McDougald LR, Nair V, Suarez DL, de Wit S, Grimes T, Johnson D, Kromm M, Prajitno TY, Rubinoff I, Zavala G, 2019, Diseases of Poultry, 14th Edition, John Wiley & Sons

Hours	**Lectures:** 4	**Practicals:** 2	**DON:** 4

Teaching methods

Theoretical teaching with interactive learning, with the application of audio-visual methods (PowerPoint presentations, films), practical work in teaching bases with which the Faculty has signed a cooperation agreement.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium			
Seminars	10		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Surgical methods in the diagnostic and treatment of animal diseases

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ECTS credits: 15

Prerequisites: Fulfilled pre-examination obligations in the previous semester

Course aims

Acquisition of practical necessary skills for the application of surgical methods in the diagnosis and treatment of animal diseases in accordance with the plan and program of specialization.

Course outcomes

Upon conclusion of the course "Surgical methods in the diagnostic and treatment of animal diseases", the trainee should be trained in surgical care of patients in emergencies, have the basic surgical techniques in soft tissue surgery, orthopedics and ophthalmology, as well as properly assess and apply adequate surgical methods. diagnostic and therapy of animal diseases.

Course content

Lectures

Anesthesia, monitoring and surgical care of semy-traumatized patients, abdominal surgery, basic surgical techniques in orthopedics, surgical techniques in ophthalmology, oncological surgery, reconstructive surgery, endoscopic surgery, application of biocompatible materials in veterinary surgery, expert surgery.

Practical teaching

Practical work and duty in the outpatient clinic, operating rooms of the Clinic. Presentation of characteristic cases from the areas envisaged by the specialization plan and program

DON

Recommended literature

1. *Small Animal Surgery*. 5th Edition, *Theresa Fossum, 2018.*
2. Textbook of Small Animal Surgery, 3rd Edition, Slatter, 2003.
3. Handbook of Small Animal Orthopedics and Fracture Repair Brinker, Piermattei and Flo's, 2015.
4. Advances in the Canine Cranial Cruciate Ligament, 2nd Edition, Peter Muir, 2018.
5. Veterinary Surgery: Small Animal 1st Edition, Karen Tobias Spencer Johnston, 2011.
6. P. Milosavljević, Special surgery of large animals in field conditions, Tebinje, Ljubostinja, 2017.
7. J. Vasić, General Surgery, second edition, Belgrade, 2018.

Hours	**Lecurers:** 4	**Practicals:** 2	**DON:** 4

Teaching methods

Interactive teaching with the use of audio-visual methods (PowerPoint presentations for each lecture, films). Work in the operating room and the department for experimental surgery.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	**Points**	**Final exam**	**Points**
Lectude attendence	10	Written exam	
Participation in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: General epizootiology

Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor

Course status: Elective

ECTS credits: 15

Prerequisites:

Course aims is to acquire basic epizootiological principles that are related to the knowledge of the epizootiological determinants, their effects as far as foreseeing of the events and follow up of the health disturbance due to infectious and parasitic diseases, as well as non-infectious and non-parasitic animal health issues, changing in animal industry productivity and effects of epizootiological determinant to animal wellbeing.

Course outcomes: On the basis of epizootiological determinants data and data analysis, biological basis of the health and productivity disturbance, student should be able to recognize what kind of epizootiological research there is to be applied; to define spatial and temporal disease and productivity disturbance distribution in the population of susceptible animal species; using results of the study, the student should be able to perform observational as well as analytical studies, to define and apply animal health scheme and to perform risk analysis of the disease and productivity disturbance; to evaluate effects of particular epizootiological determinants to the disease productivity disturbance in animal species population occurrence.

Course content

Lectures: consist of topics as follows: Introduction and general epizootiology terms; Types of epizootiological studies; Epizootiological determinants; Frequency and biology of the diseases and animal productivity disturbances; Spatial and temporal of the disease and productivity disturbance in animal production distribution; Epizootiological data and their analysis; Observational and analytical epizootiological studies, Comparative epizootiology; Risk analysis.

Practicals:

- Field and clinic data analysis, role of particular epizootiological determinants on the disease and productivity disturbance in animal population occurrence,
- Application of the epiziootiological data and decision making process concerning type of epizootiological study to use in particular case of disease and productivity disturbance
- Analysis of the frequency and risk analysis of the disease and productivity disturbance occurrence
- Practical application of the animal health schemes

DON (additional forms of teaching)

Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveilance.

SIR (study research work)

Recommended literature

Valčić M: Opšta epizootiologija, autorsko izdanje, 1998.
Thrusfield, MI: Veterinary epidemiology, Bleckwell,
Martin W et al: Veterinary epidemiology, principles and methods, Iowa St. Univ. USA 1987
Dohoo I et al: Veterinary epidemiology research. AVC Inc. Charlettotown, Canada, 2003

Hours	**Lectures:** 4	**Practicals:** 2

Teaching methods

Power point presentation, student essay work, practical work in epizootiological laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50
Colloquium			
Seminars	50		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Epizootiology methods

Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor; Miodrag Mirilović, Full Professor

Course status: Elective

ECTS credits: 15

Prerequisites:

Course aims is student to acquire knowledge on epizootiological methods, above all regularity of the disease occurrence, disturbances in productivity and animal wellbeing, in whole animal population as well as in segment (sample) of the population by using appropriate statistical methods. Also, objectives of the course are to work on the principles of the control and eradication measures in the animal population as well as to acquire knowledge on the methodology of productivity and animal wellbeing disturbance follow up.

Course outcomes: After acquiring basic knowledge on epizootiological methods, student should be able to apply it in concrete circumstances when disease, productivity and animal wellbeing disturbance in animal population occur. After completing the course, the student should know qualitative and quantitative methods concerning sampling (sample from animal and from population). By using epizootiological methods, student should be able to form causal-effect hypothesis, to be familiar with the methods of surveillance and monitoring, and to apply field and clinical methods of investigation.

Course content

Lectures: consist of topics as follows: Epizootiological assumption; Causality and methods of data relationship study; Nature, collection and epizootiological data processing; Monitoring and surveillance; Clinical studies; Diagnostic investigation and data processing; Economical aspect of the disease; Animal health schemes in animal industry and veterinary medicine; Methods for disease control and eradication.

Practicals:

- Acquiring knowledge about the analysis of causality and interrelationship between epizootiological determinants,
- Applying epizootiological methods in control and eradication of diseases as well as disturbances in animal productivity in animal population
- Applying of the statistical methods to the clinical studies data
- Adopting epizootiological methods of control and disease eradication to the concrete situation in the field

DON (additional forms of teaching)

Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveilance.

Recommended literature

Valčić M: Opšta epizootiologija, autorsko izdanje, 1998.
Thrusfield, MI: Veterinary epidemiology, Bleckwell,
Martin W et al: Veterinary epidemiology, principles and methods, Iowa St. Univ. USA 1987
Dohoo I et al: Veterinary epidemiology research. AVC Inc. Charlettotown, Canada, 2003

Hours	**Lectures:** 4	**Practicals:** 2	**DON:** 4

Teaching methods

Power point presentation, student essay work, practical work in epizootiological laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50
Colloquium			
Seminars	50		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical microbiology

Lecturers: Nenad Milić, Full Professor; Dejan Krnjaić, Full Professor; Dušan Mišić, Full Professor; Jakov Nišavić, Full Professor; Marina Radojičić, Associate Professor; Andrea Radalj, Assistant Professor

Course status: Elective

ECTS credits: 15

Prerequisites: Enrolled semester in which the course is taken

Course aims

Acquisition of knowledge about structural, physiological and antigenic characteristics of pathogenic microorganisms, methods of their isolation from suspected material and subsequent identification.

Course outcomes

The student should be able to perform sampling of suspected material for isolation and identification of pathogenic bacteria, fungi, and animal viruses using standard methods of microbiological diagnostics. The student should determine the shape and structure of microorganisms, know how to perform all types of sterilization and apply adequate biosecurity protection measures when working with infectious agents; to isolate bacteria in pure culture and perform their identification based on biochemical and antigenic characteristics; to examine the susceptibility of isolated strains of pathogenic bacteria to antibiotics; to apply adequate immunological methods for antigenic identification of microorganisms and to interpret the obtained results; to get acquainted with tissue culture techniques ie. their inoculation with animal viruses in order to determine the appearance of cytopathic effect; to perform the detection of viral antigens in cell cultures as well as to inoculate embryonated chicken eggs with viruses, rickettsia and chlamydia; to know how to stain preparations from allantochorionic and vitelus membranes and detect the presence of viral antigens in samples of suspected material and/or in cells of inoculated tissue cultures by immunofluorescence.

Course content

Lectures

The effect of the environment on bacteria; bacterial physiology; bacterial nutrition; reproduction of bacteria; bacterial metabolism; assimilation activities of bacteria; infection; toxins; genetics of microorganisms; morphological, structural and physiological characteristics of the most important genera and species of pathogenic bacteria and fungi in Veterinary Medicine; definition of virus; size, shape and structure of viruses; chemical composition of viruses and influence of physical and chemical factors on viruses; the relationship of viruses and host cells (bacteriophages, animal viruses); viral etiology of tumors; characteristics of viral infections of the organism; antiviral defense of the organism; antigens and virus variability; virus classification; morphological and biological characteristics of the most important representatives of families and genera of animal viruses in Veterinary Medicine.

Practicals

Practical laboratory work with teachers.

DON (additional forms of teaching)

60 class hours

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.
2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.
3. Nišavić J., Milić N., Knežević A. (2013) Laboratorijska dijagnostika virusnih infekcija, Naučna KMD, Beograd.
4. MacLachlan N.J., Dubovi E.J. (2016) Fenner's Veterinary Virology, 5th Edition, Academic Press.
5. Tizard I. (2017) Veterinary Immunology, 10th Edition, Saunders.
6. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier.

Hours	**Lectures:** 4	**Practicals :** 2	**DON:** 4

Teaching methods

Formal lecture, Practical laboratory work

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	10	Oral exam	60
Colloquium			
Seminars	20		
Knowledge assessment methods: seminar paper, oral exam			

Study programme: Specialist academic studies of veterinary medicine

Course title: Methods of virological, bacteriological, mycological, and parasitological diagnostics

Lecturers: Nenad Milić, Full Professor; Dejan Krnjaić, Full Professor; Zoran Kulišić, Full Professor; Dušan Mišić, Full Professor; Jakov Nišavić, Full Professor; Marina Radojičić, Associate Professor; Andrea Radalj, Assistant Professor

Course status: Elective

ECTS credits: 15

Prerequisites: enrolled semester in which the course is taken

Course aims

Acquisition of knowledge and skills in the application of conventional, automatic, and serological methods of laboratory diagnostics of bacterial, viral, fungal and parasitic infections in animals.

Course outcomes

The student should be able to apply the adequate method depending on the type of sample acquired for examination; to know how to prepare nutrient media and perform sterilization. Also, the candidate must master the skills to perform the selected diagnostic methods, to understand the principles of those methods, and correctly interpret the obtained results.

Course content

Lectures

Basic principles of sampling and adequate shipping methods of materials for bacteriological, virological, mycological and parasitological examinations. Principles for the isolation and identification of pathogenic microorganisms. Bacteriological diagnostic methods. Virological diagnostic methods. Mycological diagnostic methods. Parasitological diagnostic methods.

Practicals

Material processing. Preparation of microscopic preparations, staining. Techniques for obtaining pure bacterial culture. Biochemical properties-classical method of testing and application of automatic identification systems. Biological examination. Serological reactions. Coprological examinations.

DON (additional forms of teaching)

60 class hours

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.

2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.

3. Nišavić J., Milić N., Knežević A. (2013) Laboratorijska dijagnostika virusnih infekcija, Naučna KMD, Beograd.

4. MacLachlan N.J., Dubovi E.J. (2016) Fenner's Veterinary Virology, 5th Edition, Academic Press.

5. Tizard I. (2017) Veterinary Immunology, 10th Edition, Saunders.

6. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier.

7. Roberts L. S., Janovy J., Schmidt G.D. (2008). Foundations of Parasitology, McGraw-Hill

Hours	**Lectures:** 4	**Practicals :** 2	**DON**: 4

Teaching methods

Formal lecture, Practical laboratory work

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	10	Oral exam	60
Colloquium			

Seminars	20		
Knowledge assessment methods: seminar paper, oral exam			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Food safety			
Lecturers: Neđeljko Karabasil, **Full Professor**; Mirjana Dimitrijević, Full Professor; Snežana Bulajić, Full Professor; Dragan Vasilev, Associate Professor, Radoslava Savić Radovanović, Assistant Professor; Silvana Stajković, Assistant Professor; Nevena Grković, Assistant Professor; Jasna Djordjević, Teaching Assistant PhD			
Course status: Elective			
ECTS credits: 15			
Prerequisites: Enrolled and solved subjects: Composition and properties of food			
Course aims The aim of the course is that student understand the connections of process steps in the food production chain, as well as the sources and routes of contamination with biological, chemical and physical hazards of importance for food safety assessment.			
Course outcomes Upon successful completion of the course, students should be able to: - identify process steps in the flow diagram of food production chain and sources and routes of contamination by biological, chemical and physical hazards and apply appropriate control measures.			
Course content *Lectures* Food safety management. Foodborne diseases. Biological, chemical and physical hazards. Sources and routes of contamination by biological, chemical and physical hazards in the food production chain (meat and meat products, milk and dairy products, fish and seafood, honey, eggs, mixed food). Risk assessment. The role and responsibility of different sectors in the food chain. *Practicals-DON* Analysis of food production flow diagrams (meat and meat products, milk and dairy products, fish and seafood, honey, eggs, mixed food), sources and routes of contamination by biological, chemical and physical hazards and application of control measures to eliminate hazards or reduction to an acceptable level.			
Recommended literature Food Safety Management, A practical Guide for the Food Industry., edited by Yasmine Motarjemi, HuuB Lelieveld. Elsevier 2014; Food Safety, Emerginig Issues, Technologies and Systems. Edited by Steven C. Ricke, Janet R. Donaldson and Carol A. Phillips, Elsevier 2015. Foodborne Pathogens, Hazards, Risk Analysis and Control. Edited by Clive de W Blackburn and Peter J. McClure, Elsevier 2009			
Hours	**Lectures:** 4	**Practicals:** 2	**DON:** 4
Teaching methods Interactive theoretical classes and analytical individual and team work.			
Evaluation and grading (maximum 100 points)			

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	50
Participation in practicals	30	Oral exam	
Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Food testing methods

Lecturers: Mirjana Dimitrijević, Full Professor; Neđeljko Karabasil, Full Professor; Dragan Vasilev, Associate Professor; Snežana Bulajić, Full Professor; Silvana Stajković, Assistant Professor; Radoslava Radovanović Savić, Assistant Professor; Nikola Čobanović, Teaching Assistant PhD; Tijana Ledina, Assistant Professor

Course status: Elective

ECTS credits: 15

Prerequisites: Enrolled and solved subjects: Composition and properties of food

Course aims

The aim of the course is that students be theoretically and practically acquainted with classical, alternative and modern methods for food analysis and partly of them successfully do it. They would acquire abilities that will be useful to them during professional work during sensory, chemical, physicochemical methods of food testing, as well as modern instrumental and fast methods of determining of foodborne pathogens. Also, during the course, students would be able to properly conduct the process of food sampling and handling, choose an adequate testing method according to the expected outcome, as well as to understand and correctly interpret the results obtained.

Course outcomes

Upon successful completion of the course, students should be able to:

• food sampling for analysis depending on the type of intended test;

• select the method for the intended test;

• know and partially master the sensory analysis methods;

• know and partially master classical chemical, physical and physicochemical, as well as modern instrumental methods of food testing;

• know and partially master the methods for isolation of certain foodborne pathogens, as well as fast and alternative microbiological methods;

• know and partially master molecular methods for genotyping foodborne pathogens;

• know and partially master the methods for testing the susceptibility of bacteria isolated from food to antibiotics / antimicrobial drugs.

Course content

Lecture

Methods for sampling, packaging, transport and storage of the food sample. Preparation of food sample for analysis and accompanying documentation. Selection of methods for analysis and sequence of testing. Selection, training and coaching of individuals for sensory analysis. Sensory analysis methods. Standard methods for testing the composition and physicochemical properties of foods. Instrumental methods. HPLC, GC (GLC) - principle and application. Electrophoresis, Western Blot- principle and application. Methods for detection, quantification and isolation of foodborne pathogens and their identification. Rapid microbiological methods for foodborne pathogens isolation. Alternative methods for the detection of foodborne pathogens. Molecular methods for genotyping foodborne pathogens. Methods for testing antimicrobial resistance of bacteria isolated from food.

Practicals +DON (additional forms of teaching)

Selection, training and coaching of students for sensory analysis. Preparation of food samples for analysis. Sensory analysis methods: difference tests, tests with scales and categories, descriptive analysis, quantitative descriptive analysis. Demonstration of basic chemical and physicochemical analyzes. Spectrophotometry. Chromatography. Electrophoresis. Some methods for isolation and identification of foodborne pathogens. Preparing presentations.

Recommended literature

1.Food Analysis (2017) Editors: Nielsen, Suzanne (Ed.), 2.Electrophoresis in Practice: Guide to Methods and Applications of DNA and Protein Separations (2016) Editor: Reiner Westermeier 3. Baltic M, Karabasil N.: Control of foodstuffs of animal origin- Scientific book (2011) 4.Karabasil N, Savic Radovanovic R., Stajkovic S., Cobanovic N., Suvajdzic B.: Control of foodstuffs of animal origin - Practicum, (2020).

Hours	**Lectures:** 4	**Practicals:** 2	**DON:** 4

Teaching methods

Theoretical teaching: classical, with interactive learning, with the use of audio-visual methods (PowerPoint presentation). Practical classes: demonstration of methods with individual independent work in the laboratory, preparation and presentation of individual work.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	30
Participation in practicals	30	Oral exam	20
Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Feed safety

Lecturers: Dragan Šefer, Full Professor; Radmila Marković, Full Professor; Jelena Nedeljković Trailović, Full Professor; Svetlana Grdović, Full Professor; Dejan Krnjaić, Full Professor

Course status: Elective

ECTS credits: 15

Prerequisites: Feed safety

Course aims

1. Acquiring knowledges about nutrients and their classification, methods of production, processing and canning of feed, as well as factors that affect feed spoilage;
2. Acquisition of knowledge on the impact of hygienic safety and chemical composition of feed on health status and production results of various production categories and animal species, as well as on the quality of food of animal origin;
3. Acquiring knowledge about the presence of antinutritive substances and their impact on feed utilization, as well as the manifestation of the production potential of animals in order to produce as economically as possible;
4. Acquisition of knowledge about potential hazard factors (hazards) in the production of animal feed and control measures in order to detect and prevent hazards to human and animal health;

Course outcomes

After passing the exam in the subject Feed Safety, the student should:

1. Recognize the conditions under which animal feed failure can occur as well as define changes if they have already occurred;
2. Defines the degree of change in the quality of feed and its impact on the health status and production results of animals fed such feed;
3. Be able to spot irregularities and problems caused by inadequate nutrition;
4. Is able to select and apply adequate control measures in order to eliminate or reduce potential risk factors in the production of animal feed;

Course content

Formal lecture:

Storage of feed. Quality of animal feed. Preservation of feed. Preparing feed. Hazard factors in feed production and control measures: physical, chemical and biological hazards. Significance of bacteria and mold. Feed parasites. Feed poisoning: mycotoxins, organic toxins, inorganic substances. Regulations on maximum permissible harmful and prohibited substances in feed. Antinutritive substances in feed. HACCP system and feed safety.

Practicals:

Sampling. Organoleptic examination. Determining the usability of animal feed. Basics of analytical procedures: chemical, mycotoxicological and bacteriological analyzes, analyzes of the presence of toxic and harmful substances in animal feed.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

1. Marković R., Petrujkić B., Šefer D.: Bezbednost hrane za životinje, Fakultet veterinarske medicine, 2018.
2. Mitrović B., Šefer D.:Praktikum iz radiobiologije i radijacione higijene, 2016.
3. Pravilnik o kvalitetu hrane za životinje. Sl. Glasnik RS, 41, 2009.
4. Sinovec Z., Resanović R., Sinovec S.: Mikotoksini, pojava, efekti i prevencija, Caligraph, Beograd, 2006.
5. Jovanović R., Dujić D., Glamočić D.: Ishrana domaćih životinja, Stylos-izdavaštvo, Novi Sad, 2000.

A large number of review papers are available to students on the recommendation of teachers from the current field.

Hours	**Lectures:** 4	**Practicals :** 2	**DON:** 4

Teaching methods

Theoretical classes with interactive learning with the application of audio-visual methods, practical work in the laboratory of the Department of Animal Nutrition and Botany, practical work in the field (animal feed factories, farms with their own feed factories);

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points

Lecture attendence	Maximum 20	Written exam	
Participation in practicals	Maximum 20	Oral exam	10-50
Colloquium			
Seminars	Maximum 10		
Knowledge assessment methods**:** Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.			

MODULE 1

REPRODUCTION IN DOMESTIC ANIMALS

Study programme: Specialist academic studies of veterinary medicine

Course title: Reproductive endocrinology in domestic animals

Lecturers: Vladimir Magaš, Associate Professor; Milan Maletić, Assistant Professor; Slobodanka Vakanjac, Full Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Passed course Introduction to the reproduction of farm and social animals

Course aims

Introducing students to the importance and role of hormones in the reproduction of domestic animals. Acquisition of additional theoretical and practical knowledge concerning hormonal regulation of physiological reproductive processes (sexual cycle, pregnancy, lactation). Understanding the role and importance of hormones in the reproduction of male animals. Emphasizing the correct use of hormones in reproduction, potential risks of misuse.

Course outcomes

Candidates with obtained knowledge for rational and correct application of hormones in daily practical work, hormonal protocol definition and their practical application for induction and synchronization of estrus, Candidates should know to define the indication for application of hormones (substitution, stimulation or inhibition).

Course content

Lectures

Hormones - properties, functions, mechanism of action; Factors influencing hormone secretion, limbic system and hypothalamus, regulatory mechanisms of hypothalamus-pituitary-gonadal axis; Regulatory mechanisms of gonadotropic hormone secretion in males and females, hormonal regulation of metabolism of pregnant and non-pregnant females; Hormonal regulation of female sexual cycle, Specificity of hormonal status of pregnant females; Hormones and lactation; Neuroendocrine regulation of parturition in domestic animals, proper use of hormones in reproduction of domestic animals; Protocols for hormonal synchronization of estrus and ovulation, hormones in male reproduction; Hormones in treatment of pathological reproductive conditions.

Practicals

SIR, Practical presentation of hormone application in the reproduction of farm and social animals based on indications, determination of hormone levels using ELISA techniques from different media (blood serum, milk, etc.), use of hormones in male reproductive pathology (cryptorchidism, prostate hyperplasia, decreased libido, etc.).

Recommended literature

1.Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
2. Pavlović V, Pavlović M, Vakanjac S: Dijagnostika graviditeta domaćih životinja, 2010.
3. Pavlovic V i sar. Porodiljstvo, sterilitet i veštačko osemenjavanje, 2018
4. Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
5. Vukovic D., Miljkovic V.: Klinička primena hormona u reporodukciji ženki domaćih životinja, 2008.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the office and statistical laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Infertility in domestic animals

Lecturers: Miloje Djurić**,** Assistant Professor; Miloš Pavlović, Associate Professor; Slobodanka Vakanjac, Full Professor; Milan Maletić, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Passed course Introduction to the reproduction of farm and social animals

Course aims

Teorethical and practical knowledge of forehand use the methods of diagnosis, treatment and monitoring of reproductive health of domestic animals, how to use preventive measures in the suppression of sterility of various etiologies.

Course outcomes

Students will acquire knowledge for work with animals with pathological conditions of the reproductive tract which can consequently lead or cause sterility, regardless of the size of the population and type of domestic animals, as well as monitoring the reproductive status of individuals or fertility by controlling fertility parameters.

Course content

Lectures

Principles of physiology and neuroendocrine regulation of reproduction, diagnostics of reproductive status of domestic animals, ultrasound and laboratory diagnostics of infertility, congenital and acquired infertility, sexual cycle and its disorders in animals, pathological puerperium-diagnosis and therapy, metabolic disorders, nutritional cause of infertility

Practicals

SIR, Practical review of ultrasound diagnostics, practical application of laboratory methods and laboratory work, clinical microbiology, cytology, review and analysis of various cases of infertility

Recommended literature

1 McKinnon AO, Voss JL: Equine reproduction, Lea&Febiger, 1993.
2 Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
3 E.S.E. Hafez: Reproduction in farm animals Lea&Febiger, 2000.
4 Pavlović V, Pavlović M, Vakanjac S: Dijagnostika graviditeta domaćih životinja, 2010.
5 Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the ultrasound cabinet and laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: The diseases of the mammary gland of domestic animals

Lecturers: Slobodanka Vakanjac, Full Professor; Vladimir Magaš, Associate Professor; Milan Maletić, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Passed course Introduction to the reproduction of farm and social animals

Course aims

Acquiring knowledge about the physiology, physiology of mammary gland immunity, etiology of mastitis, diagnosis, therapy and prophylaxis of the mammary gland diseases in domestic animals

Course outcomes

Students will acquire the following knowledge: assessment of mammary gland and teat morphology, diagnosis of mastitis, proper milk sampling for microbiological analysis, specifics of mammary gland diseases by animal species, udder skin diseases, correct therapy selection and therapy of mastitis.

Course content

Lectures

Anatomy and physiology of the mammary gland - introduction lecture, etiology of mastitis, mastitis of cows, sheep, goats, mares, donkeys, bitches and cats, diagnosis of mastitis, udder skin diseases of domestic animals, parenteral and local therapy of mastitis and mammary gland diseases, therapy of lactating mastitis and mastitis during dry period in cows, lactation without pregnancy - functional disorders of lactation, false pregnancy of bitches and cats, ultrasound diagnosis of mammary gland diseases, immunoprophylaxis of mastitis, non-antibiotic approach to the treatment of mastitis, mammary gland tumors

Practicals

SIR, milk sampling for bacteriological analysis (biogram, antibiogram), California mastitis test, Draminski test, preparation of samples for somatic cells counting (SCC) in milk, ultrasound diagnosis of mammary gland diseases

Recommended literature

1. Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
2. E.S.E. Hafez: Reproduction in farm animals Lea&Febiger, 2000.
3. Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
4. Pavlović V et al.. Porodiljstvo, sterilitet i veštačko osemenjavanje, 2018.

Bačić G., 2009: Dijagnostika i liječenje mastitisa u goveda, Veterinarski fakultet, Zagreb.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the ultrasound cabinet, cytology and andrology laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Andrology and artificial insemination in domestic animals

Lecturers: Slobodanka Vakanjac, Full Professor; Vladimir Magaš, Associate Professor; Miloš Pavlović, Associate Professor; Milan Maletić, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Passed course Introduction to the reproduction of farm and social animals

Course aims

Acquiring knowledge about the physiology of male genitals, spermatogenesis, disorders of spermatogenesis, diseases of the male genitals, assessment of sperm quality, methods and techniques of taking and processing the sperm, techniques of artificial insemination of domestic animals

Course outcomes

Upon successful completion of the course, students will acquire the following knowledge: diagnosis of congenital and other diseases of the male genital organs, assessment of sperm quality, protocols for improving sperm quality, methods of preserving domestic animal sperm and artificial insemination

Course content

Lectures

Anatomy and physiology of male genitals-introduction lecture, spermatogenesis, congenital and other diseases of male genitals of domestic animals, methods of sperm collection in animals, quality analysis of fresh, diluted and deep-frozen sperm/semen, conservation and storage of semen samples, different techniques and methods of artificial insemination in domestic animals, diseases and therapy of accessory glands, ultrasound diagnostics of pathological conditions of male genitals

Practicals

Sperm collection in dogs and cats, assessment of sperm/semen quality (total and progressive motility, sperm count in 1 ml of sperm, cytomorphological analysis of sperm, Blom and Farrell staining), analysis of sperm samples by CASA method, artificial insemination of bitches and cows, ultrasound diagnostics of the reproductive tract diseases in males

Recommended literature

1. Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
2. E.S.E. Hafez: Reproduction in farm animals Lea&Febiger, 2000.
3. Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
4. Pavlović V et al., Porodiljstvo, sterilitet i veštačko osemenjavanje, 2018.
5. Cergolj M and Samardžija M. Veterinarska andrologija, 2006.

Hours	**Lectures:** 2	**Practicals :** 3	DON: 1

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the ultrasound cabinet, cytology and andrology laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Surgical and obstetric techniques in reproduction

Lecturers: Miloš Pavlović, Associate Professor; Vladimir Magaš, Associate Professor; Milan Maletić, Assistant Professor; Miloje Djurić, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Passed course Introduction to the reproduction of farm and social animals

Course aims

Introducing students to the indications for the selection of obstetric and surgical techniques, training students to perform obstetric and surgical techniques and solving possible complications in the genital tract and mammary gland pathology of domestic animals.

Course outcomes

The student is trained to apply knowledge for performing obstetric techniques and surgical procedures on the genital tract and mammary gland of domestic animals, learn and improve the techniques of bloodless and blood methods in cases of dystocia, surgical techiques for solving surgical complication and complications with other etiology

Course content

Lectures

Local and general anesthesia and analgesia in various interventions on the reproductive tract, selection of surgical materials, caesarean section, ovarian hysterectomy, ovariectomy, vasectomy, castration, obstetric diagnosis and prognosis, bloodless and blood techniques on the reproductive tract, postpartal and postoperative complications, laparoscopy and endoscopy techniques in reproduction, surgical interventions on the mammary gland of farm and social animals

Practicals

SIR, Practical review of obstetric and surgical procedures, performing biopsies, performing endoscopic and laparoscopic techniques in reproduction, review of clinical obstetric cases.

Recommended literature

1. McKinnon AO, Voss JL. : Equine reproduction, Lea&Febiger, 1993.
2. Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
3. E.S.E. Hafez: Reproduction in farm animals Lea&Febiger, 2000.
4. Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
5. Pavlović i sar. Porodiljstvo, sterilitet i veštačko osemewavawe, 2018.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the ultrasound cabinet and laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module I

Lecturers: Slobodanka Vakanjac, Full Professor; Miloš Pavlović, Associate Professor; Vladimir Magaš, Associate Professor; Miloje Djurić, Assistant Professor; Milan Maletić, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Obligatory

ECTS credits: 7

Prerequisites: Enrolled semester in which the course is taken

Course aims

Acquiring knowledge about the physiology and pathology of the male genital organs, assessment of sperm quality, physiology and pathology of the mammary gland and acquainting students with the indications for the selection of obstetric and surgical techniques on the reproductive tract

Course outcomes

The candidate should be able to independently diagnose, apply therapy on the genital tract of male domestic animals and the mammary gland. Assess the quality of sperm and independently choose the obstetric and surgical techniques on the genital tract of domestic animals.

Course content

Practicals

SIR (study research work)

Sperm collection in dogs and cats, evaluation of sperm/semen quality (total and progressive motility, number of sperm in 1 ml of sperm, cytomorphological analysis of sperm, Blom and Farrell staining), analysis of sperm samples by CASA method, artificial insemination of bitches and cows, ultrasound diagnostics diseases of the reproductive tract of male domestic animals. Different techniques of sperm sampling.

Milk sampling for bacteriological analysis (biogram, antibiogram), California mastitis test, Draminski test, preparation of milk samples for somatic cells count (SCC), ultrasound diagnosis of mammary gland diseases.

Practical presentation of obstetric and surgical procedures, performing biopsies, endoscopic and laparoscopic techniques in reproduction, presentation of clinical obstetric cases.

DON

Reccomended literature

Hours	**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5

Teaching methods

Work in laboratories, clinics and farms with subject teachers

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals	50	Oral exam	
Colloquium	30		
Seminars	20		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Protocols for improving the reproductive efficiency of farm animals

Lecturers: Milan Maletić, Assistant Professor; Vladimir Magaš, Assistant Professor; Miloje Djurić, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 6

Prerequisites: Passed course Introduction to the reproduction of farm and social animals

Course aims

Participants acquire practical and theoretical knowledge from the most important areas of reproduction with a special emphasis on the prevention and therapy of infertility. Introduction with organized reproduction management through defined and complex work protocols on farms. Training of students for rational use of material and animal resources in order to achieve the best results.

Course outcomes

Students will acquire the following knowledge: profitable reproductive management with the application of current knowledge in the field of physiology and pathophysiology of reproduction; Adaptation and selection of reproductive protocols to species requirements and housing conditions; Organizing work on the farm with up to date documentation; working with modern diagnostic tools (ultrasound diagnostics); Practical application of hormonal protocols in intensive production; keeping the offspring management protocols.

Course content

Lectures

Basics of reproduction in farm animals, Factors affecting the reproductive efficiency of herds, specifics of reproduction management on farms of cows, sheep, goats and pigs, reproductive parameters, metabolic disorders, nutrition and reproduction, keeping proper productive/reproductive records and possible errors, diagnostic procedures in reproduction (general and special), hormonal protocols-when and how?, possible causes of failure in the application of hormonal treatments, neonatal and offspring management

Practicals

SIR, DON, analysis of necessary data for keeping farm documentation, analysis of reproductive and metabolic parameters in order to establish the diagnosis of reproductive disorders, general and special examination of the genital tract, practical application of protocols to improve fertility, offspring monitoring

Recommended literature

1.Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
2. Pavlović V, Pavlović M, Vakanjac S: Dijagnostika graviditeta domaćih životinja, 2010.
3. Pavlovic V i sar. Porodiljstvo, sterilitet i veštačko osemenjavanje, 2018.
4. Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
5. Vukovic D., Miljkovic V.: Klinička primena hormona u reporodukciji ženki domaćih životinja, 2008.

Hours	**Lectures:** 1	**Practicals :** 2

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the ultrasound cabinet and laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Protocols for improving the reproductive efficiency of social animals

Lecturers: Vladimir Magaš, Associate Professor; Miloš Pavlović, Associate Professor; Miloje Djurić, Assistant Professor; Slobodanka Vakanjac, Full Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 6

Prerequisites: Passed course Introduction to the reproduction of farm and social animals

Course aims

Acquiring knowledge about the application of various techniques and protocols in order to improve and enhance the reproductive efficiency of dogs, cats, exotic animals and horses

Course outcomes

Students will acquire the following knowledge: selection of breeding animals, determining the optimal time for mating, analysis and assessment of hormonal status at different ages and stages of the sexual cycle, manipulation (induction and synchronization) of the sexual cycle, selection and timely application of protocols to improve reproductive efficiency, acquisition of basic knowledge in neonatology

Course content

Lectures

Characteristics of anatomy and physiology of male and female sexual organs of social and exotic animals - introduction lecture, methods to determine the phase of the sexual cycle, analysis and assessment of hormonal status in different ages and phases of the sexual cycle of social animals, hormonal and other techniques of sexual cycle manipulation and parturition, biotechnological methods of improving reproduction, ultrasound, endoscopic and laparoscopic diagnostics and therapy of physiological and pathological conditions.

Practicals

Methods of determining the phase of the estrus cycle - clinical and laboratory, analysis of the results of hormonal and cytological examinations, ultrasound, endoscopic and laparoscopic diagnostics and therapy of physiological and pathological conditions, clinical and specialist examination of the genital tract of social animals, parturition and puerperium management.

Recommended literature

1. Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
2. Pavlović V i sar. Porodiljstvo, sterilitet i veštačko osemenjavanje, 2018.
3. Brisko SP et al.: Manual of Equine Reproduction, 3rd ed., Mosby Elsevier, 2011.
4. Canine and Feline Endocrinology and Reproduction, Edward C. Feldman, Richard W. NelsonElsevier Science Health Science, 03.11.2003.
5. Clinical Canine and Feline Reproduction: Evidence-Based Answers 1st Edition by Margaret V. Root Kustritz
6. BSAVA Manual of Canine and Feline Reproduction and Neonatology 2nd Edition by Gary England (Editor), Angelika von Heimendahl (Editor)
7. Equine Reproductive Procedures by John Dascanio (Editor), Patrick McCue (Editor); 2014
8. Equine Breeding Management and Artificial Insemination 2nd Edition by Juan C. Samper DVM MSc PhD DiplACT (Author)

Hours	**Lectures:** 1	**Practicals :** 2

Teaching methods

Theoretical teaching with interactive learning, application of audiovisual methods, mentoring type practical exercises, research work in the ultrasound cabinet and laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	50
Participation in practicals	10	Oral exam	
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module II

Lecturers: Slobodanka Vakanjac, Full Professor; Miloš Pavlović, Associate Professor; Vladimir Magaš, Associate Professor; Miloje Djurić, Assistant Professor; Milan Maletić, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Obligatory

ECTS credits: 7

Prerequisites: Enrolled semester in which the course is taken

Course aims

Participants acquire practical and theoretical knowledge from the most important areas of reproduction of farm animals with a special emphasis on the suppression of infertility. They gain knowledge about the application of various techniques and protocols to improve and enhance the reproductive efficiency of dogs, cats, exotic animals and horses.

Course outcomes

Students will acquire the following knowledge: selection of breeding animals, determination of optimal mating time, analysis and assessment of hormonal status at different ages and stages of the sexual cycle, manipulation (induction and synchronization) of the sexual cycle, selection and timely application of protocols to improve reproductive efficiency. Introduction to offspring management protocols.

Course content

Practicals

Monitoring of the estrus cycle of social animals - clinical and laboratory, analysis of the results of hormonal and cytological examinations, ultrasound, endoscopic and laparoscopic diagnostics and therapy of physiological and pathological conditions, clinical and specialist examination of the genital tract of social animals, parturition and puerperium management.

Analysis of the necessary data for keeping farm documentation, analysis of reproductive and metabolic parameters in order to establish the diagnosis of reproductive disorders, general and special examination of the genital tract, practical application of protocols to improve fertility, monitoring of offspring.

Recommended literature

Hours	**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5

Teaching methods

Work in laboratories, clinics and farms with subject teachers

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals	50	Oral exam	
Colloquium	30		
Seminars	20		

Knowledge assessment methods:

MODULE 2

VETERINARY MICROBIOLOGY AND IMMUNOLOGY

Study programme: Specialist academic studies of veterinary medicine

Course title: Bacteriology and mycology

Lecturers: Dejan Krnjaić, Full Professor; Nenad Milić, Full Professor; Dušan Mišić, Full Professor; Marina Radojičić, Associate Professor; Jakov Nišavić, Full Professor; Andrea Radalj, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: previously elected courses: Infection and Mechanisms of Defense Against Infectious Agents, Methods of Virological, Bacteriological, Mycological and Parasitological Diagnostics, and Clinical Microbiology

Course aims

Acquiring knowledge about structural, physiological, and antigenic characteristics of pathogenic and non-pathogenic bacteria and fungi, their ecology and distribution in nature; the process of infection and etiopathogenesis of bacterial and fungal infections and immunological reactions to antigens; the mechanisms of antibiotic effect on bacteria and the phenomenon of antibiotic resistance.

Course outcomes

The candidate should know the shapes and structures of bacteria and fungi, their ecological characteristics, and the etiopathogenesis of the most important bacterial and fungal infections in Veterinary Medicine, the principles of assessment methods for bacterial susceptibility to antibiotics in vitro and mechanisms of antibiotic action on bacteria.

Course content

L*ectures*

Structure and antigenic properties of pathogenic and non-pathogenic species of bacteria and fungi and methods for their isolation and identification; the effect of physical and chemical environmental factors on bacteria; application of physical and chemical methods in the control of bacterial populations; microbial communities; chemical composition and functional significance of individual components of the bacterial cell; bacterial nutrition; assimilation activities of bacteria; genetic mechanisms of microorganisms; bacterial chromosomes and their multiplication; modification; mutation; gene transfer in bacteria (transformation, transduction, conjugation); plasmids; mechanisms of antibiotic action; mechanisms of bacterial resistance to antibiotics; methods for testing bacterial susceptibility to antibiotics *in vitro*; characteristics of the following genera or groups of bacteria: *Pseudomonas, Burkholderia, Aeromonas, Campylobacter, Vibrio, Escherichia coli, Enterobacter, Klebsiella, Proteus, Salmonella, Pasteurella* and *Mannheimia, Bordetella, Haemophilus, Actinobacillus, Moraxella, Fusobacterium, Bacteroides, Brucella, Micrococcus, Staphylococcus, Streptococcus, Lactobacillus, Corynebacterium, Trueperella* and *Rhodococcus*, *Listeria, Erysipelotrix, Bacillus, Clostridium, Mycobacterium, Nocardia, Actinomyces, Serpulina - Brachispira, Borrelia, Treponema, Leptospira, Mycoplasma, Chlamydia* and *Chlamydophila, Rickettsia, Coxiella*, *Ehrlichia*.

Morphological and structural characteristics of fungi; physiology of fungi; fungi as pathogens; morphological and biological properties of the following genera of fungi: *Saccharomyces*, *Candida, Malasezia, Blastomycetes, Hyphomycetes, Phycomycetes, Ascomycetes, Basidiomycetes, Cryptococcus, Histoplasma, Coccidioides, Sporothrix, Mucor, Rhizomucor, Rhizopus, Aspergillus, Penicillium, Trichophyton, Microsporum.*

Practicals

Practical laboratory work with teachers.

DON (additional forms of teaching)

15 class hours

SIR (study research work)

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.

2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.

3. Mišić D. (2013) Metode mikrobiološke dijagnostike–ispitivanje osetljivosti bakterija na antibiotike, Elit Medica, Beograd.

4. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary

Microbiology, Mosby, Elsevier.			
Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1
Teaching methods Formal lecture			
Evaluation and grading (maximum 100 points) Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			
Seminars			
Knowledge assessment methods: oral exam			

Study programme: Specialist academic studies of veterinary medicine

Course title: Virology

Lecturers: Nenad Milić, Full Professor; Jakov Nišavić, Full Professor; Dejan Krnjaić, Full Professor; Dušan Mišić, Full Professor; Marina Radojičić, Associate Professor; Andrea Radalj, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: previously elected courses: Infection and Mechanisms of Defense Against Infectious Agents, Methods of Virological, Bacteriological, Mycological and Parasitological Diagnostics, and Clinical Microbiology

Course aims

Acquiring knowledge about structural and antigenic characteristics of animal viruses, the role of viruses in the etiopathogenesis of animal infections and non-specific and specific mechanisms of defense against viral infections as well as standard and molecular methods used in virological diagnostics.

Course outcomes

The candidate should know the basic characteristics of the most important groups of animal viruses, to explain the role of viruses in the development of animal infections and the process of viral replication, to explain the mechanisms of defense against viral infections and to understand the basic diagnostic principles for viral infections.

Course content

Lectures

Definition of virus; virus size and structure; influence of physicochemical factors on viruses; the relationship between viruses and host cells; viral etiology of tumors; virus variability; classification of viruses; general characteristics of animal viruses; viral infections and antiviral defense; morphological and biological characteristics of representatives of the following groups of viruses: *Poxviridae; Herpesviridae; Hepadnaviridae; Adenoviridae; Asfarviridae; Iridoviridae; Papillomaviridae u Polyomaviridae; Parvoviridae; Circoviridae; Picornaviridae; Caliciviridae; Reoviridae; Birnaviridae; Togaviridae; Flaviviridae; Arenaviridae; Coronaviridae; Retroviridae; Bornaviridae, Bunyaviridae; Ortomyxoviridae; Paramyxoviridae; Rhabdoviridae, Arteriviridae*, and *Astroviridae.*

Practicals

Practical laboratory work with teachers.

DON (additional forms of teaching)

15 class hours

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.

2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.

3. Nišavić J., Milić N., Knežević A. (2013) Laboratorijska dijagnostika virusnih infekcija, Naučna KMD, Beograd.

4. MacLachlan N.J., Dubovi E.J. (2016) Fenner's Veterinary Virology, 5th Edition, Academic Press.

5. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Formal lecture

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			

Seminars			
Knowledge assessment methods: oral exam			

Study programme: Specialist academic studies of veterinary medicine

Course title: Laboratory diagnostics of bacterial and fungal infections

Lecturers: Dejan Krnjaić, Full Professor; Nenad Milić, Full Professor; Dušan Mišić, Full Professor; Marina Radojičić, Associate Professor; Jakov Nišavić, Full Professor; Andrea Radalj, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: previously elected courses: Infection and Mechanisms of Defense Against Infectious Agents, Methods of Virological, Bacteriological, Mycological and Parasitological Diagnostics, and Clinical Microbiology

Course aims

Acquisition of knowledge and skills for the application of the most important conventional, automatic, molecular, and serological laboratory diagnostic methods for bacterial and fungal infections of animals.

Course outcomes

The candidate should be able to: perform sampling, packaging and shipping of materials for bacteriological examination, choose a method depending on the type of received samples for microbiological testing, perform sterilization, select and prepare nutrient media, prepare and stain microscopic slidess, properly use the microscope during the examination prepared slides, isolate microorganisms in pure culture and perform their identification using both classical and molecular methods, examine the sensitivity of isolated bacterial species to antibiotics and correctly interpret the obtained test results.

The candidate should be able to prepare media for the cultivation of fungi, prepare microscopic preparations of fungi, and perform their identification.

Course content

Lectures

Methods for isolation and identification of the following genera of bacteria: *Pseudomonas, Burkholderia, Aeromonas, Campylobacter, Vibrio, Escherichia coli, Enterobacter, Klebsiella, Proteus, Salmonella, Pasteurella* and *Mannheimia, Bordetella, Haemophilus, Actinobacillus, Moraxella, Fusobacterium, Bacteroides, Brucella, Micrococcus, Staphylococcus, Streptococcus, Lactobacillus, Corynebacterium, Trueperella* and *Rhodococcus*, *Listeria, Erysipelotrix, Bacillus, Clostridium, Mycobacterium, Nocardia, Actinomyces, Serpulina - Brachispira, Borrelia, Treponema, Leptospira, Mycoplasma, Chlamydia* and *Chlamydophila, Rickettsia, Coxiella*, *Ehrlichia*. Methods for antibiotic susceptibility testing - disk diffusion method; macrodilution method, microdilution method; E test; ESBL test; testing for special forms of resistance in bacteria (MRSA, VRE, etc.).

Methods for isolation and identification of the following genera of fungi: *Saccharomyces*, *Candida, Malasezia, Blastomycetes, Hyphomycetes, Phycomycetes, Ascomycetes, Basidiomycetes, Cryptococcus, Histoplasma, Coccidioides, Sporothrix, Mucor, Rhizomucor, Rhizopus, Aspergillus, Penicillium, Trichophyton, Microsporum.* Nutrient media for the cultivation of fungi, sample processing for cultivation of fungi. Methods of isolation and identification of fungi. Preparation of microscopic slides from fungi: native and colored preparations.

Practicals

Practical laboratory work with teachers.

DON (additional forms of teaching)

15 class hours

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.

2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.

3. Mišić D. (2013) Metode mikrobiološke dijagnostike–ispitivanje osetljivosti bakterija na antibiotike, Elit Medica, Beograd.

4. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier.

5. Quinn P.J., Markey B.K., Leonard F.C., Hartigan P., Fanning S., Fitzpatrick E.S. (2011) Veterinary

Microbiology and Microbial Disease, 2nd Edition, Wiley-Blackwell.			
Hours	**Formal lecture:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Formal lecture			
Evaluation and grading (maximum 100 points) Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			
Seminars			
Knowledge assessment methods: oral exam			

Study programme: Specialist academic studies of veterinary medicine

Course title: Laboratory diagnostics of viral infections

Lecturers: Nenad Milić, Full Professor; Jakov Nišavić, Full Professor; Dejan Krnjaić, Full Professor; Dušan Mišić, Full Professor; Marina Radojičić, Associate Professor; Andrea Radalj, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: previously elected courses: Infection and Mechanisms of Defense Against Infectious Agents, Methods of Virological, Bacteriological, Mycological and Parasitological Diagnostics, and Clinical Microbiology

Course aims

Acquisition of knowledge and skills in the application of the most important conventional, serological, and molecular methods of laboratory diagnosis of viral infections of animals.

Course outcomes

The candidate should be able to perform sampling, packaging and shipping of the materials for virological examination, choose a method depending on the type of samples received, to independently set the primary tissue culture, to maintain continuous cell lines and to recognize the appearance of cytopathic effect characteristic for certain viruses. Also, the student should be able to perform methods of direct and indirect immunofluorescence and interpret the results, perform methods of agglutination, precipitation, complement fixation reactions, enzyme-linked immunosorbent assay - ELISA, and hemagglutination and inhibition of hemagglutination tests and to know the basic principles of molecular methods used in virological diagnostics as well as to perform some of them independently and interpret the obtained results.

Course content

Lectures

Methods of isolation and identification of animal viruses, serological reactions and molecular methods in virology.

Practicals

Tissue cultures, preparation and maintenance of tissue cultures, inoculation of cell lines with animal viruses and monitoring the development of cytopathic effect (CPE), application of embryonated chicken eggs in Virology, immunofluorescence methods in virological diagnostics, serum neutralization test (SN test) and virus neutralization (VN test), hemagglutination (HA test), heminhibition (HI test), enzyme-linked immunosorbent assay, polymerase chain reaction (PCR, RT-PCR and Real-Time PCR) and Sanger sequencing methods.

DON (additional forms of teaching)

15 class hours

SIR (study research work)

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.

2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.

3. Nišavić J., Milić N., Knežević A. (2013) Laboratorijska dijagnostika virusnih infekcija, Naučna KMD, Beograd.

4. MacLachlan N.J., Dubovi E.J. (2016) Fenner's Veterinary Virology, 5th Edition, Academic Press.

5. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier.

6. Pestana E., Belak S., Diallo A., Crowther J.R., Viljoen G.J. (2010) Early, rapid and sensitive veterinary molecular diagnostics - real time PCR applications, Springer, Netherlands.

Hours	**Lecture:** 2	**Practicals:** 3	**DON:** 1

Teaching methods Formal lecture

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			
Seminars			
Kowledge assessment methods: oral exam			

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module I

Lecturers: Nenad Milić, Full Professor; Jakov Nišavić, Full Professor; Dejan Krnjaić, Full Professor; Dušan Mišić, Full Professor; Marina Radojičić, Associate Professor; Andrea Radalj, Assistant Professor

Course status: Obligatory

ECTS credits: 7

Prerequisites: Enrolled semester in which the course is taken

Course aims

Introduction to the general properties of certain types of bacteria, fungi and viruses. Acquisition of knowledge and skills in the application of the most important conventional, serological and molecular methods of laboratory diagnostics of bacterial, fungal and viral infections of animals.

Course outcomes

The candidate should be able to independently perform and apply selected laboratory diagnostic methods of bacterial, fungal and viral infections of animals and interpret the obtained results.

Course content

Practicals

Preparation of nutrient media in bacteriology and mycology; Preparation and staining of microscopic slides; Examination of microscopic slides; Isolation of microorganisms in pure culture and identification of isolated microorganisms using classical methods of laboratory diagnostics; Investigation of biochemical properties of isolated microorganisms using classical methods and automatic identification systems. Susceptibility testing of isolated bacteria to antibiotics and interpretation of test results; Molecular methods of bacteriological diagnostics and interpretation of obtained results.

Preparation of nutrient media for cell culture; Setting up primary tissue culture and maintaining continuous cell lines; Inoculation of viruses in cell cultures and recognizing the appearance of cytopathic effect; Performing direct and indirect immunofluorescence, serum neutralization and virus neutralization tests (SN and VN tests) and interpretation of the obtained results; Performing methods of agglutination, precipitation, complement fixation test, enzyme-linked immunosorbent assays (ELISA), hemagglutination and hemagglutination inhibition tests (HA and HI tests) as well as interpretation of results; Molecular methods of virological diagnostics and interpretation of obtained results.

DON (additional forms of teaching)

Hours	**Formal lecture:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 1

Teaching methods

Practical laboratory work with teachers.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	
Colloquium			
Seminars			

Knowledge assessment methods:

Study program: Specialist academic studies of veterinary medicine

Course title: Vectors of animal pathogens

Lecturers: Zoran Kulišić, Full Professor; Nevenka Aleksić, Full Professor; Tamara Ilić, Associate Professor; Danica Bogunović, Assistant Professor

Course status: Elective

ECTS credits: 6

Prerequisites: Enrolled semester in which the course is taken

Course aims

Acquiring knowledge about the morphology, biology, and ecology of vectors that transmit pathogens such as viruses, bacteria, and parasites of veterinary importance. Understanding the complex relationships between vectors, hosts, and environmental conditions critical to the dynamics of the occurrence, maintenance, and spread of pathogens transmitted by vectors.

Course outcomes

Upon course completion, the student is able to recognize, properly sample and determine the type of vector in case of suspected vector-borne disease, independently analyze the results and apply adequate preventive, control and eradication measures according to the epizootiological situation, socio-economic, climatic and environmental conditions.

Course content

Llectures

• Morphological and biological characteristics of vectors of veterinary importance - 10 hours
• Biotic and abiotic factors that affect the appearance, maintenance and spread of vectors - 6 hours
• Mechanical and biological role of vectors in the transmission of pathogens of bacterial, viral, rickettsial and parasitic etiology - 6 hours
• Pathogens transmitted by vectors - 2 hours
• Types of vector protection - 2 hours
• Environmental management - 4 hours

Practicals

Practical work in the field in order to master the techniques of vector collection. Practical work in the laboratory: vector isolation and determination. Preparation and processing of vectors in order to examine the presence of pathogens (45 hours).

Recommended literature

1. Roberts, Larry S.; John, Janovy; Gerald D., Schmidt (2008). Foundations of Parasitology.McGraw Hill
2. A global brief on vector-borne diseases, WHO Press, World Health Organization, Geneva, 2014
3. Sonenshine DE & Roe RM. Biology of Ticks Volume 1 (2nd Ed.). Oxford University Press, 2014.
4. Sonenshine DE & Roe RM. Biology of Ticks Volume 2 (2nd Ed.). Oxford University Press, 2014.
5. Gunn A & Pitt SJ. Parasitology. An Integrated Approach. Willey-Blackwell, 2012.
6. Bowman AS & Nuttall PA. Ticks. Biology, Disease and Control. Cambridge University Press, Roberts, Marquardt W. Biology of Disease Vectors (2nd Ed.). Academic Press, 2004.
7. Mehlhorn H. Arthropods as Vectors of Emerging Diseases. Springer, Berlin, Heidelberg, 2012.
8. Krishan J, Sigamani P, Shankar EM, Chattopadhyay I. Vectors and Vector-Borne Diseases. Pathobiological Insights, Public Health Challanges and Management Strategies. Bloomsbury, 2017.

Hours	**Formal lecture:** 1	**Practicals :** 2

Teaching methods

Formal lecture, Practical laboratory work

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			
Seminars			

Knowledge assessment methods: oral exam

Study programme: Specialist academic studies of veterinary medicine

Course title: Immunology

Lecturers: Nenad Milić, Full Professor; Dejan Krnjaić, Full Professor; Dušan Mišić, Full Professor; Jakov Nišavić, Full Professor; Marina Radojičić, Associate Professor; Andrea Radalj, Assistant Professor

Course status: Elective

ECTS credits: 6

Prerequisites: enrolled semester in which the course is taken

Course aims

Acquiring knowledge about immunological methods, primary and secondary antigen-antibody reactions used for the identification of isolated microorganisms based on their antigenic structure and for gaining insight into the immune status of diseased and immunized individuals (serological diagnosis), the application of bacterial and viral antigens for vaccine preparation.

Course outcomes

The candidate should be able to independently perform serological diagnostic methods that include agglutination reactions, precipitation and complement fixation (CFT), enzyme-linked immunosorbent assay (ELISA), immunofluorescence (IF), haemagglutination (HA test) and haemagglutination inhibition (HI test) and to know how to interpret the obtained results.

Course content

Lectures

Natural (innate) resistance; the most important factors of nonspecific defense of the organism from pathogenic microorganisms, which include: skin, mucous membranes, antimicrobial factors of tissues and organs, complement system and other reactive substances important for non-specific resistance, phagocytosis and inflammation; acquired immunity and characteristics of the humoral and cellular immune responses; antigens, immunogens, haptens and antibodies; antigenic specificity and mechanisms of immune recognition of antigenic determinants, ie. immunological memory; organs and tissues of the immunological system.

Practicals

Agglutination and precipitation reactions, enzyme-linked immunosorbent assay (ELISA), immunofluorescence (IF) and hemagglutination and haemagglutination inhibition methods (HA and HI tests).

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom. Naučna KMD, Beograd.
2. Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.
3. Abbas A., Lichtman A. H., Pillai S. (2017) Cellular and Molecular Immunology, 9th Edition, Elsevier.
4. Tizard I. (2017) Veterinary Immunology, 10th Edition, Saunders.
5. Murphy K., Weaver C. (2016) Janeway's Immunobiology, 9th Edition, Garland Science.
6. Alberts B., Johnson A., Lewis J., Morgan D., Raff M., Roberts K., Walter P. (2015) Molecular Biology of the Cell, 6th edition, Garland Science.

Hours	**Lectures:** 1	**Practicals :** 2

Teaching methods

Formal lecture, Practical laboratory work

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			
Seminars			

Knowledge assessment methods: oral exam

Study programme: Specialist academic studies of veterinary medicine

Course title: Microbiology of food and animal feed

Lecturers: Mirjana Dimitrijević, Full Professor; Dejan Krnjaić, Full Professor; Nenad Milić, Full Professor; Dušan Mišić, Full Professor; Marina Radojičić, Associate Professor; Snežana Bulajić, Full Professor; Dragan Šefer, Full Professor

Course status: Elective

ECTS credits: 6

Prerequisites: Enrolled semester in which the course is taken

Course aims

Acquiring knowledge about microorganisms that can be found in food and feed, their importance in Veterinary Medicine and veterinary public health, as well as the application of standard and alternative microbiological methods of testing food and feed.

Course outcomes

The candidate should be able to independently perform microbiological methods of testing food and animal feed, to interpret the obtained results, to verify and validate microbiological methods, to evaluate measurement uncertainty and to ensure the validity of the results.

The applicant must be familiar with the regulations in the field of food and feed safety, as well as the requirements for giving a declaration of conformity, opinions and interpretations.

Course content

Llectures

Microorganisms in food and feed. Regulations in the field of food and feed safety. Standard SRPS ISO IEC microbiological test methods for food and feed including SRPS EN ISO 4833-1,2: 2014; SRPS EN ISO 6579-1: 2017; SRPS EN ISO 11290-1,2: 2017; SRPS ISO 15213: 2011; SRPS EN ISO 18593: 2018; SRPS ISO 21527-1,2: 2011

Practicals

Microbiological methods for determining the total number of bacteria, the number of fungi, the number of sulfite-reducing anaerobic bacteria, the detection of *Salmonella* spp*,* the detection and determination of *Listeria monocytogenes* and *Listeria* spp.

Recommended literature

1. Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.
2. Zakon o bezbednosti hrane Službeni glasnik RS broj 41/2009, 17/2019
3. Pravilnik o opštim i posebnim uslovima higijene hrane u bilo kojoj fazi proizvodnje, prerade i prometa Službeni glasnik RS broj 72/10, 62/2018
4. Pravilnik o kvalitetu hrane za životinje Službeni glasnik RS, 4/2010 i 113/2012, 27/2014, 25/2015 i 39/2016
5. Odgovarajući SRPS EN ISO standardi mikrobioloških ispitivanja hrane i hrane za životinje

Hours	**Formal lecture:** 1	**Practicals :** 2

Teaching methods

Formal lecture, Practical laboratory work

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			
Seminars			

Knowledge assessment methods: oral exam

Study programme: Specialist academic studies of veterinary medicine

Course title: Laboratory diagnosis of fish diseases

Lecturers: Maja Marković, Full Professor; Ksenija Aksentijević, Assistant Professor

Course status: Elective

ECTS credits: 6

Prerequisites: Enrolled semester in which the exam is taken

Course aims

Acquisition of knowledge and skills necessary for the most important conventional, automated, molecular, and serological methods used in laboratory diagnostics of bacterial, fungal, viral and parasitic diseases of fish.

Course outcomes

The candidate should be able to: choose appropriate method depending on the type of samples received for examination; perform sampling, packaging and sending of materials for bacteriological, mycological, virological and parasitological examination; prepare and stain microscopic slides; use a light microscope to examine microscopic specimens; perform isolation of microorganisms in pure culture and identify isolated microorganisms using classical and molecular diagnostic methods.

Course content

L*ectures*

Methods for isolation and identification of the most important bacteria, fungi, viruses and parasites of fish; Methods for testing the antibiotic sensitivity in bacteria of fish origin: disk diffusion method; agar dilution method; broth dilution method (macrodilution method, microdilution method); E test; ESBL test; examination of special forms of resistance in bacteria.

Practicals

Practical work in the laboratory with subject teachers and associates.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

1. Fish diseasese and disorders, Three Volume Set, Patrick T. K. Woo, Publisher CABI, Published 28th March 2011, ISBN 9781845935801
2. Fish Pathology, 4th Edition, Ronald J. Roberts, Wiley-Blackwell, May 2012, ISBN: 978-1-444-33282-7
3. Bolesti riba – PRAKTIKUM, Maja Marković, Ksenija Aksentijević, 2017, ISBN: 978-86-81043-55-4
4. OIE Aquatic Code, 22nd Edition, 2019, ISBN: 978-92-95108-96-7

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Formal lecture

Practical laboratory work

Evaluation and grading (maximum 100 points)

Grading: 6 = 51-60 points, 7 = 61-70 points, 8 = 71-80 points, 9 = 81-90 points, 10 = 91-100 points.

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	20	Oral exam	60
Colloquium			
Seminars			

Knowledge assessment methods: oral exam

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module II

Lecturers: Nenad Milić, Full Professor; Dejan Krnjaić, Full Professor; Dušan Mišić, Full Professor; Jakov Nišavić, Full Professor; Marina Radojičić, Associate Professor; Zoran Kulišić, Full Professor; Mirjana Dimitrijević, Full Professor; Snežana Bulajić, Full Professor; Dragan Šefer, Full Professor; Maja Marković, Full Professor; Ksenija Aksentijević, Assistant Professor; Andrea Radalj, Assistant Professor

Course status: Obligatory

ECTS credits: 7

Prerequisites: Enrolled semester in which the course is taken

Course aims

Acquisition of knowledge and skills in the application of the most important serological methods of microbiological diagnostics, microbiological testing of animal feed, parasitological diagnostic methods, and laboratory diagnostic methods of fish diseases.

Course outcomes

The candidate should be able to independently perform and apply selected immunological methods based on antigen-antibody reactions, *in vitro* used in microbiological diagnostics to identify isolated microorganisms based on their antigenic structure as well as to interpret the obtained results.

The candidate should be able to independently perform microbiological methods of testing food and animal feed, to interpret the obtained results, verify and validate microbiological methods, evaluate measurement uncertainty and to ensure the validity of the results. In addition, the applicant must be familiar with food and feed safety regulations as well as requirements for the declaration of conformity, opinions and interpretations.

The candidate should be able to independently conduct microbiological testing of animal feed samples and interpret current regulations on the usability of animal feed.

The candidate should be able to recognize, properly sample and determine vector species in the event of suspected vector borne disease, to independently analyze the results and apply adequate measures to prevent, control and eradicate the disease in accordance with the given epizootiological situation, socio-economic, climatic and environmental conditions.

The candidate should be able to independently perform adequate laboratory diagnostic methods of bacterial, fungal, viral and parasitic diseases of fish.

Course content

Practicals

Performing agglutination and precipitation reactions; Performing enzyme-linked immunosorbent assays (ELISA); Immunofluorescence (IF) methods and hemagglutination and hemagglutination inhibition methods (HA and HI tests).

Determining the total bacterial count, enumeration of fungi, enumeration of sulfite-reducing anaerobic bacteria, the detection of *Salmonell*a spp., the detection and determination of the number of *Listeria monocytogenes* and *Listeria* spp.

Mastering vector collection techniques (practical field work); vector isolation and determination; vector processing for pathogen detection.

Performing classical and molecular laboratory diagnostics methods of fish diseases.

DON (additional forms of teaching)

SIR (study research work)

Hours	**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5

Teaching methods

Practical laboratory and field work with teachers.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	
Colloquium			
Seminars			

Knowledge assessment methods:

MODULE 3

EPIZOOTIOLOGY

Study programme: Specialist academic studies of veterinary medicine

Course title: Special epizootiology 1 – bacterial and parasitic diseases

Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor; Nataša Stević, Teaching Assistant PhD; Zoran Kulišić, Full Professor; Nevenka Aleksić, Full Professor; Tamara Ilić, Associate Professor; Danica Bogunović, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites:

Course aims Students to acquire knowledge of the basic epizootiological determinants: causative agent, susceptible animal species and environmental factors that influence enzootic and/or epizootic occurrence of bacterial and parasitic diseases in the animal population.

Course outcomes: Students to acquire knowledge about elements of epizootiological determinants that cause particular bacterial and parasitic diseases in the animal population that occur in the region and globally. After completing the course, student in order to apply control and eradication measures, should be familiar with:

- Epizootiological aspects of bacterial and parasitic diseases in susceptible animal species
- Measures that are at disposal in case of bacterial and parasitic disease outbreak
- Importance of particular bacterial and parasitic diseases

Course content

Lectures: consist of topics as follows:

- Bacterial diseases
  a. Enzootic bacterial diseases
  b. Epizootic bacterial diseases
  c. Measures of control and eradication of bacterial diseases of animals
- Parasitic diseases
  a. Enzootic parasitic diseases
  b. Epizootic parasitic diseases
  c. Measures of control and eradication of parasitic diseases of animals

Practicals: Acquiring knowledge about all elements of bacterial and parasitic diseases, especially as follows:

- Etiology (epizootiological characteristics of bacteria and parasites that cause diseases in animal population),
- Susceptible species (population characteristics, factors that influence occurrence and transmission of diseases),
- Diagnostic investigation and data interpretation

DON (additional forms of teaching)

Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveilance.

SIR (study research work)

Recommended literature

Radojičić S., M. Valčić and B. Đuričić: Infectious diseases – special, 2011
Valčić M. General epizootiology, 1998
Kulišić Z. Helminthology. Veterinary Chamber, Belgrade, Serbia, 2001.
Dimitrijević S. and Ilić T. Clinical Parasitology, Faculty of Veterinary Medicine University of Belgrade. Author's Edition and Interprint D.O.O. Belgrade, Serbia, 2011.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Power point presentation, student essay work, practical work in epizootiological laboratory, practical work in parasitological laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50
Colloquium			
Seminars	50		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine			
Course title: Special epizootiology 2 – viral diseases			
Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites:			
Course aims Students to acquire knowledge of the basic epizootiological determinants: causative agent, susceptible animal species and environmental factors that influence enzootic and/or epizootic occurrence of viral diseases in the animal population.			
Course outcomes: Students to acquire knowledge about elements of epizootiological determinants that cause particular viral diseases in animal population, that occur in the region and globally. After completing the course, the student in order to apply control and eradication measures, should be familiar with: - Epizootiological aspects of viral diseases in susceptible animal species - Measures that are at disposal in the case of viral disease outbreak - Importance of particular viral disease			
Course content *Lectures:* consist of topics that address viral epizootic and enzootic diseases of animals. *Practicals*: Students have practical classes on control and eradication measures of the viral diseases of animals as well as on diagnostic work in laboratory and diagnostic data evaluation and interpretation. *DON (additional forms of teaching)* Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveilance. *SIR (study research work)*			
Recommended literature Radojičić S., M. Valčić and B. Đuričić: Infectious diseases – special, 2011			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Power point presentation, student essay work, practical work in epizootiological laboratory, practical work in parasitological laboratory			
Evaluation and grading (maximum 100 points)			

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50
Colloquium			
Seminars	50		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Epizootiology of non infectious diseases - technopaties

Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor; Sanja Aleksić-Kovačević, Full Professor; Milan Maletić, Assistant Professor; Ivan Vujanac, Associate Professor; Miloš Vučićević, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites:

Course aims

Students to acquire knowledge of basic epizootiological determinants: cause, susceptible species and environmental factors that influence enzootic and/or epizootic occurrence of non-infectious, as well as non-parasitic diseases in animal population.

Course outcomes: After completing the course, student should acquire knowledge to recognize as follows:

- Elements of epizootiological determinants that influence productivity results in a way to compromise production in given technological and organizational way of animal keeping,
- Non-infectious and/or non-parasitic diseases that affect the health (metabolic and malignant diseases)
- Methods that are used to analyze such diseases as well as to analyze animal productivity disorders

Student should be able to apply specific epizootiological measures in order to treat non-infectious and non-parasitic diseases as well as productivity disorders and animal welfare disturbance

Course content

Lectures: Non-infectious and non-parasitic diseases, metabolic disorders, tumors and technopaties in as follows:

- Animal species that are of economic importance
- "Companion" animal species
- Different production technologies and way of keeping animals

Practicals: Diagnostic work and data analysis in order to define and apply specific measures in concrete situation-disease (non-infectious, non-parasitic and technopaties).

DON (additional forms of teaching)

Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveillance.

SIR (study research work)

Recommended literature

Radojičić S., M. Valčić and B. Đuričić: Infectious diseases – special, 2011
Swayne DE, Boulianne M, Logue CM, McDougald LR, Nair V, Suarez DL, de Wit S, Grimes T, Johnson D, Kromm M, Prajitno TY, Rubinoff I, Zavala G, Diseases of Poultry, 14th Edition, John Wiley & Sons, 2019
Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
Pavlovic et al., Porodiljstvo, sterilitet i B.O., Naučna KMD i Nova Poetika Beograd 2018.
Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
Vuković D, Miljković V, Klinička primena hormona u reprodukciji ženki domaćih životinja, Heleta Beograd, 2008
Petrujkic, T, Bijkovski J, Petrujkić B, Reprodukcija svinja, Репродукција свиња, 2011, VKS Beograd
Grant Maxie M. Jubb, Kennedy and Palmer's pathology of domestic animals, fifth edition, Philadelphia: Elsevier Saunders, 2007.
Meuten DJ, Tumors in domestic animals, fifth edition, Oxford: John Wiley & Sons Inc., 2017.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Power point presentation, student essay work, practical work in epizootiological laboratory, practical work in parasitological laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50

Colloquium			
Seminars	50		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Application of diagnostic methods and epizootiological preventive measures			
Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites:			
Course aims Students to acquire knowledge on diagnostic methods as far as infectious and parasitic diseases are concerned, on diagnostic methods for non-infectious and non-parasitic diseases as well as epizootiological methods to investigate productivity animal wellbeing disorders. As for preventive measures, students should acquire knowledge on the control and eradication of the diseases at the individual animal, farm, regional and global level.			
Course outcomes After completing the course, student should acquire knowledge on: - Elements to define sample size concerning one animal (causative agent) and concerning statistical aspect of sampling procedures - Field (clinic) diagnostic methods - Laboratory diagnostic methods - Test (field and laboratory) results evaluation and interpretation - Measures that are applied for disease prevention (infectious, parasitic, non-infectious and non parasitic)			
Course content *Lectures:* - Sampling procedures in veterinary medicine (sample from animal, statistical aspect of sampling) - Theoretical aspect of diagnostic methods (field and laboratory) - Diagnostic work in the field - Laboratory diagnostic - Laboratory results and their evaluation and interpretation - Application of epizootiological preventive measures and their effects *DON (additional forms of teaching)* Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveillance. *SIR (study research work)*			
Recommended literature Radojičić S., M. Valčić and B. Đuričić: Infectious diseases – special, 2011 Valčić M., General epizootiology, 1998 OIE Manual of laboratory diagnostic techniques			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Power point presentation, student essay work, practical work in epizootiological laboratory, practical work in parasitological laboratory			
Evaluation and grading (maximum 100 points)			

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50
Colloquium			
Seminars	50		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module I

Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor; Sanja Aleksić Kovačević, Full Professor; Ivan Vujanac, Associate Professor; Milan Maletić, Assistant Professor; Miloš Vučićević, Assistant Professor; Danica Bogunović, Assistant Professor; Nataša Stević, Teaching Assistant PhD

Course status: Obligatory

ECTS credits: 7

Prerequisites

Course aims

Students to acquire knowledge on basic epizootiological characteristics and diagnostic methods for bacterial, parasitic and virus diseases as well as to acquire knowledge of the elements of the non infectious and non parasitic, productivity disorder and animal welfare disturbance occurrence in animal populations

Course outcomes

After completing the course, student should acquire knowledge to estimate the potential of the disease transmission and spreading, to perform epizootiological enquiry, to estimate validity of the data, critically to estimate epizootiological anamnesis and expected prevalence, evaluate most appropriate sample and diagnostic and laboratory procedures and methods.

Course content

DON (additional forms of teaching) and **SIR** (study research work)

Work on the particular disease or diseases groups with the same epizootiological potentials, risk factors for disease transmission determination, validation and evaluation of diagnostic tests that are in use in laboratories that have real importance in epizootiological problems solving. On his own student should be capable of sample as well as data collection in order to evaluate real status and to use basic programs for the prediction of the disease occurrence, transmission and disease maintenance in animal population. Collection of the appropriate samples on the basis of the confidence intervals, number of animals and expected prevalence. Practical examples in data usage in order to analyze the risk of disease occurrence, and prediction of the occurrence of emerging diseases in the region. Practical usage of the epizootiological methods in the solving of technopaties on the farms. Defining and practical usage of the preventive measures in order to control and eradication of the technopaties and infectious and parasitic diseases in animal populations.

Hours	**Lectures:** 0	**Practicals:** 0	**DON:** 3	**SIR:** 5

Teaching methods

Work in epizootiology laboratory, in the field with lecturers and epizootiologists from Institutes

Evaluation and grading (maximum 100 points)

Lecture attendence		Written exam	30
Participation in practicals		Oral exam	40
Colloquium			
Seminars	30		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Biosecurity measures and veterinary hygiene

Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor; Radislava Teodorović, Full Professor

Course status: Elective

ECTS credits: 6

Prerequisites:

Course aims

Students to acquire knowledge on bio security measures at the level of individual animal (farm), locally and in the region, in order to apply zoo hygienic measures that are used in order to control and eradication of infectious and parasitic diseases as well as to control and eradicate non-infectious and non-parasitic diseases.

Course outcomes: After completing the course, student should acquire knowledge on:

- Risks for "free" farms and regions,
- Risk assessment for farms, locally and in the region,
- Measures taken in order minimize risks of introduction and transmission of the infectious and parasitic disease as well as to minimize negative effects of non-infectious and non-parasitic diseases in animal population
- Zoo hygienic principles and techniques for prevention of introduction infection to the farm, locally and in the region
- Zoo hygienic principles and techniques taken in order to minimize consequences of infectious and parasitic diseases as well as non-infectious and non-parasitic diseases.

Course content

Lectures:

- Risk analysis in veterinary medicine and epizootiology
- Techniques for defining and implementation of bio security measures on the farm, locally and in the region
- Zoo hygienic principles that are applied in epizootiology

DON (additional forms of teaching)

Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveillance.

SIR (study research work)

Recommended literature

Radojičić S., M. Valčić and B. Đuričić: Infectious diseases – special, 2011
Valčić M., General epizootiology, 1998
Radenković-Damnjanovic Brana, Janković Ljiljana, Đorđević Milutin, Teodorović Radislava: Zoo higyena 1. FVM, Beograd, 2016, 1-167.
Radenković-Damnjanovic Brana: Practical approach of zoo higyenic. FVM Beograd, 2010, 1-270.

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Power point presentation, student essay work, practical work in epizootiological laboratory, practical work in parasitological laboratory

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50
Colloquium			
Seminars	50		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine
Course title: Epizootiology service organization
Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor; Vladimir Nešić, Associate Professor
Course status: Elective
ECTS credits: 6
Prerequisites:
Course aims Students to acquire knowledge on the veterinary service segment that is dealing with animal health, productivity and animal wellbeing in animal population as well as with the factors that influence occurrence of infectious and parasitic diseases, non-infectious and non-parasitic diseases, productivity disorders and negative effects on animal wellbeing. Students to acquire knowledge on activities which aim is to control and eradicate infectious and parasitic as well as non-infectious and non-parasitic diseases in animal population.
Course outcomes After completing the course, students should acquire knowledge on: - Horizontal and vertical organization of epizootiological service - Activities and expediency of the system for monitoring and surveillance of disease occurrence locally, regionally and globally, - Mechanisms of epizootiological methods and measures proposal - Principles of national contingency planning, legislative and other documents which are related to the control and eradication of infectious and parasitic diseases as well as non-infectious and non-parasitic diseases
Course content *Lectures* consist of topics as follows: - Principles of epizootiological service organization - Principles of defining epizootiological measures - Legislation that is related to the control and eradication of infectious and parasitic diseases as well as non-infectious and non-parasitic diseases *DON (additional forms of teaching)* Student work in order to make plans as far as hers/his field of interest in veterinary medicine is concerned in the field of epizootiological monitoring and surveilance. *SIR (study research work)*
Recommended literature Radojičić S., M. Valčić and B. Đuričić: Infectious diseases – special, 2011 Valčić M. General epizootiology, 1998 Nacionalni propisi (Zakon o veterinarstvu, Zakon o dobrobiti zivotinja i podzakonska akta). Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health (‘Animal Health Law’). Directive 2003/99/EC on the monitoring of animal diseases and infections.

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods Power point presentation, student essay work, practical work in epizootiological laboratory, practical work in parasitological laboratory

Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	
Participation in practicals		Oral exam	50
Colloquium			
Seminars	50		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine				
Course title: Specialist teaching block from elective module II				
Lecturers: Miroslav Valčić, Full Professor; Sonja Radojičić, Full Professor; Vladimir Nešić, Associate Professor; Radislava Teodorović, Full Professor; Nataša Stević, Teaching Assistant PhD				
Course status: Obligatory				
ECTS credits: 7				
Prerequisites				
Course aims Students to acquire knowledge on basic principles of the surveillance and monitoring as well as of biosecurity measures that are applied in order to prevent, control and eradicate infectious, parasitic, noninfectious and nonparasitic diseases and disturbance of the animal welfare.				
Course outcomes After completing the course, student should understand and to be capable to define and apply general and particular biosecurity principles and measures above all to the veterinary field service. By understanding of the epizootiology service functioning in order to control and eradication of infectious and parasitic diseases, noninfectious and nonparasitic diseases as well as animal welfare disturbances, student should be capable to apply measures and procedures in case of disease and disturbance occurrence in animal population, in specific field circumstances and animal keeping technology.				
Course content **DON** (additional forms of teaching) and **SIR** (study research work) Depending on the student's affinity and professional orientation, work in epizootiology laboratory as well as work in the field, in veterinary specialist and diagnostic institutes in order to master practical skills and procedures for estimation, defining and acting as far as biosecurity measures are concerned. Work as a member of the epizootiology service, acquiring knowledge on the epizootiology service structure that deal with specific surveillance and monitoring measure adoption, risk assessment and prediction, control and eradication of the infectious and parasitic, noninfectious and nonparasitic diseases occurrence, as well as to control and improve animal welfare status in animal population.				
Hours	**Lectures:** 0	**Practicals:** 0	**DON:** 3	**SIR:** 5
Teaching methods Work in epizootiology laboratory, in the field with lecturers and epizootiologists from Institutes				
Evaluation and grading (maximum 100 points)				
Lecture attendence		Written exam	30	
Participation in practicals		Oral exam	40	
Colloquium				
Seminars	30			
Knowledge assessment methods:				

MODULE 4

VETERINARY PATHOLOGY

Study programme: Specialist academic studies of veterinary medicine

Course title: Morphological characteristics of diseases of social and farm animals

Lecturers: Sanja Aleksić-Kovačević, Full Professor; Darko Marinković, Associate Professor; Vladimir Kukolj, Associate Professor; Slađan Nešić, Assistant Professor; Ivana Vučićević, Assistant Professor; Milan Aničić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Specialist academic studies enrolled

Course aims

To gain knowledge about the pathogenesis and morphological manifestations of diseases in the organ systems of different animal species, to independently perform a necropsy and make a morphological diagnosis, to make a differential diagnosis, to recognize morphological manifestations of infectious and non-infectious diseases and to grade neoplastic processes.

Course outcomes

Student is able to: describe pathogenesis and morphology of pathological processes, independently perform a necropsy and write a necropsy protocol, a report and an opinion, properly sample and process tissue for microscopic examination.

Independently make a pathohistological diagnosis and observe morphological differences of important infectious diseases, degenerative and neoplastic processes (social animals, farm animals, laboratory animals, exotic animal species, etc.).

Course content

Lectures

Pathology of the gastrointestinal system, liver and pancreas. Pathology of the respiratory system. Pathology of the cardiovascular system. Pathology of the hematopoietic system. Pathology of the musculoskeletal system. Pathology of the nervous system. Pathology of the reproductive system. Pathology of the skin.

Practicals

Necropsy and necropsy protocol. Proper tissue sampling, sending and processing. Fixative choice. Microscopy, making a diagnosis. Descriptive pathology. Slide seminars. Interpretation, presentation and publication of the results and data regarding gross and microscopic morphology.

Individual work with presentation of grossly, microscopically and clinically related cases.

Recommended literature

1. Pathologic Basis of Veterinary Disease, 6th ed, Zachary J (editor), Elsevier, 2016
2. Jubb, Kennedy and Palmer's Pathology of Domestic Animals, 3-Vol. Set, 6th ed, Maxie G (editor), Elsevier, 2015
3. Specijalna veterinarska patologija. Jovanović M, Aleksić-Kovačević S, Knežević M, Udruženje veterinarskih patologa Srbije, Beograd, 2012
4. Tehnika obdukcije životinja sa osnovama tanatologije. Marinković D, Nešić V, Univerzitet u Beogradu, Fakultet veterinarske medicine, 2013
5. Praktikum iz patohistologije za studente Fakulteta veterinarske medicine, Nešić S, Vučićević I, Naučna KMD, 2018
6. OIE Manual

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Formal lectures – interactive learning with use of audio-visual methods (Power Point presentation).

Practicals – necropsy room and pathohistology lab, microscopic analysis of histology slides, immunohistochemistry.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points

Lecture attendence	10	Written exam	50
Participation in practicals	20	Oral exam	
Colloquium			
Seminars	20		
Knowledge assessment methods:			

Study program: Specialist academic studies of veterinary medicine			
Course title: Descriptive pathology			
Lecturers:Vladimir Kukolj, Full Professor; Sanja Aleksić-Kovačević, Full Professor; Ivana Vučićević, Assistant Professor; Milan Aničić, Teaching Assistant PhD			
Course status: Elective			
ECTS credits: 9			
Prerequisites: Specialist academic studies enrolled			
Course aims To gain knowledge and skills in describing gross and microscopic lesions in organs and tissues of various animal species.			
Course outcomes Upon course completion student will be able to, using acquired principles and standard terminology in descriptive pathology, independently describe gross and microscopic changes and to make a pathomorphological diagnosis.			
Course content L*ectures* Getting familiar with basic principles and terminology of gross lesion description. Getting familiar with basic principles and terminology of histological lesion description. Getting familiar with basic principles and terminology of cytological specimen description. Making a diagnosis based on described lesions –an etiological and a pathomorphological diagnosis. *Practicals* Description and interpretation of gross lesions in various animal species; Description and interpretation of histological lesions in various animal species; Description and interpretation of cytology smears; Correlation between described gross and microscopic lesions; Correlation of gross and microscopic lesions with clinical data and history; Description and interpretation of immunohistochemical slides; Description and interpretation of electron and light microphotography; Writing different types of pathomorphological diagnosis of gross and microscopic specimens.			
Recommended literature 1. Maxie G. Jubb, Kennedy & Palmer's Pathology of Domestic Animals. Volumes 1, 2 & 3. Philadelphia: Saunders Ltd.; 2007. 2. van Dijk JE, Gruys E, Mouwen JMVM. Color Atlas of Veterinary Pathology General morphological reactions of organs and tissues. Philadelphia: Elsevier Limited; 2008. 3. Horn C, Naugler C. Gross Pathology Handbook: A Guide to Descriptive Terms. Edmonton: Brush Education Inc.; 2014.			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Formal lectures - oral and PowerPoint presentation of special collections photographies (Noah's archive, Cornel University photography collection). Practicals - gross examination and description of lesions in necropsy room and archived macroscopic specimens. Microscopic examination and description of archived histology slides and slides from routine daily diagnostics. Microscopic examination and description of archived cytology slides and slides from routine daily diagnostics. Microscopic examination and description of immunohistochemical slides. Review of selected cases.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	0
Participation in practicals	30	Oral exam	20
Colloquium	0	Practicals	40

Seminars	0		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Diagnostic methods in pathology

Lecturers: Slađan Nešić, **Assistant Professor**; Ivana Vučićević, Assistant Professor; Milan Aničić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Specialist academic studies enrolled

Course aims

Performing a necropsy and making a morphological diagnosis and a differential diagnosis, sampling and processing tissue for microscopic examination. Examination and interpretation of slides stained with standard, special and immunohistochemical stains.

Course outcomes

Candidate independently performs a necropsy and writes a necropsy protocol, a report and an opinion, properly samples and processes tissue for microscopic examination. Independently describes morphological changes and makes pathohistological diagnosis.

Candidate is able to use an immunohistochemical procedure for antigen detection in infectious and neoplastic diseases.

Course content

Lectures

Necropsy, report and protocol. Procedures in histopathology. When to perform special staining and immunohistochemistry. New procedures according to OIE standards.

Practicals

Necropsy and necropsy protocol. Tissue sampling and fixation. Sample preparation and histochemical staining. Morphometric and molecular methods in pathology. Descriptive pathology. Digital photography. Processing, presentation and publication of gross and microscopic morphological results. Individual work with interpretation of gross and microscopic cases.

Recommended literature

1. Pathologic Basis of Veterinary Disease, 6th ed, Zachary J (editor), Elsevier, 2016
2. Jubb, Kennedy and Palmer's Pathology of Domestic Animals, 3-Vol. Set, 6th ed, Maxie G (editor), Elsevier, 2015
3. Specijalna veterinarska patologija. Jovanović M, Aleksić-Kovačević S, Knežević M, Udruženje veterinarskih patologa Srbije, Beograd, 2012
4. Tehnika obdukcije životinja sa osnovama tanatologije. Marinković D, Nešić V, Univerzitet u Beogradu, Fakultet veterinarske medicine, 2013
5. Praktikum iz patohistologije za studente Fakulteta veterinarske medicine, Nešić S, Vučićević I, Naučna KMD, 2018
6. OIE Manual

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Formal lectures – interactive learning using audio-visual methods (Power Point presentation),

Practicals – individual work in necropsy room and pathohistology lab, microscopic analysis of pathohistology slides, immunohistochemistry.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	20
Participation in practicals	20	Oral exam	
Colloquium		Practicals	50

Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Pathomorphological and pathohistological diagnosis of parasitic animal diseases			
Lecturers: Vladimir Kukolj, **Associate Professor**; Slađan Nešić, Assistant Professor; Nevenka Aleksić, Full Professor; Tamara Ilić, Associate Professor; Danica Bogunović, Assistant Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites: Completed courses of second semester: Clinical pathology of social animals and Instrumental methods of diagnostics and therapy of animal diseases			
Course aims To complete and correlate theoretical and practical knowledge about all aspects of pathomorphological and pathohistological changes in various organs and the organ systems as well as pathologic processes of parasitic etiology, course and evolution.			
Course outcomes Student is able to recognize gross and microscopic changes in the organ systems related to certain pathological conditions of parasitic etiology and course. Student needs to recognize and describe pathomorphological changes and to be able to make a pathoanatomical diagnosis.			
Course content *Llectures* Etiopathogenesis of pathomorphological and pathohistological changes caused by endoparasites and ectoparasites of the gastrointestinal and hepatobiliary system, the respiratory system, the cardiovascular system, the urinary system, the hematopoietic system, the nervous system, the muscles, the skin, the reproductive system, the eye and the ear. *Practicals* Practical work in a necropsy room, necropsy and postmortem diagnostics, tissue sampling of various organs for pathohistological examination, sampling of grossly visible parasites, organ sampling for examination in the parasitology lab, preparation and making of histopathological slides, microscopy and microscopic slide examination, description of microscopic changes. Practical work in the parasitology lab, parasite isolation, parasite identification, parasite determination.			
Recommended literature 1) Jovanović M, Aleksić-Kovačević S, Knežević M. Specijalna veterinarska patologija, Udruženje veterinarskih patologa Srbije, Beograd, 2019; 2) Nešić S., Vučićević I. Praktikum iz patohistologije, Beograd, Naučna, 2019; 3) Marinković D, Nešić V. Tehnika obdukcije životinja sa osnovama tanatologije, Univerzitet u Beogradu, Fakultet veterinarske medicine, Beograd, 2013; 4) Dimitrijević S, Ilić T. Klinička parazitologija, Fakultet veterinarske medicine Univerziteta u Beogradu, Izdanje autora i Interprint d.o.o. Beograd, Beograd, 2011; 5) Zajac MA, Conboy AG. Veterinary clinical parasitology. 8ht Edition, Wiley Blackwell, New Jersey, USA, pp. 368, 2012; 6) Taylor AM, Coop LR, Wall LR. Veterinary Parasitology. 4th Edition, Wiley Blackwell, New Jersey, USA, pp. 1032, 2016; 5) Despommier DD, Griffin OD, Gwadz WR, Hotez JP, Knirsch C. Parasitic Diseases. 6th Edition, 2nd Printing, Parasites Without Borders, Inc. NY, pp. 610, 2017.			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Formal lectures - interactive learning, using audio-visual methods (Power Point presentation, movies). Practicals – necropsy and gross examination of animal carcasses, preparation of pathohistological slides, microscopy, recognition and description of pathohistological changes in certain organ systems, determination of various parasite development stages, quantitative and qualitative methods of parasitology examination.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	

Participation in practicals	20	Oral exam	30
Colloquium		Practical exam	30
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Pathomorphological characteristics of important diseases of ruminants			
Lecturers: Vladimir Kukolj, **Associate Professor**; Darko Marinković, Associate Professor; Slađan Nešić, Assistant Professor; Ivan Vujanac, Associate Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites: Specialist academic studies enrolled			
Course aims To gain theoretical and practical knowledge about characteristic pathologic changes of important diseases of ruminants (cattle, sheep and goats) caused by various agents, as well as comprehension of pathogenesis, gross and microscopic lesions characteristic of specific diseases of these animals.			
Course outcomes Upon course completion student will be able to independently perform a necropsy of ruminant (cattle, sheep and goats) carcass, identify and recognize pathologic lesions in various organs and make a diagnosis based on observed gross and microscopic changes.			
Course content L*ectures* Pathomorphological changes of important internal diseases of cattle; Pathomorphological changes of important internal diseases of sheep; Pathomorphological changes of important internal diseases of goats; Pathomorphological changes of important bacterial diseases of cattle; Pathomorphological changes of important bacterial diseases of sheep; Pathomorphological changes of important bacterial diseases of goats; Pathomorphological changes of important viral diseases of cattle; Pathomorphological changes of important viral diseases of sheep; Pathomorphological changes of important viral diseases of goats; Pathomorphological changes of important parasitic diseases of cattle; Pathomorphological changes of important parasitic diseases of sheep; Pathomorphological changes of important parasitic diseases of goats. *Practicals* Necropsy of carcasses of ruminants; Microscopic analysis of specimens taken from ruminants; Description of changes from the macroscopic specimen archive collection which derived from ruminants. *DON* Correlation of pathomorphological changes and clinical manifestations.			
Recommended literature 1. Kimberling CV. Jensen and Swift's Diseases of Sheep. Philadelphia: Lea and Febiger; 1988. 2. Andrews AH. Bowine medicine: diseases and husbandry of cattle. New York: Blackwell; 2004. 3. van Dijk JE, Gruys E, Mouwen JMVM. Color Atlas of Veterinary Pathology General morphological reactions of organs and tissues. Philadelphia: Elsevier Limited; 2008.			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Formal lectures - oral and PowerPoint presentation. Practicals – necropsy of ruminants in the necropsy room and in the field. Microscopic examination of archived histology slide collection and slides from daily routine diagnostics. Interpretation of selected cases.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	0

Participation in practicals	30	Oral exam	20
Colloquium	0	Practicals	40
Seminars	0		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Pathomorphological characteristics of important diseases of equids			
Lecturers: Darko Marinković, Associate Professor; Milan Aničić, Teaching Assistant PhD; Stefan Đoković, Assistant Professor; Petar Milosavljević, Full Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites: Specialist academic studies enrolled			
Course aims To gain theoretical and practical knowledge about characteristic pathologic changes of important diseases of equids caused by various agents, as well as comprehension of pathogenesis, gross and microscopic lesions characteristic of specific diseases of these animals.			
Course outcomes Upon course completion student will be able to independently perform a necropsy of equid carcass, identify and recognize pathologic lesions in various organs and make a diagnosis based on observed gross and microscopic changes.			
Course content *Lectures* Pathomorphological changes of important respiratory diseases of equids; Pathomorphological changes of important gastrointestinal diseases of equids; Pathomorphological changes of important musculoskeletal diseases of equids; Pathomorphological changes of important viral diseases of equids; Pathomorphological changes of important bacterial diseases of equids; Pathomorphological changes of important parasitic diseases of equids. *Practicals* Necropsy of carcasses of equids; Microscopic analysis of specimens taken from equids; Description of changes from the macroscopic specimen archive collection which derived from equids.			
Recommended literature 1. Rooney JR, Robertson JL, Equine Pathology, 1st Edition, Wiley-Blackwell, 1999 2. Buergelt CD, Del Piero F, Color Atlas of Equine Pathology, 1st Edition, Wiley-Blackwell, 2014 3. Zachary JF, Pathologic Basis of Veterinary Disease Expert Consult, 6th Edition, Mosby, 2016 4. Maxie G, Jubb, Kennedy & Palmer's Pathology of Domestic Animals: 3-Volume Set, 6th Edition, Saunders Ltd., 2015			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Formal lectures - oral and PowerPoint presentation. Practicals – necropsy of equids in the necropsy room and in the field. Microscopic examination of archived histology slide collection and slides from daily routine diagnostics. Interpretation of selected cases.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	0
Participation in practicals	30	Oral exam	20
Colloquium	0	Practicals	40
Seminars	0		
Knowledge assessment methods:			

Study program:me Specialist academic studies – Module Veterinary pathology

Course title: Pathomorphological characteristics of important diseases of wild, zoo and exotic animal species

Lecturers: Darko Marinković, Associate Professor; Milan Aničić, Teaching Assistant PhD; Ivana Vučićević, Assistant Professor; Miloš Vučićević, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Specialist academic studies enrolled

Course aims

To gain theoretical and practical knowledge about characteristic pathologic changes of important diseases of wild, zoo and exotic animal species caused by various etiologic agents, as well as comprehension of pathogenesis, interspecies differences of pathologic changes, gross and microscopic changes characteristic of specific disease.

Course outcomes

Upon course completion student will be able to independently perform a necropsy of wild, zoo and exotic species animals, identify and recognize pathologic lesions in various organs and make a diagnosis based on observed gross and microscopic changes.

Course content

Lectures

Pathomorphological changes of important internal diseases of indigenous wild animals; Pathomorphological changes of important internal diseases of zoo animals; Pathomorphological changes of important internal diseases of exotic wild animals; Pathomorphological changes of important viral diseases of wild, zoo and exotic animal species; Pathomorphological changes of important bacterial diseases of wild, zoo and exotic animal species; Pathomorphological changes of important parasitic diseases of wild, zoo and exotic animal species.

Practicals

Necropsy of carcasses of wild, zoo and exotic animal species; Microscopic analysis of specimens taken from wild, zoo and exotic animal species; Description of changes from the macroscopic specimen archive collection which derived from wild, zoo and exotic animals.

Recommended literature

1. Terio KA, Mcaloose D, St. Leger J, Pathology of Wildlife and Zoo Animals, 1st Edition, Academic Press; 2018
2. Miller ER, Fowler ME, Fowler's Zoo and Wild Animal Medicine, Volume 8, 1st Edition, Saunders, 2014
3. Widen DG, Meredith A, Duff JP, Infectious Diseases of Wild Mammals and Birds in Europe, 1st Edition, Wiley-Blackwell, 2012
4. Samuel WM, Pybus MJ, Kocan AA, Parasitic Diseases of Wild Mammals, 2nd Edition, Manson Publishing Ltd, 2001
5. Williams ES, Barker IK, Infectious Diseases of Wild Mammals, 3rd Edition, Wiley-Blackwell; 2000
6. Zachary JF, Pathologic Basis of Veterinary Disease Expert Consult, 6th Edition, Mosby, 2016
7. Maxie G, Jubb, Kennedy & Palmer's Pathology of Domestic Animals: 3-Volume Set, 6th Edition, Saunders Ltd., 2015

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Formal lectures - oral and PowerPoint presentation.

Practicals – necropsy of wild, zoo and exotic species animals in the necropsy room and in the field. Microscopic examination of archived histology slide collection and slides from daily routine diagnostics. Interpretation of selected cases.

Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	0
Participation in practicals	30	Oral exam	20
Colloquium	0	Practicals	40
Seminars	0		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Pathomorphological characteristics of important avian diseases			
Lecturers: Ivana Vučićević, **Assistant Professor**; Sanja Aleksić-Kovačević, Full Professor; Slađan Nešić, Assistant Professor; Darko Marinković, Associate Professor; Vladimir Kukolj, Associate Professor; Milan Aničić, Teaching Assistant PhD; Miloš Vučićević, Assistant Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites: Specialist academic studies enrolled			
Course aims To gain theoretical and practical knowledge about characteristic pathologic changes of relevant diseases of birds caused by various agents. To teach about pathogenesis, morphology and histological characteristics of pathological changes and their location.			
Course outcomes Upon course completion student will be able to independently perform a necropsy of bird carcass, identify and recognize pathologic lesions in various organs and make a diagnosis and differential diagnosis based on observed gross and microscopic changes.			
Course content *Lectures* Pathogenesis, gross and microscopic changes of bacterial diseases of birds. Pathogenesis, gross and microscopic changes of viral diseases of birds. Pathogenesis, gross and microscopic changes of parasitic diseases of birds. Pathogenesis, gross and microscopic changes in birds caused by toxins. *Practicals* Individual work with gross and microscopic interpretation of cases.			
Recommended literature 1. Knežević N., Matejić M.: Bolesti pernate živine, FVM, 1996 2. Tahseen Abdul-Aziz and H. John Barnes: Gross Pathology of Avian Diseases: Text and Atlas, American Association of Avian Pathologists, 2018 3. Tahseen Abdul-Aziz, Oscar J. Fletcher, H. John Barnes: Avian histopathology, 4th edition, American Association of Avian Pathologists, 2016			
Hours	**Formal lecture:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Formal lectures – oral presentation using audio-visual methods (Power Point presentation), pathohistology slide seminars and case presentations. Practicals – Necropsy of birds, gross and microscopic examination, preparation of histology slides (Laboratory for pathohistology and immunohistochemistry).			

Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals		Oral exam	
Colloquium		Seminars	70 (min. 36)
Seminars		Practicals	20
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine				
Course title: Specialist teaching block from elective module I				
Lecturers: Sanja Aleksić-Kovačević, Full Professor; Darko Marinković, Associate Professor; Vladimir Kukolj, Associate Professor; Slađan Nešić, Assistant Professor; Ivana Vučićević, Assistant Professor; Milan Aničić, Teaching Assistant PhD				
Course status: Obligatory				
ECTS credits: 7				
Prerequisites: Specialist academic studies enrolled				
Course aims To gain knowledge and practical skills in pathomorphological diagnostics of animal diseases, making a morphological diagnosis, sampling and processing of tissue for microscopic analysis.				
Course outcomes Candidate should be able to independently perform a necropsy and write a necropsy protocol, a report and an opinion, properly sample and process tissue for microscopic examination. Candidate should be able to independently make a pathohistological diagnosis and describe an observed change.				
Course content *Practicals* SIR-DON Performing a necropsy of different animal species and writing a necropsy protocol. Tissue sampling for pathohistological examination, fixation and preparation of samples and methods of histochemical staining. Description of gross changes according to principles of descriptive pathology. Description of microscopic changes and making a pathohistological diagnosis.				
Hours	**Lectures:** 0	**Practicals:** 0	**DON:** 3	**SIR:** 5
Teaching methods Work in the necropsy room and pathohistology lab, work with the course teachers on the field and in the premises of regional Institutes.				
Evaluation and grading (maximum 100 points)				
Pre-exam requirements	Points	**Final exam**	Points	
Lecture attendence		Written exam	30	
Participation in practicals		Oral exam	40	
Colloquium		.....		
Seminars	30			
Knowledge assessment methods can be various, enlisted above are some of them.				

Study programme: Specialist academic studies of veterinary medicine

Course title: Tumors of social animals

Lecturers: Sanja Aleksić-Kovačević, Full Professor**;** Ivana Vučićević, Assistant Professor**;** Slađan Nešić, Assistant Professor; Darko Marinković, Associate Professor; Vladimir Kukolj, Associate Professor; Milan Aničić, Teaching Assistant PhD; Milica Kovačević Filipović, Full Professor

Course status: Elective

ECTS credits: 6

Prerequisites: Specialist academic studies enrolled

Course aims

To deepen their understanding of carcinogenesis. To gain theoretical and practical knowledge about cytological, pathohistological and immunohistochemical characteristics of the most common pet animal neoplasms. To be familiar with recent tumor classifications.

Course outcomes

Upon course completion student will be able to independently make a diagnosis and a differential diagnosis, considering cytological and pathohistological findings. Student will know immunohistochemical characteristics of the most common tumors. Will be able to independently describe and write a pathohistology report of the most common tumors of pet animals.

Course content

Lectures

Carcinogenesis. Etiology. Nomenclature. Laboratory diagnostics of tumors.

Canine and feline tumors of the skin and skin adnexa. Canine and feline mammary gland tumors. Canine and feline tumors of the reproductive system. Canine and feline hematopoietic tumors.

Equine tumors.

Tumors of the small mammals.

Tumors of the exotic pets.

Avian tumors.

Practicals

Individual work with gross and microscopic interpretation of cases.

Recommended literature

1. M. Jovanović, S Aleksić-Kovačević, M. Knežević: Specijalna veterinarska patologija, Makarije d.o.o., Beograd, 2019

2. Meuten D. J.: Tumors in Domestic Animals, 5th Edition, Wiley-Blackwell, 2020

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Formal lectures – oral presentation using audio-visual methods (Power Point presentation), pathohistology slide seminars and case presentations.

Practicals – Microscopic analysis of cytological, pathohistological and immunohistochemical slides of tumors (Laboratory for pathohistology and immunohistochemistry).

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals		Oral exam	
Colloquium		Practicals	70 (min. 36)

Seminars		Test	20
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Dermatopathology

Lecturers: Darko Marinković, Associate Professor; Sanja Aleksić-Kovačević, Full Professor; Milan Aničić, Teaching Assistant PhD; Natalija Milčić Matić, Research Fellow

Course status: Elective

ECTS credits: 6

Prerequisites: Specialist academic studies enrolled

Course aims

To gain theoretical and practical knowledge about the etiology, pathogenesis, gross and microscopic changes in the epidermis, dermis, subcutis and skin adnexa of domestic and wild animals.

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Course content

Lectures

Structure of the epidermis, dermis, subcutis and skin adnexa. Interspecies characteristics and differences in skin structure.

Epidermal and dermoepidermal interface diseases of hereditary, viral, bacterial, parasitic and immunological etiology.

Dermal diseases of hereditary, viral, bacterial, parasitic and immunological etiology.

Skin adnexa diseases of hereditary, viral, bacterial, parasitic and immunological etiology.

Neoplastic skin diseases of epithelial origin.

Neoplastic skin diseases of mesenchymal origin.

Neoplastic skin diseases of melanocytic origin.

Practicals

Individual work on clinical cases and interpretation of cytological and pathohistological findings.

Recommended literature

1. Thelma Lee Gross, Peter J. Ihrke,Emily J. Walder,Verena K. Affolter, Skin Diseases of the Dog and Cat – Clinical and Histopathologic Diagnosis, 2nd Edition, Wiley-Blackwell, 2005
2. William H. Miller Jr.,Craig E. Griffin,Karen L. Campbell, Muller and Kirk's Small Animal Dermatology, 7th Edition, Saunders; 2012
3. Donald J. Meuten, Tumors in Domestic Animals, 5th Edition, Wiley-Blackwell; 2020
4. Hendrick MJ, Mahaffey EA, Moore FM, Vos JH, Walder EJ, Histological classification of mesenchymal tumors of skin and soft tissues of domestic animals, second edition, WHO, Armed Forces Institute of Pathology and American Registry of Pathology, Washington D.C., 1998
5. Goldschmidt MH, Dunstan RW, Stannard AA, Tscharner C et al., 1998, Histological classification of epithelial and melanocytic tumors of the skin of domestic animals, second edition, WHO, Armed Forces Institute of Pathology and American Registry of Pathology, Washington D.C., 1998
6. Goldschmidt MH, Munday MS, Scruggs JL, Klopfleish R, Kiupel M, Surgical Pathology of Tumors of Domestic Animals, Vol 1: Epithelial Tumors of the Skin, Gurnee, IL: Davis-Thompson Foundation, 2018
7. Yager JA, Color Atlas and Text of Surgical Pathology of the Dog and Cat : Dermatopathology and Skin Tumors, 94 edition, C.V. Mosby Co., 1994
8. Zachary JF, Pathologic Basis of Veterinary Disease Expert Consult, 6th Edition, Mosby, 2016
9. Maxie G, Jubb, Kennedy & Palmer's Pathology of Domestic Animals: 3-Volume Set, 6th Edition, Saunders Ltd., 2015

Hours	**Lectures:** 1	**Practicals:** 2	
Teaching methods Formal lectures - oral and PowerPoint presentation. Practicals – examination of cytological and pathohistological slides of the skin. Microscopic examination of archived histology slide collection and slides from daily routine diagnostics. Interpretation of various selected cases.			
Evaluation and grading (maximum 100 points)			
Lecture attendence	10	Written exam	0
Participation in practicals	30	Oral exam	20
Colloquium	0	Practicals	40
Seminars	0		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Neuropathology
Lecturers: Slađan Nešić, Assistant Professor; Ivana Vučićević, Assistant Professor; Vladimir Kukolj, Associate Professor; Nenad Andrić, Associate Professor; Milan Aničić, Teaching Assistant PhD
Course status: Elective
ECTS credits: 6
Prerequisites: Specialist academic studies enrolled
Course aims To enable candidate to: Gain knowledge about pathogenesis, clinical and morphological manifestations of the nervous system diseases in animals; Independently make a morphological diagnosis, a differential diagnosis, recognize morphological manifestations of infectious and non-infectious diseases and grade neoplastic processes in the nervous systems of animals; Independently write a report along with an opinion about morphological examinations of the nervous system; Independently sample and process nervous tissue for microscopic analysis; Independently sample, prepare, pack and deliver tissue for TSE examination according to national and EU regulations.
Course outcomes Upon completion of neuropathology course candidate will acquire knowledge and skills to: Independently perform a necropsy and write a necropsy report; Independently properly sample and process nervous tissue for microscopic analysis; Independently make pathohistological diagnosis of various pathologic changes in the nervous system of animals; Independently diagnose morphological differences of important infectious diseases, degenerative and neoplastic processes in the animal nervous system (social animals, farm animals, laboratory animals, exotic species etc.); Independently, according to current regulations, sample adequate tissue for monitoring and diagnostics of TSE in animals.
Course content *Lectures* Anatomical, histological and morphofunctional characteristics of the animal nervous system, cell reactions to damage in the nervous system, developmental anomalies in the nervous system, degenerative-necrotic changes in the nervous system, inflammatory changes in the nervous system, changes in the nervous system caused by viral infections, changes in the nervous system caused by bacterial infections, changes in the nervous system caused by parasites, changes in the nervous system caused by fungi, transmissive encephalopathies, neoplastic changes in the nervous system of animals, necropsy techniques, sampling and nervous tissue preparation for pathohistological examination, pathohistological diagnostic techniques for pathological changes in the nervous system of animals, methods for diagnosing TSE in animals. *Practicals* Necropsy technique, Skull opening and brain gross examination, Opening of the spine and spine cord gross examination, Coronary cuts and proper sampling of brain tissue for microscopic analysis, Preparation of tissue for pathohistology, Microscopic analysis of pathohistology slides.

DON

Review and analysis of selected cases of animals with diagnosed nervous system changes (interpretation of clinical data, gross and microscopic findings).

Review of current national and international regulations regarding TSE in animals.

Recommended literature

1. Veterinary Neuropathology, Vandervelde, Higins and Overman, 2012.
2. Specijalna veterinarska patologija. Jovanović M, Aleksić-Kovačević S, Knežević M, Udruženje veterinarskih patologa Srbije, Beograd, 2012
3. Pathology of domestic animal, Jubb, Kenedy & Palmer, 5th edition, 2007.
4. Fundamental Neuropathology for Pathologists and Toxicologists (Principles and Techniques), Bolon and Butt, 2011.

Pathologic Basis of Veterinary Disease, 6th ed, Zachary J (editor), Elsevier, 2016

OIE manual

Zakon o veterinarstvu

Program mera zdravstvene zaštite životinja

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Formal lectures - interactive learning using audio-visual methods (Power Point presentations, movies).

Practicals – individual work in necropsy room and pathohistology lab, microscopic analysis of pathohistology slides, review and interpretation of current national and international regulations regarding TSE in animals.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	20	Oral exam	
Colloquium		Seminars	70
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module II

Lecturers: Sanja Aleksić-Kovačević, Full Professor; Darko Marinković, Associate Professor; Vladimir Kukolj, Associate Professor; Slađan Nešić, Assistant Professor; Ivana Vučićević, Assistant Professor; Milan Aničić, Teaching Assistant PhD

Course status: Oandatory

ECTS credits: 7

Prerequisites: Specialist academic studies enrolled

Course aims

To gain knowledge and practical skills regarding tissue processing in the pathohistology lab and use of standard, special and immunohistochemical staining methods, morphometric analysis and making a diagnosis.

Course outcomes

Upon course completion, candidate should be able to understand as well as capable to choose suitable method of fixation, processing and staining of tissue sample. During laboratory work, student should be able to apply correct procedures of histologic staining method validation and estimate quality of the final specimen. To independently perform immunohistochemistry for antigen detection in infectious and neoplastic processes. Also, student is capable to use standard morphometric software for measuring certain tissue parameters.

Course content

Practicals

SIR-DON

Tissue sample processing in the pathohistology lab – fixative choice, tissue modeling, manual and automated tissue processing, sample preparation and histochemical staining methods. Pretreatment of tissue samples for immunohistochemical staining, specific antibody blocking, primary antibody incubation methods, visualization kits and use of various chromogens. Morphometric and molecular methods in pathology. Digital photography in pathology. Processing, presentation and publication of results from gross and microscopic morphology. Individual work with interpretation of gross and microscopic cases.

Hours	**Lectures:** 0	**Practicals:** 0	**DON:** 3	**SIR:** 5

Teaching methods

Work in the pathohistology lab, work with the course teachers on the field and in the premises of regional Institutes.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	30
Participation in practicals		Oral exam	40
Colloquium		.....	
Seminars	30		

Knowledge assessment methods can be various, enlisted above are some of them.

MODULE 5

FOOD HYGIENE AND TECHNOLOGY

Study programme: Specialist academic studies of veterinary medicine

Course title: Integrated food control

Lecturers: Neđeljko Karabasil, **Full Professor**; Snežana Bulajić, Full Professor; Mirjana Dimitrijević, Full Professor; Dragan Vasilev, Associate Professor, Radoslava Savić Radovanović, Assistant Professor; Nevena Grković, Assistant Professor; Jasna Đođević, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Food testing methods and Food safety

Course aims

The aim of the course is that student understand the connections of process steps in the food production chain and the importance of prerequisite programs, as well as the concept of hazard analysis, risk assessment and risk management.

Course outcomes

Upon successful completion of the course, students should be able to:

Apply the rules of good manufacturing practice and good hygiene practice in the food production chain, successfully analyze the hazard for each process step, define critical control point, develop and implement control measures to eliminate or reduce hazards to an acceptable level, validate and verify the applied measures

Course content

L*ectures*

The concept of integrated food control systems. Codex Alimentarius standards, ISO standards, European Union legislation, national regulations. Prerequisite programs (good manufacturing practice, good hygiene practice). Risk analysis, risk assessment and risk management. Determination of critical control points. Determining critical limits. Monitoring critical limits at critical control points. Validation and verification. Documentation and Record keeping.

Documentation and records.*Practicals-DON*

Hazard analysis and risk assessment for selected food production flow chart (meat and meat products, milk and dairy products, fish and seafood, eggs, honey, mixed foods). Identification of critical control points. Establishment of critical limits and monitoring procedure.

Recommended literature

ISO 22000:2018, Food Safety management system; CAC/RCP 1-1969, 2003, General Principles of Food Hygiene; Food Safety Management, A practical Guide for the Food Industry., edited by Yasmine Motarjemi, HuuB Lelieveld. Elsevier 2014; Food Safety, Emerginig Issues, Technologies and Systems. Edited by Steven C. Ricke, Janet R. Donaldson and Carol A. Phillips, Elsevier 2015. Foodborne Pathogens, Hazards, Risk Analysis and Control. Edited by Clive de W Blackburn and Peter J. McClure, Elsevier 2009

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Interactive theoretical classes and analytical individual and team work.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	50
Participation in practicals	30	Oral exam	

Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Food preservation methods
Lecturers: Dragan Vasilev, **Associate Professor**; **Snežana Bulajić, Full Professor**; Tijana Ledina, Assistant Professor; Branko Suvajdžić, Teaching Assistant PhD
Course status: Elective
ECTS credits: 9
Prerequisites: Food testing methods and Food safety
Course aims Students deepen specific knowledge about physical, chemical and biological methods of food preservation acquired during basic studies and to enable their efficient application in the preparation of specialist work and further professional work.
Course outcomes Upon successful completion of classes, students should be able to: - describe the physical, chemical and biological methods of food preservation. - explain the mechanisms of action of these methods on food safety, quality and sustainability. - know their importance within integrated food production control systems. - know the possibilities and effects of mutual combination of certain physical, chemical and biological methods of food preservation.
Course content *Llectures* 1. Food spoilage: Causes and manifestations of spoilage. 2. Basics of canning: Physical and chemical methods of canning; Antimicrobial parameters. 3. Refrigeration and freezing: Inhibition of microorganisms by low temperatures, Physical basis and procedures of refrigeration and freezing, Storage of chilled and frozen foods; Defrosting; Chilled and frozen products. 4. Salt canning: Salts for canning, Influence of salt on microorganisms and foods; Salting and pickling procedures and risks. 5. Smoking: Obtaining and processing smoke; Physical properties and chemical composition of smoke; Influence of smoke on microorganisms and foods; Smoking procedures and risks. Smoked products. 6. Drying: Physical bases and drying and lyophilization procedures; Impact of drying on micro-organisms and food quality; Water activity; Dried products. 7. Heat treatment: Influence of high temperatures on microorganisms, Heat treatment procedures, Determination of lethality of heat treatment; Heat treatment control; Influence of heating temperatures on foodstuffs. Heat treated products. 8. Other canning methods: High pressure canning; Ultraviolet radiation, Ionizing radiation. 9. Additives. 10. Packing. Instrumental and laboratory methods of control of conservation procedures. 11. Fermentation - the basis of biopreservation; The role of lactic acid bacteria in the fermentation process; Antagonism - the principle of competitive exclusion; Selection criteria for starter cultures. 12. Bacteriocins; Definition; Bacteriocins vs antibiotics; Classification; Mechanism of action; Antimicrobial spectrum; Application of bacteriocin. 13. Low molecular weight antimicrobial components: organic acids, H2O2, CO2, diacetyl, acetaldehyde, fatty acids, reuterin. 14. Enzymes with antimicrobial action: lysozyme, lactoperoxidase, lactoferrin. *Practicals - DON* Instrumental and laboratory methods of control of food preservation procedures. Methods for determining the antimicrobial activity of lactic acid bacteria.
Recommended literature 1. Teodorović V., Karabasil N., Dimitrijević M., Vasilev D., 2015, Higijena i tehnologija mesa, Fakultet veterinarske medicine Beograd. 2. Teodorović V, Bunčić O, Karabasil N, Dimitrijević M, Vasilev D., 2012, Higijena i tehnologija mesa, Praktikum, FVM, Beograd. 3. Vuković, I, 2012, Osnove tehnologije mesa, 4.

izdanje, VKS, Beograd; 4. Katić V. i Bulajić S., 2018, Higijena i tehnologija mleka, Fakultet veterinarske medicine Beograd. 5. Hammami, R., Fliss, I., Corsetti, A., eds., 2019, Application of Protective Cultures and Bacteriocins for Food Biopreservation, Lausanne: Frontiers Media. 6. Gálvez A, López RL, Pulido RP, Burgos MJG, 2014, Food Biopreservation, SpringerBriefs in Food, Health, and Nutrition. Springer, New York, NY. 7. Lacroix C, ed., Protective Cultures, Antimicrobial Metabolites and Bacteriophages for Food and Beverage Biopreservation, 2011, Woodhead Publishing, UK			
Hours	**Lectures:** 2	**Practicals:** 3	**DON**: 1
Teaching methods Theoretical classes using Power Point presentations. Practical classes in food production facilities and laboratories.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	80
Participation in practicals	10	Oral exam	
Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Instrumental food analysis

Lecturers: **Silvana Stajković**, Assistant Professor; Neđeljko Karabasil, Full Professor, Nikola Čobanović, Assistant Professor; Branko Suvajdžić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 9

Prerequisites: Food testing methods and Food safety

Course aims

That students understand the principles, complexity and connection of steps in the application of modern instrumental analytical techniques of food analysis (milk and dairy products, meat and meat products, eggs, honey, mixed foods, etc.) and their importance for food quality assessment.

Course outcomes

Upon successful completion of this course, students should be able to:

- select and apply techniques and methods for determining the chemical composition of food, for the analysis of physical and physico-chemical properties of food, for the detection of food adulteration, for the detection and quantification of contaminants and allergens in food;
- to determine and describe instrumental methods for assessing certain sensory properties of food;
- evaluate the obtained results of analysis and to critically analyze them;
- assess food quality based on the results of instrumental analyzes of food.

Course content

Lectures

Importance of instrumental food analysis, its development and application of methods and techniques in food quality assurance. Consideration of general requirements in modern food analysis (speed, accuracy, reproducibility, sensitivity, selectivity, material costs). Sample characteristics and purpose of instrumental analysis. Introduction to instrumental techniques that include chromatographic, optical, electrochemical and immunochemical methods of food analysis in order to detect and identify food components and their quantitative analysis. Application of the mentioned techniques in the analysis of group composition and individual components of food, contaminants, allergens and selected sensory attributes. Interpretation of results obtained by instrumental food analysis.

Practicals + DON (additional forms of teaching)

Performance of chromatographic, optical, electrochemical (potentiometry) and immunochemical methods.

Recommended literature

Selected books covering the area of food quality such as: Essentials of Food Science, 4th edition, Vickie A. Vaclavik and Elizabeth W Cristian. 2014, Springer; Food Analysis, 5th edition. Suzanne Nielsen, Editor, 2017, Springer; Handbook of Meat, Poultry and Seafood Quality, Leo M.L.Nollet, 1rst edition, 2007, Blackwell Publishing; etc.

Hours	**Formal lecture:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

- Interactive theoretical classes;
- Practical classes: demonstration of methods, independent and group work in the laboratory.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points

Lecture attendence	20	Written exam	50
Participation in practicals	30	Oral exam	
Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Microbiological analysis of food			
Lecturers: Radoslava Savić Radovanović, Assistant Professor; Neđeljko Karabasil, Full Professor; Mirjana Dimitrijević, Full Professor; Snežana Bulajić, Full Professor; Dragan Vasilev, Associate Professor; Nevena Grković, Assistant Professor; Branko Suvajdžić, Teaching Assistant PhD; Jasna Đorđević, Teaching Assistant PhD			
Course status: Elective			
ECTS credits: 9			
Prerequisites: Enrolled and solved subjects: Food testing methods and Food safety			
Course aims The aim of the course is that students be theoretically and practically acquainted with classical, alternative and modern methods for microbiological analysis of food. During the course, students would be able to properly conduct the process of food sampling and handling, choose an adequate testing method according to the expected outcome, as well as to understand and correctly interpret the results obtained.			
Course outcomes Upon successful completion of the course, students should be able to: food sampling for microbiological analysis; select the method for the intended test; know and partially master the methods for isolation of certain foodborne pathogens and process hygiene indicators; presentation and interpretation of the results of microbiological analysis.			
Course content *Lectures* Sampling and handling of food for microbiological analysis. Preparation of microbiological media and equipment for microbiological analysis. Methods of microbiological analysis of food (classical, alternative and modern methods in food microbiology). Preventive and corrective measures in the food production chain. Presentation and interpretation of the results. *Practicals-DON* Laboratory work: Sample and sampling, processing and handling food samples for analysis, precautions and critical points; Isolation and identification of microorganisms and their metabolites: salmonella, listeria, E. coli, campylobacter, coagulase positive staphylococci and toxins, clostridia, enterobacter, arobic colony counts, enterobacteria, histamine.			
Recommended literature Lynne McLandsborough, 2017. Food Microbiology Laboratory, CRC Press. Jay J., Loessner M., Golden D., 2005. Modern Food Microbiology, 7th Edition, Springer.			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Interactive theoretical classes and analytical individual and team work.			
Evaluation and grading (maximum 100 points)			

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	*50*
Participation in practicals	30	Oral exam	

Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Parasitological analysis of food
Lecturers: Mirjana Dimitrijević, **Full Professor**; Dragan Vasilev, Associate Professor; Zoran Kulišić, Full Professor; Danica Bogunović, Assistant Professor; Branko Suvajdžić, Teaching Assistant PhD
Course status: Elective
ECTS credits: 9
Prerequisites: Enrolled and solved subjects: Food testing methods and Food safety
Course aims The primary goal is for students to be acquainted with both classical and modern methods that are used in parasitological analysis of food, and partly of them successfully do it. During the course, students would be able to properly sample food for parasitological analysis, as well as to choose the most appropriate testing method. In addition to knowledge of current methods of diagnosing parasites in food, they would also be familiar with the assessment of food usability, as well as preventive and corrective measures, in order to combat their occurrence in food.
Course outcomes Upon successful completion of the course, students should be able to: • qualified sampling of food for parasitological analysis; • choose a qualified method for the intended examination; • know and partially master the methods for isolation of certain parasites that are transmitted through food; • critically analyze the obtained results and draw appropriate conclusions, on the basis of which they can assess the usability of food and propose appropriate preventive as well as corrective measures.
Course content *Lectures* Food sampling for parasitological analysis. Methods of parasitological analysis of food. Preventive and corrective measures in the food production chain and assessment of food usability for human consumption. Morphological and biological characteristics of food-borne protozoa and helminths originating from domestic and wild terrestrial animals, fish, crustaceans and molluscs used in human nutrition; defining transmission routes; disease potential, geographical distribution and guides for surveillance, management, prevention and control of parasitological diseases. *Practicals +DON (additional forms of teaching)* Independent work in the laboratory : selection of materials for sampling, processing and work with food samples, precautions and critical points; morphological identification of protozoa and helminths of current and archival cases; methods for isolation and identification of pathogens and their developmental stages from food.
Recommended literature 1) Teodorović V, Karabasil N, Dimitrijević M, Vasilev D. Meat hygiene and technology, Scientific book, 2015; 2) Kulišić Z. Helminthology, Veterinary Chamber of Serbia, 2001; 3) Ortega YR, Sterling CR (Eds.). *Foodborne Parasites*. Springer, Cham, 2018; 4) Xiao L, Ryan U, Feng Y (Eds.). *Biology of Foodborne Parasites*. CRC Press, 2015; 5) Murrell KD, Fried B (Eds.). *Food-Borne Parasitic Zoonoses*. Springer, 2007; 6) Jay-Russell M, Doyle MP. *Food Safety Risks from Wildlife*. Springer, Cham, 2016; 7) Bauerfeind R, von Graevenitz A, Kimmig P, Schiefer HG, Schwarz T, Slenczka W, Zahner H, *Zoonoses: Infectious Diseases Transmissible From Animals and Humans* (4th ed.), AMS Press, Washington DC, 2016; 8) Whoo P & Buchmann K (Eds.). *Fish Parasites*: pathobiology and protection. CABI Int., London, 2012; 9) FAO/WHO

[Food and Agriculture Organization of the United Nations/World Health Organization]. *Multicriteria-based ranking for risk management of food-borne parasites*. Microbiological Risk Assessment Series, No. 23. Rome, 2014, 302 pp.

Hours	**Lecture:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Theoretical teaching: classical, with interactive learning, with the use of audio-visual methods (PowerPoint presentation).

Practical classes: demonstration of methods, independent work in the laboratory, preparation and presentation of individual work.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	30
Participation in practicals	30	Oral exam	20
Colloquium			
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Radiation food analysis

Lecturers: Branislava Mitrović, Associate Professor; Jelena Ajtić, Full Professor; Borjana Vranješ, Teaching Assistant

Course status: Elected

ECTS credits: 9

Prerequisites: /

Course aims

to introduce the students with the sources of radiation in the environment, pathways of radionuclides food contamination, as methods of radioactivity measuring in food.

Course outcomes

Upon completion of the course, students should be able to:

- know the origin of radioactivity in the environment and distinguish between natural and artificial radionuclides;
- know the pathways of food contamination;
- perform sampling, packaging and sending of samples in order to determine the content of radioactivity in food;
- interpret the obtained results in accordance with the legislation;
- propose measures that can exclude migrations of radionuclides from the food chain: soil-plants-animals-humans.

Course content

Lectures

Natural and artificial radionuclides in the environment and food (2). Radionuclides of special importance for food safety (1). Transfer of radionuclides through the food chain (2). Dosimetry and radiation detection (1). Laboratories for measuring radioactivity and safety measures at work (2). Sampling, sending and preparation of samples for analysis (1). Gamma spectrometric analysis of food (1). Processing of radioactively contaminated raw materials, work in food technology (1). Legislation and determination of maximum permitted concentrations of radionuclides in food (2). Decontamination of raw materials and food. Protection of humans from irradiation and radioactive contamination (1). Monitoring of radioactivity in food on the territory of the Republic of Serbia (1).

Practicals-DON: work in laboratory for gamma spectrometry.

Recommended literature

Mitrović Branislava, Andrić Velibor, Dragan Šefer: Praktikum iz radiobiologije i radijacione higijene. Beograd, 2016. Michael Pöschl and Leo M. L. Nollet: Radionuclide Concentrations in Food and the Environment, Taylor & Francis Group 2006.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Lectures

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	

Participation in practicals		Oral exam	
Colloquium	30	Seminars	50
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine				
Course title: Specialist teaching block from elective module I				
Lecturers: Neđeljko Karabasil, **Full Professor**; **Dragan Vasilev, Associate Professor**; Mirjana Dimitrijević, Full Professor; Snežana Bulajić, Full Professor; Radoslava Savić Radovanović, Assistant Professor, Nikola Čobanović, Assistant Professor; Tijana Ledina, Assistant Professor; Nevena Grković, Assistant Professor; Branko Suvajdžić, Teaching Assistant PhD; Jasna Đorđević, Teaching Assistant PhD				
Course status: Obligatory				
ECTS credits: 7				
Prerequisites: enrolled semester in which the course is taken				
Course aims Understands the position, responsibilities and authorization of veterinarians in the food industry and in official food control.				
Course outcomes Upon completion of the specialist block, the student will be able to manage processes in food production and control in the food production chain.				
Course content *DON-SIR* Position of veterinarians in the industry of meat and milk and other products of animal origin (honey, eggs, fish, game). Control of raw materials. Control of technological procedures in meat and milk production. Checking the application of good manufacturing practice and good hygiene practice. Control of critical control points. Application of corrective measures with the aim of eliminating the identified hazards in the production flow diagram. Records and traceability of production and control of processes. Responsibilities and authorities in the process of official food control. Traceability of the official food control and procedure.				
Recommended Literature Food Safety Management, A practical Guide for the Food Industry., edited by Yasmine Motarjemi, HuuB Lelieveld. Elsevier 2014; Food Safety, Emerginig Issues, Technologies and Systems. Edited by Steven C. Ricke, Janet R. Donaldson and Carol A. Phillips, Elsevier 2015. В.Теодоровић и сар., 2015. Хигијена и технологија меса, Факултет ветеринарске медицине, Београд. Катић В., Булајић С., 2017. Хигијена и технологија млека. Фаултет ветеринарске медицине, Београд. Бунчић С. 2006. Integrated Food Safety and Veterinary Public Health. CABI Publishing				
Hours	**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5
Teaching methods Research work in the food industry, with solving tasks and cases in the real environment of food production.				
Evaluation and grading (maximum 100 points)				
Pre-exam requirements	Points	**Final exam**		Points
Lecture attendence		Written exam		50
Participation in practicals		Oral exam		
Colloquium		Seminars		

Seminars	50		
The knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Safety and quality of meat and meat products			
Lecturers: Neđeljko Karabasil, Full Professor; Mirjana Dimitrijević, Full Professor; Dragan Vasilev, Associate Professor; Nikola Čobanović**,** Assistant Professor; Nevena Grković, Assistant Professor; Branko Suvajdžić, Teaching Asistant PhD			
Course status: Elective			
ECTS credits: 6			
Prerequisites: students must be enrolled at least at the minimum requirement in the semester in which course is taken			
Course aims Training students to implement an integrated and holistic approach in assessing meat and meat products quality and safety			
Course outcomes Upon successful completion of the course, students should be able to: independently assess the meat quality and safety; analyze the hygienic conditions related to meat production and processing environment; recognize relationship between meat technology and quality, microbiological stability and safety of meat products; interpret and apply regulations (national, EU, *Codex Alimentarius*) in relation to meat quality and safety.			
Course content *Lectures* Slaughterhouses - structure and organization. Ante-mortem inspection. Meat inspection – Judgement of Fitness. Slaughter by-products, and risk material. Carcass quality and meat cutting. Safety and quality of meat products (sausages, fermented products, canned food, cured meat products, fats, etc). Sustainability of meat and meat products. Labeling of meat and meat products. *Practicals* Meat inspection – Red meat animals and poultry Laboratory tests of meat and meat products: sensory evaluation, microbiological and parasitological testing, chemical and instrumental analysis.			
Recommended literature Food Safety Management, A practical Guide for the Food Industry., edited by Yasmine Motarjemi, HuuB Lelieveld. Elsevier 2014; Food Safety, Emerginig Issues, Technologies and Systems. Edited by Steven C. Ricke, Janet R. Donaldson and Carol A. Phillips, Elsevier 2015. Foodborne Pathogens, Hazards, Risk Analysis and Control. Edited by Clive de W Blackburn and Peter J. McClure, Elsevier 2009. В.Теодоровић и сар., 2015. Хигијена и технологија меса. Факултет ветеринарске медицине.			
Hours	**Lectures:** 1	**Practicals :** 2	
Teaching methods Active participation on the lectures, seminar exercises and at field work; Group discussion Practical laboratory work			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points

Lecture attendence	**20**	Written exam	50
Participation in practicals	**30**	Oral exam	
Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Safety and quality of milk and dairy products
Lecturers: Snežana Bulajić, Full Professor; Radoslava Savić Radovanović, Assistant Professor; Tijana Ledina, Assistant Professor; Jasna Đorđević, Teaching Asistant PhD
Course status: Elective
ECTS credits:6
Prerequisites: students must be enrolled at least at the minimum requirement in the semester in which course is taken
Course aims Training students to implement an integrated and holistic approach in assessing milk and dairy products quality and safety
Course outcomes Upon successful completion of the course, students should be able to: - independently assess the dairy quality and safety - analyze the hygienic conditions related to milk production and processing environment - recognize relationship between dairy technology and quality, microbiological stability and safety of dairy products - adopt and implement an integrated approach to food safety (prerequisite program, HACCP, risk analysis) - conduct risk assessment based on biology, ecology and epidemiology of foodborne diseases - correctly interpret and apply regulations (national, EU, *Codex Alimentarius*) in relation to dairy quality and safety
Course content *Lectures* Dairy supply chain/organization structure. Health requirements for raw milk production. Hygiene on milk production holdings. Dairy products / classification, quality standards and basic processing technologies. Effect of subclinical mastitis on public health and milk processing characteristics. Raw milk microbiota. Microbiota of dairy products (heat-treated milk, fermented milk, cheese). The changing ecology and epidemiology of food-borne diseases. Standards and guidelines on food (dairy products) labelling. Dairy products as functional food: health claims evaluation. Integrated food safety system (prerequisite programs, HACCP, risk analysis). A one health perspective on dairy sector. Guidance to food laws and regulations (national, EU, Codex standards, guidelines and related texts). *Practicals* On-farm hygienic milk production: evaluation study. Implementation of mastitis control plan. Quality monitoring in milk processing (recording and control of milk pasteurization, milk fermentation process monitoring, evaluation of dairy sanitation procedure. Identification of a critical control points. Validation of product shelf-life. Development, implementation and validation of HACCP plan in relation to specific production process and hazard/food combination. Dairy products testing against the microbiological criteria set down in Commission Regulation (EC) No 2073/2005.
Recommended literature

A plethora of books on the subject related to dairy production and processing, food safety, veterinary public health, understanding the dairy cow – available at vetbooks.ir				
Hours	**Lecture:** 1		**Practicals :** 2	
Teaching methods Active participation on the lectures, seminar exercises and at field work; Group discussion, Practical laboratory work				
Evaluation and grading (maximum 100 points)				
Pre-exam requirements	Points	**Final exam**		Points
Lecture attendence	10	Written exam		20
Participation in practicals	20	Oral exam		30
Colloquium				
Seminars	20			
Knowledge assessment methods:				

Study programme: Specialist academic studies of veterinary medicine				
Course title: Specialist teaching block from elective module II				
Lecturers: Neđeljko Karabasil, Full Professor; **Silvana Stajković**, Assistant Professor; Mirjana Dimitrijević, Full Professor; Snežana Bulajić, Full Professor; Dragan Vasilev, Associate Professor; Radoslava Savić Radovanović, Assistant Professor; Nikola Čobanović, Assistant Professor; Tijana Ledina, Assistant Professor; Nevena Grković, Assistant Professor; Branko Suvajdžić, Teaching Assistant PhD; Jasna Đorđević, Teaching Assistant PhD				
Course status: Obligatory				
ECTS credits: 7				
Prerequisites: enrolled semester in which the course is taken				
Course aims Understands the position, responsibilities and authorization of stuff in the food testing laboratory.				
Course outcomes Upon completion of the specialist block, the student will be able to manage processes in food testing laboratory.				
Course content *DON-SIR* Sample and Sampling procedure. Transport, storage, and handling of samples. Sampling and Records keeping. Parameters of food safety, hygiene and quality and selection of methods. Verification of standard test methods and validation of non-standard test methods. Significance of measurement uncertainty in food analysis. Management of laboratory equipment and environmental conditions. Risk analysis and risk management in the food analysis. Food analysis: sensory, microbiological, chemical, physico-chemical, immunochemical and physical food analysis. Reporting on test results. Presentation and interpretation of test results.				
Recommended literature Lynne McLandsborough, 2017. Food Microbiology Laboratory, CRC Press. Jay J., Loessner M., Golden D., 2005. Modern Food Microbiology, 7th Edition, Springer. SRPS ISO / IEC 17025: 2017 - General requirements for the competence of testing and calibration laboratories ISO standardi – методе изолације и идентификације микроорганизама, одређивање броја; В.Теодоровић и сар., 2015. Хигијена и технологија меса, Факултет ветеринарске медицине, Београд. Катић В., Булајић С., 2017. Хигијена и технологија млека. Фаултет ветеринарске медицине, Београд; Н.Карабасил и сар., 2020. Контрола намирница анималног порекла, Факултет ветеринарске медицине, Београд; Бунчић С. 2006. Integrated Food Safety and Veterinary Public Health. CABI Publishing				
Hours	**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5
Teaching methods Research work in the food industry, with solving tasks and cases in the real environment of food production.				
Evaluation and grading (maximum 100 points)				
Pre-exam requirements	Points	**Final exam**		Points
Lecture attendence		Written exam		50
Participation in practicals		Oral exam		

Colloquium		Seminars	
Seminars	50		
Knowledge assessment methods:			

MODULE 6

INTERNAL MEDICINE OF SOCIAL ANIMALS

Study programme: Specialist academic studies of veterinary medicine			
Cours title: Internal diseases of dogs and cats			
Lecturers: Vanja Krstić, Full Professor; Nenad Andrić, Associate Professor; Predrag Stepanović, Associate Professor; Vojislav Ilic, Full Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisite: Completed courses of the second semester, Clinical pathology of Social animals and Instrumental Methods of diagnosis and Therapy of animal diseases			
Course aims Gaining theoretical knowledge and practical experience on all aspects of etiopathogenesis, diagnosis and therapy of diseases of dogs and cats. Independent care of all clinical cases of diseases of dogs and cats and solving specialist tasks following the specialization program.			
Course outcomes The future specialist must know the differential diagnosis and therapy of diseases of dogs and cats. He must also master diagnostic, therapeutic procedures and prevention in the clinical pathology of carnivores.			
Course content *Lectures* This elective course enables the acquisition of theoretical knowledge and skills for solving the problems of internal diseases of dogs and cats. In that sense, the program of theoretical classes would be focused on the etiology of important diseases of dogs and cats, differential diagnosis and therapy of cardiovascular, respiratory, digestive, urogenital, hematopoietic, endocrine, nervous and musculoskeletal systems, skin and carnivorous senses. Also, theoretical classes would refer to certain parasitological diseases, then the use of drugs, pain therapy, with special emphasis on oncology of dogs and cats. *Practical* Practical classes would be conducted within the Clinic for Small Animals, specialist clinics, clinical laboratory, the clinic for X-ray diagnostics of the Faculty of Veterinary Medicine in Belgrade.			
Recommended Literature Small animal internal medicine, 6th edition, Nelson R., Couto G., Elsevier Science, 2019. 2. Textbook of veterinary internal medicine expert consult, 8th Edition, Ettinger S., Feldman E., Cote E., Elsevier Science, 2017.			
Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1
Teaching methods Interactive teaching, PowerPoint presentationi and practical teaching			
Evaluation and grading (maximum number of points 100)			
Pre-examination obliqations	Points	**Final exam**	Points
Lecture attendence	30	Written exam	20
Participation in practicals	30	Oral exam	
Colloquium	10	.....	

Seminars	10		
Knowledge assessment methods: The method of evaluation can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Internal diseases of equidae			
Lecturers: Stefan Djoković, Assistant Professor; Vanja Krstić, Full Professor; Nenad Andrić, Associate Professor; Predrag Stepanović, Associate Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites: Attended subjects of the second semester: Clinical pathology of social animals and Instrumental methods of diagnosis and therapy of animal diseases			
Course aims To gain theoretical knowledge and practical experience on all aspects of ethiology, pathogenesis, diagnosis and therapy of equine diseases. Independent care of all clinical cases of equine diseases and solving specialist tasks in accordance with the specialization program.			
Course outcomes The future specialist must know the differential diagnosis and therapy of equine diseases. He must also master diagnostic, therapeutic procedures and prevention in clinical pathology of equidae.			
Course content L*ectures* This elective subject enables the acquisition of theoretical knowledge and skills for solving the problems of internal diseases of equidae. In that sense, the program of theoretical classes would be focused on the etiology of important diseases of equidae, differential diagnosis and therapy of diseases of the cardiovascular, respiratory, digestive, urogenital, hematopoietic, endocrine, nervous and musculoskeletal system, skin and senses of equidae. Also, theoretical classes would refer to certain prasitological diseases, then the use of drugs, pain therapy, with special reference to sports injuries of equidae. *Practicals* Practical classes: Practical classes would be conducted within the Clinic for Small Animals and Equidae, specialist clinics, Clinical laboratory, Clinic for radilogical diagnostics of the Faculty of Veterinary Medicine in Belgrade, as well as the Hippodrome Belgrade *DON (additional forms of teaching)* *SIR (study research work)*			
Recommended literature 1.Equine Internal Medicine 3rd Edition , Reed S, WarvickB, Sounders Elsevier, 2010 2.Adams and Stashak's Lameness in Horses 6th Edition , Baxter Gary M, John Willey& Sons, 2011 3.Cardiology of the Horse 2nd Edition, Celia Marr B, Sounders Elsevier, 2010 4.Болести копитара,Траиловић Д., Научна КМД , 2011			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods : Interactive teaching, Power -Point presentation and practical teaching			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Participation in formal lecture	30	Written exam	
Participation in practicals	30	Oral exam	20

Colloquium	10		
Seminars	10		
Knowledge assessment methods: Knowledge assessment methods of can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc ....)			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Exotic pet diseases			
Lecturers: Miloš Vučićević, Assistant Professor; Radmila Resanović, Full Professor; Danica Bogunović, Assistant Professor; Darko Marinković, Associate Professor; Uroš Glavinić, Assistant Professor; Ksenija Aksentijević, Assistant Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites:			
Course aims The aim of the course is to enable students to work independently with exotic pets in accordance with the rules of the profession and on the basis of the latest scientific and professional knowledge			
Course outcomes Specialist veterinarian capable of independently recognizing the symptoms of exotic pet diseases, sampling tissues for examination, applying adequate diagnostic procedures and using appropriate therapeutic protocols			
Course content *Lectures* Specifics of certain types of exotic pets; Tissue sampling; The most significant diseases of infectious etiology; Parasitosis; Zoonoses; Welfare; Diagnostic protocols *Practicals* Practical work with patients within the Teaching Hospital for Small Animals of the Faculty of Veterinary Medicine *DON (additional forms of teaching)* *SIR (study research work)*			
Recommended literature Quesenberry K, Mans C, Orcutt C, Carpenter JW, 2020, Ferrets, Rabbits and Rodents: Clinical Medicine and Surgery 4th Edition, Elsevier Health Sciences Mitchell M , Tully T N, 2016, Current Therapy in Exotic Pet Practice, Elsevier Health Sciences Doneley B, Monks D, Johnson R, Carmel B, 2018, Reptile Medicine and Surgery in Clinical Practice, John Wiley & Sons Kubiak M, 2020, Handbook of Exotic Pet Medicine, John Wiley & Sons Summers A, 2019, Common Diseases of Companion Animals E-Book, Elsevier Health Sciences			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Theoretical lectures, case analyzes, practical work at the clinic, practical work in the laboratory			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	20
Participation in practicals	30	Oral exam	
Colloquium			

Seminars	30		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Diagnostic imaging of companion animals' diseases
Lecturers: Mirjana Lazarević Macanović, Full Professor; Nikola Krstić Full Professor; Marko Mitrović, Assistant Professor; Vanja Krstić, Full Professor; Predrag Stepanović, Associate Professor; Vladimir Magaš, Associate Professor
Course status: Elective
ECTS credits: 9
Prerequisites: Teaching in the subject of Diagnostic Imaging of Companion Animals' Diseases can be attended only by those students who, during the 2nd semester of Specialist Academic Studies, attended classes in the elective subject Instrumental Methods of Diagnostics and Therapy of Animal Diseases.
Course aims During the teaching process residents are trained to impove their skills in analyzing and interpreting images obtained by different diagnostic imaging methods acquired during bachelor studies (radiography/fluoroscopy, computed tomography /CT/ and ultrasonography) in order to detect pathological changes and make an accurate diagnosis of the disease.
Course outcomes Upon completion of this course, students should: - Use X-ray and CT devices, as well as ultrasound devices; - Understand how the organs are displayed in radiological and ultrasound images; - Recognize, analyze and interpret pathological changes in radiological and ultrasound images.
Course content L*ectures* Diagnostic imaging of respiratory diseases in dogs and cats (methodology of radiological examination, radiographic anatomy of respiratory organs). Radiological examination of respiratory function. Radiological diagnostics of the upper respiratory tract diseases (nasal cavities, sinuses, larynx, trachea). Radiological diagnostics of the lower respiratory tract diseases (the bronchal tree, the lung parenchyma). Radiological diagnostics of pathological changes on the thoracic boundaries, pleural and mediastinal space. Diagnostic imaging of cardiovascular diseases in dogs and cats (methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of heart and major blood vessels). Radiological and ultrasound diagnostics of heart disease and pathological changes in major blood vessels. Diagnostic imaging of urogenital diseases in dogs and cats (methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of urogenital organs). Radiological examination of kidney's function. Radiological and ultrasound diagnostics of pregnancy. Radiological and ultrasound diagnostics of urogenital diseases. Diagnostic imaging of adrenal gland diseases in dogs and cats (methodology of radiological and ultrasound examination and radiological and ultrasonografic anatomy of the adrenal gland). Ultrasound diagnostics of adrenal gland diseases. Radiological diagnostics of dental diseases in dogs and cats (methodology of radiological examination of the stomatognathic system, radiological diagnostics of hereditary and acquired diseases of the stomatognathic system). Diagnostic imaging of the liver and pancreatic diseases and gastrointestinal organs diseases in dogs and cats

(methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of liver, pancreas and gastrointestinal organs). Radiological examination of the gastrointestinal motility. Radiological and ultrasound diagnostics of the gastrointestinal diseases. Radiological and ultrasound diagnostics of the liver and hepatobiliary system diseases and pancreatic diseases.

Diagnostic imaging of the spleen diseases and pathological conditions in the abdominal cavity in dogs and cats (methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of the spleen). Radiological and ultrasound diagnostics of spleen diseases. Radiological and ultrasound diagnostics of pathological changes in the peritoneal cavity (ascites, lymphadenopathy, intra-abdominal masses).

Diagnostic imaging of the bone and joint diseases in dogs and cats (methodology of radiological examination, basic changes in bone structure), radiological diagnostics of the axial and appendicular skeleton diseases (congenital anomalies, diseases of traumatic, inflammatory, metabolic and endocrine etiology).

Radiological diagnosics of equine acropodium diseases.

Radiological diagnostics of diseases of the endocranium and vestibular system in dogs and cats.

Diagnostic Imaging of the bird diseases.

Diagnostic imaging of the exotic animal diseases.

Use of the magnetic resonance imaging in veterinary medicine.

Practicals

Analysis of radiographs, ultrasonograms and CT images from the archive of the Department of Radiology and Radiation Hygiene, Faculty of veterinary medicine Universtity of Belgrade and writing descriptions of pathological changes.

DON (additional forms of teaching)

Clinical work with patients in cabinets for radiological and ultrasound diagnostics. Writing descriptions of pathological changes observed on the radiographs, CT images and ultrasonograms.

SIR (study research work)

Individual student's research work guided by teachers.

Recommended literature

1. Šehić M: Klinička rentgenologija u veterinarskoj medicini, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2002.
2. Krstić N, Krstić V: Rendgenološka i endoskopska dijagnostika oboljenja digestivnog i respiratornog sistema pasa i mačaka, autorsko izdanje, Beograd, 2007.
3. Šehić M: Osteoartropatije u domaćih životinja, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2012.
4. Thrall D: Textbook of Veterinary Diagnostic Radiology, 7th edition, WB Saunders Company, Philadelphia, 2017.
5. Šehić M, Matko M: Kompjuterizirana tomografija i dijagnostika patologije lubanje mozga i kralježnice psa, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2012.
6. Schwarz T, Saunders J: Veterinary Computed Tomography, 1st edition, Wiley-Blackwell, UK, 2011.
7. Šehić M, Stanin D, Butković V: Ultrasonografija abdomena i toraksa psa i mačke, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2006.
8. Matton JS, Nyland TG: Small Animal Diagnostic Ultrasound, 3rd edition, WB Saunders Company, Philadelphia, 2014.
9. Krautwald-Junghanns M-E, Pees M, Reese S, Tully T: Diagnostic Imaging of Exotic Pets – Birds, Small Mammals, · Reptiles, Schlütersche Verlagsgesellschaft mbH & Co, Hannover, Germany, 2011.

Hours	**Lecture:** 2	**Practicals :** 3	**DON:** 1

Teaching methods:

Power point presentations, analysis of radiographs and CT images from the archive of the Department of Radiology and Radiation Hygiene, practical work in cabinets for radiological and ultrasound diagnostics.

Evaluation and grading (maximum 100 points):

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	20
Participation in practicals	30	Oral exam	
Colloquium		Practical exam	50
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Behavioral disorders of social animals

Lecturers: Marijana Vučinić, Full Professor; Katarina Nenadović, Assistant Professor; Miloš Vučićević, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites:

Course aims

The aim of the course is to acquire broader knowledge about the basics and forms of behavior of social animals, as well as the possibilities of applying this knowledge in everyday veterinary practice

Course outcomes

Specialist veterinarian capable of independently recognizing behavioral disorders in social animals, applying appropriate diagnostic procedures and therapeutic protocols

Course content

L*ectures*

Neurobiochemical and ethological bases of animal behavior, general etiology, pathogenesis and therapy of social animal behavioral disorders; Behavioral disorders in dogs and cats; Horse behavioral disorders; Behavioral disorders of exotic pets

Practicals

Practical work with patients within the Teaching Hospital for Small Animals of the Faculty of Veterinary Medicine.

Processing of clinical cases

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

Quesenberry K, Mans C, Orcutt C, Carpenter JW, 2020, Ferrets, Rabbits and Rodents: Clinical Medicine and Surgery 4th Edition, Elsevier Health Sciences

Bays TB, Evans EI, Fisher PG, Johnson DH, Lightfoot T, Mayer J, Nacewicz CL, 2006, Exotic Pet Behavior: Birds, Reptiles, and Small Mammals, Elsevier Health Sciences

Hunt J, 2018, Animal Behaviour, Scientific e-Resources

Broom DM, Fraser AF, 2015, Domestic Animal Behaviour and Welfare, 5th Edition, CABI

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Theoretical lectures, case analyzes, practical work at the clinic

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	20

Participation in practicals	30	Oral exam	
Colloquium			
Seminars	20		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Diagnostic and therapy of parasitic diseases of social animals
Lecturers: Tamara Ilić, **Associate Professor**; Vanja Krstić, Full Professor; Nevenka Aleksić, Full Professor; Zoran Kulišić, Full Professor; Danica Bogunović, Assistant Professor
Course status: Elective
ECTS credits: 9
Prerequisites: Completed courses of the second semester - Clinical pathology of social animals and Instrumental methods in diagnosis and therapy of animal diseases
Course aims Acquisition of theoretical and practical knowledge about all aspects of etiopathogenesis, diagnosis and treatment of parasitic diseases in social animals, in order to fully understand the overall pathology of social animals.
Course outcomes The student is skillful to make (differential) diagnosis and conduct therapy for treating parasitic diseases of dogs, cats and horses. She/he can perform the necessary clinical procedures in order to diagnose and undertake appropriate therapy and prevention in numerous diseases that are seen in everyday clinical practice.
Course content *Lectures* Etiology of major parasitic diseases in horses, clinical manifestation of diseases, examination methods and treatment procedures, considering the principles of good veterinary practice, animal welfare and national and European regulations: The major group of endoparasitosis in horses (Anoplocephalidosis, Parascariosis, Oxyuriosis, Strongylidosis, Strongyloidosis) - (6 hours) The major ectoparasitosis in horses (Scabies, Gasterophilosis) - (2 hours) Etiology of major parasitic diseases in dogs and cats, clinical manifestation of diseases, examination methods and treatment procedures, considering the principles of good veterinary practice, animal welfare and national and European regulations: The major important protozoa in carnivores (Babesiosis, Coccidiosis, Neosporosis, Toxoplasmosis) - (8 hours) The major helminthes in carnivores (Cestodoses, Dirofilariosis, Ascarididosis, Ancylostomatidosis, Strongyloidosis, Trichuriosis) - (10 hours) The major arthropods in carnivores (Linguatulosis, Scabies, Demodicosis) - (4 hours) *Practicals* Practical classes are held in the parasitological laboratory and at the Small Animal Teaching Hospital, and include interactive learning, using various diseases examples and complete handling of clinical cases including diagnostic procedure and treatment (45 hours). *DON (additional forms of teaching)* *SIR (study research work)*
Recommended literature 1) Dimitrijević S, Ilić T. 2011, Clinical Parasitology, Faculty of Veterinary Medicine, University of Belgrade,

Published by the author and Interprint d.o.o. Belgrade, Belgrade; 2) Zajac MA, Conboy AG. Veterinary clinical parasitology. 8ht Edition, Wiley Blackvell, New Jersey, USA, pp. 368, 2012; 3) Taylor AM, Coop LR, Wall LR. Veterinary Parasitology. 4th Edition, Wiley Blackvell, New Jersey, USA, pp. 1032, 2016; 4) Deplazes P, Eckert J, Mathis A, Von Samson-Himmelstjerna G, Zahner H. Parasitology in veterinary medicine. 1st Edition, Wageningen Academic Pub, Gelderland, Netherlands, pp. 653, 2016; 5) Despommier DD, Griffin OD, Gwadz WR, Hotez JP, Knirsch C. Parasitic Diseases. 6th Edition, 2nd Printing, Parasites Without Borders, Inc. NY, pp. 610, 2017; 6) Elsheikha MH, Wright I, McGarry J. Parasites and pets: a veterinary nursing guide. 1st Edition, CABI Publishing, Texas, USA, pp. 170, 2018; 7) Smythe HR. Veterinary parasitology. 1st Edition, Franklin Classics, New Zealand, pp. 150, 2018; 8) Saari S, Näreaho A, Nikander S. Canine Parasites and Parasitic Diseases. 2nd Edition, Academic Press, Waltham, USA, pp. 287, 2019.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

1. Clinical and parasitological methodology for determining resistance in equidae

Fecal Egg Count Reduction Test (FECRT)

Test for determination of the period required for the eggs reappearance in the feces (ERP - Egg Reappearance Period)

2. Quantitative and qualitative FEC (Fecal Egg Count) - comparative evaluation of the obtained diagnostic results in carnivores

3. Concentration techniques for the detection of microfilariae in the peripheral blood of dogs (modified Knott test, DIFIL test)

4. Immunodiagnostic methods for the antigens detection of *D. immitis* adult females in the peripheral blood of dogs (application and diagnostic possibilities of rapid commercial tests in the detection of cardiorespiratory heartworm disease)

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	40	Oral exam	10
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Diagnosis and therapy of neurological diseases in dogs and cats

Lecturers: Nenad Andrić, Associate Professor; Nikola Krstić, Full Professor; Slađan Nešić, Assistant Professor; Miloš Đurić, Teaching Assistant

Course status: Elective

ECTS credits: 9

Prerequisites: Enrollment in the semester in which the exam is taken

Course aims

The aim of the course is to learn how to perform a neurological examination, to get knowledge about the mechanisms of neurological disease, diagnosis of the most common neurological diseases in dogs and cats, to get treatment protocols for the most commonly diagnosed neurological diseases in dogs and cats,

Course outcomes

DVM specialist trained to work independently with patients with neurological diseases.

Course content

Lectures

- Anatomical diagnosis and pathophysiological mechanisms of diseases of the nervous system
- Recognition of neurological clinical signs of the disease
- Epilepsy, narcolepsy / cataplexy and hydrocephalus
- Seizures in dogs and cats - differential diagnosis, diagnosis, therapy
- Differential diagnosis between neurological and orthopedic diseases
- Diseases of the disc and spinal cord
- Diseases of peripheral nerves and neuromuscular joints
- Special methods of examination of the nervous system of dogs and cats
- Physical therapy in neurological patients
- The importance of making a pathoanatomical diagnosis

Practicals - SIR (study research work)

Practical exercises at the Clinic of small animal disease, Case reports with discussion

Recommended literature

1. Handbook of Veterinary Neurology - E-Book, Michael D. Lorenz, Joan Coates, Marc Kent, Saunders, 2010.
2. BSAVA manual of canine and feline neurology, Simon R Platt; Natasha J Olby; British Small Animal Veterinary Association, 2014.
3. Neurology, Rehabilitation, Veterinary Technicians and Neurologic Rehabilitation, Mary Ellen Goldberg Jan/Feb 2016.
4. Braund's Clinical Neurology in Small Animals: Localization, Diagnosis and Treatment, Braund K.G.Editor(s):Vite C.H. Publisher:, International Veterinary Information Service, 2003
5. Practical Guide to Canine and Feline Neurology, Curtis W. Dewey (Editor), Ronaldo C. da Costa (Editor), Wiley-Blackwell, 2015.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Theoretical classes:

PowerPoint presentations, seminars, public presentation and discussion

Practical classes: Exercises at the Clinic of small animal disease, Case reports presentation

Evaluation and grading (maximum 100 points)

Knowledge assessment methods: Test, seminar papers, public presentations. Within the compulsory classes and on the exam, students can collect 100 points: 70 from pre-exam obligations (class attendance, seminar papers) and 30 on the exam. The exam is taken in oral exam form .

Study programme: Specialist academic studies of veterinary medicine

Course title: Laboratory diagnosis of tumors and principles of pharmacological therapy

Lectrurers: Milica Kovačević Filipović, Full Professor; Sanja Aleksić Kovačević, Full Professor; Darko Marinkovic, Associate Professor; Vladimir Kukolj, Associate Professor; Ivana Vučićević, Assistant Professor; Sladjan Nešić, Assistant Professor; Mirjana Milovanović, Associate Professor; Jelena Francuski Andrić, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Completed courses of the second semester Clinical pathology of social animals and Instrumental methods of diagnosis and therapy of animal diseases

Course aims

To enable students to create and implement an algorithm for laboratory diagnosis of tumors and to establish pharmacological therapy of tumors.

Course outcomes

Students are expected to 1. list all laboratory methods of tumor diagnosis as well as their advantages and disadvantages; 2. practically perform and apply cytological diagnostics; 3. with the help of pathohistological grading of tumors, perform therapeutic decision-making 4. select appropriate pharmacological therapeutic protocols for the most common tumors with the application of the necessary safety measures.

Course content

Lectures

1) Tumor etiology and carcinogenesis; 2) Tumor metastases; 3) Tumor immunology; 4) Tumor markers and molecular diagnostics of tumors; 5) Principles of classical and fine-needle biopsy; 6) Pathohistological diagnosis of tumors; 7) Immunohistochemical diagnosis of tumors; 8) Cytological diagnosis of tumors; 9) Laboratory monitoring of paraneoplastic syndrome; 10) Grading, staging and therapeutic decision making; 11) General principles of cytostatic therapy; 12) General principles of immunotherapy, vaccination and molecular therapy; 13) General principles of stem cell therapy; 14) Alternative therapies; 15) Clinical trials and development of therapies;

Practicals Practical classes Performing classical and fine-needle biopsy. Making and staining cytological preparations. Tumor autopsy findings. Review of pathohistological preparations. Review of cytological preparations of solid tumors. Review of cytological preparations of hematopoietic tumors. Review of cytological preparations of effusions. Review of the application of cytostatics on an oncology patient - preparation of the patient; communication with the owner about the specifics of therapy; way of disposal and destruction of residual cytostatics and packaging. Method of monitoring an oncology patient during cytostatic therapy.

DON (additional forms of teaching) Daily work in the laboratories

SIR (study research work) Work with mentor

Recommended literature

1. Vail DM, Thamm D, Liptak J, Withrow and MacEwen's Small Animal Clinical Oncology, 6th Edition, Elsevier Science, 2019
2. Klopfleisch R, Veterinary Oncology A Short Textbook, 1st Edition, 2016
3. Donald J. Meuten, Tumors in Domestic Animals, 5th Edition, Wiley-Blackwell; 2020
4. Hendrick MJ, Mahaffey EA, Moore FM, Vos JH, Walder EJ, Histological classification of mesenchymal tumors

of skin and soft tissues of domestic animals, second edition, WHO, Armed Forces Institute of Pathology and American Registry of Pathology, Washington D.C., 1998
5. Goldschmidt MH, Dunstan RW, Stannard AA, Tscharner C et al., 1998, Histological classification of epithelial and melanocytic tumors of the skin of domestic animals, second edition, WHO, Armed Forces Institute of Pathology and American Registry of Pathology, Washington D.C., 1998
6. Goldschmidt MH, Munday MS, Scruggs JL, Klopfleish R, Kiupel M, Surgical Pathology of Tumors of Domestic Animals, Vol 1: Epithelial Tumors of the Skin, Gurnee, IL: Davis-Thompson Foundation, 2018

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods
Theoretical classes with interactive learning, with the application of audio-visual methods (PowerPoint presentations), demonstrations and practical teaching in the laboratories of the Faculty, discussions, case studies.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	60
Participation in practicals	20	Oral exam	
Colloquium	10		
Seminars	10		

The knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical pharmacology of social animals

Lecturers: Mirjana Milovanović, Associate Professor; Saša Trailović, Full Professor; Nenad Andrić, Associate Professor; Vanja Krstić, Full Professor; Predrag Stepanović, Associate Professor; Radmila Resanović, Full Professor; Milos Vučićević, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Passed and certified I and II semesters

Course aims

Introduction to the legal regulations and the manner of registration and introduction of drugs into clinical practice.

Possibility of application of modern pharmacotherapeutic procedures in the treatment of diseases and disorders of organ systems in social animals.

Course outcomes

Upon completion of classes, SAS-VET MED students will:

- Acquire the necessary knowledge about clinical trials of drugs and the way of introducing new drugs into clinical practice.
- To master in more detail the mechanisms of action, indications and dosage for drugs used in the treatment of diseases and disorders of the organic systems in social animals.
- Be more closely informed about the monitoring and reporting of adverse and toxic effects of drugs that they may encounter in their clinical practice.

Course content

Lectures

- Clinical trial of drugs
- Bioequivalence of drugs
- Pharmacovigilance
- Drug interactions in clinical practice
- Doses and dosage of drugs
- Adverse and toxic effects of drugs
- Drugs in the treatment of the respiratory system diseases
- Drugs in the treatment of the cardiovascular system diseases
- Drugs in the treatment of the digestive system diseases
- Drugs in the treatment of the urinary system diseases
- Drugs in the treatment of the endocrine disorders
- Drugs in the treatment of the neurological disorders
- Drugs in the treatment of the animal behavioral disorders
- Mechanisms of development and pain therapy
- Drugs in the treatment of the musculoskeletal system diseases
- Drugs in the treatment of the skin diseases

- Drugs in the treatment of parasitic infections

Practicals

Application of pharmacotherapeutic procedures in the treatment of diseases of the respiratory, cardiovascular, digestive, urinary, nervous, endocrine system, skin diseases and parasitic diseases, through case reports. Monitoring of drug side effects.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

Walter H. Hsu, 2008: Handbook of VeterinaryPharmacology, 1 ed, Wiley-Blackwell

Desmond J. Baggot, 2001:The Physiological Basis of Veterinary Clinical Pharmacology, 1 ed, Wiley

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Lectures, practical classes, seminars

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	15	Written exam	50
Participation in practicals	30	Oral exam	
Colloquium			
Seminars	5		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical toxicology of social animals

Lecturers: Saša Trailović, Full Professor; Mirjana Milovanović, Associate Professor; Nenad Andrić, Associate Professor; Vladimir Nešić, Associate Professor

Course status: Elective

ECTS credits: 9

Prerequisite: Completed I and II semesters

Course aims

Introduction to the legal aspect of animal poisoning.
Possibility of applying diagnostic procedures in detecting the causes of animal poisoning.
Proper and timely approach for decontamination and detoxification of poisoned animals.

Course outcomes

Upon completion of classes, students of SAS-VET MED will:
- Acquire the necessary knowledge about the etiopathogenesis of social animal poisoning
- Learned diagnostic procedures for social animal poisoning.
- Learned pharmacotherapeutic procedures in order to decontaminate and detoxify poisoned animals.

Course content

Lectres

- Introduction to toxicology - basic concepts (xenobiotics, toxicity and toxicity measurement, exposure, risk and risk assessment, decontamination, detoxification).
- Legislation in animal poisoning-criminal-legal aspect.
- Toxicokinetics.
- Xenobiotics and organ systems (neurotoxicity, hepatotoxicity, nephrotoxicity, chemotoxicity, mutagenicity, carcinogenicity, teratogenicity, reproductive toxicity).
- Diagnosis of poisoning.
- Basic principles of poisoning therapy.
- Poisoning with metals and micronutrients and therapy of poisoning.
- Poisoning with insecticides, rodenticides, industrial toxicants and poisoning therapy.
- Poisoning with mycotoxins, herbicides, fungicides, molluscicides and poisoning therapy.
- Poisoning with bacterial toxin and treatment.
- Poisoning with inadequately prescribed drugs and treatment.

Practical classes

Poisoning diagnosis - sampling of materials for chemical-toxicological analysis; interpretation of the results of hematological and biochemical analyzes in case of suspected poisoning; interpretation of pathohistological findings; setting up a biological test to diagnose poisoning. Procedures for decontamination and detoxification of poisoned animals.

Recommended literature
Ramesh C. Gupta, 2018:Veterinary Toxicology: Basic and Clinical Principles, 3rd ed., Elsevier Science.
Larry R. Engelking, 2014: Textbook of Veterinary Phisiological Chemistry, 3rd ed., Academic Press.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods
Lectures, practical classes, seminars

Knowledge assessment (maximum number of points 100)

Evaluation and grading	points	**Final exam**	points
Lecture attendence	15	Written exam	50
Participation in practicals	30	Oral exam	
Colloquiums		.....	
Seminars	5		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Cours Title: Specialist teaching block from elective module I

Lecurers: Vanja Krstić, Full Professor; Nenad Andrić, Associate Professor; Predrag Stepanović, Associate Professor; Vojislav Ilić, Full Professor; Stefan Đoković, Assistant Professor; Radmila Resanović, Full Professor; Danica Bogunović, Assistant Professor; Darko Marinković, Associate Professor; Uroš Glavinić, Assistant Professor; Ksenija Aksentijević, Assistant Professor; Mirjana Lazarević Macanović, Full Professor; Nikola Krstić, Professor; Marko Mitrović, Assistant Professor; Vladimir Magaš, Associate Professor; Marijana Vučinić, Full Professor; Katarina Nenadović, Assistant Professor; Tamara Ilić, Associate Professor; Nevenka Aleksić, Full Professor; Zoran Kulišić, Full Professor; Slađan Nešić, Assistant Professor; Milica Kovačević Filipović, Full Professor, Sanja Aleksić Kovačević, Full Professor; Vladimir Kukolj, Associate Professor; Ivana Vučićević, Assistant Professor; Mirjana Milovanović, Associate Professor; Jelena Francuski Andrić, Assistant Professor; Saša Trailović, Full Professor; Vladimir Nešić, Full Professor; Miloš Vučićević, Assistant Professor

Course status: Obligatory

ECTS credits: 7

Prerequisite: Enrolled semester in which the course is taken

Course aims

Acquiring the knowledge and skills necessary to work with internist patients dogs, cats, horses and exotic pets

Course outcomes

Student able to: solve complicated internal cases of social animals, apply imaging diagnostic methods, recognize behavioral disorders in social animals, diagnose and treat neurological diseases of dogs and cats, diagnose and treat social animal poisoning and practically perform and apply cytological diagnosis of neoplasms and select appropriate therapeutic protocol

Course content

Lectures

Practical

Practical work in the Teaching Hospital for Small Animals of the Faculty of Veterinary Medicine; work in the laboratories of the Faculty; clinical work with patients in cabinets for radiological and ultrasound diagnostics; case analysis

Recommended literature
Quesenberry K, Mans C, Orcutt C, Carpenter JW, 2020, Ferrets, Rabbits and Rodents: Clinical Medicine and Surgery 4th Edition, Elsevier Health Sciences
Small nimal internal medicine, 6th edition, Nelson R., Couto G., Elsevier Science, 2019
Thrall D: Textbook of Veterinary Diagnostic Radiology, 7th edition, WB Saunders Company, Philadelphia, 2017

Vail DM, Thamm D, Liptak J, Withrow and MacEwen's Small Animal Clinical Oncology, 6th Edition, Elsevier Science, 2019				
Hours	**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5
Teaching methods Practical work with patients with subject teachers				
Evaluation and grading (maximum number of points 100)				
Pre-examination obliqations	Points	**Final exam**		Points
Lecture attendence		Written exam		50
Participation in practicals	50	Oral exam		
Colloquium		.....		
Seminars				
Knowledge assessment methods: The method of evaluation can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc				

Study programme: Specialist academic studies of veterinary medicine		
Cours Title: Emergencies in social animals		
Lecturers: Vanja Krstic, Full Professor; Nenad Andrić, Associate Professor; Predrag Stepanović, Associate Professor		
Course status: Elective		
ECTS credits: 6		
Prerequisite: Completed courses of the second semester, Clinical pathology of Social animals and Instrumental Methods of diagnosis and Therapy of animal diseases		
Course aims Gaining theoretical knowledge and practical experience on all aspects of etiopathogenesis, diagnosis, and emergency therapy in dogs and cats. Independent care of all clinical cases of emergencies in dogs and cats.		
Course outcomes A specialist is able to recognize the emergency condition and conduct appropriate therapy in dogs and cats. Trained to perform proper emergency patient triage, provide first aid, and perform emergency patient stabilization.		
Course content *Lectures* This elective course enables the acquisition of theoretical knowledge and skills for solving the problem of emergency conditions of dogs and cats. Theoretical lecture included: definition of basic terms in emergency veterinary medicine, triage, cardiopumlonary stasis, urgent conditions of the cardio-respiratory system, acute abdomen, emergencies in neurology, emergencies in hematology, emergencies in reproduction, emergencies in dermatology, sepsis, shock, stabilization of patients and certain stabilization procedures, intensive care of critical and urgent patients, fluid therapy. *Practical* Practical classes would be conducted within the Clinic for Small Animals, an X-ray diagnostics clinic at the Faculty of Veterinary Medicine in Belgrade.		
Recommended literature 1. Deborah C. Silverstein, Kate Hopper, Small animal critical care medicine, Saunders Elsevier, 2009. 2. Murtaugh Kaplan, Veterinary emergency and critical care medicine, Mosby Year Book, 1992. 3. Jill E. Meddison, Stephen W. Page, David B. Church, Small animal clinical pharmacology, Saunders Elsevier, 2008		
Hours	**Lectures**: 1	**Practicals :** 2
Teaching methods Interactive teaching, PowerPoint presentations, and practical teaching		
Evaluation and grading (maximum number of points 100)		

Pre-examination obliqations	Points	**Final exam**	Points
Lecture attendence	20	Written exam	20
Participation in practicals	20	Oral exam	20
Colloquium	10	.....	
Seminars	10		
Knowledge assessment methods: The method of evaluation can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc			

Study programme: Specialist academic studies of veterinary medicine

Course title: Integrative clinical approach in social animal oncology

Lecturers: Nenad Andrić, Associate Professor; Vanja Krstić, Full Professor; Vladimir Magaš, Associate Professor; Predrag Stepanović, Associate Professor; Mirjana Macanović Lazarević, Full Professor; Branislava Mitrović, Associate Professor; Darko Davitkov, Teaching Assistant PhD; Miloš Đurić, Teaching Assistant; Marko Mitrović, Assistant Professor; Ljubodrag Stanišić, Teaching Assistant PhD

Course status: Elective

ECTS credits: 6

Prerequisites: Participant in the module Internal Medicine of Social Animals

Course aims

To raise the level of awareness of veterinarians about the approach to oncology patients and to present the possibilities of diagnosis and therapy of oncology patients

Course outcomes

Specialist trained in the application of the protocol of examination of oncology patients, accurate determination of the location of the tumor, the application of the appropriate diagnostic method and the appropriate therapeutic protocol.

Course content

Lectures

1. Epidemiology of neoplasms and evidence based approach; 2. Imaging in the diagnosis of neoplasms of social animals; 3. Radiation therapy of tumors in clinical practice of social animals; 4. Clinical approach to diagnosis and therapy of skin and subcutaneous tissue tumors; 5. Clinical approach to diagnosis and treatment of tumors of the endocrine system; 6. Clinical approach to diagnosis and treatment of tumors of the digestive system; 7. Clinical approach to diagnosis and therapy of nerve and bone tissue tumors; 8. Clinical approach to diagnosis and treatment of tumors of the respiratory system; 9. Clinical approach to diagnosis and therapy of tumors of the reproductive tract and mammary gland 10. Clinical approach to diagnosis and therapy of tumors of the hematopoietic system.

Practicals

Clinical examination of oncology patients, Diagnosis of tumor processes / formations, sampling for cytological or histopathological examination, choice of treatment protocol

DON (additional forms of teaching)

Cse reports presentation and discussion

SIR (study research work)

Recommended literature:

Vail DM, Thamm D, Liptak J, Withrow and MacEwen's Small Animal Clinical Oncology, 6th Edition, Elsevier Science, 2019

2. Klopfleisch R, Veterinary Oncology A Short Textbook, 1st Edition, 2016
3. Barb Biller, John Berg, Laura Garrett et al, 2016 AAHA Oncology Guidelines for Dogs and Cats, J Am Anim Hosp Assoc, 181-204.
4. Susan M. North, Tania Ann Banks, Small Animal Oncology E-Book: An Introduction, Saunders Elsevier, 2009.

Hours	**Lectures:** 1	**Practicals :** 2

Teaching methods: Teaching methods Theoretical teaching with interactive learning, with the application of audio-visual methods (PowerPoint presentations), demonstrations and practical teaching at the clinics of the Faculty, discussions about cases, case studies.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	40
Participation in practicals	40	Oral exam	
Colloquium			
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: The use of ionizing radiation in the diagnosis and treatment of animal diseases

Lecturers: Branislava Mitrović, Associate Professor; Jelena Ajtić, Full Professor

Course status: Elective

ECTS credits: 6

Prerequisites: /

Course aims

to introduce the students theoretically with the modern application of ionizing radiation in the diagnosis and treatment of diseases of social animals.

Course outcomes

Upon completion of the course, students should be able to:
- describe the physical basis of the application of wave and particle ionizing radiation in diagnostics and therapy;
- have the knowledge about the equipment used in tumor radiotherapy;
- list the changes that ionizing radiation causes in the animal's body;
- give examples of brachytherapy and teletherapy in animals;
- list biologically significant radionuclides and give examples of their use;

Course content

Lectures

Selected chapters of general radiation physics: ionizing radiation, X-ray radiation, radioactivity, radiation interactions with matter (2). Dosimetry and radiation detection (1). Fundamentals of radiobiology (2). Application of radionuclides in veterinary medicine (2). Nuclear medicine (1). Fundamentals of radiotherapy physics and equipment and practical application (2). Brachytherapy. Radiotherapy. Proton therapy (2). Radiosurgery and gamma knife (1). Side effects of radiotherapy, early and late reactions and their diagnosis and therapy (2).

Practicals:/

DON (additional forms of teaching)

Recommended literature:

E.B. Podgorsak: Review of Radiation Oncology Physics: A Handbook for Teachers and Students. Educational reports series. IAEA Vienna 2015.
S. J. Withrow and D. M. MacEwen: Small Animal Clinical Oncology. Elsevier, 2013. (selected chapters).
L. Higginbotham: Cancer management in small animal practice. Елсевиер, 2010. (selected chapters).
F. M. Khan: Physics of Radiation Therapy, 4th Edition, Lippincott Williams & Wilkins, 2010 (selected chapters).

Hours	**Lectures:** 1	**Practicals:** 2	
Teaching methods: lectures, movies			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attndence	15	Written exam	50
Participation in practicals		Oral exam	
Colloquium			
Seminars	35		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Physical therapy of social animals

Lecturers: Nikola Krstić, Full Professor; Mirjana Lazarević Macanović, Full Professor; Marko Mitrović, Assistant Professor

Course status: Elective

ECTS credits: 6

Prerequisite: Already enrolled in the module 6 attended classes ininstrumental methods of diagnosis and therapy of animal diseases in the second semester of academic specialist studies

Course aims

During the course, postgraduates get acquainted with the modern methods of physical therapy, its laws, possibilities and scope and master the skills of handling various devices used in physical medicine. The aim of the course is to explain and adopt the fact that the essence of the rehabilitation program in patients with dysfunction of various organ systems is not the literal removal of anatomical and physiological damage, but rather establishing the optimal functional state of the organism according to its remaining capabilities, and thus improving the quality of life.

Course outcome

Upon successful completion of this course, students should be able to:
-know the general principles and laws of physical therapy, to make the differences of its stimulating effect, as well as to independently use and choose among different methods of physical treatment;
-master the ways of functioning of various devices in physical therapy and application techniques;
-perform an initial evaluation of the patient's physiological status;
-establish an individual therapy plan, form a treatment protocol and present it to the animal owner in an appropriate way;
-make a comparative analysis of the findings obtained on the basis of medical history, clinical and orthopedic examinations, as well as the results of physical therapy examinations obtained through specific tests;
-make a physical therapy diagnosis, give a prognosis of the disease and perform physical therapy treatment.

Course content

Lecures

General principles and laws of physical therapy, theoretical basis, mechanisms of therapeutic action. On the specificity of the stimulating effect of physiotherapy. Biophysical basis of physical medicine (energy reception and distribution in tissues, energy absorption and transformation, oxidoreduction processes, surface phenomena, colloidal state, the essence of biophysical action of various types of energy). Bioelectrical activity of cells, origin and transmission of biocurrents. Pathophysiology of pain. Organization of the Department for Physical Therapy.Physiotherapy examination, development of therapy plan, physiology of exercise, therapeutic exercises (passive exercises, assistive standing exercises, proprioceptive training, dynamic movement activities). Methods and modalities of physiotherapy. Physiotherapy of muscle disorders, tendons and ligaments (contusions of

muscles, tendons, nerves and joints, distortions of joints, distension of muscles and ligaments, partial and complete rupture of muscles and tendons, sections of tendons and luxation of joints), physiotherapy of traumatic conditions, post-traumatic conditions and posttrauma wound after surgical interventions (bite and, stab wounds), ear shell hematoma, physiotherapy of proliferative–degenerative diseases of the axial and appendicular skeleton, physical treatment of arthritis, physiotherapy of pulmonary diseases (catarrh of maxillary sinuses, rhinitis, restrictive pulmonary diseases,chronic obstructive pulmonary disease, pulmonary emphysema), physiotherapy of neurological diseases (peripheral nerve lesions, cervical syndrome, lumbar syndrome, polyradiculoneuritis, myopathies, spinal lesions, craniocerebral injuries). Rehabilitation of geriatric patients, physical treatment of sports injuries.

Practical classes. Application of devices for physical therapy on clinical material.

Recommended literature

1. Bockstahler, B, Levine, D, Millis, D. (2004), *Essential Facts of Physiotherapy in Dogs and Cats Rehabilitation and Pain Management*, Babenhausen: BE VetVerlag
2. Mc Gowan, C, Goff, L, Stubbs, N. (2007) *Animal Physiotherapy (Assessment, Treatment and Rehabilitation of Animals)*, New Jersey: Blackwell Publishing
3. Millis, L. D, Taylor, A. P. (2004), *Canine Rehabilitation and Physical Therapy*, Philadelphia: WB Saunders
4. Petrović, B, Draganović, B, Gligorijević, J. (1972), *Fundamentals of Physical Medicine for Students of the Faculty of Veterinary Medicine*, Belgrade: Institute for Textbooks Publishing and Teaching Aids
5. Šehić, M.(2014), *Physical Therapy and Rehabilitation of Dogs*, Zagreb: Faculty of Veterinary Medicine

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods:

Power Point presentations for each lecture as well as work with physical therapy devices.

Evaluation and grading (maximum number of points 100)

Pre-exam requirements	Points	**Final exam**	Points
Classroom participation		Written exam	60
Practical teaching	40	Oral exam	
Colloquium		Practical exam	
Seminars			

Knowledge assessment methods: can be different and only some of them are listed in the table (written exams, oral exam, project presentation, seminars, etc.)

Study programme: Specialist academic studies of veterinary medicine				
Cours Title: Specialist teaching block from elective module II				
Lecturers: Vanja Krstić, Full Professor; Nenad Andrić, Associate Professor; Predrag Stepanović, Associate Professor; Mirjana Lazarević Macanović, Full Professor; Nikola Krstić, Full Professor; Marko Mitrović, Assistant Professor; Vladimir Magaš, Associate Professor; Jelena Ajtić, Associate Professor; Branislava Mitrović, Associate Professor				
Course status: Obligatory				
ECTS credits: 7				
Prerequisite: Enrolled semester in which the course is taken				
Course aims Acquiring the knowledge and skills necessary to work with oncology and emergency internal medicine patients. Enabling students to apply physical therapy to social animals				
Course outcomes Student trained to: solve urgent internal medicine cases; apply modern principles of diagnosis and therapy in oncology patients; apply the principles of physical therapy				
Course content *Practical* Practical work in the Teaching Hospital for Small Animals of the Faculty of Veterinary Medicine; work in the laboratories of the Faculty; clinical work with patients in cabinets for radiological and ultrasound diagnostics; case analysis				
Recomennded literature Small nimal internal medicine, 6th edition, Nelson R., Couto G., Elsevier Science, 2019 Catherine Mc Gowan,Lesley Goff, Narelle Stubbs, Animal Physiotherapy(assessment, treatment and rehabilitation of animals), Blackwell publishing, 2007 Thrall D: Textbook of Veterinary Diagnostic Radiology, 7th edition, WB Saunders Company, Philadelphia, 2017 Vail DM, Thamm D, Liptak J, Withrow and MacEwen's Small Animal Clinical Oncology, 6th Edition, Elsevier Science, 2019				
Hours	**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5
Teaching methods Practical work with patients with subject teachers				
Evaluation and grading (maximum number of points 100)				
Pre-examination obliqations	Points	**Final exam**		Points
Lecture attendence		Written exam		50

Participation in practicals	50	Oral exam	
Colloquium		.....	
Seminars			
Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc			

MODULE 7

FARM ANIMAL WELFARE

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical pathology and therapy of ruminant diseases

Lecturers: Ivan Vujanac, Associate Professor; Jovan Bojkovski, Full Professor; Radiša Prodanović, Assistant Professor; Danijela Kirovski, Full Professor; Sreten Nedić, Teaching Assistant PhD; Sveta Arsić, Teaching Assistant

Course status: Elective

ECTS credits: 9

Prerequisites: Items which are a condition for admission to the module

Course aims

The aim of the course is to provide students with specialist knowledge and skills that enable the application of diagnostic procedures and methods necessary in clinical practice in order to establish the most accurate clinical or etiological diagnosis. Accordingly, students acquire additional knowledge about modern measures of prevention and treatment of both non-infectious and infectious diseases in ruminants. In addition, the aim of this course is to point out possible errors in clinical examination skills, errors in sampling and transmission of biological material for laboratory tests, as well as errors in the implementation of prophylactic and therapeutic measures in ruminants.

Course outcomes

Upon completion of this course, students should master all the basic and special methods of clinical examination of farm animals in conditions of intensive livestock production, skills for assessing the health status of both individual cases and the entire stock. Students should be able to independently and correctly take various samples of biological material (blood and other body fluids, secretions and excreta, tissues), adequately pack and send samples to the laboratory or prepare samples for testing that can be done in clinical - field conditions and further, should be able to interpret the results of laboratory tests as part of other findings obtained by general and special methods of clinical examination, and in accordance with that, forms an opinion, gives recommendations and draws conclusions.

Course content

Lectures

General and special methods of examination of ruminant digestive organs, differential diagnosis and therapy of alimentary, functional and infectious disorders in digestion, General and special methods of examination, differential diagnosis and therapy of diseases of the respiratory and cardiovascular systems, Diagnosis, prevention and treatment of metabolic disorders in high-milk cows; Differential diagnosis and therapy of lameness of domestic ungulates, Diagnosis and therapy of skin diseases of ungulates, Special examination methods and differential diagnosis of diseases of the central and peripheral nervous system, Infectious diseases of ruminants (Leukosis, Tuberculosis, Paratuberculosis, Malignant catarrhal fever, Bovine viral diarrhea) The most common errors in collecting samples for laboratory tests; Interpretation of hematological and biochemical

results - writing a specialist report.

Practicals

Interactive learning on clinical, internal medicine cases of various diseases of domestic ruminants in farm conditions. Work in the laboratory with subject teachers of the Department of Ruminants and Swine Diseases.

Recommended literature

Radojičić B.,Bojkovski J., Jonjić B., Ćutuk R.: Bolesti preživara,NaučnaKMD , 2017.
ŠamancA. H., Bolesti respiratornog i kardiovaskularnog sistemagoveda, Naučna KMD, 2010.
ŠamancA. H.,Bolesti organa za varenje kod goveda, Naučna KMD, 2011.
Šamanc A. H., Vujanac M. I.: Bolesti sirišta goveda, Naučna KMD, 2013.
Stockham S.L, Scot M.A. Fundamentald of veterinary clinical patology. Blockwell Publishing Professional, 2121 State Avenue, Ames, Iowa, USA, 2008. Second edition.
AndrewsA.H.,BloweyR.W., BoydH., EddyR.G. Bovine Medicine Diseases and Husbandry of Cattle. Blackwell Science Ltda Blackwell Publishing Company, 2004. Second edition

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Theoretical teaching with interactive learning, with the application of audio-visual methods (PowerPoint presentations, films), practical exercises on healthy and sick animals in teaching bases with which the Faculty has signed a cooperation agreement.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium			
Seminars	10		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical pathology and therapy of swine diseases

Lecturers: Jovan Bojkovski, Full Professor; Ivan Vujanac, Associate Professor; Radiša Prodanović, Assistant Professor; Sreten Nedić, Teaching Assistant PhD; Sveta Arsić, Teaching Assistant

Course status: Elective

ECTS credits: 9

Prerequisites: Items which are a condition for admission to the module

Course aims

The aim of the course is to provide students with specialist knowledge and skills for making a clinical and etiological diagnosis of swine diseases. Students acquire additional knowledge about modern measures of prevention and treatment of both non-infectious and infectious diseases of pigs. In addition, the aim of this course is to point out possible errors in diagnostic procedures and in sampling and processing biological material for laboratory tests.

Course outcomes

Students are trained in the diagnosis of infectious and non-infectious diseases of pigs and the application of prophylactic and therapeutic measures.

Course content

Lectures

Biosafety on commercial pig farms, Breeding diseases bacterial etiology of piglets on suckling, Breeding diseases viral etiology of piglets on suckling, Breeding diseases bacterial etiology, piglets in rearing, Breeding diseases viral etiology of piglets in rearing, Breeding diseases of pigs in fattening infectious and non-infectious Control of sow health in pregnancy, Boar health control, Pig diseases caused by nutrient deficiency (pacifier heart disease, dietary hepatosis, piglet anemia, parakeratosis of pigs), Hereditary diseases of pigs (stress sensitivity syndrome, piglet dislocation), congenital atherosclerosis syndrome piglets, pustular psoriasisiform dermatitis of pigs, Diseases of pigs of multifactorial etiology (swine gastric ulcer, swine enterohemorrhagic syndrome, lean sow syndrome, mastitis syndrome, metriritis and agalction of sows, swine rectal prolapse, canine laryngitis, piglet ear necrosis syndrome, Swine diseases caused by toxic substances.

Practicals

Evaluation of biosecurity measures on pig farms, Diagnosis and solving of health problems, Work in individual farms. Practical work of candidates in hematology and biochemical laboratory.

Recommended literature

Bolesti svinja, Horea A. Šamanc, Naučna KMD, (2013).

Diseases of Swine, Jeffpey J. Zimmepman, Locke A. Kappikep, Alejandpo Ramipez, Kent J. Schwaptz,

Gpegopy W. Stevenson, and Jianqiang Zhang, 11th edition, Iowa State Univepsity, USA, (2019).			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Theoretical classes with interactive learning, with the application of audio-visual methods (PowerPoint presentations, films), practical exercises on healthy and sick animals in teaching bases with which the Faculty has signed a cooperation agreement			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium			
Seminars	10		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine			
Course title: Poultry clinical pathology and therapy			
Lecturers: Miloš Vučićević, Assistant Professor; Radmila Resanović, Full Professor; Ivana Vučićević, Assistant Professor			
Course status: Elective			
ECTS credits: 9			
Prerequisites:			
Course aims The aim of the course is to train students for independent work on a poultry farm			
Course outcomes Specialist veterinarian trained to independently recognize the symptoms of poultry disease, perform an autopsy, sample tissues for testing and select an adequate laboratory method of diagnosis, use appropriate therapeutic and vaccine protocols			
Course content *Lectures* Procedures of veterinarians on the farm in case of various diseases; The most significant diseases in poultry production; Infectious diseases; Neoplastic diseases; Diagnostic procedures; Non-infectious diseases; Diagnostic procedures; Preventive measures (specific and non-specific) *Practicals* Practical work on poultry farms, Practical work in diagnostic laboratories *DON (additional forms of teaching)* *SIR (study research work)*			
Recommended literature Swayne DE, Boulianne M, Logue CM, McDougald LR, Nair V, Suarez DL, de Wit S, Grimes T, Johnson D, Kromm M, Prajitno TY, Rubinoff I, Zavala G, 2019, Diseases of Poultry, 14th Edition, John Wiley & Sons Kaupp BF, 2020, Poultry Diseases and Their Treatment, Alpha Editions			
Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1
Teaching methods Theoretical classes, work in the autopsy room, practical work on farms, practical work in veterinary specialist institutes			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	

Participation in practicals	30	Oral exam	30
Colloquium			
Seminars	20		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Methods of diagnosing ruminant diseases
Lecturers: Sanja Aleksić Kovačević, Full Professor; Jakov Nišavić, Full Professor; Tamara Ilic, Associate Professor
Course status: Elective
ECTS credits: 9
Prerequisites: Items which are a condition for admission to the module
Course aims Acquiring knowledge about the application, principles of performance and interpretation of the results of certain standard and molecular methods in the laboratory diagnosis of the most important bacterial, viral and fungal infections of ruminants. Completion and correlation of theoretical and practical knowledge on all aspects of etiopathogenesis, diagnosis and therapy of diseases of parasitic etiology of ruminants, in order to form a complete picture of the overall pathology of farm animals. Independent autopsy and morphological diagnosis and differential diagnosis in large and small ruminants. Independent sampling and processing of ruminant tissue for microscopic examination.
Course outcomes Candidates should be able to independently perform certain classical and molecular methods of diagnosis of bacterial, fungal and viral infections of ruminants and interpret the obtained results. Students should be able to apply the differential diagnosis and therapy of ruminant parasitic diseases and to independently perform the necessary clinical procedures in order to diagnose and undertake appropriate therapy and prevention in all cases of diseases that are part of everyday clinical practice. Independently perform autopsy and write autopsy protocol. Independently correctly collect samples and processes tissue for microscopic examination.
Course content *Lectures* Introduction to the basic principles of performing certain classical and molecular methods of laboratory diagnostics of bacterial, fungal and viral infections of ruminants. Etiology of major parasitic diseases of cattle, sheep and goats, clinical manifestations, methods of examination and treatment, in accordance with the standards of good veterinary practice, animal welfare principles, national and European regulations: Important protozoa of ruminants (Babesiosis, Tyleriosis, Neosporosis, Cryptosporidiosis, Trichomoniasis) Important helminthiasis of ruminants (Anoplocephalydosis, Cenurosis, Cysticercosis, Toxocariasis, Parasitic gastroenteritis, Pulmonary strongylidosis, Strongyloidosis, Strongyloidosis, Strongyloidosis. Autopsy, report and protocol. New procedures in ruminant pathology according to the OIE standard.

Practicals

Practical work of candidates in the laboratory of microbiology.

Practical work in a parasitological laboratory.

Autopsy and autopsy protocol. Proper taking and sending of samples for examination in the pathology laboratory. Individual work with the processing of related clinical, macroscopic and microscopic cases.

Recommended literature

Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.

Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.

Nišavić J., Milić N., Knežević A. (2013) Laboratorijska dijagnostika virusnih infekcija, Naučna KMD, Beograd.

MacLachlan N.J., Dubovi E.J. (2016) Fenner's Veterinary Virology, 5th Edition, Academic Press.

Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier.

Dimitrijević S, Ilić T. 2011, Klinička parazitologija, Fakultet veterinarske medicine Univerziteta u Beogradu, Izdanje autora i Interprint d.o.o. Beograd, Beograd;

Despommier DD, Griffin OD, Gwadz WR, Hotez JP, Knirsch C. Parasitic Diseases. 6th Edition, 2nd Printing, Parasites Without Borders, Inc. NY, pp. 610, 2017;

Smythe HR. Veterinary parasitology. 1st Edition, Franklin Classics, New Zealand, pp. 150, 2018.

Specijalna patologija. Jovanović, Aleksić-Kovačević, Knežević

Obdukcioni praktikum.Marinković, Nešić

Praktikum za patohistologiju.Vučićević, Nešić

OIE Priručnik

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Theoretical teaching with interactive learning with the application of audio-visual methods (Power Point presentation).

Exercises: Practical work of the candidate in the autopsy room and pathohistological laboratory.

Work in a microbiological laboratory with a subject teacher.

Work in a parasitology laboratory with a subject teacher.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	40	Oral exam	40
Colloquium			
Seminars	10		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Methods of diagnosing swine diseases

Lecturers: Sanja Aleksić Kovačević, Full Professor; Jakov Nišavić, Full Professor; Nevenka Aleksić, Full Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Items which are a condition for admission to the module

Course aims

Acquiring knowledge about the application, principles of performance and interpretation of the results of certain standard and molecular methods in the laboratory diagnosis of the most important bacterial, viral and fungal infections of pigs.

Detailed knowledge of the importance of parasitic infections of pigs and the way of their diagnosis. Introduction to the problem of resistance to antiparasitics and determining its presence.

Independent autopsy and morphological diagnosis and differential diagnosis in pigs. Self-sampling and tissue processing for microscopic examination.

Course outcomes

Candidate should be able to independently perform certain classical and molecular methods of diagnosis of bacterial, fungal and viral infections of pigs and interpret the obtained results.

After completing the course, trainees mastered the methods of diagnosing parasitic infections in pigs, and are able to independently diagnose, determine and apply therapy and measures to suppress and prevent parasitic infections of pigs raised on large and small farms.

They are able to perform the autopsy independently and write the autopsy protocol, and independently sample and process the tissue for microscopic examination.

Course content

Lectures

Introduction to the basic principles of performing certain classical and molecular methods of laboratory diagnostics of bacterial, fungal and viral infections of pigs.

The most significant parasitic infections of domestic and wild pigs: etiology, pathogenesis, epizootiology, diagnosis and therapy. Suppression and treatment programs. Pig protozoa: toxoplasmosis, balantidiosis, coccidiosis. Trematodoses and cestodes of importance for pigs in intensive and extensive breeding Nematodoses of pigs: ascariasis, strongyloidosis, esophagostomosis, trichurosis, metastrongylidosis, trichinosis. Acanthocephalidosis. Ectoparasitosis: scabies, lice, tick infestation. Problems in suppressing and preventing parasitic infections. Determination of resistance to antiparasitics. Autopsy, report and protocol

Practicals

Practical work of candidates in the laboratory of microbiology. Practical work in the laboratory for parasitology. Autopsy and autopsy protocol. Proper taking and sending of samples for examination in the pathology laboratory. Individual work with processing of related clinical, macroscopic and microscopic cases.

Recommended literature

Milić N., Krnjaić D., Mišić D., Nišavić J., Radojičić M. (2017) Mikrobiologija sa imunologijom, Naučna KMD, Beograd.

Ašanin R., Krnjaić D., Milić N. (2014) Priručnik sa praktičnim vežbama iz mikrobiologije sa imunologijom Naučna KMD, Beograd.

Nišavić J., Milić N., Knežević A. (2013) Laboratorijska dijagnostika virusnih infekcija, Naučna KMD, Beograd.

MacLachlan N.J., Dubovi E.J. (2016) Fenner's Veterinary Virology, 5th Edition, Academic Press.

Markey B., Leonard F., Archambault M., Cullinane A., Maguire D. (2013) Clinical Veterinary Microbiology, Mosby, Elsevier.Smythe HR. Veterinary parasitology. 1st Ed., Franklin Classics, New Zealand, 2018.

Specijalna patologija. Jovanović, Aleksić-Kovačević, Knežević

Obdukcioni praktikum.Marinković, Nešić

Praktikum za patohistologiju.Vučićević, Nešić

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Theoretical teaching with interactive learning with the application of audio-visual methods (Power Point presentation).

Practical work of candidates in the autopsy room and pathohistological laboratory.

Work in a microbiological laboratory with a subject teacher.

Work in a parasitology laboratory with a subject teacher.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium			
Seminars	10		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Diagnostic methods in poultry production

Lecturers: Radmila Resanović, **Full Professor**; Miloš Vučićević, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites:

Course aims

The aim of the course is to acquaint the student with all the steps necessary for making a diagnosis on a poultry farm

Course outcomes

The student is able to take a detailed history, notice the symptoms of the disease, perform an autopsy, identify pathoanatomical changes, select material for sampling from both live animals and corpses, select a laboratory method for further diagnosis and make a referral to various diagnostic institutions

Course content

Lectures

Flock history. Methods of clinical examination of flocks and individual examination. External inspection. Euthanasia methods (obtaining fresh corpses for diagnosis). Necropsy procedures. Making a differential diagnostic list. Methods of sampling blood, tissues, eggs, embryos, meconium, feces and litter. Creating instructions for various diagnostic institutions. Principles on which laboratory diagnosis of poultry diseases is based: pathohistological methods, virus and bacterial isolation, serological methods and molecular methods. Analysis of all collected data and labor theory results. Make a diagnosis

Practicals

Taking anamnesis, collecting and analyzing anamnestic data. Clinical examination of flocks at rest, in motion and individual examination of birds. Euthanasia of animals (exclusively on moribund animals in order to preserve welfare). Making a differential diagnostic list. Sampling of blood, tissues, eggs, embryos, diapers, meconium, feces and litter of different types of poultry on broiler farms, laying hens and in incubator cells. Proper disposal, packaging and freezing of samples. Writing accompanying instructions that accompany the sampled material to various diagnostic institutions. Analysis of all collected data and labor theoretical results in order to make a diagnosis.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

Swayne DE, Boulianne M, Logue CM, McDougald LR, Nair V, Suarez DL, de Wit S, Grimes T, Johnson D,

Kromm M, Prajitno TY, Rubinoff I, Zavala G, 2019, Diseases of Poultry, 14th Edition, John Wiley & Sons Вучићевић М, Маринковић Д, Ресановић Р, 2016, Болести живине – Практикум, ФВМ			
Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1
Teaching methods Theoretical classes, work in the autopsy room, practical work on farms, practical work in veterinary specialist institutes			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	10	Written exam	70
Participation in practicals	20	Oral exam	
Colloquium			
Seminars			
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module I

Lecturers: Ivan Vujanac, Associate Professor; Jovan Bojkovski, Full Professor; Radiša Prodanović, Assistant Professor; Sreten Nedić, Teaching Assistant PhD; Sveta Arsić, Teaching Assistant

Course status: Obligatory

ECTS credits: 7

Prerequisites: Subjects that are prerequisite for enrollment in the module

Course aims

Introduction to the etiopathogenesis and clinical manifestations of non - infectious and infectious diseases of domestic ruminants and swine in farm conditions. Acquisition of knowledge and skills on modern (specialist) diagnostic procedures and therapeutic measures in the control of health and production status of domestic ruminants and swine.

Course outcomes

The student should be able to independently perform general and specialist diagnostic procedures, interpret the results of laboratory tests and apply adequate preventive and therapeutic measures in the treatment of non-infectious and infectious diseases of domestic ruminants and swine.

Course content

Practicals

SIR

Health control of cows, sheep and goats in pregnancy and lactation, Health control of calves, lambs and kids in the neonatal period, Health control of breeding offspring and heifers, Examination of pre-stomachs and abomasum (probing with nasogastric and orogastric tube, ruminocentesis, physical and chemical examination methods of ruminal contents), Abdominal puncture, Diagnostic laparoscopy and laparotomy, Surgical treatment of displaced abomasum, Laparoscopic treatment of dispalced abomasum. Liver examination (biochemical diagnostics - hepatogram, ultrasound examination, liver biopsy), Differential diagnosis of diseases of the cardiovascular and respiratory system, Diagnosis of diseases of the urinary system (physical - chemical and laboratory examination of urine). Differential diagnosis of the cardiovascular diseases and respiratory system, Diagnosis of diseases of the urinary system (physical - chemical and laboratory examination of urine). Differential diagnosis of diseases of the nursery piglets, Differential diagnosis of diseases of the growing pigs, Differential diagnosis of the diseases at the fattening /finishing stage, Differential diagnosis of diseases of sows in pregnancy and lactation, Sampling of biological material for diagnostic tests. Interpretation of hematological and biochemical results.

Recommended literature

Šamanc A. Horea, Bolesti svinja, Naučna KMD, 2013.

Jeffrey J. Zimmerman, Locke A. Karriker, Alejandro Ramirez, Kent J. Schwartz, Gregory W. Stevenson, and Jianqiang Zhang (2019) Diseases of Swine, 11th edition, Iowa State University, USA, ttps://lib.dr.iastate.edu/vdpam_books/1
Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
Pavlović V, Pavlović M, Vakanjac S: Dijagnostika graviditeta domaćih životinja, 2010.
Pavlovic et al, Porodiljstvo, sterilitet i V.O., Naučna KMD i Nova Poetika Beograd, 2018.
Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
Vuković D, Miljković V, Klinička primena hormona u reprodukciji domaćih životinja, Heleta Beograd, 2008.
Petrujkić T, Bojkovski J, Petrujkić B, Reprodukcija svinja, Naučni institut za veterinarstvo Srbije, 2011.

Hours	**Lectures: 0**	**Practicals: 0**	**DON: 3**	**SIR: 5**

Teaching methods

Performing diagnostic procedures and application of therapeutic measures on cattle and pig farms which the Faculty has a contract of cooperation agreement. Interactive learning on clinical cases of various diseases of domestic ruminants and pigs in farm conditions. Work in the laboratories of the Department of Ruminants and Swine Diseases and the Department of Reproduction, Fertility and Artificial Insemination

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium			
Seminars	10		

Study programme: Specialist academic studies of veterinary medicine

Course title: Metabolic and reproductive disorders of ruminants

Lecturers: Ivan Vujanac, Associate Professor; Radiša Prodanović, Assistant Professor; Milan Maletić, Assistant Professor; Sreten Nedić, Teaching Assistant PhD; Sveta Arsić, Teaching Assistant

Course status: Elective

ECTS credits: 6

Prerequisites: Clinical pathology and therapy of ruminants, Diagnostic methods of ruminants diseases

Course aims

The aim of the course is to provide students with specialist knowledge and skills that enable the application of diagnostic procedures and methods in clinical and laboratory practice with the aim of making a timely and reliable diagnosis of energy and mineral metabolism disorders of ruminants. Consequently, students acquire additional knowledge about recent measures of prevention and treatment of both energy and mineral metabolism disorders, as well as their impact on reproductive efficiency in large and small ruminants. In addition, the aim of this course is to point out possible errors in clinical examination skills, errors in sampling of biological material for laboratory tests and errors in the selection of procedures in clinical diagnosis and treatment of diseases of farm animals.

Course outcomes

Upon successful completion of this course, the student should master all the basic and special methods of assessing the status of energy and mineral metabolism of large and small ruminants in the conditions of intensive livestock production, as well as individual cases The student should be able to independently and correctly compare clinical symptoms and signs of energy and mineral metabolism disorders, take appropriate samples of biological material, adequately pack them and send them to the laboratory or prepare for tests that can be done in clinical - field conditions. The student is trained to recognize, diagnose and treat the most common reproductive disorders in the transition period (puerperal endometritis and metritis, lochiometers, ovulatory disorders, cervicitis, etc.). , and accordingly, applies therapy and makes recommendations.

Course content

Lectures

Energy balance in the transition period in ruminants and its impact on the health, production and reproductive status of the herd. Ketosis. Fatty liver. Puerperal hepatic coma. Pregnancy toxemia of sheep. Insulin resistance of cows in the transition period. Typical puerperal paresis. Atypical puerperal paresis. Hypomagnesaemia of large and small ruminants. Differential diagnosis of downer cow syndrome Ovulatory disorders and insulin resistance, diagnosis and therapy of puerperal infections of the genital tract, mineral metabolism and reproduction, corrective and preventive measures in the transition period in order to improve the reproductive efficiency of small and large ruminants.

Practicals

Control of energy, metabolic and reproductive status of cows, sheep and goats in conditions of intensive production. Interactive learning on clinical cases of domestic ruminants with metabolic and reproductive health disorders. Work in the laboratories of the Department of Ruminants and Swine Diseases and the Department of Reproduction, Fertility and Artificial Insemination.

Recommended literature

Radojičić B, Bojkovski J, Jonjić B, Ćutuk R: Bolesti preživara, Akademska misao, 2017.
Šamanc A. H, Bolesti respiratornog i kardiovaskularnog sistema goveda, Naučna KMD, 2010.
Šamanc A. H, Bolesti organa za varenje kod goveda, Naučna KMD, 2011.
Šamanc A.H, Vujanac M. I: Bolesti sirišta goveda, Naučna KMD, 2013.
Pavlović i sar., Porodiljstvo, sterilitet i V.O, Naučna KMD i Nova poetika Beograd, 2018.
Stockham S.L, Scot M.A. Fundamentald of veterinary clinical patology. Blockwell Publishing Professional, 2121 State Avenue, Ames, Iowa, USA, 2008. Second edition.
AndrewsA.H., BloweyR.W., BoydH., EddyR.G. Bovine MedicineDiseases and Husbandry of Cattle. Blackwell Science Ltda Blackwell Publishing Company, 2004. Second edition.

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Theoretical teaching with interactive learning, with the application of audio-visual methods (PowerPoint presentations, films), practical exercises on healthy and sick animals in teaching bases which the Faculty has signed a cooperation agreement.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium			
Seminars	10		

Study programme: Specialist academic studies of veterinary medicine

Course title: Production diseases, technopathies and reproductive disorders of swine

Lecturers: Jovan Bojkovski, Full Professor; Radiša Prodanović, Assistant Professor; Miloje Đurić, Assistant Professor; Sreten Nedić, Teaching Assistant PhD; Sveta Arsić, Teaching Assistant

Course status: Elective

ECTS credits: 6

Prerequisites: Clinical pathology and therapy of swine diseases, Methods of diagnosis of swine diseases

Course aims

Introducing students to modern breeding technologies at intensive farming, as well as diseases and technopathies that can occur in conditions of intensive production. Acquisition of additional theoretical and practical knowledge about the most common reproductive diseases of pigs during the production cycle.

Course outcomes

The student - trainee is able to independently recognize errors in the process of industrial type of breeding of pigs, as well as the clinical signs of diseases caused by these errors. Studenst are able to apply appropriate diagnostic procedures, preventive and therapeutic measures of diseases caused by technopathies. The student is able to assess the reproductive funciton of the sows on the basis of their fertility parameters, diagnose reproductive problems and apply therapeutic measures to resolve them.

Course content

Lectures

Technology at the farrowing stage, Technology at the nursery stage, Technology at the fattening /finishing stage, The most common technopathies in industrial type of breeding, Health and economical consequences of technopathies, Prevention of technopathies, Principles of physiology mechanisms and neuroendocrine regulation of pigs reproduction, Monitoring of reproductive status, Reproductive tract pathology, fertility, sterility, sexual cycle and its disorders with sterility treatment methods; hormonal manipulation of the sexual cycle, induction of parturition, ovulation, synchronization and superovulation, auxiliary methods in reproduction (methods of taking and processing boar sperm, artificial insemination, embryo transfer in pigs).

Practicals

Practical work with subject teachers on industrial type of pigs farms. Work in the laboratories of the Department of Ruminants and Swine Diseases and the Department of Reproduction, Fertility and Artificial Insemination

Recommended literature

Šamanc A. Horea, Bolesti svinja, Naučna KMD, 2013.
Jeffrey J. Zimmerman, Locke A. Karriker, Alejandro Ramirez, Kent J. Schwartz, Gregory W. Stevenson, and Jianqiang Zhang (2019) Diseases of Swine, 11th edition, Iowa State University, USA, ttps://lib.dr.iastate.edu/vdpam_books/1
Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
Pavlović V, Pavlović M, Vakanjac S: Dijagnostika graviditeta domaćih životinja, 2010.
Pavlovic et al, Porodiljstvo, sterilitet i V.O., Naučna KMD i Nova Poetika Beograd, 2018.
Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
Vuković D, Miljković V, Klinička primena hormona u reprodukciji domaćih životinja, Heleta Beograd, 2008.
Petrujkić T, Bojkovski J, Petrujkić B, Reprodukcija svinja, Naučni institut za veterinarstvo Srbije, 2011.

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Theoretical classes with interactive learning with the application of audio-visual methods (Power Point presentation), practical exercises on pig farms, work in the laboratory with subject teachers.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium			
Seminars	10		

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Technopathies in poultry production

Lecturers: Miloš Vučićević, Assistant Professor; Radmila Resanović, Full Professor

Course status: Elective

ECTS credits: 6

Prerequisites:

Course aims

The aim of the course is to acquaint the student with the technology of incubation, breeding and exploitation in modern poultry industry, and thus with the technopathies that are generated in the process.

Course outcomes

A specialist veterinarian is able to independently recognize errors in the process of poultry production, as well as the symptoms of the condition caused by these errors. Able to perform autopsies, sample tissues for examination and select an adequate laboratory method of diagnosis, use appropriate therapeutic protocols and define measures to prevent the occurrence of technopathies.

Course content

Lectures

Incubation technology. Technology of breeding of parent flocks. Technology of exploitation of layers and broilers. The most common technopathies in poultry production. Economic consequences of technopathy. Welfare and technopathies. Preventive and corrective measures.

Practicals

Practical work on poultry farms and incubator stations, exercises at the slaughterhouse

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

Swayne DE, Boulianne M, Logue CM, McDougald LR, Nair V, Suarez DL, de Wit S, Grimes T, Johnson D, Kromm M, Prajitno TY, Rubinoff I, Zavala G, 2019, Diseases of Poultry, 14th Edition, John Wiley & Sons
Kaupp BF, 2020, Poultry Diseases and Their Treatment, Alpha Editions

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Theoretical classes, work in the autopsy room, practical work on farms, practical work in veterinary specialist

institutes			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	30
Colloquium			
Seminars	20		
Knowledge assessment methods:			

Study programme: Specialist academic studies of veterinary medicine
Course title: Specialist teaching block from elective module II
Lecturers: Ivan Vujanac, Associate Professor; Jovan Bojkovski, Full Professor; Radiša Prodanović, Assistant Professor; Miloje Đurić, Assistant Professor; Milan Maletić, Assistant Professor; Sreten Nedić, Teaching Assistant PhD; Sveta Arsić, Teaching Assistant
Course status: Obligatory
ECTS credits: 7
Prerequisites: Enrolled semester in which the course is taken
Course aims Introducing students to the mechanisms of neuroendocrine regulation of energy and mineral metabolism, the reproductive cycle, acquiring knowledge and skills in the diagnosis, prevention and treatment of metabolic health disorders in domestic ruminants and swine. Acquiring specialist practical knowledge about metabolic and reproductive diseases of ruminants and swine during the production cycle, understanding the role and importance of hormones in reproduction and potential risks of their misusage. Mastering the methods of diagnosis, treatment and monitoring of the reproductive tract of ruminants and swine, as well as improving the methods of assisted reproduction.
Course outcomes The student should be able to independently perform diagnostic procedures and apply preventive and therapeutic measures in solving metabolic, reproductive and production disorders of farm animals, analyze and link test results, draw conclusions and make recommendations for improving production and biotechnology in organized livestock production.
Course content *Practicals* *SIR* Assessment of health status and production potential of ruminant and pig farms based on analysis of production and reproductive indicators; Assessment of energy and metabolic status of ruminants and pigs based on assessment of body condition and analysis of organic milk components; Control of health status and production capacity of ruminant and pig farms using metabolic profile; Diagnosis of metabolic and production disorders of ruminant and pig health; Application of clinical and dietary measures in prevention and treatment of metabolic and reproductive disorders; Use of hormones in reproduction of ruminants and swine; Application of ultrasound in pregnancy check and certain pathological conditions in genital tract of ruminants and swine; Application of laboratory methods (clinical microbiology, cytology, examination of bull and boar semens by

CASA system), surgical and conservative methods of treatment, as well as surgical and non-surgical procedures in obstetrics; Review of clinical cases.
DON

Recommended literature

Šamanc A. Horea, Bolesti svinja, Naučna KMD, 2013.
Jeffrey J. Zimmerman, Locke A. Karriker, Alejandro Ramirez, Kent J. Schwartz, Gregory W. Stevenson, and Jianqiang Zhang (2019) Diseases of Swine, 11th edition, Iowa State University, USA, ttps://lib.dr.iastate.edu/vdpam_books/1
Noakes DE, Parkinson TJ, England GCW: Veterinary reproduction and obstetrics, 2009.
Pavlović V, Pavlović M, Vakanjac S: Dijagnostika graviditeta domaćih životinja, 2010.
Pavlovic et al, Porodiljstvo, sterilitet i V.O., Naučna KMD i Nova Poetika Beograd, 2018.
Robert S. Youngquist, Walter R. Threlfall: Large Animal Theriogenology, 2007.
Vuković D, Miljković V, Klinička primena hormona u reprodukciji domaćih životinja, Heleta Beograd, 2008.
Petrujkić T, Bojkovski J, Petrujkić B, Reprodukcija svinja, Naučni institut za veterinarstvo Srbije, 2011.

Hours	**Lectures: 0**	**Practicals:** 0	**DON:** 3	**SIR:** 5

Teaching methods

Application of diagnostic procedures and therapeutic measures on cattle and pig farms which the Faculty has a contract of cooperation agreement. Interactive learning on ruminant and pig farms in solving metabolic, production and reproductive health disorders. Work in the laboratories of the Department of Ruminants and Swine Diseases and the Department of Reproduction, Fertility and Artificial Insemination.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	20	Written exam	
Participation in practicals	30	Oral exam	40
Colloquium	10		
Seminars			

Knowledge assessment methods: Theoretical classes with interactive learning with the application of audio-visual methods (Power Point presentation), practical exercises on pig farms, work in the laboratory with subject teachers.

MODULE 8

VETERINARY DIETETICS

Study programme: Specialist academic studies of veterinary medicine

Course title: Nutritional therapy

Lectures: Radmila Marković, Full Professor; Jelena Nedeljković Trailović, Full Professor; Branko Petrujkić, Associate Professor; Stamen Radulović, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Feed safety

Course aims

1. Acquisition of knowledge about nutritional therapy, the connection between diet and certain diseases and ways of prevention and therapy;
2. Acquisition of knowledge about possibility of choosing the right dietary measure in order to positively influence the course and duration of the disease process, to alleviate the severity of the disease, to spare diseased organs and organ systems, as well as their treatment;
3. Meal formulation for the prevention and treatment of metabolic diseases of farm animals;

Course outcomes

After passing the exam in the subject of Nutritional Therapy, the trainee should:

1. Be able to spot irregularities and problems caused by inadequate nutrition;
2. Knows the chemical composition of nutrients in order to properly formulate a diet meal;
3. Be able to propose and implement dietary measures depending on the nature of the disease (quantitative and qualitative dietetics);

Course content

Lectures

Basics of veterinary dietetics. Dietary measures and their application. Nutrition of sick animals. Diseases related to dietary errors. Obesity. Dietetics in diseases of the digestive, respiratory, endocrine, locomotor and urinary tract. Nutrition of febrile animals and recovery. Nutrition before and after surgery; Artificial feeding. Metabolic diseases of cattle. Productive diseases of pigs and poultry.

Practicals:

Nutrition of sick animals. Diseases related to dietary errors. Quantitative and qualitative dietetics. Dietetics in certain diseases (digestive, respiratory, urinary, endocrine and locomotor tract);

DON (additional forms of teaching)

SIR (study research work)

Recommende literature

1. Marković R., Petrujkić B., Šefer, D.: Bezbednost hrane za životinje, Fakultet veterinarske medicine, 2018.
2. Đorđević N., Grubić G., Makević M., Jokić Ž.: Ishrana domaćih i gajenih životinja, Grafika, Beograd, 2009.
3. Sinovec Z.: Stimulatori rasta u ishrani nepreživara, Hemijska industrija „Župa“ Kruševac, 2000.
4. Strombeck RD.: Home prepared dog and cat diets. Iowa State University Press, 1999.
5. Liong M.T.: Beneficial Microorganisms in Agriculture Aqaculture and Other Areas, Springer, 2015.
6. Bedford M., Partridge G.: Enzymes in Farm Animal Nutrition, 2nd Edition, Cabi Publishing, 2001.
7. Simpson J.W., Anderson R.S., Markwell P.J.: Clinical Nutrition of the dog and cat, Blackwell Scientific Publications, Berlin, 1993.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Theoretical A large number of review papers are available to students on the recommendation of teachers from the current field.classes with interactive learning with the application of audio-visual methods, practical work in the laboratory of the Department of Nutrition and Botany, practical work in the field, seminar papers. The part of practical classes related to clinical nutrition will take place at the faculty clinics;

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	Maximum 20	Written exam	
Participation in practicals	Maximum 20	Oral exam	10-50
Colloquium			
Seminars	Maximum 10		

Knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.

Study programme: Specialist academic studies of veterinary medicine

Course title: Animal nutrition and quality of food of animal origin

Lecturers: Radmila Marković, Full Professor; Dragan Vasilev, Associate Professor; Dragan Šefer, Full Professor; Branko Petrujkić, Associate Professor; Stamen Radulović, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Feed safety

Course aims

1. Acquiring knowledge about nutritional factors that affect the production and composition of milk, meat and eggs;
2. Acquisition of knowledge about nutrients used in animal nutrition in order to produce functional food;
3. Acquiring knowledge about the nutrition of certain species and categories of animals whose products can be classified in the category of functional food;
4. Acquiring knowledge about the modification of meals for animals in order to obtain new food for human consumption (GMO food and nano food);

Course outcomes

After passing the exam in the subject Animal nutrition and quality of food of animal origin, the student should:

1. Fully understand the biochemical and physiological basis of animal nutrition;

2. Recognizes certain nutrients and knows their basic characteristics and specifics, as well as their impact on the quality of food of animal origin;

3. Knows and understands the principles of nutrition of different species and categories of animals, taking into account the specifics and differences;

4. Can form a meal for the appropriate species and category of animals with the aim of designing the chemical composition and increasing the nutritional value of foodstuffs of animal origin;

Course content

Lectures

Energy and protein nutrients in animal nutrition. Importance of minerals (Zn, Se, Cu, Fe, Ca, etc.) and vitamins (vitamins C, A, E, D, etc.) in human and animal nutrition. Fats and fatty acid composition of nutrients used in animal nutrition. Influence of animal nutrition on fatty acid composition of food. Flavonoids in animal nutrition. Enrichment of foods of animal origin (eggs, poultry) with lutein, zeaxanthin and vitamin E. Examples of the influence of nutrient selection on yield parameters, quality and nutritional value of foodstuffs of animal origin; Possibilities of changing the share of fat and protein in milk through diet.

Practicals:

Determining the needs for individual categories of animals. Use of nutritional tables of different nutrients. Assembling meals. Meal formulation in order to design foods of animal origin.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

1. Marković R., Petrujkić B., Šefer, D.: Bezbednost hrane za životinje, Fakultet veterinarske medicine, 2018.
2. Marković R., Baltić Ž.M.: Ishranom životinja do funkcionalne hrane, Fakultet veterinarske medicine, Naučna, 2018.
3. Milićević D.: Mikotoksini u lancu ishrane – hemijski, biološki i zdravstveni aspekt, Institut za higijenu i tehnologiju mesa Beograd, 2016.
4. Jovanović R., Dujić D., Glamočić D.: Ishrana domaćih životinja, Stylos-izdavaštvo, Novi Sad, 2000.
5. Shetty K., Sarkar D.: Functional Foods and Biotechnology, CRC Press, 2019.
6. AEC Tables: Recomandation for animal nutrition. 6th edition, Rhone Poulenc, France, 1993.
7. McDowell L.R.: Minerals in animal and human nutrition, Academic Press, Inc. 1992.
8. McDowell L.R.: Vitamins in animal nutrition, Academic Press, Inc. 1981.

A large number of review papers are available to students on the recommendation of teachers from the current field.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods:

Theoretical teaching with interactive learning with the application of audio-visual methods. Practical work with getting to know the nutrition on the farm and the parameters of yield and meat quality in the slaughter industry;

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Participation in formal lecture	Maximum 20	Written exam	
Participation in practicals	Maximum 20	Oral exam	10-50
Colloquium			
Seminars	Maximum 10		
Knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.			

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical dietetics of ruminants

Lecturers: Dragan Šefer, Full Professor; Ivan Vujanac, Associate Professor; Radmila Marković, Full Professor; Svetlana Grdović, Full Professor; Branko Petrujkić, Associate Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Feed Safety

Course aims

1. Acquiring knowledge about nutrients used in ruminant nutrition, their classification, methods of production, processing and canning of feed, as well as factors that affect feed spoilage;
2. Acquiring knowledge about the nutrition of certain species (cattle, sheep, goats); and ruminant production categories;
3. Acquiring knowledge about norms on the needs of ruminants in nutrients, specific feed supplements, as well as feeding techniques and technology;
4. Acquiring knowledge about clinical nutrition, the connection between diet and certain diseases of ruminants, as well as ways of prevention and therapy;

Course outcomes

After passing the exam in the subject Clinical Dietetics of Ruminants, the student should:

1. Fully understand the biochemical and physiological basis of ruminant nutrition;
2. Recognizes individual nutrients and knows their basic characteristics and specifics, defines their importance in the diet of ruminants, as well as the impact on health;
3. Knows and understands the principles of nutrition of different species and categories of ruminants, taking into account the specifics and differences;
4. It can form a meal for the appropriate species and category of ruminants, as well as organize and supervise the feeding process itself;
5. Be able to spot irregularities and problems caused by inadequate nutrition;
6. Be able to recognize the nutritional cause of animal health disorders and propose and implement dietary measures;

Course content

Lectures

Physiological features of cattle nutrition. Selection of feed for cattle. Life support needs. Cow nutrition: needs for pregnancy and lactation, the influence of diet on milk quality. Calf nutrition: growth needs, feeding systems. Nutrition of breeding categories: calves, cattle, bulls. Nutrition of cattle in fattening: needs for fattening, nutrition of calves, cattle and adult cattle. Metabolic profile of lactating cows. The most common nutritional and metabolic disorders and dietary measures. Cattle poisoning. Pronutrients in the diet of ruminants. Physiological features of sheep nutrition. Selection of feed for sheep. Nutrition of breeding and fattening sheep: needs and feeding systems. Nutritional and metabolic disorders and dietary measures. Physiological features of goat nutrition. Selection of nutrients for goats. Goat nutrition practice, nutritional disorders and dietary measures. Metabolic diseases of ruminants.

Practicals:

Determining needs for individual categories. Use of nutritional tables of different nutrients. Assembling meals. Mixture analysis and correction. Corrective nutrition in metabolic diseases of ruminants.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

Radojičić B., Bojkovski J., Jonić B., Ćutuk R.: Bolesti preživara, Akademska misao Beograd, 2017.

2. Milićević D.: Mikotoksini u lancu ishrane – hemijski, biološki i zdravstveni aspekt, Institut za higijenu i tehnologiju mesa Beograd, 2016.

Pravilnik o kvalitetu hrane za životinje. Sl. Glasnik RS, 41, 2009.

Stojković J.: Ishrana koza, Sven Niš, 2004.

Jovanović R., Dujić D., Glamočić D.: Ishrana domaćih životinja, Stylos-izdavaštvo, Novi Sad, 2000.

Pavličević A.: Ishrana goveda i ovaca. Poljoprivredni fakultet, Zemun, 2001.

Grubić G., Adamović M.: Ishrana visokoproizvodnih krava, Prosveta, Niš, 1998.

McDonald P., Edwards R.A., Greenhalgh J.F.D., Morgan C.A., Sinclair L.A., Wilkinson R.G.: Animal Nutrition, Pearson, 2010.

10.	Lyons T.P., Jacques K.A.: Biotechnology in the Feed Industry. Nottingham University Press, Alltech 2002. National Research Council: Nutritient requirements of dairy cattle. Seventh Revised Edition. National Academy of Sciences, Washington, 2001. A large number of review papers are available to students on the recommendation of teachers from the current field.			
	Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1
	Teaching methods Theoretical classes with interactive learning with the application of audio-visual methods, practical work in the laboratory of the Department of Animal Nutrition and Botany, practical work in the field, seminar papers. The part of the practical teaching related to the clinical nutrition of ruminants will take place at the clinics of the faculty;			
	Evaluation and grading (maximum 100 points)			
	Pre-exam requirements	Points	**Final exam**	Points
	Lectures attendence	Maximum 20	Written exam	
	Participation in practicals	Maximum 20	Oral exam	10-50
	Colloquium			
	Seminars	Maximum 10		
	Knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.			

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical dietetics of pigs

Lecturers: Dragan Šefer, Full Professor; Radmila Marković, Full Professor; Branko Petrujkić, Associate Professor; Stamen Radulović, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Feed Safety

Course aims

1. Acquisition of knowledge about nutrients used in pig nutrition, their classification, methods of production, processing and canning of feed, as well as factors that affect feed spoilage;
2. Acquiring knowledge about the nutrition of different production categories of pigs;
3. Acquiring knowledge of norms on the needs of different categories of pigs in nutrients, specific feed supplements, as well as feeding techniques and technology;
4. Acquiring knowledge about the clinical diet of pigs, the relationship between diet and certain diseases of pigs and ways of prevention and therapy;

Course outcomes

After passing the exam in the subject Clinical Dietetics of Pigs, the student should:

1. Fully understand the biochemical and physiological basis of pig nutrition;
2. Recognizes individual nutrients and knows their basic characteristics and specifics, defines their importance in the diet of pigs, as well as the impact on health;
3. Knows and understands the principles of nutrition of different production categories of pigs, taking into account the specifics and differences;
4. Can form a meal for the appropriate type and category of pigs, as well as organize and supervise the feeding process itself;
5. Be able to spot irregularities and problems caused by inadequate nutrition;
6. Be able to propose and implement dietary measures depending on the nature of the disease;

Course content

Lectures

Physiological features of pig nutrition. Utilization and selection of feed for pigs. Nutrient needs. Nutrition of breeding pigs: boars and sows and gilts in the phase of fertilization, farrowing and lactation. Influence of diet on reproduction. Piglet nutrition and feeding systems. Feeding of pigs in fattening and its influence on production results, meat quality. Pig feeding technique. Nutritional and metabolic disorders and dietary measures. Pronutrients in pig nutrition.

Practicals:

Determining needs for individual categories. Use of nutritional tables of different nutrients. Assembling meals. Meal analysis and correction. Analysis and correction of complete feed mixtures. Corrective nutrition in metabolic diseases of pigs.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

1. Marković R., Petrujkić B., Šefer, D.: Bezbednost hrane za životinje, Fakultet veterinarske medicine, 2018.
2. Milićević D.: Mikotoksini u lancu ishrane – hemijski, biološki i zdravstveni aspekt, Institut za higijenu i tehnologiju mesa Beograd, 2016.
3. Pravilnik o kvalitetu hrane za životinje. Sl. Glasnik RS, 41, 2009.
4. Sinovec Z.: Stimulatori rasta u ishrani nepreživara, Hemijska industrija „Župa“ Kruševac, 2000.
5. Jovanović R., Dujić D., Glamočić D.: Ishrana domaćih životinja, Stylos-izdavaštvo, Novi Sad, 2000.
6. NOVUS: Nutrition of hyperprolific sows, Novus International, Editorial Agricola Espanola, S.A., 2019.
7. Francois B., Guoyao W., Yulong Y.: Nutritional and Physiological Functions of Amino Acids in Pigs, Springer, 2013.
8. Torrallardona D., Roura E. :Voluntary feed intake in pigs, Wageningen Academic Publishers, 2009.
9. Patience J.F.: Feed efficiency in swine, Wageningen Academic Publishers, 2012.
10. Pluske J.R., Dividich J.L., Verstegen M.W.A.: Weaning the pig, Concepts and consequences, Wageningen Academic Publishers, 2003.
11. National Research Council: Nutritient requirements of swine. 6th ed. National Academy of Sciences, Washington, 2001.

12. Varley M.A., Wiseman J.: The Weaner Pig Nutrition and Management, Cabi Publishing, 2001.
13. Lewis J.A., Southern L.L.: Swine Nutrition, Second edition, CRC Press, 2001.

A large number of review papers are available to students on the recommendation of teachers from the current field.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods

Theoretical classes with interactive learning with the application of audio-visual methods, practical work in the laboratory of the Department of Nutrition and Botany, practical work in the field, seminar papers. The part of practical classes related to the clinical nutrition of pigs will take place at the clinics of the faculty;

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	Maximum 20	Written exam	
Participation in practicals	Maximum 20	Oral exam	10-50
Colloquium			
Seminars	Maximum 10		

Knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module I

Lecturers: Dragan Šefer, Full Professor; Radmila Marković, Full Professor; Jelena Nedeljković Trailović, Full Professor; Svetlana Grdović, Full Professor; Branko Petrujkić, Associate Professor; Stamen Radulović, Assistant Professor; Dragoljub Jovanović, Research Fellow; Dejan Perić, Teaching Assistant

Course status: Obligatory

ECTS credits: 7

Prerequisites: Feed Safety

Course aims

1. Acquiring practical knowledge about the importance of proper sampling of animal feed for analysis;
2. Practical assessment of the quality of concentrated, roughage and complete feed mixtures in the laboratory of the Department of Nutrition and Botany, Faculty of Veterinary Medicine;
3. Determining the energy value of feed;
4. Interpretation of the declared values of feed and the Rulebook of the feed quality;
5. Determination of buffer capacity and electrolyte balance of feed;
6. Chemical analysis of designed animal feed in order to obtain fortified foods of animal origin;

Course outcomes

After passing the exam in the subject Specialist teaching block - elective module I, the student should:

1. Fully understand the procedure for proper sampling of feed for analysis;
2. Masters the proper technique of work in the laboratory in order to evaluate feed;
3. Be able to determine the energy value of food, determine the buffer capacity and electrolyte balance of animal feed;
4. Can interpret the declared values, the values obtained by chemical analysis and the values defined by the Rulebook of the feed quality and other norms;
5. To understand the connection between ingredients in feed (macro-, microelements, fatty acids) and the same ingredients in foods of animal origin, ie the possibility of production of designed foods of animal origin;

Course content

Practicals:

Work in the laboratory of the Department of Animal Nutrition and Botany and in animal feed factories with which the department has a cooperation defined by the contract. The specific work refers to the following steps:

Proper feed sampling for analysis. Quality assessment of concentrated nutrients and complete mixtures (sensory analysis of feed, determination of basic chemical composition of feed, determination of macro-, microelements and heavy metals in animal feed, mycotoxicological analysis, determination of pH value, urease activity). Quality assessment of bulky nutrients (sensory analysis and scoring of animal feed, determination of basic chemical composition of animal feed, determination of macro-, microelements and heavy metals in feed, mycotoxicological analysis, determination of pH, determination of volatile fatty acid content, determination of NDF content and ADF fiber). Determining energy value. Proper interpretation of the declared values and the Rulebook of the feed quality. Production of animal feed according to the manufacturer's specification. Determination of buffer capacity of animal feed. Determination of electrolyte balance in feed. Chemical analysis of food of animal origin (determination of the content of micro-, macroelements and heavy metals, determination of fatty acid composition).

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

Đorđević N., Grubić G., Makević M., Jokić Ž.: Ishrana domaćih i gajenih životinja, Grafika, Beograd, 2009.

Pravilnik o kvalitetu hrane za životinje. Sl. Glasnik RS, 41, 2009.

Jovanović R., Dujić D., Glamočić D.: Ishrana domaćih životinja, Stylos-izdavaštvo, Novi Sad, 2000.

Sinovec Z., Ševković N.: Praktikum iz Ishrane, Fakultet Veterinarske medicine, Beograd, 1995.

Shetty K., Sarkar D.: Functional Foods and Biotechnology, CRC Press, 2019.

National Research Council: Nutritient requirements of cats. 6th ed. National Academy of Sciences, Washington, 2003.

National Research Council: Nutritient requirements of dogs. 6th ed. National Academy of Sciences, Washington, 2002.

National Research Council: Nutritient requirements of swine. 6th ed. National Academy of Sciences, Washington, 2001.

	National Research Council: Nutritient requirements of dairy cattle. Seventh Revised Edition. National Academy of Sciences, Washington, 2001.				
10.	National Research Council: Nutritient requiraments of poultry. 6th ed. National Academy of Sciences, Washington, 2000.				
	A large number of review papers are available to students on the recommendation of teachers from the current field.				
Hours		**Lectures:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5
Teaching methods					
Practical work in the laboratory of the Department of Animal Nutrition and Botany.					
Evaluation and grading (maximum 100 points)					
Pre-exam requirements	Points	**Final exam**			Points
Lecture attendence	Maximum 20	Written exam			
Participation in practicals	Maximum 20	Oral exam			10-50
Colloquium					
Seminars	Maximum 10				
The knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.					

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical dietetics of poultry

Lecturers: Dragan Šefer, Full Professor; Radmila Marković, Full Professor; Jelena Nedeljković Trailović, Full Professor; Stamen Radulović, Assistant Professor

Course status: Elective

ECTS credits: 7

Prerequisites: Feed safety

Course aims

1. Acquisition of knowledge about nutrients used in poultry nutrition, their classification, methods of production, processing and canning of feed, as well as factors that affect feed spoilage;
2. Acquiring knowledge about the nutrition of certain species (chickens, turkeys, geese, ducks) and production categories of poultry (fattening, breeding and laying hens);
3. Acquiring knowledge about the norms on the needs of broilers and laying hens in nutrients, specific feed supplements, as well as feeding techniques and technology;
4. Acquiring knowledge about clinical nutrition, the connection between diet and certain diseases of poultry and ways of prevention and therapy;

Course outcomes

After passing the exam in the subject Clinical Dietetics of Poultry, the student should:

1. Fully understand the biochemical and physiological basis of poultry nutrition;
2. Recognizes individual nutrients and knows their basic characteristics and specifics, defines their importance in poultry nutrition as well as the impact on health;
3. Knows and understands the principles of nutrition of different species and categories of poultry while respecting the specifics and differences;
4. It can form a meal for the appropriate type and category of poultry, as well as organize and supervise the feeding process itself;
5. Be able to spot irregularities and problems caused by inadequate nutrition;
6. Be able to propose and implement dietary measures depending on the nature of the disease;

Course content

Lectures

Physiological features of poultry nutrition. Utilization and selection of poultry feed. Nutrient needs. Diet of different species (chickens, turkeys, geese, ducks) and categories (breeding, fattening and laying) of poultry. Positive and negative impact of diet on poultry production results. Nutritional and metabolic disorders and dietary measures. Pronutrients in poultry nutrition.

Practicals:

Determining needs for individual categories. Use of nutritional tables of different nutrients. Assembling meals. Meal analysis and correction. Analysis and correction of complete feed mixtures. Corrective nutrition in metabolic diseases of poultry.

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

1. Marković R., Petrujkić B., Šefer, D.: Bezbednost hrane za životinje, Fakultet veterinarske medicine, 2018.
2. Milićević D.: Mikotoksini u lancu ishrane – hemijski, biološki i zdravstveni aspekt, Institut za higijenu i tehnologiju mesa Beograd, 2016.
3. Pravilnik o kvalitetu hrane za životinje. Sl. Glasnik RS, 41, 2009.
4. Jokić Ž., Kovčin S., Joksimović Todorović Mirjana: Ishrana živine, Poljoprivredni fakultet Zemun, 2004.
5. Sinovec Z.: Stimulatori rasta u ishrani nepreživara, Hemijska industrija „Župa“ Kruševac, 2000.
6. Jovanović R., Dujić D., Glamočić D.: Ishrana domaćih životinja, Stylos-izdavaštvo, Novi Sad, 2000.
7. Hester PY.: Egg Innovations and Strategies for Improvements, Academic Press, Elsevier, 2017.
8. Colin GS.: Sturke's Avian Physiology, Sixth Edition, Elsevier, 2014.
9. Lesson S., Summers JD.:Commercial Poultry Nutrition, 3rd edition, Nottingham University Press, 2009.
10. Bedford M., Partridge G. : Enzymes in Farm Animal Nutrition, 2nd Edition, Cabi Publishing, 2001.
11. National Research Council: Nutritient requiraments of poultry. 6th ed. National Academy of Sciences, Washington, 2000.

A large number of review papers are available to students on the recommendation of teachers from the current field.

Hours	**Lectures:** 1	**Practicals :** 2

Teaching methods Theoretical classes with interactive learning with the application of audio-visual methods, practical work in the laboratory of the Department of Animal Nutrition and Botany, practical work in the field, seminar papers. The part of practical classes related to the clinical nutrition of poultry will take place at the clinics of the faculty;			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	Maximum 20	Written exam	
Participation in practicals	Maximum 20	Oral exam	***10-50***
Colloquium			
Seminars	Maximum 10		
Knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.			

Study programme: Specialist academic studies of veterinary medicine

Course title: Clinical dietetics of dogs and cats

Lecturers: Dragan Šefer, Full Professor; Vojislav Ilić, Full Professor; Branko Petrujkić, Associate Professor; Stamen Radulović, Assistant Professor

Course status: Elective

ECTS credits: 6

Prerequisites: Feed safety

Course aims

1. Acquisition of knowledge about nutrients used in the diet of dogs and cats, their classification, methods of production, processing, canning and declaration of feed, as well as factors that affect feed spoilage;
2. Acquiring knowledge about the specifics of the diet of dogs and cats during their life cycle;
3. Acquiring knowledge about the norms and needs of different categories of dogs in nutrients, specific feed supplements, as well as feeding techniques and technology;
4. Acquiring knowledge about clinical nutrition, the relationship between diet and certain diseases of dogs and cats and ways of prevention and therapy;
5. Acquiring knowledge about the nutritional basis of behavioral disorders in dogs and cats;

Course outcomes

After passing the exam in the subject Clinical Dietetics of Dogs and Cats, the student should:

1. Fully understand the biochemical and physiological basis of dog and cat nutrition;
2. Recognizes certain nutrients and knows their basic characteristics and specifics, defines their importance in the diet of dogs and cats, as well as the impact on health;
3. Knows and understands the principles of nutrition of different species and categories of dogs and cats, taking into account the specifics and differences;
4. Can form a meal for the appropriate type and category of dogs and cats, as well as organize and supervise the feeding process itself;
5. Be able to spot irregularities and problems caused by inadequate nutrition;
6. Be able to propose and implement dietary measures depending on the nature of the disease;

Course content

Lectures

Physiological features of dog and cat nutrition. Utilization and selection of feed for dogs and cats. Nutrient needs. Dog nutrition: puppies, breeding and working dogs. Cat nutrition: in growth and reproduction. Nutritional disorders and dietary measures; Pronutrients in the diet of dogs and cats;

Practicals:

Determining needs for individual categories. Use of nutritional tables of nutrients used in the diet of dogs and cats. Assembling meals. Meal analysis and correction. Analysis and correction of ready meals. Corrective nutrition in metabolic diseases of dogs and cats;

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

1. Đorđević N., Grubić G., Makević M., Jokić Ž.: Ishrana domaćih i gajenih životinja, Grafika, Beograd, 2009.
2. Case, Daristotle, Hayek, Raasch, : Canine and Feline Nutrition, third edition, Elsevier, 2011.
3. National Research Council: Nutritient requirements of cats. 6th ed. National Academy of Sciences, Washington, 2003.
4. National Research Council: Nutritient requirements of dogs. 6th ed. National Academy of Sciences, Washington, 2002.
5. Strombeck R. Donald : Home prepared dog and cat diets. Iowa State University Press, 1999.
6. Reinhart G.A., Carey D.: Recent advances in canine and feline nutrition, IAMS, Ohio, 1998.
7. Burger I.H. : The Waltham book of companion animal nutrition, Pergamon Press, 1995.
8. Simpson J.W., Anderson R.S., Markwell P.J: Clinical nutrition of the dog and cat, Blackwell Scientific Publications, Oxford, 1993.

A large number of review papers are available to students on the recommendation of teachers from the current field.

Hours	**Lectures:** 1	**Practicals :** 2

Teaching methods

Theoretical classes with interactive learning with the application of audio-visual methods, practical work in the laboratory of the Department of Nutrition and Botany, practical work in the field, seminar papers. The part of practical classes related to clinical nutrition will take place at the faculty clinics;			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	Maximum 20	Written exam	
Participation in practicals	Maximum 20	Oral exam	***10-50***
Colloquium			
Seminars	Maximum 10		
Knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.			

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module II

Lecturers: Dragan Šefer, Full Professor; Radmila Marković, Full Professor; Jelena Nedeljković Trailović, Full Professor; Svetlana Grdović, Full Professor; Branko Petrujkić, Associate Professor; Stamen Radulović, Assistant Professor; Dragoljub Jovanović, Research Fellow; Dejan Perić, Teaching Assistant

Course status: Obligatory

ECTS credits: 7

Prerequisites: Feed safety

Course aims

1. Mastering the technique of meal optimization;
2. Mastering the calculation of buffer capacity and electrolyte balance in mixtures for feeding different species of animals;
3. Application of matrices when using various feed additives;
4. Practical approach to meal adjustment for the prevention and treatment of productive diseases of farm animals, as well as for food production according to specific consumer requirements;
5. Designing meals in order to produce fortified foods of animal origin;

Course outcomes

After passing the exam in the subject Specialist teaching block - elective module II, the student should:

1. Independently formulates mixtures and premixes for different species and categories of animals;
2. Fully masters the calculation techniques of optimizing the buffer capacity and electrolyte balance in animal feed;
3. Master the application of matrices when using various feed additives;
4. Independently adjust the meal for the prevention and treatment of productive diseases of farm animals;
5. Be able to formulate a meal according to the specific requirements of consumers;
6. To design a meal for animals in order to produce functional foods of animal origin;

Course content

Lectures

Nnutrigenomics.

Practicals:

Classic and modern procedures of meal optimization (basic calculations in meal formulation, use of Pearson square, use of Excel program in meal calculation, basics of linear programming, meal formulation in modern software packages AFOS and BRILL). Formulation of premix (premix) using Excel program. Buffer capacity-computational approach. Electrolyte balance-computational approach. Application of matrices when using various feed additives. Meal design in order to produce functional food of animal origin. Nutritional prevention and therapy of productive diseases of farm animals. Meal formulation according to specific consumer requirements (home made, BARF, sports nutrition).

DON (additional forms of teaching)

SIR (study research work)

Recommended literature

1. Marković R., Petrujkić B., Šefer, D.: Bezbednost hrane za životinje, Fakultet veterinarske medicine, 2018.
2. Pravilnik o kvalitetu hrane za životinje. Sl. Glasnik RS, 41, 2009.
3. Jovanović R., Dujić D., Glamočić D.: Ishrana domaćih životinja, Stylos-izdavaštvo, Novi Sad, 2000.
4. NOVUS: Nutrition of hyperprolific sows, Novus International, Editorial Agricola Espanola, S.A., 2019.
5. Hester PY.: Egg Innovations and Strategies for Improvements, Academic Press, Elsevier, 2017.
6. Colin GS.: Sturke's Avian Physiology, Sixth Edition, Elsevier, 2014.
7. Francois B., Guoyao W., Yulong Y.: Nutritional and Physiological Functions of Amino Acids in Pigs, Springer, 2013.
8. Case, Daristotle, Hayek, Raasch, : Canine and Feline Nutrition, third edition, Elsevier, 2011.
9. McDonald P., Edwards RA., Greenhalgh JFD., Morgan CA., Sinclair LA., Wilkinson RG.: Animal Nutrition, Pearson, 2010.
10. Lyons T.P., Jacques K.A.: Biotechnology in the Feed Industry. Nottingham University Press, Alltech 2002.

A large number of review papers are available to students on the recommendation of teachers from the current field.

Hours	**Lecture:** 0	**Practicals :** 0	**DON:** 3	**SIR:** 5

Teaching methods

Practical work at the Department of Animal Nutrition and Botany using modern programs for optimizing meals for animals.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence	Maximum 20	Written exam	
Participation in practicals	Maximum 20	Oral exam	10-50
Colloquium			
Seminars	Maximum 10		
Knowledge assessment methods: Methods can be different. The table lists only some options: written exam, oral exam, project presentation, seminars, etc.			

MODULE 9

VETERINARY SURGERY

Study programme: Specialist academic studies of veterinary medicine

Course title: Orthopedics of dogs and cats

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Enrollement in the third semester and passed the exams from the previous year of study

Course aims

During the teaching of this subject, the trainee gets acquainted with the basic methods of surgical technique for repairing orthopedic injuries - the use of wire, screws, wedges, as well as postoperative treatment. The aim of the course is to explain and adopt the essence of orthopedic lesions in patients who have developed dysfunction of different parts of the locomotor system.

Course outcomes

Upon conclusion of this course, the trainee should be able to independently resolve various orthopedic injuries and establish an individual plan of postoperative therapy and treatment. In addition, he must be able to compare the findings obtained on the basis of medical history, clinical and orthopedic examinations, as well as the results of physical therapy examinations.

Course content

Lectures

Introduction to the anatomy of the locomotor system, pathology of orthopedic injuries - bones, joints, ligaments and tendons, as well as medications used in the treatment of alterations of the locomotor system.

Practical teaching

Working with patients in the operating room.

DON

SIR

Recommended literature

1. *Small Animal Surgery*. 5th Edition, *Theresa Fossum, 2018.*
2. Textbook of Small Animal Surgery, 3rd Edition, Slatter, 2003.
3. Handbook of Small Animal Orthopedics and Fracture Repair Brinker, Piermattei and Flo's, 2015.
4. Advances in the Canine Cranial Cruciate Ligament, 2nd Edition, Peter Muir, 2018.
5. Veterinary Surgery: Small Animal 1st Edition, Karen Tobias Spencer Johnston, 2011.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Power Point presentation for each lecture as well as work in the operating room.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Prarticipation in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: Abdominal surgery of dogs and cats

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Enrollement in the third semester and passed the exams from the previous year of study

Course aims

The aim of the course is to enable the trainee to perform various laparotomy procedures on dogs and cats, whether on the digestive, urogenital or reproductive organs.

Course outcomes

Upon conclusion of this course, the trainee should be able to independently solve various problems and alterations of the abdominal organs. In addition, he must be able to compare the findings obtained on the basis of medical history, clinical and specialist examinations - ultrasound or X-ray.

Course content

Lecturers

Introduction to the anatomy of the abdominal cavity, pathology of the digestive, reproductive and urinary tract, as well as medications used in the treatment of these organs.

Practical teaching

Working with patients in the operating room

DON

SIR

Recommended literature

1. *Small Animal Surgery*. 5th Edition, *Theresa Fossum, 2018.*
2. Textbook of Small Animal Surgery, 3rd Edition, Slatter, 2003.
3. Handbook of Small Animal Orthopedics and Fracture Repair Brinker, Piermattei and Flo's, 2015.
4. Advances in the Canine Cranial Cruciate Ligament, 2nd Edition, Peter Muir, 2018.
5. Veterinary Surgery: Small Animal 1st Edition, Karen Tobias Spencer Johnston, 2011.

Hours	**Lecturers:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Power Point presentation for each lecture as well as work in the operating room.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: Surgery of horses

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ECTS credits: 9

Condition: Enrollement in the third semester and passed the exams from the previous year of study

Course aims

The aim of the course is to enable the trainee to perform basic surgical procedures on the abdomen (castration and complications, cryptorchidism, solving various forms of hernias, laparotomy) and the locomotor system of horses (diagnosis of lameness, treatment of arthritis, tendinitis, bursitis, intra-articular drug use, hooves).

Course outcomes

Upon conclusion of this course, the trainee should be able to independently solve various problems and alterations of the locomotor system of horses - tendons, bursa, joints, as well as recognizing different forms of lameness. In addition, they must be able to solve basic onychological diseases. In addition, they will get acquainted with the basic forms of laparotomy procedures in horses.

Course content

Lectures

Introduction to the anatomy and pathology of the locomotor system and abdominal organs, as well as medications used in the treatment of these conditions.

Practical teaching

Work with patients in the operating room and in the field.

DON

SIR

Recommended literature

1. Milosavljević P: Special surgery of large animals, "Ljubostinja" 2017;
2. Tadic M., Milosavljevic P. Onychologia Equi- Clinic, pathology and therapy of horse hooves. Čikoš Holding, Subotica, 1995;
3. Ross M, Dyson S .: Diagnosis and Management of Lameness in Horses, Sauders Comp., Philadelphia, 2003.
4. Adams S.P. and Fessler J. F .: Atlas of equine surgery, WB Saunders, Philadephia, 2000. 5. Hickmann, J., Houlton, J., Edwards, G.B .: Atlas of Veterinary Surgery, 3rd edn. Oxford: Blackwell K.1997.
6. Trailović D .: Diagnosis and therapy of horse diseases, Scientific KMD, Belgrade 2009.

Hours	**Lectures:** 2	**Practicals:** 3	**DON:** 1

Teaching methods

Power Point presentation for each lecture as well as work in the operating room.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: Surgery of cattle

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ESPB credits: 9

Condition: Enrollement in the third semester and passed the exams from the previous year of study

Course aims

The aim of the course is to enable the trainee to perform basic surgical procedures on the abdomen and locomotor system of cattle, primarily the acropodium.

Course outcomes

Upon conclusion of this course, the trainee should be able to independently solve various problems and alterations of the locomotor system, primarily the acropodium of cattle, as well as various laparotomy procedures - rumenotomy, dislocation of the abomasum left and right, caesarean section ...

Course content

Lectures

Introduction to the anatomy and pathology of the locomotor system and abdominal organs, as well as medications used in the treatment of these conditions.

Practical teaching

Work with patients in the operating room and in the field.

DON

SIR

Recommended literature

1. Milosavljević P: Special surgery of large animals, "Ljubostinja" 2017;
2. Hickmann, J., Houlton, J., Edwards, G.B .: Atlas of Veterinary Surgery, 3rd edn. Oxford: Blackwell K.1997.
3. Amstel S .: Manual for Treatment and Control of Lameness in Cattle, Blackwell Publishing, Ames, Iowa, USA, 2008.
4. Blowey, R.W., Weaver A.D .: Color Atlas of Diseases and Disorders of Cattale, 2nd ed. Lomdon: Mosby., 2003
5. Tadić M., Milosavljević P .: Acropodium bovis: klinika, patologija i terapija, Dečije novine, Gornji Milanovac, 1991.
6. Fubini SL, Ducharme NG: Bovine surgery, In farm animal surgery, Elsevier, St. Louis 2004. 7. Greenough P .: Bovine Laminitis and Lameness, Saunders / Elsevier, Pholadelphia, USA, 2007.

Hours	**Lectures:** 2	**Practicas:** 3	**DON:** 1

Teaching methods

Power Point presentation for each lecture as well as work in the operating room.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods; can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: Diagnostic imaging of companion animals' diseases

Lecturers: Mirjana Lazarević Macanović, Full Professor; Nikola Krstić, Full Professor; Marko Mitrović, Assistant Professor; Vanja Krstić, Full Professor; Predrag Stepanović, Associate Professor; Vladimir Magaš, Associate Professor

Course status: Elective

ECTS credits: 9

Prerequisites: Teaching in the subject of Diagnostic Imaging of Companion Animals' Diseases can be attended only by those students who, during the 2nd semester of Specialist Academic Studies, attended classes in the elective subject Instrumental Methods of Diagnostics and Therapy of Animal Diseases.

Course aims

During the teaching process residents are trained to impove their skills in analyzing and interpreting images obtained by different diagnostic imaging methods acquired during bachelor studies (radiography/fluoroscopy, computed tomography /CT/ and ultrasonography) in order to detect pathological changes and make an accurate diagnosis of the disease.

Course comes

Upon completion of this course, students should:

- Use X-ray and CT devices, as well as ultrasound devices;
- Understand how the organs are displayed in radiological and ultrasound images;
- Recognize, analyze and interpret pathological changes in radiological and ultrasound images.

Course content

Lectures

Diagnostic imaging of respiratory diseases in dogs and cats (methodology of radiological examination, radiographic anatomy of respiratory organs). Radiological examination of respiratory function. Radiological diagnostics of the upper respiratory tract diseases (nasal cavities, sinuses, larynx, trachea). Radiological diagnostics of the lower respiratory tract diseases (the bronchal tree, the lung parenchyma). Radiological diagnostics of pathological changes on the thoracic boundaries, pleural and mediastinal space.

Diagnostic imaging of cardiovascular diseases in dogs and cats (methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of heart and major blood vessels). Radiological and ultrasound diagnostics of heart disease and pathological changes in major blood vessels.

Diagnostic imaging of urogenital diseases in dogs and cats (methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of urogenital organs). Radiological examination of kidney's function. Radiological and ultrasound diagnostics of pregnancy. Radiological and ultrasound diagnostics of urogenital diseases. Diagnostic imaging of adrenal gland diseases in dogs and cats (methodology of radiological and ultrasound examination and radiological and ultrasonografic anatomy of the adrenal gland). Ultrasound diagnostics of adrenal gland diseases.

Radiological diagnostics of dental diseases in dogs and cats (methodology of radiological examination of the stomatognathic system, radiological diagnostics of hereditary and acquired diseases of the stomatognathic system).

Diagnostic imaging of the liver and pancreatic diseases and gastrointestinal organs diseases in dogs and cats (methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of liver, pancreas and gastrointestinal organs). Radiological examination of the gastrointestinal motility. Radiological and ultrasound diagnostics of the gastrointestinal diseases. Radiological and ultrasound diagnostics of the liver and hepatobiliary system diseases and pancreatic diseases.

Diagnostic imaging of the spleen diseases and pathological conditions in the abdominal cavity in dogs and cats (methodology of radiological and ultrasound examination, radiographic and ultrasonografic anatomy of the spleen). Radiological and ultrasound diagnostics of spleen diseases. Radiological and ultrasound diagnostics of pathological changes in the peritoneal cavity (ascites, lymphadenopathy, intra-abdominal masses).

Diagnostic imaging of the bone and joint diseases in dogs and cats (methodology of radiological examination, basic changes in bone structure), radiological diagnostics of the axial and appendicular skeleton diseases (congenital anomalies, diseases of traumatic, inflammatory, metabolic and endocrine etiology).

Radiological diagnosics of equine acropodium diseases.

Radiological diagnostics of diseases of the endocranium and vestibular system in dogs and cats.

Diagnostic Imaging of the bird diseases.

Diagnostic imaging of the exotic animal diseases.

Use of the magnetic resonance imaging in veterinary medicine.

Practicals

Analysis of radiographs, ultrasonograms and CT images from the archive of the Department of Radiology and Radiation Hygiene, Faculty of veterinary medicine Universtity of Belgrade and writing descriptions of pathological changes.

DON (additional forms of teaching)

Clinical work with patients in cabinets for radiological and ultrasound diagnostics. Writing descriptions of pathological changes observed on the radiographs, CT images and ultrasonograms.

SIR (study research work)

Individual student's research work guided by teachers.

Recommended literature

Šehić M: Klinička rentgenologija u veterinarskoj medicini, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2002.

2. Krstić N, Krstić V: Rendgenološka i endoskopska dijagnostika oboljenja digestivnog i respiratornog sistema pasa i mačaka, autorsko izdanje, Beograd, 2007.
3. Šehić M: Osteoartropatije u domaćih životinja, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2012.
4. Thrall D: Textbook of Veterinary Diagnostic Radiology, 7th edition, WB Saunders Company, Philadelphia, 2017.
5. Šehić M, Matko M: Kompjuterizirana tomografija i dijagnostika patologije lubanje mozga i kralježnice psa, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2012.
6. Schwarz T, Saunders J: Veterinary Computed Tomography, 1st edition, Wiley-Blackwell, UK, 2011.
7. Šehić M, Stanin D, Butković V: Ultrasonografija abdomena i toraksa psa i mačke, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb, 2006.
8. Matton JS, Nyland TG: Small Animal Diagnostic Ultrasound, 3rd edition, WB Saunders Company, Philadelphia, 2014.
9. Krautwald-Junghanns M-E, Pees M, Reese S, Tully T: Diagnostic Imaging of Exotic Pets – Birds, Small Mammals, · Reptiles, Schlütersche Verlagsgesellschaft mbH & Co, Hannover, Germany, 2011.

Hours	**Lectures:** 2	**Practicals :** 3	**DON:** 1

Teaching methods:

Power point presentations, analysis of radiographs and CT images from the archive of the Department of Radiology and Radiation Hygiene, practical work in cabinets for radiological and ultrasound diagnostics.

Evaluation and grading (maximum 100 points)

Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	20
Participation in practicals	30	Oral exam	
Colloquium		Practical exam	50
Seminars			

Knowledge assessment methods:

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module I

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ESPB credits: 7

Prerequisites: Fulfilled pre-examination obligations in the previous semester

Course aims

To acquaint the student with the basic principles of surgical preparation of the patient for surgery, from the preparation of the operative field, adequate application of asepsis - antisepsis, sedation and anesthesia, introduction to the proper use of surgical instruments, types of sutures and materials used in orthopedics.

Course outcomes

The student must be able to independently prepare the patient for surgical intervention from sedation of anesthesia to the preparation of the operative field as well as the choice of sutures and materials for the repair of surgical injuries.

Course content

Lectures

Asepsis - antisepsis, preparation of the operating field, types of suture materials, proper placement of incisions, types of sutures, wound drainage and lavage, temporary and permanent hemostasis, instruments routine and special purposes, healing of purulent inflammations and old wounds.

Practical teaching

Practical work and duty in the outpatient clinic, operating rooms of the Clinic. Presentation of characteristic cases from the areas envisaged by the specialization plan and program

Recommended literature

1. Small Animal Surgery. 5th Edition, Theresa Fossum, 2018.
2. Textbook of Small Animal Surgery, 3rd Edition, Slatter, 2003.
3. Handbook of Small Animal Orthopedics and Fracture Repair Brinker, Piermattei and Flo's, 2015.
4. Advances in the Canine Cranial Cruciate Ligament , 2nd Edition, Peter Muir, 2018.
5. Veterinary Surgery: Small Animal 1st Edition, Karen Tobias Spencer Johnston, 2011.
6. P. Milosavljević, Special surgery of large animals in field conditions, Tebinje, Ljubostinja, 2017.
7. J. Vasić, General Surgery, second edition, Belgrade, 2018.

Hours	**Lectures:** 0	**Practicals:** 0	**DON:** 3	**SIR:** 5

Teaching methods

Interactive teaching with the use of audio-visual methods (PowerPoint presentations for each lecture, films). Work in the operating room and the department for experimental surgery.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participations in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods:can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: Reconstructive surgery

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ESPB credits: 6

Prerequisites: Enrolled in the fourth semester and passed the exams from the previous year of study

Course aims

The aim of the course is to enable the trainee to perform surgical procedures that reconstruct severely traumatized and damaged soft tissues (musculature, abdominal wall, head) or the locomotor system (joints, tendons, head bones and extremities).

Course outcomes

Upon conclusion of this course, the trainee should be able to independently solve various problems and alterations of the locomotor system as well as soft tissues in social animals.

Course content

Lectures

Introduction to the anatomy and pathology of the locomotor system and abdominal organs, as well as medications used in the treatment of these conditions.

Practical teaching

Work with patients in the operating room and in the field.

DON

SIR

Recommended literature

1. Milosavljević P: Special surgery of large animals, "Ljubostinja" 2017;
2. Tadic M., Milosavljevic P. Onychologia Equi- Clinic, pathology and therapy of horse hooves. Čikoš Holding, Subotica, 1995;
3. Ross M, Dyson S .: Diagnosis and Management of Lameness in Horses, Sauders Comp., Philadelphia, 2003.
4. Adams S.P. and Fessler J. F .: Atlas of equine surgery, WB Saunders, Philadephia, 2000.
5. Hickmann, J., Houlton, J., Edwards, G.B .: Atlas of Veterinary Surgery, 3rd edn. Oxford: Blackwell K.1997.
6. Trailović D .: Diagnosis and therapy of horse diseases, Scientific KMD, Belgrade 2009.
7. Small Animal Surgery. 5th Edition, Theresa Fossum, 2018.
8. Textbook of Small Animal Surgery, 3rd Edition, Slatter, 2003.
9. Handbook of Small Animal Orthopedics and Fracture Repair Brinker, Piermattei and Flo's, 2015.
10. Advances in the Canine Cranial Cruciate Ligament , 2nd Edition, Peter Muir, 2018.
11. Veterinary Surgery: Small Animal 1st Edition, Karen Tobias Spencer Johnston, 2011.

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods

Power Point presentation for each lecture as well as work in the operating room.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participations in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: Veterinary ophtalmology

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ESPB credits: 6

Prerequisite: Enrolled in the fourth semester and passed the exams from the previous year of study

Course aims

The aim of the course is to enable the trainee to perform basic surgical procedures on the eye (eyelids, cornea, lacrimal apparatus, eyeball) as well as therapeutic procedures in ophthalmology of domestic animals.

Course outcomes

Upon completion of this course, the trainee should be able to independently solve various problems and alterations of the eye in social animals.

Course content

Lectures

Introduction to the anatomy and pathology of the eye, as well as medications used in the treatment of these conditions.

Practical teaching

Working with patients in the operating room.

DON

SIR

Recommendes literature:

1. Essentials of Veterinary Ophtalmology, secund edition, Kirk N. Gelatt, 2008.
2. Ophthalmic Disease in Veterinary Medicine, Charles L. Martin, 2010.
3. Veterinary Ophthalmic Surgery, Kirk N. Gelatt, Janice P. Gelatt 2011.
4. BSAVA Manual of Small Animal Ophthalmology, Second edition, Simon Petersen-Jones and Sheila Crispin, 2002.
5. Veterinary Ophthalmology, fifth edition/ two volume set, Kirk N. Gelatt, Brian C Gilger, Tomas J. Kern, 2013.
6. Slatter's Fundamentals of Veterinary Ophthalmology, Edition 4, 2008., David J. Maggs, Paul E. Miller, Ron Ofri

Hours	**Lectures:** 1	**Practicals:** 2

Teaching methods Power Point presentation for each lecture as well as work in the operating room.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	Points	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....

Study programme: Specialist academic studies of veterinary medicine

Course title: Physical therapy of social animals

Lecturers: Nikola Krstić, Full Professor; Mirjana Lazarević Macanović, Full Professor; Marko Mitrović, Assistant Professor

Course status: Elective

ECTS credits: 6

Prerequisite: Already enrolled in the module surgery, attended classes ininstrumental methods of diagnosis and therapy of animal diseases in the second semester of academic specialist studies

Course aims

During the course, postgraduates get acquainted with the modern methods of physical therapy, its laws, possibilities and scope and master the skills of handling various devices used in physical medicine. The aim of the course is to explain and adopt the fact that the essence of the rehabilitation program in patients with dysfunction of various organ systems is not the literal removal of anatomical and physiological damage, but rather establishing the optimal functional state of the organism according to its remaining capabilities, and thus improving the quality of life.

Course outcomes

Upon successful completion of this course, students should be able to:

-know the general principles and laws of physical therapy, to make the differences of its stimulating effect, as well as to independently use and choose among different methods of physical treatment;

-master the ways of functioning of various devices in physical therapy and application techniques;

-perform an initial evaluation of the patient's physiological status;

-establish an individual therapy plan, form a treatment protocol and present it to the animal owner in an appropriate way;

-make a comparative analysis of the findings obtained on the basis of medical history, clinical and orthopedic examinations, as well as the results of physical therapy examinations obtained through specific tests;

-make a physical therapy diagnosis, give a prognosis of the disease and perform physical therapy treatment.

Course content

Lectures

General principles and laws of physical therapy, theoretical basis, mechanisms of therapeutic action. On the specificity of the stimulating effect of physiotherapy. Biophysical basis of physical medicine (energy reception and distribution in tissues, energy absorption and transformation, oxidoreduction processes, surface phenomena, colloidal state, the essence of biophysical action of various types of energy). Bioelectrical activity of cells, origin and transmission of biocurrents. Pathophysiology of pain. Organization of the Department for Physical Therapy.Physiotherapy examination, development of therapy plan, physiology of exercise, therapeutic exercises (passive exercises, assistive standing exercises, proprioceptive training, dynamic movement activities). Methods and modalities of physiotherapy. Physiotherapy of muscle disorders, tendons and ligaments (contusions of muscles, tendons, nerves and joints, distortions of joints, distension of muscles and ligaments, partial and complete rupture of muscles and tendons, sections of tendons and luxation of joints), physiotherapy of traumatic conditions, post-traumatic conditions and posttrauma wound after surgical interventions (bite and, stab wounds), ear shell hematoma, physiotherapy of proliferative–degenerative diseases of the axial and appendicular skeleton, physical treatment of arthritis, physiotherapy of pulmonary diseases (catarrh of maxillary sinuses, rhinitis, restrictive pulmonary diseases,chronic obstructive pulmonary disease, pulmonary emphysema), physiotherapy of neurological diseases (peripheral nerve lesions, cervical syndrome, lumbar syndrome, polyradiculoneuritis, myopathies, spinal lesions, craniocerebral injuries). Rehabilitation of geriatric patients, physical treatment of sports injuries.

Practical classes. Application of devices for physical therapy on clinical material.

Recommended literature

1. Bockstahler, B, Levine, D, Millis, D. (2004), *Essential Facts of Physiotherapy in Dogs and Cats – Rehabilitation and Pain Management*, Babenhausen: BE VetVerlag
2. Mc Gowan, C, Goff, L, Stubbs, N. (2007) *Animal Physiotherapy (Assessment, Treatment and Rehabilitation of Animals)*, New Jersey: Blackwell Publishing
3. Millis, L. D, Taylor, A. P. (2004), *Canine Rehabilitation and Physical Therapy*, Philadelphia: WB Saunders
4. Petrović, B, Draganović, B, Gligorijević, J. (1972), *Fundamentals of Physical Medicine for Students of the*

Faculty of Veterinary Medicine, Belgrade: Institute for Textbooks Publishing and Teaching Aids 5. Šehić, M.(2014), *Physical Therapy and Rehabilitation of Dogs*, Zagreb: Faculty of Veterinary Medicine			
Hours	**Lectures:** 1	**Practicals:** 2	
Teaching methods Power Point presentations for each lecture as well as work with physical therapy devices.			
Evaluation and grading (maximum 100 points)			
Pre-exam requirements	Points	**Final exam**	Points
Lecture attendence		Written exam	60
Participation in practicals	40	Oral exam	
Colloquium		Practical exam	
Seminars			
Knowledge assessment methods: can be different and only some of them are listed in the table (written exams, oral exam, project presentation, seminars, etc.)			

Study programme: Specialist academic studies of veterinary medicine

Course title: Specialist teaching block from elective module II

Lecturers: Petar Milosavljević, Full Professor; Milan Hadži Milić, Assistant Professor; Bogomir Bolka Prokić, Assistant Professor

Course status: Elective

ESPB credits: 7

Prerequisite: Fulfilled pre-examination obligations in the previous semester

Course aims

Upon completion of the course, the student must master the basic principles of abdominal surgery, orthopedics and ophthalmol

Course outcomes

The student should be able to solve multiple injuries of the locomotor system, perform appropriate osteofixation, enterotomy, dislocation of certain abdominal organs, as well as repair the pathology of the eyelids, corneal ulcers and conjunctival plastic.

Course content

Lectures

Principles and types of laparotomy, enterotomy, torsion and dislocation of abdominal organs. Basics of osteofixation with wire, plates and wedges. Limb amputation. Intraarticular drug administration. Joint and tendon therapy. Ophthalmoscopy and biomicroscopy with plastic of eyelids and conjunctiva and resolution of corneal ulcers.

Practical teaching

Practical work and duty in the outpatient clinic, operating rooms of the Clinic. Presentation of characteristic cases from the areas envisaged by the specialization plan and program

Recommended literature

1. Small Animal Surgery. 5th Edition, Theresa Fossum, 2018.
2. Textbook of Small Animal Surgery, 3rd Edition, Slatter, 2003.
3. Handbook of Small Animal Orthopedics and Fracture Repair Brinker, Piermattei and Flo's, 2015.
4. Advances in the Canine Cranial Cruciate Ligament , 2nd Edition, Peter Muir, 2018.
5. Veterinary Surgery: Small Animal 1st Edition, Karen Tobias Spencer Johnston, 2011.
6. P. Milosavljević, Special surgery of large animals in field conditions, Tebinje, Ljubostinja, 2017.
7. J. Vasić, General Surgery, second edition, Belgrade, 2018.

Hours	**Lectures:** 0	**Practicals:** 0	**DON:** 3	**SIR:** 5

Teaching methods

Interactive teaching with the use of audio-visual methods (PowerPoint presentations for each lecture, films). Work in the operating room and the department for experimental surgery.

Evaluation and grading (maximum 100 points)

Pre-exam obligations	**Points**	**Final exam**	Points
Lecture attendence	10	Written exam	
Participation in practicals	20	Oral exam	30
Colloquium		Practical exam	40
Seminars			

Knowledge assessment methods: can be different, listed in the table are just some of the options: (written exams, oral exam, project presentation, seminars, etc .....