**The course is taught in Serbian, but individual tutorials and materials are offered to incoming students in English**

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| **Course: SCIENTIFIC RESEARCH METHODS** |
| **Code:** 3ДВМ1О01 |
| **Lecturer(s):** Dr Petrić V. Dušan, full professor |
| **Course status: compulsory** |
| **ECTS: 4** |
| **Condition:** no |
| **Course aims:**To define, understand and value scientific research methods. |
| **Course outcome**To extend practical and scientific capabilities for a real and valid identification of research result. To implement a sound concept for applicable design of a research project. To perform efficient methods in accomplishing justifiable results. |
| **Course contents***Theoretical studies:*Methods of defining, formulating and adjusting research activities in accordance with contemporary acceptable scientific approach. Incorporation of methods recognized by referee centers for scientific research. Techniques for laboratory and field investigation/research. Sampling methods. Methods for result evaluation and interpretation. Design of experimental protocol. Developing base for literature references. Instructions for scientific publications and thesis. Techniques of results presentations.*Practical teaching:*All the classes are based on individual student’s effort to get skilled for the methods to be applied both in laboratory and field. A choice of sampling techniques and methods will be demonstrated. A special attention will be devoted to misleading problems that are most frequent within practical performance in laboratory/field conditions. A range of applicable and justified methods will be demonstrated. |
| **Recommended literature**1. Borojević, S. (1978). Metodologija eksperimentalnog naučnog rada. Radnički Univerzitet „Radivoj Ćirpanov”, Novi Sad.
2. Sarić, М. (1985). Opšti principi naučnog rada. Naučna knjiga, Beograd.
3. Lectures and practicals from selected literature
4. Scientific journals
 |
| **Number of teaching hours: 2+1 (45)** | **Lectures: 30** | **Student research work: 15** |
| **Teaching strategies**The course will be performed by demonstration of the topics through presentations and by comprehensive didactic material. Evaluation of practical skills and abilities in conducting experimental protocol. Students will elaborate particular subjects by seminars and presentations that will be, if necessary, supported by consultations. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| independent research work | 15 | test | 15 |
| colloquium | 25 | written exam | 15 |
| seminars | 10 | oral exam | 20 |

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| **Course: RESEARCH STUDY WITH A SUPERVISOR** |
| **Code:** 3ДВМ1О02, 3ДВМ2О04, 3ДВМ3О05, 3ДВМ4О06 и 3ДВМ5О07\* |
| **Lecturer(s):** |
| **Course status: compulsory** |
| **ECTS: 14, (10\*)** |
| **Condition:**  |
| **Course aims:** The aim of the research study with a supervisor is that students, using the acquired scientific knowledge, abilities and academic skills, conduct a research in a specific scientific area that have opted, so to produce the doctoral dissertation after completing the studies and obtaining scientific results. |
| **Course outcome**It is expected that through the direct research study with a supervisor student:- develop critical and analytical way of thinking;- gain skills needed for the research, writing scientific papers and producing the doctoral dissertation;- competently, scientifically and argumentatively do the research and present the results of the work;- successfully realize the study in order to obtain valuable scientific results and making the final dissertation;- publish results of the research in international peer reviewed journals;- develop skills and knowledge needed for the future independent scientific career. |
| **Course contents**The research study with a supervisor means a specific training for laboratory and/or clinical work; inclusion in research activities; data handling and management, search and using scientific literature; research work for the selection of dissertation subject and acquisition of needed literature references; research work on setting up the experiment; writing seminars, technical and scientific papers.Research work with a supervisor is directly in the function of final production and writing of dissertation; and the specific content of the activities is created in accordance with the needs for the production of specific doctoral dissertation. |
| **Recommended literature**Scientific papers, books and other literature within the defined subject of the doctoral dissertation. |
| **Number of teaching hours:****0+5 (75); 0+10 (150)\*** | **Lectures: 0** | **Student research work: 75, (150\*)** |
| **Teaching strategies**Application of certain scientific methods and techniques acquired from prior compulsory and elective courses; consultations with supervisor and other teachers who are dealing with issues in the field of doctoral dissertations; different methods of sampling, examination, data collecting and analyzing, with supervision and independently, with respect to the type of research and subject of the dissertation. |
| **Knowledge assessment (maximum points: 100)** |
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\* in the 5th semester

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| **Course: BIOSTATISTICS** |
| **Code:** 3ДВМ2О03 |
| **Lecturer(s):** Dr Bošković T. Olgica, Associate professor |
| **Course status: compulsory** |
| **ECTS: 4** |
| **Condition:** no |
| **Course aims:**Introducing advanced statistical techniques to students that can be useful in their scientific and practical work in the future. |
| **Course outcome**Students should be fully prepared to use standard statistical techniques for parameter estimation, hypothesis testing, using multivariate analysis and making statistical models. Also, they should follow results of more advanced statistical method used by others. |
| **Course contents**Some important topics from probability theory; Parameter estimations and hypothesis testing; ANOVA and MANOVA; Multivariate regression and correlation; Non-parametic statistics and hypothesis testing. |
| **Recommended literature**1. Wayne, D. W. A Foundation for Analysis in the Health Sciences, (6th edition), J. Willey & Sons, 1995.
2. Chatfield, C., Collins A. J. Introduction to Multivariate Analysis, Chapman and Hall, 1983.
3. Kaps, M., Lamberson, W. R. Biostatistics for Animal Science, CABI, 2004.
4. Chap, L. T. Introductory Biostatistics, Wiley-Interscience, 2003.
 |
| **Number of teaching hours: 2+1 (45)** | **Lectures: 30** | **Student research work: 15** |
| **Teaching strategies**Teaching, seminar papers, practical exercises, consultations. |
| **Knowledge assessment (maximum points: 100)** |
| seminar paper oral exam  | 6040 |

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| **Course: RESEARCH WORK ON A DOCTORAL DISSERTATION** |
| **Code:** 3ДВМ5О08 and 3ДВМ6О09\* |
| **Lecturer(s):** |
| **Course status: compulsory** |
| **ECTS: 10, (20\*)** |
| **Condition:**  |
| **Course aims:** The objective of the research work on a doctoral dissertation is that the student, after completion of the research and other activities performed within the defined doctoral dissertation, make a critical review of the literature relevant to the topic of the doctoral dissertation, analyze and process data and scientific results obtained during the research, and to give a scientific conclusions about the importance of the results and dissertation. |
| **Course outcome**It is expected that through independent research, as well as through the work with supervisor, student perform a critical analysis of the available literature data relevant to the topic of the doctoral dissertation, analyze and process data and scientific results obtained during the research, and to give a scientific conclusions about the importance of the results and dissertation. |
| **Course contents**The research work on a doctoral dissertation means that student, using the scientific knowledge, abilities and academic skills acquired from prior compulsory and elective courses, as well as during the actual research work with a supervisor, collect and analyze all the data and materials needed for final writing a doctoral dissertation. This involves analysis of the available literature data relevant to the subject of doctoral dissertation, analysis and processing of data and scientific results of the research and drawing scientific conclusions from the results, their importance and value for the science and for end users. Research work on a doctoral dissertation is directly in the function of final production and writing of dissertation; and the specific content of the activities is created in accordance with the needs for the production of specific doctoral dissertation. |
| **Recommended literature**Scientific papers, books and other literature within the defined subject of the doctoral dissertation. |
| **Number of teaching hours:** **0+10 (150), 0+20 (300)\*** | **Lectures: 0** | **Student research work: 150, (300\*)** |
| **Teaching strategies**During the research work on a dissertation, student consults supervisor and other members of the Commission and, if necessary, other teachers who are dealing with issues in the field of doctoral dissertations. |
| **Knowledge assessment (maximum points: 100)** |
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\* in the 6th semester

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| **Course: PREPARING THE DOCTORAL DISSERTATION**  |
| **Code:** 3ДВМ6З10 |
| **Lecturer(s):** |
| **Course status: compulsory** |
| **ECTS: 20** |
| **Condition:**  |
| **Course aims:** Acquiring knowledge about the structure and form of writing the dissertation, conducted after completion of the research and other activities performed within the defined subject of the doctoral dissertation; Gaining the experience for creative work, analysis, scientific writing and formatting of scientific texts and for use of student’s scientific results in practice; Training students to prepare their own results of work in a suitable form for public presentation, and to discuss on the importance of the results and dissertation in a scientific and argumentative way. |
| **Course outcome**Doctoral dissertation produced and written in accordance with all scientific postulates, rules of the Faculty and the University. |
| **Course contents**Doctoral dissertation is the final result of the PhD students. Student in consultation with the supervisor and other members of the Commission prepares a doctoral dissertation in written form in accordance with the rules of the Faculty and other University rules. Student prepares and defends a written dissertation publicly in consultation with the supervisor, in accordance with the prescribed rules and procedures. |
| **Recommended literature**Scientific papers, books and other literature within the defined subject of the doctoral dissertation. |
| **Number of teaching hours:** | **Lectures:** | **Student research work:** |
| **Teaching strategies**During the work on, and writing of, a dissertation, the student consults supervisor and other members of the Commission and, if necessary, other teachers who are dealing with issues in the field of doctoral dissertations. Student prepares a doctoral dissertation and then, after approvement issued by the Commission for assessment and defense, delivers bound copies to the Commission. Doctoral dissertation defense is a public, a student is required to orally respond to questions and comments, and to discuss on the importance of the results and dissertation in a scientific and argumentative way. |
| **Knowledge assessment (maximum points: 100)** |
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| **Course: MORPHOFUNCTIONAL CHARACTERISTICS OF SELECTED TISSUES AND ORGANS** |
| **Code:** 3ДВМ1И11 |
| **Lecturer(s):** Dr Ušćebrka M. Gordana, full professor; Dr Stojanović Z. Slobodan, assistant professor andDr Kanački S. Zdenko,assistant professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**Introduce students to the morphological, physiological and histological characteristics of the development of selected organs and tissue characteristics |
| **Course outcome**Students will gain the necessary knowledge of the morphological, physiological and histological features of the development of selected organs. Special emphasis will be placed on the study of morphofunctional characteristics of those organs which students are selected according to their interests and directions of further development. |
| **Course contents***Theory* Characteristics of selected tissues, morphological, histological and physiological characteristics of the development of selected organs. Molecular and cellular physiology of selected tissues. Functional organization of tissues and organs. Physiological regulation (neural and humoral) of selected organs. Metabolic characteristics of tissues and organs.*Practice*Students will be familiar with modern methods of detection of the development of certain structural components of selected organs using anatomical and histological preparations. Practical and individual study research on introducing physiological characteristics and testing the functional state of the selected tissues and organs. |
| **Recomended literature**1. Konig, H.E., Liebich, H.G. (2009) Veterinarska anatomija domaćih sisavaca. Naklada Slap. Zagreb.
2. Eurell, J. A., Frappier, B. L. (2006) Dellmann’s Textbook of Veterinary Histology. Blackwell Publishing. London.
3. Sherwood, L., Klandorf, H., Yancey, P. (2005) Animal physiology – from genes to organisms. Thomson LARC, USA.
4. Sherwood, L. (2004) Human physiology – from cells to sistems. Thomson LARC, USA.
5. Warris, P.D. (2000) Meat Science. CABI Publishing. London.
6. Richardson, R.I., Mead, G.C. (1999) Poultry Meat Science. CABI Publishing. London.
7. Selected papers related to course
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures: 45** | **Student research work: 45** |
| **Teaching strategies**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations on the board and the application of computers with using the appropriate software. Practical laboratory student works with independent student work on a research microscope.  |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| student activity | 5 | Making of complete scientific work | 25 |
| seminar – practical part | 20 | Oral presentation scientific work results  | 30 |
| seminar – presenting of results | 20 |  |  |

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| **Course: ANIMAL WELFARE** |
| **Code:** 3ДВМ1И12 |
| **Lecturer(s):** Dr Antić B. Dragan, assistant professor; Dr Boboš F. Stanko, full professor and Dr Kanački S. Zdenko, assistant professor  |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The aim of this course is to provide students with an understanding of the need of obeying and the methods of securing welfare of laboratory and experimental animals, pets, animals used for sport and fun, ZOO animals, farm animals and slaughter animals. |
| **Course outcome**Upon successful completion of the course, students will be able to understand the needs, physiological and pathological basis of animal behavior, factors that have impact on welfare of animals in different situations (laboratory and experimental animals, pets, animals used for sport and fun, ZOO animals, farm animals and slaughter animals), factors that may compromise their welfare and measures for control of the welfare. |
| **Course contents***Theoretical studies:*Animal behavior; The impact of the environmental factors on behavior of animals; Stress adaptation, welfare and behavior; Ethical aspects of animal testing and legislation; The aspects of laboratory animal welfare; The use and care of laboratory animals; Alternative methods; Euthanasia of laboratory animals; The aspects of pets, animals used for sport and fun and ZOO animals welfare; The aspects of farm animals welfare, national and EU legislation; The aspects of welfare of slaughter animals, during transport, markets, lairiging and stunning and slaughter; The impact on the meat quality and safety.*Practical teaching:*The assessment of welfare of different categories and groups of animals in various situations: laboratory and experimental animals; pets; animals used for sport and fun; ZOO animals; farm animals and slaughter animals. |
| **Recommended literature**1. Kaliste, W.: The welfare of Laboratory Animals, Kluwer Academic Publishers, 2004.
2. Стевановић, Ђ.: Основи науке о лабораторијским животињама. Београд, Др Стевановић, 2002.
3. Стевановић, Ђ.: Методе и технике експерименталног рада са лабораторијским животињама. Београд, Др Стевановић, 2004
4. Вучинић Маријана: Понашање, добробит и заштита животиња. ВКС, Београд, 2004.
5. Gregory, Neville G**.** (1998), Animal welfare and meat science**,** CABI *Publishing,* UK.
6. Frans J.M. Smulders and Bo Algers (Eds) (2009) Welfare of production animals: assessment and management of risks. Wageningen Academic Publishers, The Netherlands.
7. EFSA opinions with respect to issues related to welfare of farm and slaughter animals.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures: 45** | **Student research work: 45** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Visits to farms, abattoirs, ZOO, and other places and animal holdings with the aim of assessment of their welfare; Independent research work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| seminars | 30 |  |  |

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| **Course: RELATIONSHIP BETWEEN NERVOUS, ENDOCRINE AND IMMUNOLOGICAL SYSTEM IN PHYSIOLOGICAL AND PATHOPHYSIOLOGICAL CONDITIONS** |
| **Code:** 3ДВМ1И13 |
| **Lecturer(s):** Dr Belić M. Branislava, associate professor |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The goal of this course is to familiarize students with the link between the nervous, endocrine and immune systems, as it is the most important team in the process of adaptation of farm animals and susceptibility to disease. |
| **Course outcome**Upon successful completion of the course, students will be able to, based on immune, endocrine and other biochemical findings, assess the health status of individual animal or entire herd. |
| **Course contents**The morphology and physiology of the nervous system; The morphology and physiology of the endocrine system; The morphology and physiology of the immune system; Peripheral hormonal activity - impact on effector cells; The central action of hormones - the influence of CNS; The autonomic nervous system and the immune response; Diffuse neuroendocrine system of different organs; Stress and neuroendocrine imunological correlation; The effects of various hormones hypothalamic-pituitary-gonadal interfaces on the immune response and reproduction Immunology; Neuroendocrine modulation of hematopoiesis; Infection and inflammation - effects of inflammation mediators and products of infection causes the endocrine-immune system; Immune Tolerance and Autoimmunity; Psycho-endokrinoimmunology of ethogram characteristics of animals; Neuroendokrinoimmunology and carcinogenesis; Immunogenetics and propensity to disease. |
| **Recommended literature**1. Миливој Боранић и сар: Психонеуроимунологија, Школска књига, Загреб, 2008.
2. Ћирић Оливера и сар.: Неуроендокриноимунологија, Завод за уџб. и наст.ср., Београд, 2000.
3. Ђурић С.и сар.: Основи неуроендокринологије, Завод за уџб. и наст.ср., Београд, 1991.
4. Оригинални и прегледни научни радови из часописа и зборника.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Oral presentations using audio-visual techniques, written communication - Seminars;Practical field work and laboratory analysis and case studies. |
| **Knowledge assessment (maximum points: 100)** |
| Project and seminar presentationOral exam | 5050 |

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| **Course: CYTOPATHOLOGY OF VIRAL INFECTIONS** |
| **Code:** 3ДВМ1И14 |
| **Lecturer(s):** Dr Lalošević M. Dušan, full professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:** Students to learn the theory and techniques of manual detection of viral cytopathic effect to diagnosis and research. |
| **Course outcome**Knowledge: The postulates of laboratory work with biological materials; processing methods of biological material for microscopic and virological expertise, including simple and complex staining, cell cultures, pathology of laboratory animals, the norms and the prevention of disease in laboratory work with laboratory animals.Skills: Mastering the work in the laboratory with biological materials with emphasis on accident prevention, preparation and maintenance of tissue culture, mastering the technique of biological experiments on lab. animals, molecular analysis techniques. |
| **Course contents***Theoretical study*Principles of cellular pathology, classification of viral cytopathic effects, history from Guarnieri and Negri bodies to the electron microscope. Methods of tissue fixation, choice of fixative for light and electron microscopy, blood and tissue smears and fingerprints, cytologic features of individual samples, cytopathic effect of the DNA and RNA viruses, primary cultures of cells and tissues, application in diagnosis. Continuous cell lines, application in diagnosis. Molecular diagnostics, viral oncogenesis. Pathology of laboratory animals and prevention of zoonoses.*Practical lessons*Native and vitally staining of microscopic preparations, tissue viability test, euthanasia and preparation of laboratory animals for the development of primary tissue culture, preparation of solutions and reagents for tissue culture, trypsinization, staining of cell and tissue cultures by haematoxylin-eosine. Analysis of the cytopathic effect of different viruses. |
| **Recommended literature**1. Boyd J.F. The Pathology of Hunman Viral Infections and Associated Conditions, University of Glasgow Press, Glasgow, 2004. pp 2374. ISBN 08526164142. Жданов В.М. Атлас вируснои цитопатологии. АМН СССР, Москва, 1975. |
| **Number of teaching hours: 3+3 (90)** | **Lectures: 45** | **Student research work: 45** |
| **Teaching strategies**Oral presentation using audio-visual techniques, seminars, practical laboratory work, analysis and case studies. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 40 |
| practical classes | 20 |  |  |
| laboratory work | 10 |  |  |
| seminars | 20 |  |  |

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| **Course: IMMUNOLOGY OF PARASITIC INFECTIONS** |
| **Code:** 3ДВМ1И15 |
| **Lecturer:** Dr Lalošević G. Vesna, associate professor |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims** studying theoretical principles of imunopathological mechanisms during parasitic infections as well as how the immune response and host defense, depending on the type of parasite and host susceptibility. |
| **Course outcome*****Knowledge*:** Extending the basic knowledge in basic immunology, introduction to the modern interpretation of inflammation and immunoregulation, and the possibility of use in immunomodulation therapy, the possibility of the use and development of vaccines against parasitic infections.***Skills*:** Acquiring the work in the laboratory with biological materials with special emphasis on the prevention of accidents, immunological methods in the diagnosis of parasitic infections. |
| **Course content**General features of the immune system, Imunopathology of parasitic infections, Specific immunity in protozoan infections, Specific immunity in helminth infections, Immunoregulation, Immunomodulation, Allergic aspects of parasitism, Vaccines against parasitic infections, Immunological methods, Methods for determination of non-specific immune response, Methods for the detection of specific immune response. |
| **Recommended literature:**1. Lalošević V. i sar. (2005) Parasitology, 1st ed., University of Novi Sad, Faculty of Agriculture, Novi Sad (in Serbian)
2. Tizard I. (1996).Veterinary Immunology, Saunders Comp.
3. Gershwin L. et al. (1995) Immunology and Immunopathology of domestic animals, Mosby, USA
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Methods of teaching**Oral presentations using audiovisual techniques, practical work in the laboratory. |
| **Knowledge assessment (maximum points: 100)** |
| Activity during the lectures and exercises: Essay: Oral exam:  | 302050 |

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| **Course: AUTOPSY AND SAMPLING TECHNIQUES** |
| **Code:** 3ДВМ1И16 |
| **Lecturer(s):** Dr Davidov N. Ivana,assistant professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The aim of the course is to teach students to determine precise (*in situ*) anatomical position of organs and organ systems, detection of changes that have occurred during the disease in organs and tissues, proper sampling and diagnosis. |
| **Course outcome**The outcome of the course is that students put the correct diagnosis, especially when clinical signs in affected animals are not distinctive or typical. |
| **Course contents***Theoretical study*Method of exenteration domestic animal organs. Sampling and storage of materials for laboratory testing (material for histological examination, the material for bacteriological examination, material for parasitological examination, the material for the chemical-toxicological testing). Packaging and shipment. Conservation materials. |
| **Recommended literature**1. Prašović S., Kadrić M., Beširović H., Alić A. Osnovi veterinarske odbukcione tehnike i makroskopske patomorfološke dijagnostike. Sarajevo, 2012.
2. Prašović S., Beširović H., Šatrović E. Obdukciona tehnika i patomorfološka dijagnostika važnijih bolesti ptica. Sarajevo, 2003.
3. Sofrenović Đ., Knežević N. Osnovne patološke karakteristike važnijih infektivnih bolesti domaćih životinja. Beograd, 1994.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**The method of oral presentation and discussion of methods and written work (essay). |
| **Knowledge assessment (maximum points: 100)** |
| Seminar Oral exam  | up to 45up to 55 |

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| **Course: PRINCIPLES OF EPIDEMIOLOGY** |
| **Code:** 3ДВМ1И17 |
| **Lecturer(s):** Dr Potkonjak S. Aleksandar, assistant professor and Dr Lako L. Branislav, full professor |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**Course introduces the concepts of epidemiology and biostatistics as applied to veterinary medicine and public health problems. Emphasis is placed on the principles and methods of epidemiologic investigation, appropriate summaries and displays of data, and the use of classical statistical approaches to describe the health of populations. Topics include the dynamic behavior of disease; usage of rates, ratios and proportions; methods of direct and indirect adjustment. Various epidemiologic study designs for investigating associations between risk factors and disease outcomes are also introduced, culminating with criteria for causal inferences. |
| **Course outcome**After completion of this course, students will be able to apply principles of epidemiology and biostatistics to the prevention of disease and the improvement of health. Also, students will be able to: distinguish the roles and relationships between epidemiology and biostatistics in the prevention of disease and the improvement of health; overcome compute basic descriptive statistics and use data from analytic methods; demonstrate a understanding of epidemiologic methods and study design; as combine appropriate epidemiological concepts and statistical methods. |
| **Course contents**Roles of quantitative methods. Quantifying and comparing measures. Quantifying the natural history of disease. Probability concepts and their use in evaluation of diagnostic tests. Epidemiologic study designs. Estimating risk and interpretation of data from epidemiologic studies. Applying epidemiology to evaluation public health policy. |
| **Recommended literature**1. Rothman K.J. et al. Modern Epidemiology. Thrid edition, Lippincott Williams & Wilkins, 2008.;
2. Krämer A. Modern Infectious Disease Epidemiology: Concepts, Methods, Mathematical Models, and Public Health. 2010 edition, Springer, 2010.;
3. Salman M. Animal Disease Surveillance and Survey Systems: Methods and Applications. First edition, Wiley-Blackwell, 2003.;
4. Cameron A. Data Management for Animal Health, In: AusVet Series in Epidemiological Skills for Animal Health. AusVet Animal Health Services Brisbane, Vol 1., Australia, 2004.
5. Sergeant E. et al. Epidemiological Problem Solving, In: AusVet Series in Epidemiological Skills for Animal Health. AusVet Animal Health Services Brisbane, Vol 2., Australia, 2004.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures: 45** | **Student research work: 45** |
| **Teaching strategies**Direct instruction (Lecture, compare and contrast), Indirect instruction (Problem solving, Case studies), Experimential learning (Conducting experiments, Focused imaging, Field observations, Surveys), Instructional skills (Explaining, demonstrating). |
| **Knowledge assessment (maximum points: 100)** |
| Project presentation maximum points 50 and Written exam 50 points |

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| **Course: ANESTHESIOLOGY** |
| **Code:** 3ДВМ1И18 |
| **Lecturer(s):** Dr Toholj D. Bojan, assistant professor and Dr Stevančević R. Milenko, full professor |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**Introduction of PhD students about the latest developments in the field of veterinary anesthesiology. |
| **Course outcome**After completing and passing the exam, students are able to think critically about techniques of anesthesia. To carry out the synthesis and come to a new conclusion through research. |
| **Course contents**Latest achievements in clinical veterinary anesthesiology, modern anesthetic and monitoring equipment, methods of scientific research in anesthesiology. |
| **Recommended literature**1. Fossum Т.W.: Small animal surgery. Third edition. St. Louis: Elsevier – Mosby; 2007. (selected topics)
2. Fubini Susan, Ducharme N.: Farm animal surgery. St. Louis: Elsevier Saunders; 2004. (selected topics)
3. Dugdale А.: VeterinaryAnaesthesia Principles to Practice. Wiley-Blackwell; 2010. (selected topics)
4. Banfield Pet Hospital: Anesthesia for pet practitioner. 3rd edition. Banfield Pet Hospital; 2010. (selected topics)
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures: 45** | **Student research work: 45** |
| **Teaching strategies:** Lectures, seminars, consultations, showing particularly interesting cases. |
| **Knowledge assessment (maximum points: 100)** |
| Attendance at lecturesActive participation in researchSeminar paper  | 205030 |

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| **Course: INFECTIONS IN SURGERY** |
| **Code:** 3ДВМ1И19 |
| **Lecturer(s):** Dr Stevančević R. Milenko, full professor; Dr Toholj D. Bojan, assistant professorand Dr Potkonjak S. Aleksandar,assistant professor |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**Introduction of PhD students about current trends in diagnosis, treatment and prevention of infections in surgery. |
| **Course outcome**After completing and passing the exam, students are able to think critically about the mechanisms of development of infection of surgical wounds. They are able to analyze, identify and recognize the critical points in the surgical techniques. They can find new methods for preventing surgical infections. |
| **Course contents**Latest achievements in the prevention and treatment of surgical infections and infections in surgery. |
| **Recommended literature**1. Fossum Т.W.: Small animal surgery. Third edition. St. Louis: Elsevier – Mosby; 2007. (selected topics)
2. Fubini Susan, Ducharme N.: Farm animal surgery. St. Louis: Elsevier Saunders; 2004. (selected topics)
3. Matičić D., Vnuk D.: Veterinarska kirurgija i anesteziologija. Zagreb: Medicinska naklada; 2010.
4. Slatter D.: Textbook of small animal surgery. Philadelphia: Elsevier Saunders; 2003. (selected topics)
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures: 45** | **Student research work: 45** |
| **Teaching strategies:** Lectures, seminars, consultations, showing particularly interesting cases. |
| **Knowledge assessment (maximum points: 100)** |
| Attendance at lecturesActive participation in researchSeminar paper  | 205030 |

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| **Course: CYTOLOGICAL АSPECTS ОF REGULATION ОF SELECTED CELLS AND TISSUES** |
| **Code:** 3ДВМ2И20 |
| **Lecturer(s):** Dr Milošević Lj. Verica,principal research fellow |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** Scientific research methods, Courses of elective block 1 |
| **Course aims:**Introducing students to the general characteristics and specific characteristics of selected cells in the examined tissues and their mutual regulation. |
| **Course outcome**Students will gain the necessary knowledge of the histological and cytological features of the selected cells and tissues in different experimental conditions and periods of the life cycle. Special emphasis will be placed on those aspects of the cytological study of cells and tissues that students are selected according to their interests and directions of further development. |
| **Course contents***Theory* Introducing students to the specific structure of cells and tissues at the light and electron microscopy of those organs for which students are especially interested in their work.*Practice*Students will be familiar with modern methods of detection of the development of certain structural components of the selected cells using cytological and histological preparations using a microscope. |
| **Recomended literature**1. Grozdanovic - Radovanovic, J. (2000) Citology. Zavod za udzbenike Beograd.
2. Ross, M., Kaye, G., Pawlina, W. (2003) Histology with cell and molecular biology. Lippincott Williams & Wilkins, London
3. Kuehnel, W. (2003) Color atlas of cytology, histology and microscopic anatomy. Thieme, Stuttgart-New York.
4. Eurell, J.A. F Rappier, B, L. (2006) Dellmanns Textbook of Veterinary Histology. Sixth edition, Blackwell Publishing, London.
5. Selected papers related to course
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations on the board and the application of computers with using the appropriate software. Practical laboratory student works with independent student work on a research microscope.  |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| student activity | 5 | Making of complete scientific work | 25 |
| seminar – practical part | 20 | Oral presentation of scientific work results  | 30 |
| seminar – presenting of results | 20 |  |  |

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| **Course: PRINCIPLES OF PHYSIOLOGICAL REGULATION** |
| **Code:** 3ДВМ2И21 |
| **Lecturer(s):** Dr Krnić S. Josip, full professor and Dr Kanački S. Zdenko, assistant professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** Physiology as a separate subject in previous levels of study. |
| **Course aims:**Expanding and consolidating previously acquired knowledge about the regulation of physiological processes on molecular and cellular level to the level of integration of individual organs and organ systems in the body аs a single functional entity. Understanding the regulation of physiological processes involved in various physiological and pathological conditions and processes. |
| **Course outcome:**Students will have the necessary foundation for further learning in the field of applied physiology, necessary for scientific research and practice as well as for understanding the clinical courses. |
| **Course contents:***Lectures:*Functional organization of multicellular organisms and cell physiology. Homeostasis and parameters of the internal environment. Feedback mechanisms in biological systems. Molecular basis of physiological regulation. Action potentials. General principles and physiological factors of control (neural and humoral). Reflex, reflex arc, and sensory receptor system. The functional organization of the nervous system. The real and tissue hormones. Synthesis, transport, and mechanism of action of hormones. Hypothalamus as integrator of neurohumoral correlation. Physiology of endocrine glands and diffuse neuroendocrine system. Regulation of metabolic parameters.*Student research work:*Practical and individual study research of regulation mechanisms of certain physiological processes in selected species of animals. |
| **Recommended literature:** 1. Sherwood, Lauralee: Human physiology – from cells to systems. Thomson LARC, USA, 2004.
2. Sjaastad, Hove, Sand: Physiology of domestic animals. Scandinavian veterinary Press. 2003.
3. Sherwood, Klandorf, Yancey: Animal physiology – from genes to organisms. Thomson LARC, USA, 2005.
4. Stojić V. Veterinarska fiziologija, Naučna knjiga, Beograd, 2007.Guyton i Hall: Medicinska fiziologija. Medicinska naklada, Zagreb, 2006.
5. Aida Hodžić, Muhidin Hamamdžić: Endokrinologija domaćih životinja, Veterinarski fakultet Univerziteta u Sarajevu, Sarajevo, 2012.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies:**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations using a computer. Methods of practical laboratory work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | Written exam | 10 |
| activities during research work | 10 | oral exam | 20 |
| laboratory work | 20 |  |  |
| seminars | 30 |  |  |

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| **Course: STRESS AND DISTRESS – PHYSIOLOGY AND PATHOPHYSIOLOGY OF ADAPTATION TO STRESS STIMULI** |
| **Code:** 3ДВМ2И22 |
| **Lecturer(s):** Dr Belić M. Branislava, associate professor |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The goal is for students to learn that stress is an inevitable cause of numerous adaptations and when stress can act when it becomes pathological and distress, as well as to meet the exact indicators of stress reactions. |
| **Course outcome**Students at the end of the course will be referred to the mechanism of stress reactions, their importance in the pathogenesis of health disorders and measures of prevention and protection of animals from stress. |
| **Course contents**General adaptive mechanism; Stress response; Distress and its manifestations; Endocrine changes in stress; Metabolic changes in stress; Immunological changes in stress; Reproductive changes in stress; Cellular adaptation to stress; Stress during intrauterine development; Stress and behavioral changes; Acute and chronic stress; Genetic selection of stress sensitivity; Test methods for assessment of stress response; Stress of some kind of animal in their daily living conditions; Well-being as the absence of stress; Prevention of stress animals. |
| **Recommended literature**1. Hristov Slavča, Bešlin Rade: Stres domaćih životinja, Poljoprivredni fakultet Zemun, Beograd, 1991
2. Đoković Radojica: Endokrini status mlečnih krava u peripartalnom periodu, Agronomski fakultet Čačak, 2010.
3. Cincović R.Marko: Toplotni stres krava- fiziologija i patofiziologija, beograd, 2010.
4. Šamanc Horea, Kirovski Danijela: Adrenokortikalni sistem goveda, Beograd, 2008.
5. Moberg G.P., Mench J.A.: The biology of animal stress, CABI publishing, 2000.
6. Contrada R.J., baum A.: The handbook of stress science, Springer, 2011.
7. Nelson R.J. et al: Seasonal patterns of stress, immune function, and disease, Cambridge 2002.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Oral presentations using audio-visual techniques; written communication - Seminars;Practical field work and laboratory analysis and case studies.  |
| **Knowledge assessment (maximum points: 100)** |
| Project and seminar presentationOral exam | 5050 |

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| **Course: PATHOLOGICAL MORPHOLOGY OF INFECTIOUS AND PARASITIC DISEASES** |
| **Code:** 3ДВМ2И23 |
| **Lecturer(s):** Dr Lalošević M. Dušan, full professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:** Students to learn the pathological pictures of infective diseases to diagnosis and research. |
| **Course outcome**Methods of animal autopsy and biopsy, tissue fixation, choice of fixative for light microscopy, microscopical analysis and diagnosis of specific infective diseases. |
| **Course contents** Pathological morphology of nonspecific bacterial diseases, pathological morphology of specific bacterial diseases, tuberculosis, pathological morphology of viral diseases, rabies, pathological morphology of tissue helminthoses, pathological morphology of some diseases caused by protozoa, pathological morphology of mycoses, specificity of pathological morphology of bird infectious diseases, animal infectious tumors, pathology of laboratory animals. |
| **Recommended literature**1. Софреновић Дј., Кнежевић Н. 1994: Основне патолошке карактеристике важнијих инфективних болести домаћих животиња; Универзитет у Београду, Београд;2. Д. Лалошевић, С. Прашовић, И. Давидов, С.Путић, И. Васић. Практикум патолошке хистологије за студенте ветеринарске медицине, Нови Сад-Земун 2011.3. AFIP Manuals of Animal Tumor Pathology, Washington |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Oral presentation using audio-visual techniques, seminars, practical work in autopsy room and laboratory, histopathological analysis and case studies. |
| **Knowledge assessment (maximum points: 100)** |
| Activities during lectures and practical classes Seminar Oral exam  | 302050 |

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| **Course: HISTOPATHOLOGICAL DIAGNOSIS** |
| **Code:** 3ДВМ2И24 |
| **Lecturer(s):** Dr Davidov N. Ivana,assistant professor |
| **Course status:** **elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The aim of the course is that students complete their knowledge and to better master the method of histopathological diagnosis. |
| **Course outcome**The outcome of the course is that students place the correct histological diagnosis, especially when clinical signs in affected animals are not distinctive or typical. |
| **Course contents**Preparation of histological preparations. Histopathological diagnosis of degeneration. Histopathological diagnosis of necrosis. Histopathological diagnosis of disorder in the bloodstream. Histopathological diagnosis of inflammation. Histopathological diagnosis of specific inflammation. Histopathological diagnosis of the tumor. Histopathological diagnosis of diseases of organ systems (digestive, respiratory, cardiovascular, urogenital, nervous and skeletal). |
| **Recommended literature**1. Lalošević D., Prašović S., Davidov I., Putić S., Vasić I. Praktikum patološke histologija. Mostart, Zemun, 2011.
2. Lalošević D. Mikroskopska laboratorijska tehnika u medicini. Novi Sad, 2005.
3. Knežević M., Jovanović M. Praktikum iz patohistoloških vežbi. Boegrad, 1994.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**The method of oral presentation and discussion of methods and written work (essay). |
| **Knowledge assessment (maximum points: 100)** |
| Seminar Oral exam  | up to 45up to 55 |

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| **Course: IMMUNITY AND INFECTION**  |
| **Code:** 3ДВМ2И25 |
| **Lecturer(s):** Dr Potkonjak S. Aleksandar, assistant professor and Dr Lako L. Branislav, full professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** Scientific research methods |
| **Course aims:**The Course Immunity and Infection is designed for those students who wish to increase their knowledge and understanding of infectious diseases, infection control and the functioning of the immune system. |
| **Course outcome**After completion of this course, students will be able to effectively participate in future veterinary health care or research programs in infection and immunity. |
| **Course contents**Evolution of the Immune System, The Defense of the Body, Innate Immunity, Systemic Responses to Inflammation, Cytokines and Their Receptors, Antigens, The Major Histocompatibility Complex, Organs of the Immune System, Adaptive Immunity, Antibodies, Immunity in the Fetus and Newborn, Immunity to Bacteria and Fungi, Immunity to Viruses, Immunity to Parasites, Attachment to and Entry of Microorganisms into the Body, Events Occurring Immediately After the Entry of the Microorganism, The Encounter with the Phagocytic Cell and the Microbe's Answers, The Spread of Microbes through the Body, Recovery from Infection, Failure to Eliminate Microbe, Concepts of Virulence, Biofilms, Pathogenesis in the Post-Genomic Era, Evolution of Pathogens, What are Pathogens and How do They Emerge. |
| **Recommended literature**1. Tizard I.R. Veterinary Immunology, Ninth edition, Saunders, 2012.
2. Delves P.J. Roitt's Essential Immunology, Tenth edition,
3. Mims C.A. et al. Mims' Pathogenesis of Infectious Disease, Fifth edition, Academic Press, 2000. Gyles C.L et al. Pathogenesis of Bacterial Infections in Animals, Fourth edition, Wiley-Blackwell, 2010.
4. Demuth D.R., Lamont R. Bacterial Cell-to-Cell Communication: Role in Virulence and Pathogenesis. First edition, Cambridge University Press, 2006.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Direct Instruction (Lecture); Experimential Learning (working in research laboratory); Instructional Skills (Explaining, Demonstrating). |
| **Knowledge assessment (maximum points: 100)** |
| Project presentation maximum points 50; and Written exam 50 points |

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| **Course: VAKCINOLOGY** |
| **Code:** 3ДВМ2И26 |
| **Lecturer(s):** Dr Lazić M. Sava,principal research fellow; Dr Petrović R. Tamaš, senior research associate and Dr Savić S. Sara, research associate |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:** Acquisition of theoretical and practical knowledge about the production, use, safety and effectiveness of vaccines, hyperimmune serum and other biological products for use in Veterinary Medicine.  |
| **Course outcome:** Knowledge gained create conditions for professional training and effective implementation of the vaccine, hyperimmune sera and other biological products for the purpose of preventing, combating and eradicating bacterial and viral infections in animals and birds. |
| **Course contents:***Theoretical study:* Passive and active immunization, Immunological reactivity in bacterial and viral infections, Immunogenes (bacteria, viruses), Adjuvants, Inactivated vaccines, Attenuated vaccines, New forms of vaccines (subunit, a marker, a DNA vaccine), Bacterial vaccines, Viral vaccines, Vaccine quality control (sterility, safety, efficiency), Vaccination programs, Hyperimmune sera, Biological and diagnostic equipment (production, application control).*Practical study:* Replication of the virus, Replication of bacteria, Inactivation, Attenuation, Vaccine formulation, Application of vaccines, Testing of vaccine: safety and efficiency, Making vaccination programs |
| **Recommended literature**1. Manual of Diagnostic Test and Vaccines for terrestrial Animals, O.I.E. 2012,
2. Europen Pharmacopoeia, 7. edition,
3. Danko Hajsig, Ljiljana Pinter, Tomo Naglić, Roberto Antolović: Veterinary Clinical Immunology, Zagreb Croatian Microbiological Society, University of Veterinary Medicine Zagreb, 2012.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies:** Theoretical study is held in classrooms using modern audiovisual techniques, including the teacher and active student participation through questions and discussion including presentation of seminar and research papers. Practical study is conducted in workshops with the use of modern audio-visual techniques and laboratories of the Scientific Veterinary Institute "Novi Sad".  |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| Activity during lectures | up 10 | Written exam |  |
| Рractical classes | up 10 | Oral exam |  up 50  |
| Seminars | up 30 |  |  |

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| **Course: EFFICACY AND SAFETY OF DRUGS IN CLINICAL VETERINARY PRACTICE** |
| **Code:** 3ДВМ2И27 |
| **Lecturer(s):** Dr Stojanović M. Dragica, associate professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The aim of the course is to train students to monitor the efficacy and safety of medications for indications of target species and categories of animals, provided with instruction for application of the drug.The purpose of this course is to train students to recognize the profile of adverse reactions in certain groups of drugs, and to treat and to register new adverse reactions which are not provided in instruction and that may be incurred due to impaired pharmacokinetics, pharmacodynamics or hypersensitivity certain types or categories of animals on given drug. Another important aim is monitoring the therapeutic efficacy of drugs applied at the recommended therapeutic doses in clinical conditions. This pharmacodynamic parameter is monitored based on changes in the value of appropriate biochemical, microbiological and parasitological parameters of blood, urine, feces and other secretions and excretions of various species and organ systems, particularly the antimicrobial agents, antiparasital and anti-inflammatory drugs in the treatment of septic shock and endotoxemia , applied for different indications. |
| **Course outcome**Checking the antibacterial efficiency of older registered representative of antibiotics and chemotherapeutics in efficiency newly registered drugs from the same chemical group in clinical trials to target animals and in the indications provided in vitro. Determining compatibility of application of newly registered antimicrobial agents using several times higher than the recommended therapeutic dose, monitoring of the changes in blood biochemistry and urinalysis, clinical signs of possible toxicity, production results and consumption of food in target species and categories of animals. Checking the efficiency of older registered representative antiparasitic drugs in efficiency of newly registered ektocids and endektocids and less sensitive to endo- and ectoparasitic infections in clinical trials and in vitro. Determining compatibility **-** security applications, especially the newly registered ektocids and endektocids in target animal species, according to the indications laid down by the manufacturer. Examinations compatibility of used anti-inflammatory drugs with potentially sensitive species monitoring local gastric tolerability, blood parameters and changes in the blood, as well as systemic and local anti-inflammatory efficacy. Testing the effectiveness of new drugs and their dosage regimen (dose size, frequency and duration of therapy) in preventing and treating septicemia and septic shock. |
| **Course contents**After they pass the exam, students will be able to conduct a rational pharmacotherapy, apply effective and safety medicines and to implement pharmacovigilance. |
| **Recommended literature**1. Veterinarska farmakologija, Milanka Jezdimirovic, 4. preradjeno i dopunjeno izdanje, Fakultet veterinarske medicine, Beograd, 2010.2. Osnovi farmakoterapije I gotovi lekovi ad us vet., Milanka Jezdimirovic, trece, izmenjeno i dopunjeno izdanje, Fakultet veterinarske medicine, Beograd, 2009. 3. Veterinary pharmacology and therapeutics, Adams, H. R., 8th edition. Iowa State University Press/Ames, 2001.4. The Complete Drug Reference, 34th edition, Martinadale, Sean C. Sweetman, Grayslake, USA, 2007.5. The Merck Veterinary Manual, 9th edition, Cynthia Kahn, Merck and Co., Inc. Rahway, N. J., USA, 2005.6. Antimicrobial Therapy in Veterinary medicine, Giguere, S., Prescott, J. F., Baggot, J.D., Walker, R. D., Dowling, P., 4th edition, Iowa State University press/Amess, 2007.7. Antimicrobal resistance, Clarce R.C., Vet Clin Small Anim, 2006.**Additonal literature**1. Zakon o lekovima i medicinskim sredstvima. Sluzbeni glasnik RS, br. 30/2010.2. National and EU regulation and guidelines.3. Veterinary pharmacovigilance 2011, Public bulletin, EMA/CVMP/PhVWP/987984/2011, Committee for Medicinal Products for Veterinary Use (CVMP)  |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies:** Oral presentation with video beam presentation. Term paper. |
| **Knowledge assessment (maximum points: 100)** |
| Term paper - up to 30 points; Oral exam - up to 70 points |

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| **Course: DIAGNOSTIC METHODS IN ANIMAL REPRODUCTION** |
| **Code:** 3ДВМ2И28 |
| **Lecturer(s):** Dr Stančić B. Ivan, assistant professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The goal of this course is that already accepted knowledge of diagnostic procedures in animal reproduction from basic studies, doctoral students now improve and modernize to make them easier to implement in practice, but also in scientific research. |
| **Course outcome**Formation of highly specialized scientists with academic education, who are trained to be based on a wider and in deeper knowledge in the field of diagnostic procedures using modern methods, participate in scientific research in the area of animal reproduction, and implement the same in the field work. |
| **Course contents**Basic principles of diagnosis in reproduction, application of the basic clinical examination, implementation and evaluation of the results of the special clinical examinations, Ultrasound diagnosis, diagnostic Imaging; Endoscopy, and the use of laparoscopic techniques in the diagnosis; The biochemical and other laboratory methods for diagnosis in reproduction. |
| **Recommended literature**1. Margaret V. Root Kustritz : Clinical canine and feline reproduction Evidence-based answers, Willey-Blackwell 2010.
2. Paddy Mannion : Diagnostic Ultrasound, Blackwell Publishing 2006.
3. Donald E. Thrall: Veterinary diagnostic radiology. Elsevier 2012
4. Stančić I. : Reprodukcija pasa i mačaka, Univerzitet u Novom Sadu 2012.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Lectures accompanied by appropriate readings and presentations. Research study. Consultation. Practical exercises in the laboratory and development of scientific research. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 5 | written exam | 30 |
| independent research work | 5 | oral exam  | 25 |
| project presentation | 20 |  |  |
| seminar | 15 |  |  |

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| **Course: CLINICAL DIAGNOSTIC METHODS OF DYSBIOSIS OF RUMINANTS** |
| **Code:** 3ДВМ2И29 |
| **Lecturer(s):** Dr Boboš F. Stanko, full professor and Dr Radinović Ž. Miodrag, assistant professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**The goal of this course is to learn the most important rumen disruptions of ruminants, as well as clinical diagnostics. |
| **Course outcome**Students will have the necessary scientific knowledge related to the malfunctioning of rumen related primarily to balance the microflora. Students will be introduced to the methods of clinical examination of rumen and diagnosis of disorders. |
| **Course contents**Introductory lecture, the physiological parameters of the rumen. Etiologic factors for dysbiosis. Correlation between motor disorders and the occurrence of ruminal dysbiosis. pH values ​​of disorders and relation with dysbiosis. Clinical examination of the animals in order to diagnose functional disorders of rumen. Auscultation and percussion of the rumen wall. Assessment tool based on the number of rumen contractions, increases and decreases in the number of contractions. Taking rumen contents with minimal stress of animal. View the contents of the rumen in order to assess the activities of infusoria. Determination of the pH of the rumen contents. |
| **Recommended literature**1. Sergei Forenbaher, D. Žubčić, gastrointestinal disease of domestic animals and, Zagreb 2010.
2. Šamanc Horea, Diseases of the digestive tract of cattle, Belgrade 2009.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**The method of oral presentation and discussion, the method of written work (essay), Method of practical work on the farm оf milking cows. |
| **Knowledge assessment (maximum points: 100)** |
| Seminar paper Research study Oral exam  | 202555 |

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| **Course: ZOONOSES OF CARNIVORES** |
| **Code:** 3ДВМ2И30 |
| **Lecturer:** Dr Lalošević G. Vesna, associate professor |
| **Course status: еlective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:**to provide students with extensive theoretical and practical knowledge in the diagnosis of the most important zoonotic disease of carnivores, as well as the prevention of professional risks for veterinarians. |
| **Course outcome*****Knowledge*:** Extending the basic knowledge of the epidemiology, diagnosis, and treatment of the most important zoonoses carnivores; introduction to contemporary techniques of laboratory diagnosis of zoonoses.***Skills*:** Acquiring skills in the laboratory during work with biological materials with special emphasis on the prevention of accidents; laboratory methods in the diagnosis of zoonoses; the use of laboratory animals for biological assay. |
| **Course content*****Theoretical classes***Prevention, diagnosis and treatment of rabies; Postexposure vaccination; Prevention, diagnosis and treatment of toxoplasmosis; Prevention, diagnosis and treatment of echinococcosis; Prevention, diagnosis and treatment of toxocariasis.***Practical classes***Modern laboratory diagnosis of rabies, toxoplasmosis, echinococcosis and toxocariasis, the ability to use "home made" antigen in serological diagnosis of rare zoonotic diseases. |
| **Recommended literature:**1. Krauss et all. (2003) Zoonoses: Infectious diseases transsmisible from animals to humans, ASM Press, USA
2. Acha P. (2005). Zoonoses and communicable diseases common to men and animals, 3rd edition, PAHO
3. WHO Expert Committee on Rabies Rabies Bulletin, 2000
4. Meslin FX, Kaplan MM, Koprowski H. Laboratory techniques in Rabies, WHO, Geneva, 1997.
5. Foreign and domestic scientific journals, symposium and conference proceedings related to these zoonoses
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Methods of teaching**Oral presentations using audiovisual techniques, practical work in the laboratory. |
| **Knowledge assessment (maximum points: 100)** |
| Activity during the lectures and exercises: Essay: Oral exam:  | 302050 |

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| **Course: GAME ECOLOGY AND PATOLOGY**  |
| **Code:** 3ДВМ2И31 |
| **Lecturer(s):** Dr Orlić B. Dušan, full professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** Scientific research methods |
| **Course aims:** Еvaluation of the ecological factors for the development and preservation of wild(game) animals and influence on the pathology and therapy in intensive rearing and natural habitat. |
| **Course outcome:** Students need to overcome diagnostics and therapy of wild (game) animals and their influence on the trophy development and especially diagnostics of zoonotic diseases and significance of wild animals in the epizootiology of contagious diseases. |
| **Course contents:** Clinical pathology of viral, bacterial and parasitic diseases of wild (game) animals and influence of the ecological factors on the health and the trophy quality, meat yield and multiplicity of wild animals. The risk assessment and meat control of shot wild animals meat. |
| **Recommended literature:**1. Velika ilustrovana enciklopedija lovstva, grupa autora, 1987
2. Novaković, V.: Jelen, monografija, 1999, poglavlje 6. "Bolesti jelenske divljači" V. Jovanović, D. Orlić
3. V. Novaković: divlja svinja, monografija
4. Z. Ristić: Fazan, monografija, PMF, Novi Sad
5. The additional literature is available in the Faculty library and in the library of the Scientific Veterinary Institute in English and German language.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Independent research work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| seminars | 30 |  |  |

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| **Course: RADIOHYGIENIC CONTROL AND PROTECTION OF ANIMAL PRODUCTION CYCLE** |
| **Code:** 3ДВМ2И32 |
| **Lecturer(s)**: Dr Ćirković А. Miroslav, full professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** no |
| **Course aims:** Training students about the harmful effects of ionizing radiation, prevention and protection. |
| **Course outcome:** Students are trained for independent research work in the field of control and protection of animal production from ionizing radiation. |
| **Course contents***Theoretical lecture:* Radioactive contamination of animal production; Radiohygienic control and protection of animal production cycle; Early warning system and measurement of radiation hazard phone, Work organization and monitoring system; System, organization and procedure for radio-hygienic control and expertise cases of objects under the state veterinary-sanitary control; Preservation of foods of animal origin by the use of ionizing radiation. Radio Hygienic expertise of cattle for slaughter and food; physical examination and screening of animals; Decontamination of animals, Decontamination of animal feedstuffs for animal; Decontamination of food, The organization and procedure of slaughtering irradiated and contaminated animals. Evaluation of the radiation hazards and protection of animal production; Protection of farmed animals, protection of animal feedstuffs; Food safety, Decontamination, transport and storage of radioactive waste; collection and transport of radioactive waste; storage of radioactive waste.*Practical lecture:* Radiological Laboratory. Detection and dosimetry of ionizing radiation. Personalprotective equipment, low level radioactivity, high level radioactivity, Decontamination Methods, Radiohygienic control of animals and objects under the state veterinary-sanitary control. Radiohygienic expertise of animals and objects under the state veterinary-sanitary control. Evaluation of the hazards in emergencies situation, radiation risk assesment. |
| **Recommended literature** 1. Митровић Р.: Радиоактивност у животној средини – угроженост, заштита, превентива, радиоактивна деконтаминација. Изд. "ВРЕЛО", Земун, 2001.
2. Митровић Р., Кљајић Р., Петровић Б.: Систем радијационе контроле у биотехнологији - Водећа књига. Изд. Научни институт за ветеринарство, Нови Сад, 1996.
3. Сарачевић Лејла.: Ветеринарска радиобиологија са радијационом хигијеном. Изд. DES Сарајево, 1999.
4. Journal of Environmental Radioactivity. Elsevier Ltd. http://www.sciencedirect.com/science/journal/0265931X
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**The method of oral presentation and discussion, the method of written work (essay), practical work in the radiological laboratory. |
| **Knowledge assessment (maximum points: 100)** |
| Oral examination:Practical examination:Seminar work: | 403030 |

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| **Course: PROCESSING TECHNOLOGIES OF FOOD OF ANIMAL ORIGIN AND FOOD PRESERVATION METHODS** |
| **Code:** 3ДВМ2И33 |
| **Lecturer(s):** Dr Antić B. Dragan, assistant professor; Dr Bunčić V. Sava, full professor and Dr Boboš F. Stanko, full professor |
| **Course status: elective** |
| **ECTS: 6** |
| **Condition:** Scientific research methods, Courses of elective block 1 |
| **Course aims:**The aim of this course is to provide students with an understanding of processing technologies of food of animal origin (meat, milk, eggs, fish and honey and their products), food preservation methods and using of antimicrobial factors; and related impact on safety and quality of these products. |
| **Course outcome**Upon successful completion of the course, students will be able to understand the principles of processing technologies of food of animal origin and preservation methods; and use acquired knowledge for the assessment of foodborne risks in these products. |
| **Course contents***Theoretical studies:*Slaughterhouse and meat factories; post mortem changes in the muscles and biochemical processes; antimicrobial factors for microbial control; meat preservation methods: cooling and freezing, salting and curing, smoking and drying, heat treatments, fermentation; packaging; advanced technologies for meat processing (irradiation, high hydrostatic pressure, etc); meat products: fermented sausages, dry meats, raw uncured meats, hot-smoked heat treated cured sausages, cooked sausages, lightly cooked (pasteurized) cured meat joints, canned commercially sterilized cured meats, RTE meats, fat; fish and fish products. Eggs and honey and their products. Milk and milk products technology (sterilized milk, powder milk), fermented products (sour milk, yoghurt, fruited yoghurt, kefir), cream, butter, kaymak, cheeses, ice cream and others. Starter cultures in milk technology.*Practical teaching:*Observation of meat processing technologies; Hazard analysis and control measures in processing of meat products; Observation of milk processing technologies; Hazard analysis and control measures in processing of milk products. |
| **Recommended literature**1. Fidel Toldra (2010) Handbook of Meat Processing. Blackwell Publishing, USA
2. Leo M. L. Nollet and Fidel Toldrá, Advanced technologies for meat processing. CRC Press, 2006
3. Gustavo V. Barbosa-Cánovas et al. (Eds) Novel Food Processing Technologies, CRC Press, 2005
4. Mansel W. Griffiths (Eds.) Improving the safety and quality of milk, Vol. 1and 2. Woodhead Publishing, 2010
 |
| **Number of teaching hours:** **3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Practical work in the food industry; Independent research work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| seminars | 30 |  |  |

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| **Course: FOODBORNE DISEASES AND FOOD MICROBIOLOGY** |
| **Code:** 3ДВМ2И34 |
| **Lecturer(s):** Dr Antić B. Dragan, assistant professor; Dr Lalošević G. Vesna, associate professor and Dr Blagojević J. Bojan, assistant professor |
| **Course status: elective** |
| **ECTS:** **6** |
| **Condition:** Scientific research methods, Courses of elective block 1 |
| **Course aims:**The aim of this course is to enable students to understand the phenotypic and genotypic characteristics, sources, transmission and behavior of the main biological hazards in the food chain, in the context of food safety, as well as the principles of the methods for their detection, isolation and typing. |
| **Course outcome**Upon successful completion of the course, students will be able to understand the principles of ecology and epidemiology of the main biological hazards in the food chain, with the aim of assessment of related risks and their management. |
| **Course contents***Theoretical studies:* Bacterial hazards in the food chain (infections, toxinfections, intoxications); Viral hazards in the food chain; Parasitic hazards in the food chain; Prion hazards in the food chain (BSE/TSE); Laboratory diagnostics of selected hazards; Monitoring and reporting of foodborne diseases; Systems and measures for control of foodborne diseases on national and international level.*Practical teaching:*Group studying of some examples of selected outbreaks of foodborne disease: study design, materials and methods, results and mitigation options. |
| **Recommended literature**1. James M. Jay, et al. Modern food microbiology. Springer, seventh edition, 2005.
2. Martin R. Adams and Maurice O. Moss. Food microbiology, The Royal Society of Chemistry Publishing, third edition, 2008.
3. Hans P. Riemann and Dean O. Cliver (Eds). Foodborne Infections and Intoxications. Elsevier, 2006.
4. Ynes R. Ortega (Eds). Foodborne Parasites. Springer, 2006.
5. EFSA - The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks
6. EFSA opinions related to epidemiology, control and monitoring of certain foodborne hazards in the food chain.
 |
| **Number of teaching hours: 3+3 (90)** | **Lectures:** **45** | **Student research work:** **45** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Practical work in the food industry; Practical work in diagnostic laboratory; Group analytical work; Independent research work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| seminars | 30 |  |  |

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| **Course: MORPHODYNAMIC OF STEM CELL DEVELOPMENT, THEIR CHARACTERISTICS AND IMPORTANCE IN VETERINARY MEDICINE** |
| **Code:** 3ДВМ3И35 |
| **Lecturer(s):** Dr Ušćebrka M. Gordana, full professor and Dr Stojanović Z. Slobodan, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1, 2 |
| **Course aims:**Introducing stem cell morphology, characteristics of their development, significance and applications in veterinary medicine. |
| **Course outcome**Students will acquire the knowledge necessary for further education in the field of morphology; also will gain insight into pluripotency of stem cells and their wide range of applications in veterinary medicine. |
| **Course contents***Theory* Basic morphological characteristics of stem cells, morphological characteristics of embryonic stem cells, morphological characteristics of adult stem cells, stem cell pluripotency, applicability of stem cells, the role of stem cells in tissue regeneration and repair*Practice*Introduce students to modern methods of detection of stem cells with special reference to the possibility of using stem cells in tissue regeneration treatments, as well as introducing to methods of quantication of the results. |
| **Recomended literature**1. Петренко,А.Ю., Хунов,Ю.А., Иванов,З,Н. (2011) Стволовьіе клетки. Луганск „Пресс-экспресс“.
2. Sadler, T.W. (1996) Langmanova medicinska embriologija. Školska knjiga, Zagreb.
3. Eurell, J.A., Frappier, B.L. (2006) Dellmann’s Textbook of Veterinary Histology. Blackwell Publishing. London.
4. Bellairs, R., Osmond, M. (1998). The atlas of chick development. Academic Press. London.
5. Selected papers related to course
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations on the board and the application of computers with using the appropriate software. Practical laboratory student works with independent student work on a research microscope.   |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| student activity | 5 | Making of complete scientific work | 25 |
| seminar – practical part | 20 | Oral presentation scientific work results  | 30 |
| seminar – presenting of results | 20 |  |  |

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| **Course: APPLIED PHYSIOLOGY IN VETERINARY MEDICINE** |
| **Code:** 3ДВМ3И36 |
| **Lecturer(s):** Dr Krnić S. Josip, full professor and Dr Kanački S. Zdenko, assistant professor |
| **Course status: elective** |
| **Број ЕСПБ: 8** |
| **Condition:** Principles of physiological regulation |
| **Course aims:**Applied veterinary physiology continues the study of normal function commenced in Veterinary physiology. A holistic approach to body function will be fostered by the integration of information presented previously using a systems based approach to the understanding of more complex physiological processes. The assimilation of information covered in concurrent and previous physiology subjects and their application to novel situations will be enhanced by the assessment tasks. |
| **Course outcome:**Students will have the necessary knowledge of physiology and applied physiology for the scientific research and practice and a basis for understanding the clinical subjects. |
| **Course contents:***Lectures:*Methods and approaches for functional testing of individual organs and organ systems, the functional organization of the organism; applied physiology of blood; immunity applied physiology, applied physiology of the cardiovascular, respiratory, digestive, excretory, endocrine and nervous system, metabolism specifics of the selected species.*Student research work:*Practical and individual student research work on introducing and examining of the physiological characteristics and the functional state of organs and organ systems of selected species.  |
| **Recommended literature:** 1. Sherwood, Lauralee: Human physiology – from cells to sistems. Thomson LARC, USA, 2004.
2. Sjaastad, Hove, Sand: Physiology of domestic animals. Scandinavian veterinary Press. 2003.
3. Sherwood, Klandorf, Yancey: Animal physiology – from genes to organisms. Thomson LARC, 2005.
4. Stojić V. Veterinarska fiziologija, Naučna knjiga, Beograd, 2007.
5. Stevanović J. Fiziologija organa za varenje kod domaćih životinja, Mladost biro šped, Beograd, 2004.
6. Stevanović J. Fiziologija nervnog sistema, Mladost biro šped, Beograd, 2004.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations using a computer. Methods of practical laboratory work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | Written exam | 10 |
| activities during research work | 10 | oral exam | 20 |
| laboratory work | 20 |  |  |
| seminars | 30 |  |  |

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| **Course: LABORATORY DIAGNOSTICS OF INTERNAL DISEASE IN ANIMALS** |
| **Code:** 3ДВМ3И37 |
| **Lecturer(s):** Dr Belić M. Branislava, associate professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** no |
| **Course aims:**The goal of this course is that students learn the indications for use of laboratory methods of diagnosis and interpretation of pathophysiological and biochemical analysis. |
| **Course outcome**After passing the exam, students will be able to perform the most important diseases using diagnostic laboratory tests and analyzes. |
| **Course contents**A complete blood - diagnosis of leukemia, anemia and thrombocytopathiaLaboratory diagnosis of metabolic disorders liquidsLaboratory diagnosis of disorders of acid-base balanceLaboratory diagnosis of respiratory disordersLaboratory diagnosis of cardiovascular disorders and ECG diagnosisLaboratory diagnosis of alimentary disorders mono tube and ruminantLaboratory diagnosis of hepatic dysfunction and pancreasLaboratory diagnosis of disorders of kidney and urinary tractLaboratory diagnosis of endocrine system disorders Laboratory diagnosis of central nervous system disordersLaboratory diagnosis of diseases of bone and joint systemLaboratory diagnosis of inflammatory and paraneoplastic syndromesLaboratory diagnosis of disorders of protein metabolism with emphasis on enzymopathy Laboratory diagnosis of disorders of fat metabolismLaboratory diagnosis of disorders of carbohydrate metabolism |
| **Recommended literature**1. Belić B., Cincović M.R.: Praktikum iz patološke fiziologije. Novi Sad, 2012.
2. Dunlo, R. H., C. H. Malbert: Vetrinary Pathophysiology, Blackwell, UK, 2004.
3. Davies C., L. Shell. Common Small Animal Diagnoses: An Algorithmic Approach. W. B. Saunders Company, Philadelphia, 2002.
4. Willard M. D., H. Tvedten, G. H. Turnwald. Small animal clinical diagnosis by laboratory methods. W. B. Saunders Company, Philadelphia, 1999.
5. Kaneko. J. J.: Clinical Biochemistry of Domestic Animals, Academic Press, Inc. San Diego, 1997.
6. Original and review papers from journals and proceedings.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Oral presentations using audio-visual techniques, written communication - Seminars;Practical field work and laboratory analysis and case studies. |
| **Knowledge assessment (maximum points: 100)** |
| Project and seminar presentationOral exam | 5050 |

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| **Course: CLINICAL VETERINARY PHARMACOLOGY** |
| **Code:** 3ДВМ3И38 |
| **Lecturer(s):** Dr Stojanović M. Dragica, associate professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1 and 2 |
| **Course aims:**The aim of the course is to teach students to conduct rational pharmacotherapy in the treatment of a variety of organic, bacterial and parasitic diseases of small and farm animals.The purpose of this course is to train students to recognize the profile of adverse reactions in certain groups of medications and how to treat them, and to register new adverse reactions that are not provided in instructions for drug application.  |
| **Course outcome**After they pass the exam, students will be able to apply, old and newly registered drugs with proven efficacy and safety for specific indications and animal species, as well as learn how to avoid or minimize the generation of adverse reactions of drugs. |
| **Course contents***Theoretical study*Efficacy and safety of drugs for the treatment of diseases of the digestive system, respiratory, cardiovasculary, genitourinary, endocrine, skin disease and sensory organs in the treatment of sepsis, bacterial and parasitic diseases of small animals, farm animals, fish and bees. Treatment of adverse reactions of drugs. Drug interactions.*Student research work* Will be performed in the field and will be followed by the use of drugs in animals on farms of cattle, horses, pigs, poultry, as well as in cats and dogs in veterinary clinics and hospitals. Students will get to known about the most common failures that accompany the application of these drugs in animals such as: cutting effectiveness of applied drug and the reasons for it, reducing adverse drug reporting to the lowest possible level of treatment and eventually caused severe adverse reactions. |
| **Recommended literature**1. Veterinarska farmakologija, Milanka Jezdimirović, 4. preradjeno i dopunjeno izdanje, Fakultet veterinarske medicine, Beograd, 2010.2. Osnovi farmakoterapije i gotovi lekovi ad us vet., Milanka Jezdimirović, treće, izmenjeno i dopunjeno izdanje, Fakultet veterinarske medicine, Beograd, 2009. 3. Veterinary pharmacology and therapeutics, Adams, H. R., 8th edition. Iowa State University Press/Ames, Iowa, 2001.4. The veterinary formulary, Bishop, M.J., 6th edition, Royal Pharmaceutical Society of Great Britain and British Veterinary Association, 2005.5. Veterinary Drug Handbook, Plumb D. C., 6th edition, Iowa State University Press/Ames, 2008.6. Antimicrobial Therapy in Veterinary medicine, Giguere, S., Prescott, J. F., Baggot, J.D., Walker, R. D., Dowling, P., 4th edition, Iowa State University press/Amess, 2007. |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Oral presentation with video beam presentation. Students prepare term paper and oral expose it with public comment. |
| **Knowledge assessment (maximum points: 100)** |
| Term paper Oral exam  | up to 30 pointsup to 70 points |

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| **Course: IMMUNOLOGICAL METHODS OF DIAGNOSIS** |
| **Code:** 3ДВМ3И39 |
| **Lecturer(s):** Dr Lazić M. Sava,principal research fellow; Dr Petrović R. Tamaš, senior research associate and Dr Savić S. Sara, research associate |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** no |
| **Course aims:** Acquisition of theoretical and practical knowledge and skills related to the mechanisms of immunological reactivity of antigens and antibodies in vitro and in vivo and their immediate application in the diagnostic process. |
| **Course outcome:** The knowledge and skills of creating conditions for professional training and more effective diagnosis, treatment, prevention of diseases, control of animal production and control of products of animal origin. |
| **Course contents:***Theoretical study:* Participants of the immunoserological reaction (antigen-antibody), Ratio of the antigen and antibody immune responses, Reaction of agglutination; Immunodiffusion reaction, Reaction immunoelectrophoresis, Complement fixation, Toxine neutralization reaction, Virus neutralization Reaction; Immunological techniques that use labeled antibodies or antigens ; Immunofluorescence technique, Immunoenzyme techniques; ELISA technique for the detection of antibodies, ELISA techniques for the detection of antigens; Immunoperoxidase technique; Radioimmunological assay, Immunoblotting tests, Rapid immunochromatography tests, Polymerase Chain Reaction-PCR techniques, Laboratory techniques to determine the effect of cellular immune responses, Hypersensitivity tests, Flowcytometry, Application of immunological techniques in the diagnosis of infectious and other diseases animals. *Practical study:* Performing of laboratory immunologic techniques: introduction, sampling and processing of materials for testing, performance requirements, environment, supplies, equipment, Performin of agglutination reaction; Performing of immunodiffusion reactions; Performing of immunoelectrophoresis reactions; Performing of complement fixation, Performing of neutralization reactions to cell culture, Performing of immunofluorescence techniques; Performing of ELISA technique; Performing of immunoperoxidase technique; Immunochromatography complete quick tests, Performing of PCR techniques, Performing of hypersensitivity tests, Performing of flowcytometry technique, National and International standards regulating these topics. |
| **Recommended literature:**1. Naglić Tomo Hajsig Danko: Veterinary Immunology, Školska knjiga, Zagreb 1993.
2. Vera Jerant Patić: Immunology, University of Medicine, Novi Sad, 2002.
3. Ružica Ašanin et al.: Manual with practical exercises in microbiology and immunology, University of Veterinary Medicine, Belgrade, 2006.
4. Ian R. Tizard, Veterinary Immunology, W.B. Saunders Company, Philadelphia, 2000.
5. Danko Hajsig, Ljiljana Pinter, Tomo Naglić, Roberto Antolović: Veterinary Clinical Immunology, Zagreb Croatian Microbiological Society, University of Veterinary Medicine Zagreb, 2012.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Theoretical study is held in classrooms using modern audiovisual techniques, including the teacher and active student participation through questions and discussion including presentation of seminar and research papers. Practical study is conducted in workshops with the use of modern audio-visual techniques and laboratories of the Scientific Veterinary Institute "Novi Sad". |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| Activities during lectures | up 10 | Written exam |  |
| Рractical classes | up 10 | Oral exam | up 50 |
| Seminars | up 30 |  |  |

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| **Course: METHODS OF MICROBIOLOGICAL DIAGNOSTIC OF BACTERIA, RICKETTSIAS AND CHLAMYDIAS** |
| **Code:** 3ДВМ3И40 |
| **Lecturer(s):** Dr Milanov S. Dubravka, research associate; Dr Suvajdžić Đ. Ljiljana, assistant professor and Potkonjak S. Aleksandar, assistant professor |
| **Course status: еlective** |
| **ECTS: 8** |
| **Condition:** Imunity and infection, Principles of epidemiology |
| **Course aims:**Students learn to perform and interpret classical and molecular diagnostic techniques and diagnostic algorithms for the microbiological diagnosis of bacteria, rickettsia and chlamydia. |
| **Course outcome**Students will be able to independently isolate and/or identify basic families, genera and species of bacteria, rickettsia and chlamydia that are important in veterinary medicine. By applying of learned methods and procedures, students will be able to independently set the etiologic diagnosis of selected infectious animal diseases and zoonoses. |
| **Course contents**Biological hazards and biosecurity/biosecurity in laboratory, Cultural, tinctoral and biochemical identification of bacteria. Diagnostic algorithms for gram-positive cocci(G. *Staphylococcus*, G. *Streptococcus*)*,* gram positive sporulating rods(G. *Bacillus*, G. *Clostridium*)*,* gram negative facultative anaerobic rods (F. *Enterobacteriaceae*)*,* aerobic gram negative rods(G. *Pseudomonas*/G. *Burkholderia*)*,* gram negative cocci and small rods(G. *Moraxella*, G. *Brucella*, G. *Actinobacillus* G. *Haemophillus*, G. *Pasteurella/*G. *Mannheimia*, G. *Francisella*, G. *Bordetella*)*,* gram positive unsporulating rods *​​*(G. *Corynebacterium*, *Rhodococcus equi*, G. *Arcanobacterium*, G. *Listeria*, *Erysipelothrix rhusiopathiae*)*,* acidoalchoholrestistant rods(*G. Mycobacterium*)and spiral bacteria(G. *Campylobacter*, G. *Leptospira*, G. *Brachyspira*, G. *Borellia*)*.* Isolation of rickettsia in chicken embryo(G. *Rickettsia*)*,* tissue culture(G. *Ehrlichia*) and in artificial media(G. *Bartonella*)*.* Identification of rickettsia by immunofluorescent techniques. Isolation of chlamydia in cell and tissue culture and diagnosis of psittacosis / ornithosis. Molecular methods for the diagnostics of infection caused by bacteria, rickettsia and chlamydia. Serological diagnostics of diseases caused by the same agents. |
| **Recommended literature**1. Leboffe M.J. et al. A Photographic Atlas for the Microbiology Laboratory. Fourth edition, Morton Publishing Company, 2011.
2. Bergey’s manual of Systematic Bacteriology, Volume Two, Second Edition, Springer, 2005.
3. Bergey's Manual of Determinative Bacteriology, Ninth edition, Lippincott Williams & Wilkins, 1994. Quinn P.J. Clinical Veterinary Microbiology, First edition, Mosby, 1993.
4. Carter G.R., Wise D.J. Essentials of Veterinary Bacteriology and Mycology. Wiley-Blackwell; Sixth edition, 2003.
5. Quinn P.J. et al. Veterinary Microbiology and Microbial Disease. Wiley-Blackwell; Second edition, 2011. Hirsh D.C., Zee Y.C. Veterinary Microbiology. Second edition, Blackwell, 1999.
6. Suvajdžić Lj. Priručnik iz mikrobiologije sa vežbama za studente farmacije. Ortomedics, Novi Sad. 2004.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Theoretical teaching (lectures, discussions), practical teaching (problem solving), experimental learning (experiments performing, focused images), Mentoriship learning (explanation, demonstration) |
| **Knowledge assessment (maximum points: 100)** |
| Project presentation maximum 50 points and Written exam 50 points |

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| **Course: VETERINARY ELECTROCARDIOGRAPHY IN CLINICAL AND BIOMEDICAL RESEARCH** |
| **Code:** 3ДВМ3И41 |
| **Lecturer(s):** Dr Spasojević Kosić B. Ljubica, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** registration into 3rd semester |
| **Course aims:** to teach students how to perform electrophysiological heart examination in veterinary patients and in laboratory animals used for biomedical research.  |
| **Course outcome:** students will understand similarities and differences of heart electrical characteristics among different species; students will be capable to establish ECG diagnosis in clinical veterinary patients, and solve the tasks on the subject of electrocardiography in interdisciplinary cooperation.  |
| **Course contents:***Lectures*: Comparative electrophysiology of heart. Differential distribution of cardiac ion channel expression as a basis for different heart electrical function in various species. Electrocardiography as diagnostic method in assessment of cardiovascular diseases. Electrocardiograms of dogs, cats and horses. Experimental model in biomedical researches of cardiovascular system.*Student research work*: Work in clinical practice and seminar papers. |
| **Recommended literature**1. Kittleson M.D., Kienle R.D.: Small animal cardiovascular medicine, Mosby, 1998.
2. Ware W.A.: Cardiovascular disease in small animal medicne, Manson Publishing, 2011.
3. Trailović D.R.: Dijagnostika i terapija oboljenja konja, FVM, Beograd, 2007.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Power point presentation for lectures; Student research work: seminar papers. |
| **Knowledge assessment (maximum points: 100)** |
| Pre exam duties (Lectures and seminar papers) Exam (test):  | 40 points60 points |

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| **Course: METABOLIC DISORDERS OF RUMINANTS**  |
| **Code:** 3ДВМ3И42 |
| **Lecturer(s):** Dr Boboš F. Stanko, full professor and Dr Radinović Ž. Miodrag, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** no |
| **Course aims:** The goal of this course is to learn the most important metabolic disorders in ruminants, as well as clinical and laboratory diagnosis. |
| **Course outcome**Students will have the necessary scientific knowledge in the prevention and suppression of metabolic disorders, will be more reliable and more rational to promote health of ruminants, the lab monitor, analyze and implement all measures in the prevention and treatment of metabolic disorders in ruminants. |
| **Course contents**Indigestion of ruminants. Ketosis of large and small ruminants. Metabolic osteopathy (rickets osteomalacia). Puerperal disorders (paraplegia, paresis and coma). Tetany of ruminants. The lack of sodium, copper, manganese, cobalt, zinc, selenium, iron, iodine, vitamin A and B complex. Disturbances of electrolyte balance, acid-base balance disorders. Metabolism and animal poisoning by lead, mercury and cadmium. Diagnosis and differential diagnosis. Ingestion, absorption, distribution and binding to specific organs. Metabolism and excretion pathways in organs and tissues. Effect of induced organophosphate and organochlorine compounds in clinical presentation and course of disease in ruminants. |
| **Recommended literature**1. Šamanc, H., Stamatovic S.: Diseases of cattle. Faculty of Veterinary Medicine, University of Belgrade. 1999
2. International and national journals and proceedings of the symposium and conference related to metabolic disorders and poisoning.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion, the method of written work (essay), Method of practical work on the farm оf milking cows, sheep and goats in the Clinical Laboratory. |
| **Knowledge assessment (maximum points: 100)** |
| Seminar paper Research study Oral exam  | 202555 |

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| **Course: DIAGNOSIS AND CONTROL OF MASTITIS IN RUMINANTS** |
| **Code:** 3ДВМ3И43 |
| **Lecturer:** Dr Boboš F. Stanko, full professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** no |
| **Course aims:**The aim of this course is to teach methods and procedures of good health care of cows, goats and sheep, as well as methods of milk safety control. |
| **Course outcome**Students will have the necessary scientific knowledge in the prevention and control of mastitis, and will be able to, more proper, more reliable and more rational, promote the health of ruminants, monitor, analyze and implement all measures in production of safe milk. |
| **Course contents**Organoleptic examination of the ruminant udder (cow, sheep and goat). Control of somatic cell count. Milk sampling for microbiological analysis. Microbiological methods for the detection of pathogens causing mastitis. Making program for control and prevention of mastitis, depending on the infection etiology. Control of the milking system, cleaning and sanitation of milking systems and dairy units. Measures for the prevention of mastitis in lactating and dry period. Udder health control in early phase of mammary gland involution, inactive period, pre- and postpartum period. Methods for testing hygienic quality of cumulative milk to assess udder health in the cow population.Going to the farm to directly participate in the control of udder health and ancillary clinical application of laboratory methods and the training in the lab.Working practices in the laboratory for mastitis, working in the hospital with cows suffering from mastitis. |
| **Recommended literature**1. Boboš, S., Vidić Branka: Mlečna žlezda preživara - morfologija, patologija, terapija. Monografija, Poljoprivredni fakultet Novi Sad, 2005.
2. Bačić, G.: Dijagnostika i liječenje mastitisa u goveda. Veterinarski fakultet, Zagreb, 2009.
3. Foreign and domestic journals and proceedings of symposiums and conferences devoted to these topics
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Lectures, using audio-visual aids;Working practices on dairy farms and in laboratories for mastitis, working in the infirmary with cows suffering from mastitis. |
| **Knowledge assessment (maximumpoints: 100)** |
| practical work in the infirmary practical work in the laboratory essay oral exam | up to 20 pointsup to 20 pointsup to 10 pointsup to 50 points |

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| **Course: CLINICAL DIAGNOSIS OF SWINE DISEASES**  |
| **Code:** 3ДВМ3И44 |
| **Lecturer(s):** Dr Savić M. Božidar,assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics |
| **Course aims:** Training of students for inspection and the clinical examination of swine in the herd, clinical and pathomorphological diagnosis including differential diagnosis, interpretation of the laboratory results as well as preparation of therapeutic and preventive measures on determined pathology at the herd level. |
| **Course outcome**After completing the course, students will be able to actively participate in preparation of the preventive and therapeutic strategies and possible eradication of certain diseases in the herd with the aim of achieving “MD” – minimal diseases status of the herd. |
| **Course contents***Lectures*The clinical examination of pregnant sows, suckling and postweaned piglets in the farrowing and weaned batches facilities, the clinical diagnosis, the pathomorphological diagnosis, etiological diagnosis, interpretation of the laboratory results, consideration of the appropriate strategies including prophylactic and metaphilactic measures for reduce the occurrence of certain diseases at the herd level.*Practical training*Practical work at the swine farm, the seminar paper related to the certain diseases that were identified on the farm. |
| **Recommended literature**1. Barbara E. Shaw; Michael, R. Wilson: Diagnosis of swine diseases. Minesota, 1985.
2. Barbara E. Shaw: Diseases of Swine. Blackwell publishing 2006.
3. Loncarevic А et al. Diseases of pigs in intensive farming, Institute of Veterinary Medicine Belgrade, Belgrade 1997.
4. Samanc, H.: Diseases of swine.Faculty of Veterinary Medicine Belgrade, Belgrade, 2003.
5. Scientific papers published in national and international journals and conferences
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Оral presentation, field work, seminar paper. |
| **Knowledge assessment (maximum points: 100)** |
| Activities during lecturesPractical trainingSeminar paperOral exam | up 10 pointsup 20 pointsup 20 pointsup 50 points |

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| **Course: POULTRY DISEASES IN INTENSIVE BREEDING**  |
| **Code:** 3ДВМ3И45 |
| **Lecturer(s):** Dr Orlić B. Dušan, full professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics |
| **Course aims:** Students should overcome contemporary methods of clinical and molecular diagnostics in the field of poultry diseases and also harmonization and implementation according to EU regulations and other markets from the field of poultry raising. |
| **Course outcome:** Students need to overcome contemporary methods of clinical and molecular diagnostics and the principle of scientific approach in the prevention and therapy in poultry disease, in the sense of preservation the health of poultry and humans |
| **Course contents:** Clinical diagnostics of viral, bacterial, fungal, parasitic and diseases of unknown etiology in poultry. Contemporary aspects of prevention and therapy. |
| **Recommended literature:**1. Orlić D., Kapetanov M.: Zarazne bolsti živine. Monografija, Novi Sad, Naučni institut za veterinarstvo "Novi Sad", 2007.
2. Bolesti pernate živine: Matejić i Knežević
3. Bolesti živine i poremećaji ishrane: Palić, Raić, Nikolić
4. The additional literature is available in the Faculty library and in the library of the Scientific Veterinary Institute in English and German language.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Independent research work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| colloquium | 20 |  |  |
| seminars | 10 |  |  |

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| **Course: PARASITIC DISEASES OF FISH** |
| **Code:** 3ДВМ3И46 |
| **Lecturer(s)**: Dr Ćirković А. Miroslav, full professor |
| **Course status: elective** |
| **ECTS:** **8** |
| **Condition:** no |
| **Course aims:**Mastering of the technique of examination, clinical diagnosis and therapeutic treatment of fish parasitic diseases.  |
| **Course outcome**Students will have the necessary knowledge and skills in the diagnosis and prevention of parasitic diseases of fish. |
| **Course contents***Theoretical lecture*Incidence od diseases, causes and distribution of diseases, epizootiological factors, sources and transmissions of the agent. Susceptibility to the disease, the impact of the environment on disease. Identification of the parasite. Myxosporidiosis. Chilodonellosis. Telohanellosis. Trichodinosis. Ichthyobodosis. Ichthyophtiriosis. Gyrodactylosis. Dactylogyrosis. Diphlosthomatosis. Posthodiplostomatosis. Ligulosis. Sphaeropsporidiosis. Nematodosis. Acanthochepalosis. Hirudinosis. Fish diseases caused by arthropods. Treatment of the disease.*Practical lecture*Methods for fish health inspection and health monitoring. Diagnostic methods of parasitic fish diseases in the pond. Identifying of fish diseases according to fish behavior. The study of the development cycle of parasites. The study of clinical and pathomorphological changes. Preventive and therapeutic measures. |
| **Recommended literature**1. Available scientific journals.2. Fijan. N.: Zaštita zdravlja riba. Poljoprivredni fakultet, Osijek, 2006. 3. Ћирковић, М. и сарадници: Рибарство. Пољопривредни факултет Нови Сад, 2002.4. Edward J Noga; Fish disease; Blackwell, 1996. |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion, the method of written work (essay), practical work in the ponds and laboratory. |
| **Knowledge assessment (maximum points: 100)** |
| Oral examination:Practical examination:Seminar work: | 403030 |

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| **Course: SPECIAL SURGERY IN DOGS AND CATS** |
| **Code:** 3ДВМ3И47 |
| **Lecturer(s)**: Dr Toholj D. Bojan, assistant professor and Dr Stevančević R. Milenko, full professor |
| **Course status: еlective** |
| **ECTS: 8** |
| **Condition:** Enrolled year at which students listen the subject |
| **Course aims:**PhD students exploring the latest developments in surgery of dogs and cats. |
| **Course outcome**After completing and passing the course, students are able to skillfully and by themselves take care of surgical diseases in dogs and cats. Also, they are trained to carry out the synthesis and coming up with new findings and knowledge through research. |
| **Course contents**The latest achievements in the field of surgery in dogs and cats. |
| **Recommended literature**1. Fossum Т.W.: Small animal surgery. Third edition. St. Louis: Elsevier – Mosby; 2007. (selected topics)
2. Banfield Pet Hospital: Anesthesia for pet practitioner. 3rd edition. Banfield Pet Hospital; 2010. (selected topics)
3. Slatter D.: Textbook of small animal surgery. Philadelphia: Elsevier Saunders; 2003. (selected topics)
4. Piermattei D., Flo G., DeCamp C.: Handbook of small animal orthopedics and fracture repair. Fourth edition. St. Louis: Elsevier Saunders; 2006. (selected topics)
5. Karen M. Tobias: Manual of small animal soft tissue surgery. Wiley-Blackwell; 2010. (selected topics)
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Lectures, seminars, consultations, showing particularly interesting cases. |
| **Knowledge assessment (maximum points: 100)** |
| Attendance at lecturesActive participation in researchSeminar paper  | 205030 |

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| **Course: SPECIAL SURGERY OF FARM ANIMALS AND HORSES** |
| **Code:** 3ДВМ3И48 |
| **Lecturer(s):** Dr Stevančević R. Milenko, full professor and Dr Toholj D. Bojan, assistant professor |
| **Course status: еlective** |
| **ECTS: 8** |
| **Condition:** Enrolled year at which students listen the subject |
| **Course aims:**PhD students exploring the latest developments in surgery of farm animals and horses. |
| **Course outcome**After completing and passing the course, students are able to skillfully and by themselves take care of surgical diseases in farm animals and horses. Also, they are trained to carry out the synthesis and coming up with new findings and knowledge through research. |
| **Course contents**The latest achievements in the field of surgery of farm animals and horses. |
| **Recommended literature**1. Hendrickson D.A.: Techniques in large animal surgery. Wiley-Blackwell; 2007. (selected topics)
2. Fubini Susan, Ducharme N.: Farm animal surgery. St. Louis: Elsevier Saunders; 2004. (selected topics)
3. Auer J.A., Stick J.A.: Equine surgery. Fourth edition.St. Louis: Elsevier Saunders; 2011. (selected topics)
4. Moyer W., Schumacher J., Schumacher J.: A guide to equine joint injection and regional anesthesia. Veterinary Learning Systems; 2007. (selected topics)
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Lectures, seminars, consultations, showing particularly interesting cases. |
| **Knowledge assessment (maximum points: 100)** |
| Attendance at lecturesActive participation in researchSeminar paper  | 205030 |

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| **Course: METHODS OF ANALYSIS OF FOODS OF ANIMAL ORIGIN** |
| **Code:** 3ДВМ3И49 |
| **Lecturer(s):** Dr Petrović M. Jelena, senior research associate; Dr Lalošević G. Vesna, associate professor and Dr Blagojević J. Bojan, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1 and 2 |
| **Course aims:** Students need to learn the methods and procedures used in the examination of foods of animal origin with respect to the safety of food. |
| **Course outcome**Students will have the necessary knowledge for the application of research methods in the study of various foods and assessment of results related to food safety. |
| **Course contents***Theoretical study*Food safety, national and international legislation; basic parameters of food safety, sensory methods in the study of food, sensory analysis methodology; Application of sensory methods to control the safety and quality of foods; Bacterial zoonotic agents transmitted by food- basic characteristics, national legislation; Bacteriological methods -detection and identification of zoonotic agents; Classical bacteriological methods for detection and determination of process hygiene parameters; Molecular methods in the characterization of bacterial zoonotic agents; parasitic zoonotic agents transmitted by food-basic characteristics, national legislation; classical parasitological methods for detection of zoonotic agents; Molecular methods for the determination of parasitic zoonotic agents; viral zoonotic agents transmitted by food-basic features: classic virological methods in the detection and determination of zoonotic agents; Molecular methods in the characterization of viral zoonotic agents.*Practical lessons*Practical application of the methods for sensory analysis, Implementation of classical bacteriological methods in determination and enumeration of zoonotic agents and process hygiene indicators; Analysis and interpretation of the results of bacteriological tests; Implementation of classical parasitological methods in enumeration and detection of zoonotic agents; Analysis and interpretation of parasitological examination. |
| **Recommended literature**1. Laboratory methods in food microbiology: Wilkie F. Harrigan, 3rd edition Academic Press, USA; ISBN 0-12-326043-4, 1998
2. The European Union Summary Reports on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks - Scientific reports of EFSA and ECDC
3. ISO metode
4. Detecting pathogens in food, Thomas A. McMeekin (Ed), Woodhead Publishing Limited, 2003
5. Microbiological analysis of red meat, poultry and eggs. Mead, C. (Eds), Woodhead Publishing Limited, England, 2007 (ISBN 978-1-84569-059-5)
6. Safety Analysis of Foods of Animal Origin. Leo M.L. Nollet and Fidel Toldra (Eds), CRC Press, USA, 2011
7. EFSA Scientific Opinions
8. EMEA *Comittee for Veterinary Medicinal products* Reports
9. How to meet ISO 17025 Requirements for method verification: AOAC International. www.aoac.org
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Practical work in the laboratory; Practical analytical work on the interpretation of the results in the form of presentations. |
| **Knowledge assessment (maximum points: 100)** |
| Theoretical knowledge of the methods of molecular diagnosis of pathogens in foods – oral exam (30 points); the interpretation of experimental data (20 points); seminar or research article (40 points), presentation of research work (10 points). |

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| **Course: CHEMICAL HAZARDS IN FOOD AND ANTIMICROBIAL RESISTANCE** |
| **Code:** 3ДВМ3И50 |
| **Lecturer(s):** Dr Bunčić V. Sava, full professor; Dr Petrović M. Jelena, senior research associate and Dr Antić B. Dragan, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1 and 2 |
| **Course aims:** Introducing students to residues, contaminants, antimicrobial resistance and their impacts on food safety. |
| **Course outcome**Students will have the necessary knowledge for the application of research methods in the study of various foods and assessment of results related to food safety. |
| **Course contents***Theoretical study*Food safety, national and international legislation; basic parameters of food safety; Veterinary drug residues - basic features, national and international legislation; Distribution and metabolism in animals; Elimination of drugs and withdrawal; Screening-qualitative methods in the detection of veterinary drug residues; confirmatory methods for detection and determination of veterinary drug residues; Pesticides - basic features, national and international legislation, Distribution and metabolism in animals; Risky foods groups; Confirmatory methods in the detection and determination of pesticides; Heavy metals - basic features, national and international legislation; distribution and metabolism in animals; Risk foods groups; confirmatory methods in the detection and determination of heavy metals; Histamine - basic features, formation dynamics, national and international legislation; Risky foods in groups, Screening and qualitative methods and quantitative methods in the detection and determination of histamine; Allergens - basic features, national and international legislation; Risky foods groups; Screening and qualitative and quantitative methods in the detection of allergens; Beef protein - basic features, national and international legislation; Risky foods groups, screening and qualitative and quantitative methods in detecting protein; Antimicrobial resistance - basic features, national and international legislation, qualitative and quantitative methods in the detection of resistance.*Practical lessons*The use of microbiological inhibitory and immunological screening method for detection of veterinary drug residues, analysis and interpretation of the results obtained; Application of immunological screening methods in the detection and determination of histamine, analysis and interpretation of the results obtained; Application of diagnostic tests for antimicrobial resistance; analysis and interpretation of results. |
| **Recommended literature**1. Consleg system of the Office for Official Publications of the European Communities, 2002, Consolidated text, Consleg, R1181-05/07/2002, 1-11.
2. Prescott JF, Baggot JD, Walker RD, 2000, Antimicrobial therapy in veterinary medicine, Third Edition, Ames: Iowa State University Press, 315-39
3. EMEA, Comittee for veterinary medicinal products,
4. Jezdimirović MB, 2002, Hinoloni (Kvinoloni), U: Jezdimirović MB, urednik, Osnovi farmakoterapije i gotovo lekovi ad us. vet., Beograd: Fakultet veterinarske medicine, Beograd,
5. ISO methods
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Practical work in the laboratory; Practical analytical work and the interpretation of the results in the form of presentations. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| seminars | 30 |  |  |

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| **Course: Molecular methods for detection and characterization of foodborne pathogens** |
| **Code:** 3ДВМ3И51 |
| **Lecturer(s):** Dr Petrović R. Tamaš, senior research associate; Dr Antić B. Dragan, assistant professor and Dr Potkonjak S. Aleksandar, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1 and 2 |
| **Course aims:** Student’s education in basic practical and research approaches and applications of molecular methods in detection of different foodborne pathogens and their training for practical application of molecular methods in detection of foodborne pathogens, as well as in the research on detection possibilities and characterization of some foodborne pathogens. |
| **Course outcome**Students are familiar with all the basic and most important specific molecular methods for the detection and characterization of foodborne pathogens, as well as practically trained in their use in diagnosis and research. |
| **Course contents***Theoretical lessons*Introduction to basic as well as the latest highly sophisticated molecular methods for the detection and characterization (typing) of foodborne pathogens including: Polymerase Chain Reaction (PCR), Reverse Transcription - Polymerase Chain Reaction (RT -PCR), Real-Time Polymerase Chain Reaction, (Real-Time PCR - qPCR), and many others, such as nested PCR and multiplex PCR, Nucleic Acid Sequence-Based Amplification (NASBA), Southern blot and Northern blot hybridization, Loop Mediated Isothermal Amplification (LAMP) Assay, Pulsed-Field Gel Electrophoresis (PFGE), Restriction Fragment Length Polymorphism (RFLP), Amplified Fragment Length Polymorphism (AFLP), Denaturing Gradient Gel Electrophoresis (DGGE) and DNA microarray methodology, introduction to DNA and RNA extraction methods from different food matrices; introduction to the basic features of all of these methods, as well as detailed characteristics, specificity and sensitivity of molecular methods, possibilities and ways of applying the methods for detection of pathogens of food, as well as advantages and disadvantages comparing with conventional diagnostic methods, and possibilities for using of molecular methods in research in the field of food safety.*Practical lessons*Practical training in setting up and performing basic molecular methods (in particular, PCR, RT-PCR and Real-Time PCR); interpretation of the laboratory results of molecular methods; practical development of protocols for the detection of selected pathogens in food; setting up and performing minor laboratory experiments. |
| **Recommended literature**1. James L. Smith. Foodborne Pathogens: Microbiology and Molecular Biology, Ed.: Pina M. Fratamico, Arun K. Bhunia and James L. Smith. Horizon Scientific Press, 2005, ISBN 190445500X, ISBN 9781904455004.2. Robert E. Levin. Rapid Detection and Characterization of Foodborne Pathogens by Molecular Techniques. Taylor & Francis, 2010, ISBN 142009243X, ISBN 9781420092431.3. Dongyou Liu. Molecular Detection of Foodborne Pathogens. CRC Press July 28, 2009 - 905 Pages 4. Steven L. Foley, Rajesh Nayak, Timothy J. Johnson and Sanjay K. Shukla. Molecular Typing Methods for Tracking Foodborne Microorganisms.Nova Science Pub Inc; 1 edition (July 2012), ISBN:978-1-62100-728-9, 405 pages.5. Steven L. Foley, Kathie Grant: Molecular Techniques of Detection and Discrimination of Foodborne Pathogens and Their Toxins, In: Foodborne Dieases, edited by Shabbir Simjee, pp 485-510, 2007, Publisher: Humana Press Publisher: Humana Press Print ISBN 978-1-58829-518-7; Online ISBN 978-1-59745-501-5, DOI 10.1007/978-1-59745-501-5\_206. PCR Methods in Foods, John Maurer (Ed), Springer Science and Business Media, Inc., 2006.7. Detecting pathogens in food, Thomas A. McMeekin (Ed), Woodhead Publishing Limited, 2003.8. Original experimantal and review papers related to the molecular methods for detection and characterization of foodborne pathogens. |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Lectures conducted by video presentations, discussions, workshops, consultations with teachers; review of the literature; interpretation of their own and the experimental results from the literature; practical experimental work; creation of a diagnostic protocols for the detection of certain foodborne pathogens; writing and oral presentation of their seminar papers, research papers or projects tasks. |
| **Knowledge assessment (maximum points: 100)** |
| Theoretical knowledge of the methods of molecular diagnosis of pathogens in foods – oral exam (30 points); the interpretation of experimental data (20 points); seminar or research article (40 points), presentation of research work (10 points). |

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| **Course: QUALITY ASSURANCE IN FOOD PRODUCTION** |
| **Code:** 3ДВМ3И52 |
| **Lecturer(s):** Dr Ušćebrka M. Gordana, full professor; Dr Žikić R. Dragan, associate professor and Dr Stojanović Z. Slobodan, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective block 1 and 2 |
| **Course aims:**Introducing students to the methods of feed-implementing quality assurance of general and specific systems and quality standards in food production. |
| **Course outcome**Students will gain the necessary knowledge of implementation of certain systems and quality standards, in order to optimize the implementation of appropriate standards and quality systems in the production in order to provide the safety of products. |
| **Course contents***Theory* Introduction to the requirements of relevant and currently available systems and quality standards in food production ("Codex alimentarius", HACCP, ISO 90001, ISO 14001, ISO 22000, ISO 26000, ISO 27000, GAP, IFC, GMP +, ISCC, and others) selection of the required standards, the methods of documenting, preparation for the assessment and internal verification.*Practice*Оn the selected model (organization) of food-production, students will practically implement the requirements of the selected standard to create complete documentation. |
| **Recomended literature**1. Current versions of ISO (9001; 14001, 2200, 2600, 2700); GAP, GMP+, IFS standards
2. Vulanovic, V. (2012) Menagement quality system. University of Novi Sad, ITC, Novi Sad.
3. Vulanovic, V. (2012) Methods and techniques for improving the working process. University of Novi Sad, ITC, Novi Sad.
4. Vulanovic, V. (2009) Internal audits. University of Novi Sad, ITC, Novi Sad.

5. Selected papers related to course. |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations on the board and the application of computers with using the appropriate software. Practical students work on chosen example, process of making of necessary documentation beginning from the current state to the end of production process.  |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| student activity | 5 | Making of complete documentation | 25 |
| seminar – plan making | 20 | Oral presentation of selected system | 30 |
| seminar – procedure making | 20 |  |  |

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| **Course: MORPHOLOGY OF EMBRYONIC AND POSTNATAL DEVELOPMENT OF TISSUE AND SELECTED ORGANS** |
| **Code:** 3ДВМ4И53 |
| **Lecturer(s):** Dr Ušćebrka M. Gordana, full professor and Dr Stojanović Z. Slobodan, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective block 1, 2 and 3 |
| **Course aims:**Introduce students to the morphology of the embryonic and postnatal development of selected organs and tissue characteristics that build them. |
| **Course outcome**Students will gain the necessary knowledge in the field of development of morphological characteristics of selected organs from embryonic to postnatal stages of development. Special emphasis will be placed on the morphologic characteristics of those organs which students are selected according to their interests and directions of further development. |
| **Course contents***Theory* The embryonic and postnatal development of selected tissues, influence of embryonic period of development to postnatal development of organs, the morphological characteristics of the postnatal development of selected organs.*Practice*Students will be familiar with modern methods of detection of the development of certain structural components of selected organs using anatomical and histological preparations, and they will be introduced to methods of quantifications of the results. |
| **Recomended literature**1. Konig, H.E., Liebich, H.G. (2009) Veterinary anatomy of domestic mammals. Naklada Slap. Zagreb.
2. Eurell, J.A., Frappier, B.L. (2006) Dellmann’s Textbook of Veterinary Histology. Blackwell Publishing. London.
3. Sadler, T.W. (1996) Langmanova medicinska embriologija. Školska knjiga, Zagreb.
4. Петренко,А.Ю., Хунов,Ю.А., Иванов,З,Н. (2011) Стволовьіе клетки. Луганск „Пресс-экспресс“.
5. Selected papers related to course.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations on the board and the application of computers with using the appropriate software. Practical laboratory student works with independent student work on a research microscope.  |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| student activity | 5 | Making of complete scientific work | 25 |
| seminar – practical part | 20 | Oral presentation scientific work results  | 30 |
| seminar – presenting of results | 20 |  |  |

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| **Course: SPECIAL METHODS OF RESEARCH IN MORPHOLOGY** |
| **Code:** 3ДВМ4И54 |
| **Lecturer(s):** Dr Milošević Lj. Verica,principal research fellow |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1, 2, 3 |
| **Course aims:**Introduce students to the specifics of scientific research in morphology, the methods used for individual morphological research, processing and presentation of the data |
| **Course outcome**Students will acquire the necessary knowledge about specific methods for their research in morphology, their use in the laboratory under different experimental conditions and periods of animals life cycles. Special emphasis will be placed on the study of these methodologies in morphology that will be of interest to students writing their PhD thesis and for their further specialized training. |
| **Course contents***Theory* The methods and approaches related to the selection of research methods in morphology, specific types of histochemical staining, immunocytochemical staining, double staining, ultrastructural tests, the use of specific test systems for the quantification in the light microscopy.*Practice*Students will be informed and participated effectively in the laboratory in the performance of certain methods, will be familiar with the ways of presenting the results, focusing on the methodology that is of interest to them for their future scientific research. |
| **Recomended literature**1. Junqueira L., Carneiro, J. (2005). Basic histology. Data status, Belgrade.
2. Ross, M., Kaye, G., Pawlina, W. (2003) Histology with cell and molecular biology. Lippincott Williams & Wilkins, London
3. Kuehnel, W. (2003) Color atlas of cytology, histology and microscopic anatomy. Thieme, Stuttgart-New York.
4. Ross, M., Kaye, G., Pawlina, W. (2003) Histology with cell and molecular biology. Lippincott Williams & Wilkins
5. Selected papers related to course.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion. Method of presentations, demonstrations, simulations and illustrations on the board and the application of computers with using the appropriate software. Practical laboratory student works with independent student work on a research microscope.  |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| student activity | 5 | Making of complete scientific work | 25 |
| seminar – practical part | 20 | Oral presentation of scientific work results  | 30 |
| seminar – presenting of results | 20 |  |  |

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| **Course: СLINICAL VETERINARY TOXICOLOGY** |
| **Code:** 3ДВМ4И55 |
| **Lecturer(s)**: Dr Stojanović M. Dragica, associate professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1 and 2 |
| **Course aims:**The aim of this course is to provide students the latest scientific and technical knowledge of the possibilities of contamination of animals and humans to pesticides (insecticides, herbicides, rodenticides, fungicides, moluscids), drugs, chemical substances of animal feed, industrial chemicals, metals and minerals, toxic plants and their active principles, toxins derived from animals and others; their toxicokinetics, mechanism of action, the degree of toxicity of the various types of domestic and wild animals and the risk of intoxication. Also, the aim of the course is to train students to recognize the clinical symptoms of poisoning, and set up a diagnosis of poisoning using biochemical and hematological, chemical and toxicological findings of blood, urine, feces, milk, food, or water content of the digestive system and the organs or parts of bodies of dead animals. The main aim of the course is to teach students to apply the appropriate specific or non-specific therapy for the majority of toxicants which animals are exposed. |
| **Course outcome**The course outcome is training students knowledge of prevention methods and treatment of poisoning. |
| **Course contents***Theoretical study* Toxicokinetics of xenobiotics, the effect of toxic substances (biotoxins, pesticides, pharmaceuticals, industrial chemicals, animal feed additives, metals and minerals, herbs, etc.) and their effects on cardiovascular system and blood, gastrointestinal, hepatobiliary, nervous system, reproductive, respiratory, urinary, muscular-sceletal, endocrine system, skin and mucous membranes.Effects of toxins on each of these organ systems include: mechanism of action, toxicity and risk factors for animals and humans, clinical image of poisoning, changes in biochemical parameters of blood and animal excrement, blood, pathomorphological and histological differential diagnosis, setting the final poisoning diagnosis, treatment, prognosis and prevention of poisoning. |
| **Recommended literature** 1. Veterinarska farmakologija, Milanka Jezdimirovic, 4. preradjeno i dopunjeno izdanje, Fakultet veterinarske medicine, Beograd, 2010.
2. Veterinarska toksikologija, Dragoljub Zivanov, Beograd, 2001.
3. Clinical veterinary toxicology, Plumlee, H. K., Mosby, 2004.
4. Small animal toxicology and poisonings, Roger Gfeller W., Shawn Messonnier P., Mosby Inc., 2003.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Oral presentation with video beam presentation. Students prepare term paper and oral expose it with public comment. |
| **Knowledge assessment (maximum points: 100)** |
| Term paper Oral exam  | up to 30 pointsup to 70 points |

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| **Course: VIROLOGY** |
| **Code:** 3ДВМ4И56 |
| **Lecturer(s):** Dr Lazić M. Sava,principal research fellow and Dr Petrović R. Tamaš, senior research associate |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** no |
| **Course aims:** Acquisition of theoretical and practical knowledge on sharing, structure, replication and detection of virus, viral infections genesis and consequences of viral infections by the organism of animals and birds. |
| **Course outcome:** Acquired knowledge enables efficient setup of diagnosis, whereabouts of the source of infection, controlling the appearance, spread and eradication of viral infections.  |
| **Course contents:** *Theoretical study:* Morphological and biological characteristics of the virus, Structure of the virus, Reaction to the viral infection, Splitting of virus, Antivirus protection, Detection of viral infections, Тhe most important biological characteristics of the virus family with their representatives for Veterinary medicine: *Adenoviridae, Arteriviridae, Asfarviridae, Birnaviridae, Circoviridae, Coronaviridae, Flaviviridae, Herpesviridae, Ortomyxoviridae, Paramyxoviridae, Parvoviridae, Picornaviridae, Poxviridae, Retroviridae, Reoviridae* and *Rhabdoviridae.**Practical study:*Sampling and processing of materials for virology examination, culture cells (proliferation and maintenance), embryonated eggs in the laboratory of virology, virus isolation procedures: cell culture, embryonated eggs and laboratory animals, Detection of viral antigens and viral antibodies, Polymerase Chain Reaction-PCR techniques for the detection of the virus. |
| **Recommended literature**1. Frederik A. Murphy, E. Paul J. Gibbs, Marian C. Horzinek, Michael J. Studdert, Veterinary Virology, Academic Press, 1999,
2. Vera Jerant Patić, Medical Virology, *ORTOMEDICS*, Novi Sad, 2007.
3. Ružica Ašanin et al.: Manual with practical exercises in microbiology and immunology, University of Veterinary Medicine, Belgrade, 2006.
4. Manual of Diagnostic Test and Vaccines for terrestrial Animals, O.I.E. 2012.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Theoretical study is held in classrooms using modern audiovisual techniques, including the teacher and active student participation through questions and discussion including presentation of seminar and research papers. Practical study is conducted in workshops with the use of modern audio-visual techniques and laboratories of the Scientific Veterinary Institute "Novi Sad". |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| Activities during lectures | up 10 | Written exam |  |
| Рractical classes | up 10 | Oral exam | up 50 |
| Seminars | up 30 |  |  |

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| **Course: CLINICAL PATHOLOGY AND THERAPY OF DOGS** |
| **Code:** 3ДВМ4И57 |
| **Lecturer(s):** Dr Spasojević Kosić B. Ljubica, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** registration into 4th semester |
| **Course aims:** to understand the etiology and pathogenesis of dog diseases as a prerequisite for diagnosis and therapy of the diseases, to learn methods which are used for registration of organs dysfunction, as well as introduction with clinical and experimental trials in pathology of dogs.  |
| **Course outcome** Students should be aware of specificity of dogs compare with other species, to know etiopathogenesis, diagnosis and therapy of dog diseases, to be acquainted with clinical and experimental methods in assessing functions of different organ systems and capable to apply them in clinical studies. |
| **Course contents***Lectures*: Factors in etiopathogenesis of dog diseases. Etiopathogenesis, diagnosis and therapy of alimentary tract, respiratory, cardiovascular, urinary, nervous, endocrine system, as well as muscle diseases, skin diseases, diseases of bones and joints, diseases of blood and blood forming organs. Experimental models in clinical pathology and therapy of dogs.*Student research work:* Work in clinical practice, seminar papers.  |
| **Recommended literature**1. Ettinger, Feldman: Textbook of veterinary internal medicine: Diseases of the dog and cat, 7th edition, WB Saunders, 2009.  |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Power point presentation for lectures; Student research work: seminar papers, clinical assessment of patients. |
| **Knowledge assessment (maximum points: 100)** |
| Pre exam duties (Lectures and seminar papers) Exam (test):  | 40 points60 points |

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| **Course: CLINICAL PATHOLOGY AND THERAPY OF CATS** |
| **Code:** 3ДВМ4И58 |
| **Lecturer(s):** Dr Spasojević Kosić B. Ljubica, assistant professor  |
| **Course status: elective**  |
| **ECTS: 8** |
| **Condition:** registration into 4th semester |
| **Course aims:** to understand the etiology and pathogenesis of cat diseases as a prerequisite for diagnosis and therapy of the diseases, to learn methods which are used for registration of organs dysfunction, as well as introduction with clinical and experimental trials in pathology of cats. |
| **Course outcome:**Students should be aware of specificity of cats compare with other species; Students should know etiopathogenesis, diagnosis and therapy of cat diseases;Students have to be acquainted with clinical and experimental methods in assessing functions of different organ systems and capable to apply them in clinical studies.  |
| **Course contents***Lectures*: Factors in etiopathogenesis of cat diseases. Etiopathogenesis, diagnosis and therapy of alimentary tract, respiratory, cardiovascular, urinary, nervous, endocrine system, as well as muscle diseases, skin diseases, diseases of bones and joints, diseases of blood and blood forming organs. Experimental models in clinical pathology and therapy of cats.*Student research work*: Work in clinical practice, seminar papers. |
| **Recommended literature**1. Ettinger, Feldman: Textbook of veterinary internal medicine: Diseases of the dog and cat, 7th edition, WB Saunders, 2009.
2. August J.R.: Consultation in feline internal medicine, 5th edition, Elsevier Saunders, 2006.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Power point presentation for lectures; Student research work: seminar papers, clinical assessment of patients. |
| **Knowledge assessment (maximum points: 100)** |
| Pre exam duties (Lectures and seminar papers) Exam (test):  | 40 points60 points |

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| **Course: CLINICAL PATHOLOGY AND THERAPY OF HORSES** |
| **Code:** 3ДВМ4И59 |
| **Lecturer(s):** Dr Ćutuk M. Ramiz, full professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** no |
| **Course aims:**Introduce students to the mechanism of development of pathological conditions, causes and consequences of the development of pathological processes in different organs and systems, as well as the possibilities for its prevention, diagnosis and treatment using the most advanced methods. |
| **Course outcome**The student needs to acquire knowledge on specific anatomical structure and physiological processes of horses, known for modern diagnostic methods, understand the mechanisms of etiopathogenesis and specific pathomorphological and pathophysiological processes that are specific to horses. |
| **Course contents***Theoretical study*Specifics of the anatomical structure and physiological processes. Pathological conditions of the digestive tract. Pathological conditions of the respiratory. Pathologic condition of the cardiovascular system. Pathologic condition of the urogenital tract. Pathological conditions of the nervous system. Pathological conditions of the musculoskeletal system. Pathologic condition of the blood, lymph nodes and spleen. Endocrine diseases. Metabolism. Pathologic condition of the skin. Hereditary disease. Sports Medicine. Specificity in the clinical pathology of individual organ systems in relation to other species. Experimental models.*Practical lessons*Clinical practice. Student research work. |
| **Recommended literature**1. Trailović D.: Bolesti kopitara, Naučna KMD, Beograd, 2011.
2. Trailović D.: Bolesti kopitara: Praktikum, Naučna KMD, Beograd, 2010.
3. Trailović D.: Dijagnostika i terapija oboljenja konja, Naučna, Beograd, 2009.
4. Trailović Dragiša, Marijan Kosec, Ramiz Ćutuk i saradnici,: Dijagnostika i terapija oboljenja konja Naučna KMD, Beograd 2009.
5. Reed SM, Bayly WM, Sellon DC: Equine Internal Medicine 3rd ed., Saunders, Philadelphia, 2010.
6. Hinchcliff K. W. et al: Equine Exercise Physiology: The Science of Exercise in the Athletic Horse, 1e. Saunders, Filadelfija, 2007.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Computer presentations, slides and film collection, demonstrations on healthy and sick animals, treatment of clinical cases in veterinary offices. Clinical practice in the stables, equestrian clubs and racecourses. |
| **Knowledge assessment (maximum points: 100)** |
| Seminar papers and activity in the course of teaching and research - 50 points (40 +10), and the oral exam may take a total of 50 points. |

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| **Course: BOVINE RESPIRATORY SYNDROME, ETIOLOGY, TREATMENT AND PREVENTION** |
| **Code:** 3ДВМ4И60 |
| **Lecturer(s):** Dr Boboš F. Stanko, full professor and Dr Radinović Ž. Miodrag, assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** no |
| **Course aims:**An introduction to the most important aspects of bovine respiratory syndrome, etiologic agents and opportunities for the implementation of prevention and therapy. |
| **Course outcome**Students are prepared for addressing the problems caused by respiratory disease of cattle. |
| **Course contents**Introductory lecture, the significance of bovine respiratory disease in the assessment of health status. Etiologic factors for respiratory syndrome, environmental factors. The causes of respiratory syndrome, virus, bacteria, parasites. Etiological factors related to the animal, deficits, immunosuppressive conditions, and predisposition. Methods for treatment of respiratory syndromes, etiology, supportive and symptomatic therapy. Possibilities of prevention, optimization of the general health of animals and external factors. Immunoprophylaxis. Colostral immunity. |
| **Recommended literature**1. Šamanc Horea, respiratory and cardiovascular diseases of cattle, Belgrade 2010.
2. Šamanc, H., Stamatovic S.: Diseases of cattle. Faculty of Veterinary Medicine, Belgrade 1999.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion, the method of written work (essay). |
| **Knowledge assessment (maximum points: 100)** |
| Seminar paper Research study Oral exam  | 202555 |

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| **Course: DISEASES OF SUCKLING AND POSTWEANING** **PIGLETS**  |
| **Code:** 3ДВМ4И61 |
| **Lecturer(s):** Dr Savić M. Božidar,assistant professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics |
| **Course aims:** Review and consideration of all factors relevant for occurrence of diseases and mortality in the suckling and postweaned piglets with special emphasizes on infectious, nutritional and zoo-hygienic factors that could be present acting on piglets during suckling and postweaning period. |
| **Course outcome**After completing the course, students will be able to assess the influence of the each individual factor including infectious, nutritional and zoo-hygienic factors on health of suckling and postweaned piglets, make specific measures to improve the health status of the piglets based on the factor/s responsible for the resulting disorder. |
| **Course contents***Lectures*Interaction between sows and litters - repercussion of health status of the sows on their litters, repercussion of microclimate, infectious, nutritional and management factors on the health status of the sows and their litters. Factors contributing to the increased losses of suckling piglets. Factors contributing to the increased losses of the weaned piglets. Factors contributing to the increased losses of the piglets at the weaning time. The clinical examination of lactating sows suckling and postweaning piglets. The pathomorphological diagnosis, interpretation of the laboratory results, the etiological diagnosis, consideration of the appropriate strategies including prophylactic and metaphilactic measures for reduce the occurrence of certain diseases at the suckling and postweaning period.*Practical training*Practical work at the swine farm, the seminar paper related to the certain diseases that were identified in suckling and postweaning piglets. |
| **Recommended literature**1. Barbara E. Shaw: Diseases of Swine. Blackwell publishing 2006.
2. Loncarevic. А. et al. Diseases of pigs in intensive farming, Institute of Veterinary Medicine Belgrade, Belgrade 1997.
3. Samanc, H.: Diseases of swine.Faculty of Veterinary Medicine Belgrade, Belgrade, 2003.
4. Scientific papers published in national and international journals and conferences
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Оral presentation, field work, seminar paper. |
| **Knowledge assessment (maximum points: 100)** |
| Activities during lecturesPractical trainingSeminar paperOral exam | up 10 pointsup 20 pointsup 20 pointsup 50 points |

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| **Course: FISH BREEDING DISEASES** |
| **Code:** 3ДВМ4И62 |
| **Lecturer(s):** Dr Ćirković А. Miroslav, full professor |
| **Course status: elective** |
| **ECTS:** **8** |
| **Condition:** no |
| **Course aims:**Mastering of the technique of examination, clinical diagnosis and therapeutic treatment of fish breeding diseases.  |
| **Course outcome**Students will have the necessary knowledge and skills in the diagnosis and prevention of fish breeding diseases. |
| **Course contents***Theoretical lecture*Incidence of diseases, causes and distribution of diseases, epizootiological factors, sources and transmissions of the agent. Susceptibility to the disease, the impact of the environment on disease. Stress. Seasonal nature of the disease. Basic characteristics of disease states. Study of methods for the prevention of disease by applying sanitary and hygienic measures. Disinfection. Application of drugs. Immunoprophylaxis. Removing of sick and dead fish. European and Serbian regulations to prevent, combat and eradicate diseases of fish. The obligation of fishing and sanitation records. Methods for monitoring the health and performance of basic diagnostics. Diseases of viral, bacterial and parasitic etiology. Environmental and disease of unknown etiology. Technopathy. Enemies of fish as a limiting factor for good fisheries production.*Practical lecture*Mistakes in choosing a fish pond location. Mistakes that can be made during the design of the pond. The significance of fish handling during harvesting, transportation, stocking and wintering on the occurrence of fish diseases. Methods of organizing health inspection and health monitoring. Diagnosis of diseases of fish in the pond. Identifying fish diseases according to fish behavior. Preventive and therapeutic measures. |
| **Recommended literature**1. Available scientific journals.2. Fijan. N.: Zaštita zdravlja riba. Poljoprivredni fakultet, Osijek, 2006. 3. Ћирковић, М. и сарадници: Рибарство. Пољопривредни факултет Нови Сад, 2002.4. Edward J Noga; Fish disease; Blackwell, 1996. |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**The method of oral presentation and discussion, the method of written work (essay), practical work in the ponds and laboratory. |
| **Knowledge assessment (maximum points: 100)** |
| Oral examination:Practical examination:Seminar work: | 403030 |

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| **Course:** **BIOTECHNOLOGICAL METHODS IN DOMESTIC ANIMAL REPRODUCTION** |
| **Code:** 3ДВМ4И63 |
| **Lecturer(s):** Dr Stančić B. Ivan, assistant professor and Dr Stančić L. Blagoje, full professor |
| **Course status:** **elective** |
| **ECTS:** **8** |
| **Condition:** no |
| **Course aims:**Advanced introducing of students to modern biotechnological methods for controlled (assisted) reproduction of domestic animals under industrial conditions. The goal is to obtain the experts capable for scientific research and the application of scientific advances and new technologies in the production of meat, milk, wool, eggs and other animal products. |
| **Course outcome**Creating the highly specialized scientists with academic education, with the wider and deeper knowledge in the field of animal biotechnology. Qualified for independent scientific research in the field of modern livestock production. Candidate's ability to improve livestock production, using modern scientific achievements in the field of animal biotechnology. |
| **Course contents***Theoretical lessons*: Definition of controlled (assisted) reproduction of domestic animals; Induction and synchronization of sexual maturation; Synchronization of estrus and ovulation in sexually mature animals; Superovulation induction; Methods pregnancy diagnosis; Induction of parturition; Control post partum estrous cycle establishment; Artificial insemination; Embryo transplantation; Manipulation with gametes and embryos (gametes obtaining, *in vitro* fertilization, embryo cloning, sex determination of gametes and embryos, production of chimeras, transgenic animal production, storage of gametes and embryos *in vitro*); Control of cattle, sheep and goats, pigs, horses and poultry reproduction.*Practical lessons*Anatomy and histology of the male and female reproductive systems of domestic mammals and birds, classical and new technology in domestic animals, methods of obtaining gametes, methods of synchronizing estrus; surgical and non-surgical methods of embryo transplantation; Modern methods for evaluating the reproductive efficiency of the herd in intensive production. |
| **Recommended literature:**1. Stančić, B.: Reprodukcija domaćih životinja. Univerzitet u novom Sadu, Poljoprivredni fakultet, 2008.
2. Feldman, E., Nelson, R.: Canine and Feline Endocrinology and Reproduction. Saunders, Elsevier, 2003.
3. Gordon, I.: Reproductive Technologies in Farm Animals. CAB Int. Publ., Wallingford, UK, 2005.
4. Stančić B., Veselinović, S.: Biotehnologija u reprodukciji domaćih životinja (udžbenik). Univerzitet u Novom Sadu, Poljoprivredni fakultet, 2002.
5. Stančić, B.: Reprodukcija svinja (monografija). Univrezitet u Novom Sadu, Poljoprivredni fakultet, 2005.
6. Stančić, B.: Tehnologija veštačkog osemenjavanja svinja (priručnik). Poljoprivredni fakultet, 2006.
7. Stančić, I.: Reprodukcija domaćih životinja- IV deo: Reprodukcija pasa i mačaka (udžbenik). Univerzitet u Novom Sadu, Poljoprivredni fakultet, 2012.
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Theoretical lessons, Practical exercises, Consultations, Seminars, Laboratory work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 5 | written exam | 30 |
| independent research work | 5 | oral exam  | 25 |
| project presentation | 20 |  |  |
| seminar | 15 |  |  |

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| **Course: SURGICAL TECHNIQUES IN OBSTETRICS** |
| **Code:** 3ДВМ4И64 |
| **Lecturer(s):** Dr Toholj D. Bojan, assistant professor;Dr Stančić B. Ivan, assistant professor and Dr Stevančević R. Milenko, full professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Enrolled year at which students listen the course |
| **Course aims:**PhD students exploring the latest developments in the field of obstetrics surgery. |
| **Course outcome**After completing and passing the course, students are able to skillfully and by themselves take care of obstetric surgical procedures. Also, they are trained to carry out the synthesis and coming up with new findings and knowledge through research. |
| **Course contents**The latest achievements in the field of obstetric surgery. |
| **Recommended literature**1. Hendrickson D.A.: Techniques in large animal surgery. Wiley-Blackwell; 2007. (selected topics)
2. Fubini Susan, Ducharme N.: Farm animal surgery. St. Louis: Elsevier Saunders; 2004. (selected topics)
3. Auer J.A., Stick J.A.: Equine surgery. Fourth edition.St. Louis: Elsevier Saunders; 2011. (selected topics)
4. Fossum Т.W.: Small animal surgery. Third edition. St. Louis: Elsevier – Mosby; 2007. (selected topics)
5. Karen M. Tobias: Manual of small animal soft tissue surgery. Wiley-Blackwell; 2010. (selected topics)
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Lectures, seminars, consultations, showing particularly interesting cases. |
| **Knowledge assessment (maximum points: 100)** |
| Attendance at lecturesActive participation in researchSeminar paper  | **20****50****30** |

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| **Course: LIMB DISEASES OF DOMESTIC ANIMALS** |
| **Code:** 3ДВМ4И65 |
| **Lecturer(s):** Dr Toholj D. Bojan, assistant professor and Dr Stevančević R. Milenko, full professor |
| **Course status: еlective** |
| **ECTS: 8** |
| **Condition:** Enrolled year at which students listen the course |
| **Course aims:**Mastering the technique of examination, clinical diagnosis and treatment of diseases and injuries of the locomotor system of domestic animals.  |
| **Course outcome**After completing and passing the course, students are able to skillfully and independently perform clinical examination of the animals, a diagnosis of musculoskeletal diseases, using in their work general and special clinical diagnostic methods and implement appropriate therapy. Also, they are trained to carry out the synthesis and coming up with new findings and knowledge through research.  |
| **Course contents**Recent developments in diagnosis and treatment of musculoskeletal diseases. |
| **Recommended literature**1. Hendrickson D.A.: Techniques in large animal surgery. Wiley-Blackwell; 2007. (selected topics)
2. Fubini Susan, Ducharme N.: Farm animal surgery. St. Louis: Elsevier Saunders; 2004. (selected topics)
3. Auer J.A., Stick J.A.: Equine surgery. Fourth edition.St. Louis: Elsevier Saunders; 2011. (selected topics)
4. Fossum Т.W.: Small animal surgery. Third edition. St. Louis: Elsevier – Mosby; 2007. (selected topics)
5. Greenough P.R.: Bovine laminitis and lameness. A hands – on approach. Philadelphia: Elsevier Saunders; 2007. (selected topics)
6. Baxter G.M., editor: Adams and Stashak's Lameness in Horses. Sixth edition. Wiley-Blackwell; 2011. (selected topics)
7. Sarel van Amstel, Shearer Ј.: Manual for treatment and control of lameness in cattle. Wiley-Blackwell, 2007. (selected topics)
8. Piermattei D., Flo G., DeCamp C.: Handbook of small animal orthopedics and fracture repair. Fourth edition. St. Louis: Elsevier Saunders; 2006. (selected topics)
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies:** Lectures, seminars, consultations, showing particularly interesting cases. |
| **Knowledge assessment (maximum points: 100)** |
| Attendance at lecturesActive participation in researchSeminar paper  | 205030 |

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| **Course: FOOD SAFETY RISK ASSESSMENT** |
| **Code:** 3ДВМ4И66 |
| **Lecturer(s):** Dr Blagojević J. Bojan, assistant professor; Dr Antić B. Dragan, assistant professor and Dr Bunčić V. Sava, full professor |
| **Course status: elective** |
| **ECTS: 8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1, 2, 3 |
| **Course aims:**The aim of this course is to provide students with an understanding of the source, transmission and behavior of the main biological hazards along the food chain and in the context of food safety, with emphasis on the epidemiology of these hazards in the food chain, and the principles of risk assessment of the hazards, particularly from the veterinary public health viewpoint. |
| **Course outcome**Upon successful completion of the course, students will be able to understand and apply the principles of qualitative and quantitative food safety risk assessment. |
| **Course contents***Theoretical studies:* The principles and the role of risk assessment in the process of risk analysis; Qualitative and quantitative risk assessment; Deterministic and stochastic models for the quantitative risk assessment; Hazard identification; Hazard characterization (including dose-response relationship); Exposure assessment; Risk characterization; Uncertainty and variability; Sensitivity analysis.*Practical teaching:*Analysis of existing risk assessment models for selected combinations of human foodborne pathogens and food commodities; Creating own risk assessment models for selected combinations of human foodborne pathogens and food commodities. |
| **Recommended literature**1. Forsythe S. J. (2002). The microbiological risk assessment of food. Blackwell Science Ltd., Oxford, UK
2. Brown M., Stringer M. (2002) Microbiological risk assessment in food processing. Woodhead Publishing Ltd., Cambridge, UK
3. EFSA, FAO, WHO food safety risk assessments
 |
| **Number of teaching hours:** **4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Independent research work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| seminars | 30 |  |  |

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| **Course: FOOD SAFETY RISK MANAGEMENT** |
| **Code:** 3ДВМ4И67 |
| **Lecturer(s):** Dr Blagojević J. Bojan, assistant professor; Dr Antić B. Dragan, assistant professor and Dr Bunčić V. Sava, full professor |
| **Course status: elective** |
| **ECTS:** **8** |
| **Condition:** Scientific research methods, Biostatistics, Courses of elective blocks 1, 2, 3 |
| **Course aims:**The aim of this course is to enable students to understand the nature and objectives of control measures for alimentary hazards in the food chain. |
| **Course outcome**Upon successful completion of the course, students will be able to understand and apply the principles of development and implementation of control measures for the alimentary hazards in the food chain. |
| **Course contents***Theoretical studies:* The principles and the role of risk management in the process of risk analysis; Preliminary risk management activities; Identification and selection of risk management options; Implementation of the risk management decision; Monitoring and review of the risk management measures; Current risk management strategies in food production, processing and distribution; Appropriate level of protection (ALOP) and food safety objective (FSO) concept; Microbiological Criteria; Prerequisite programs and HACCP in food production, processing and distribution; Official controls and audit in the risk management.*Practical teaching:*Analysis of the effectiveness of current risk reduction options for selected combinations of human foodborne pathogens and food commodities; Analysis of the effectiveness of new risk reduction options for selected combinations of human foodborne pathogens and food commodities. |
| **Recommended literature**1. FAO/WHO (1997) Risk management and food safety. FAO food and nutrition paper 65. Report of a Joint FAO/WHO Consultation Rome, Italy, 27 to 31 January 1997
2. FAO/WHO (2006). The use of microbiological risk assessment outputs to develop practical risk management strategies: Metrics to improve food safety. Report. A joint FAO/WHO Expert Meeting in Kiel, Germany. April 3-7, 2006
3. Blagojević B., Dučić M., Radovanović D., Tešić M., Pejin I. Mirilović M., Tajdić N., Avery S. (2009) Tom I: Priroda i opšti principi preduslovnih programa i HACCP planova, pp. 1-155. U: Bunčić S. (Ed.) 2009. Vodič za razvoj i primenu preduslovnih programa i HACCP principa u proizvodnji hrane (Prvo izdanje). Ministarstvo poljoprivrede, šumarstva i vodoprivrede Srbije, Uprava za veterinu, Beograd, Srbija.
 |
| **Number of teaching hours: 4+4 (120)** | **Lectures:** **60** | **Student research work:** **60** |
| **Teaching strategies**Lectures in the classroom with the use of audio-visual aids; Independent research work. |
| **Knowledge assessment (maximum points: 100)** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| activities during lectures | 10 | oral exam | 50 |
| independent research work | 10 |  |  |
| seminars | 30 |  |  |