## Personnel in the establishment provided for veterinary training:

### Teaching staff:

- Suzana Milinković Tur, DVM, PhD, Full Professor
- Zvonko Stojević, DVM, PhD, Full Professor
- Miljenko Šimpraga, DVM, PhD, Full Professor
- Jasna Aladrović, DVM, PhD, Associate Professor
- Marinko Vilić, DVM, PhD, Assistant Professor
- Jadranka Pejaković Hlede, DVM, assistant
- Lada Radin, DVM, PhD, senior assistant

### Research staff:

- Lana Vranković, DVM, junior research assistant
- Ana Shek-Vugrovečki, DVM, junior research assistant
- Ivona Žura Žaja, DVM, junior research assistant

### Others (technical staff):

- Ecija Blašković Vondraček, Bacc. Med. Lab. Diagn., senior tehnican
- Jasna Sačer, laboratory technician
- Dubravka Bedić, maid
- Andelko Slaviček, maid

## List of obligatory subjects:

### Physiology of domestic animals I

**Teachers:**

- Suzana Milinković Tur, DVM, PhD, Full Professor
- Zvonko Stojević, DVM, PhD, Full Professor
- Miljenko Šimpraga, DVM, PhD, Full Professor
- Jasna Aladrović, DVM, PhD, Associate Professor

**Course year:** 2nd  
**Semester:** 3rd  
**Number of credits:** 6.0  
**Hours of theoretical training:** 30  
**Hours of practical training:** -  
**Laboratory hours:** 50

### Course content:
1. Introduction (Introduction to physiology of living creatures, importance in veterinary medicine, necessary knowledge).

2. Body fluids (Body fluids dynamics, osmotic pressure, intracellular and extra cellular fluid).


7. Nervous System Physiology (Nervous system organisation, neuron, nerve impulse formation, impulse travels, synapse, neurotransmitters, receptors and receptor potential. Peripheral nervous system, CNS, autonomic nervous system).

8. Muscle Physiology (Physiological features of skeletal and smooth muscle, mechanisms of muscle contraction and energy requirements. Motor units, muscle twitch, muscle tone, tetanus).

This course qualifies students to be able to successfully:

- describe basic principles and facts of physiological processes in a cell and organism in whole
- explain basic functions of blood, neurological, musculoskeletal and hormonal system
- recognize the importance of maintaining basic functions of blood, neurological, musculoskeletal and hormonal system
- incorporate the knowledge on regulatory mechanisms, homeostasis and acid-base balance
- use the skills of obtaining and analysing full blood, plasma, serum
- interpret laboratory results within reference ranges for specific domestic animals
- conclude how laboratory tests can be of aid in diagnostic veterinary medicine

Physiology of domestic animals II

Teachers:
Suzana Milinković Tur, DVM, PhD, Full Professor
Zvonko Stojević, DVM, PhD, Full Professor
Miljenko Šimpraga, DVM, PhD, Full Professor
Jasna Aladrović, DVM, PhD, Associate Professor

Course year: 2nd
Semester: 4th
Number of credits: 10,0
Hours of theoretical training: 45
Hours of practical training: 25
Laboratory hours: 60

Course content:


2. Respiration (Ventilation and lung mechanics, partial pressures lungs-blood, transport of oxygen and carbon dioxide in blood. Control of respiration; respiratory centres, factors that influence on respiratory centres. External breathing; inspiration, expiration, respiratory volumes, alveolar ventilation, intrapulmonary pressure and pressure in thorax).


4. Digestion in ruminants (Basic principles of symbiosis ruminant-micro population, motility; relation water-dry substances, oesophagus, rumination, gasses in rumen; influence of pH, nourishment, elimination, role of bacteria and infusoria in digestion, efficacy of digestion in rumen. Digestion of carbohydrates, proteins and fats, ruminohepatic circle of nitrogen, synthesis of vitamins, metabolic pathways of low fatty acids, digestion in abomasums).

5. Digestion in small and large intestine (Relation stomach-duodenum, pH change and influence of food, secretion of bile and pancreatic juice, regulation of their secretion. Gutt polypeptides. Secretion of small and large intestine, digestion and absorption).

6. Excretion (Role of excretory organs; general and special functions, formation of urine, nephron physiology. Regulation of primary and secondary urine secretion, counter current mechanism, urination physiology):

7. Metabolism of carbohydrate (Regulation of anaerobic and aerobic glycolysis; metabolic pathway of lactate, Kory cycle, regulation of gluconeogenesis; ruminants, carnivores. Pentose-phosphate pathway, glucuronic acid cycle; regulation, role, glycogenic reserve).

8. Protein metabolism (Classification of body proteins, half-life of body proteins, protein synthesis and degradation in different animal species; regulation. Specificities of non-protein nitrogen elimination, regulation of biosynthesis; hormonal, genetic, energetic, by nourishment).


10. Metabolism of minerals (Role of minerals in synthesis and metabolism of tissues; microelements, macro elements, minerals as coenzymes, mechanism of excretion).

11. Metabolism of vitamins (Role of vitamins in metabolic processes, hydro soluble vs. liposoluble vitamins, absorption of vitamins, deposition in the body and vitamins excretion)
12. Antioxidative status (Free radical production during the metabolic processes, mechanism of free radicals action, effect of harm free radical activity, in vivo antioxidants, antioxidative enzymes, nonenzymatic antioxidative molecules, oxidative stress).

13. Bioenergetics (Basic principles of bioenergetics and metabolic rate, brutto energy of food, digestible energy, metabolizable energy, specific dynamic action of food, resting energy metabolism, importance of ATP, efficacy of production processes, biocaloimetry, respiratory quotient and its interpretation).


15. Physiology of oviposition (Composition of egg, egg formation as enriched egg-cell, oviposition, control of oviposition).

16. Physiology of lactation (Composition of milk in different animal species, mamogenesis, lactogenesis, metabolism of mammary gland).

17. Thermoregulation (Poikilotherms, homeotherms, hibernation, thermoreceptors, organism defence of hypothermia and hyperthermia).

18. Physiology of skin (Physiological features of skin and mucous membrane, skin glands).

This course qualifies students to be able to successfully:

- describe physiology of heart and cardiovascular system, respiration, digestion in monogastric animals and ruminants, excretion, the metabolism of nutrients, minerals and vitamins, physiological processes of oviposition, lactation and thermoregulation
- associate regulatory mechanisms of specific body systems
- interpret functions of different body systems during different physiological conditions
- prepare biological samples for various laboratory analyses
- know the concept of modern diagnostic tools and machines (haematological and biochemical analyser, spirometry, ECG, EMG, EEG)
- analyse and interpret the results of laboratory tests

Radiation hygiene

Teachers: Marinko Vilić, DVM, PhD, Assistant Professor
Course year: 5th
Semester: 9th
Number of credits: 2.5
Hours of theoretical training: 15
Hours of practical training: 4
Laboratory hours: 11
Course content:

1. Introduction to radiation hygiene (RH) (What is radiation hygiene? Relationships between radiation hygiene and other scientific disciplines. Scope and purpose of radiation hygiene in veterinary medicine.)


4. Biologically significant radionuclides (Iodine-131, Strontium-90, Strontium-89, Caesium-137 and Caesium-134. Their essential physical and chemical characteristics, absorption, distribution in organism, secretion from organism, antidotes)

5. Effects of ionizing radiation upon animals and humans (Biological damage of mammals caused by ionizing radiation. Factors which have influence upon type and strength of effects: dose of ionizing radiation, speed of radiation dose, topographic distribution of dose, way of irradiation and type of ionizing radiation, sensitivity of irradiated tissue, oxygen presence, compounds that increase sensitivity of hypoxic cells, compounds that protect from radiation)

6. Protection of animals and humans against irradiation (Principles of protection from radiation: reduction of time exposure to radiation, increasing the distance from radiation source, absorption of radiation. Protection of domestic animals from radiation. Half-thickness)

7. Protection of humans, animals, animal feed and foodstuff from contamination (Protection of humans and domestic animals from radioactive contamination. Protection of food and animal feed from radioactive contamination)

8. Methods of radioactive decontamination (Mechanical, chemical and combined methods. Degree of success of decontamination)


10. Radiation-hygiene controls of food, water and animal feed and evaluation of their propriety (Evaluation of radiated and (or) contaminated animals intended for slaughtering, Evaluation of use of slaughtered animal meat which were irradiated and (or) contaminated. Evaluation of milk and other food)

11. Conservation of food by ionizing radiation (Advantages of conservation by ionizing radiation, principal conditions necessary for achievement the harmlessness of radiated food,
radiation aspect of radiation, microbiological aspects of radiation, toxicological aspect of radiation. Sterilization and pasteurization procedures. Estimation of ionizing radiation dose used in conserving food)

12. Calculation of exposition rate, safe distance from sources of radiation and as well as absorber thickness in the vicinity of radioactive source. Calculation of maximum time spending inside contamination area (Calculation of accepted dose inside contamination area. Calculation of permissible time spending within contaminated area in regard to maximally allowed dose. Calculation of the exposition rate on a certain distance from the radioactive source. Calculation of absorber thickness around the radioactive source)

13. Calculation of maximum permissible concentration of radio nuclides in animal feed in regard to permissible concentrations of those radionuclides in milk and meat

14. Calculation of risk from malignant diseases in humans due to intake of contaminated milk and meat


18. Decontamination of different material and calculation of decontamination factor (Decontamination of wood, formica, concrete, iron, and lead by various decontamination procedures and calculation of decontamination success. Decontamination of animal feed and single foodstuff)

19. Procedure with animals, animal feed and foodstuff of animal origin in possible accidental contamination of the area.

20. Evaluation of risk contamination by Iodine-131 and Caesium-137 and ways of reduction the consequences.

This course qualifies students to be able to successfully:

- recognize sources of ionizing radiation
- associate paths of radioactive contamination and ionizing radiation of people and animals with their consequences
- undertake protection of humans, animals, animal feed and foodstuff from contamination and irradiation
- apply decontamination methods upon humans, animals, animal feed and foodstuff
- evaluate radiation properties of meat, milk and other food and their use as human food
- use detectors of ionising radiation and dosimeters to detect ionising radiation, determine its type and calculate the radiation dose
- recognize foodstuffs conserved by ionizing radiation and develop an attitude towards such products

**List of electives:**

- Bird physiology
- Amphibians and reptiles physiology
- Clinical physiology
- Veterinarian's role on an organic farm
- Veterinary nuclear medicine
- Principles of scientific work
- Cell structure and organisation

**List of obligatory subjects related to individual study tracks:**

- 

**List of electives related to individual study tracks:**

- 

**List of subjects in doctoral study:**

- Physiology of digestion in ruminants
- Physiology of neuroendocrine system in domestic animals
- Oxidative/antioxidative processes in physiological and stress conditions
- Cardiovascular system in domestic animals
- Exercise physiology
- Digestive physiology of monogastric animals
- Respiration physiology in domestic mammals
- Biological effects of ionizing radiation
- Radioimmunoassay (RIA) investigation of thyroide function

**List of subjects in postgraduate university specialist studies:**

- Physiology of domestic mammals - Selected chapters
- Domestic mammals reproductive endocrinology
- Radiation in food technology and hygiene
- Radioactive contamination and decontamination

**Major equipment, acquired in the last ten years:**

- Olympus microscope
- Homogenizer
- Hematological counter Coulter
- Automatic analyzer SABA
- Roto centrifuge
- Lab dancer
- Transilluminator
- CO₂ Incubator
- Digestor
<table>
<thead>
<tr>
<th>Lecture hall(s) and rooms that can be used for supervised group work:</th>
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<tbody>
<tr>
<td><strong>Large classroom with 130 seats, group work room with 30 places,</strong></td>
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<tr>
<td>The number of laboratories for practical work by students:</td>
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<tr>
<td><strong>4 with total number of places in laboratories 58</strong></td>
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<th>List of agreements between the faculty and external bodies for practical training, assembled for thematic areas:</th>
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<th>List of graduation theses in the last three academic years:</th>
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<tbody>
<tr>
<td><strong>2010:</strong></td>
</tr>
<tr>
<td><em>Slaven Pinotić.</em> Effect of season and age on serum protein and lipid concentration in breeding bulls.</td>
</tr>
<tr>
<td><em>Josipa Anić-Ivičić.</em> Seasonal differences of biochemical parameters in blood of simmental cows from the private breeding.</td>
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<tr>
<td><em>Tomislav Deže.</em> Research methods of bone metabolism in domestic animals.</td>
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<tr>
<td><em>Ana Martinić.</em> Lipid metabolism during fasting and refeeding period in ducklings.</td>
</tr>
<tr>
<td><em>Melani Stepić.</em> Quantitative and qualitative analysis of volatile fatty acid concentrations in rumen contents of dairy cows</td>
</tr>
<tr>
<td><em>Katarina Špiranec.</em> Determination of natural resistance of Croatian indigenous sheep breed dalmatian pramenka to scrapie by analysis of gene prp encoding prion protein.</td>
</tr>
<tr>
<td><em>Albina Jakovljević.</em> Chick blood enzymes' activity post low dose gamma irradiation.</td>
</tr>
<tr>
<td><em>Marinković Iris.</em> The relationship between lipid metabolism and magnesium in cows during late pregnancy and early lactation</td>
</tr>
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| **2011:** |
| *Sandra Plužarić.* Platelet antioxidative enzymes in croatian coldblood mares during pregnancy and early lactation |
| *Vjekoslav Rade.* Lipoprotein fractions in serum of dairy cows |

<p>| <strong>2012:</strong> |
| <em>Damir Grgić.</em> Effects of exercise on haematological parameters in working dogs |</p>
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<thead>
<tr>
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<tbody>
<tr>
<td>Nikola Rašković</td>
<td>Indigenous goat breeds - basis for organic goats production in karsts areas in Croatia.</td>
</tr>
<tr>
<td>Sotošek David</td>
<td>Specificity of calcium, phosphorus and magnesium metabolism in ruminants</td>
</tr>
<tr>
<td>Marija Pavković</td>
<td>Metabolic profiling of Holstein dairy cows herd for the purposes of herd health management.</td>
</tr>
<tr>
<td>Josip Vučer</td>
<td>Erythrocytes count and indices in mares breed Posavina horse during gravidity and early lactation.</td>
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**2013:**

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**Number of student's scientific works which received Rectors' and Deans' Awards** for the best published work during the last three academic years:

<table>
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