UNIVERSITY OF ZAGREB

FACULTY OF VETERINARY MEDICINE

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Division: Veterinary Public Health and Food Safety

Department / Clinic: Pharmacology & Toxicology

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Register no.:

File no.:

Zagreb, 05/09/2022

**COURSE SYLLABUS**

Course name: Pharmacology

Academic year 2022/2023

Course leader: Prof. Frane Božić, PhD

Teachers: Prof. Frane Božić, PhD; Hrvoje Pavasović, DVM, Assistant Ena Oster, DVM, Assistant Nikola Čudina, DVM

First day of classes: 17/10/2022

Last day of classes: 27/01/2023

 **Timetable for LECTURES academic year 2022/2023**

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| **LECTURES** |
| **Date** | **Methodological unit** | **Teacher** | **Location / time** | **Literature** |
| 17/10/2022 | Introduction to Pharmacology | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 20/10/2022 | Pharmacodynamics | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 21/10/2022 | PharmacokineticsDrug residues | Prof. Frane Božić | 14-16 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 26/10/2022 | Autonomic pharmacology | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 27/10/2022 | Drugs acting on the Central Nervous System | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 28/10/2022 | General anaesthesia  | Prof. Frane Božić | 12-14 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 15/11/2022 | Sedatives and Tranquilizers | Prof. Frane Božić | 14-16 h **LECTURE**, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 16/11/2022 | Opioid Analgesic Drugs | Prof. Frane Božić | 14-16 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 17/11/2022 | Local Anesthetics | Prof. Frane Božić | 12-14 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 21/11/2022 | Muscle relaxants, neuromuscular blocking agents  | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 23/11/2022 | Analgesics, Antiinflammatory, Antipyretic Drugs | Prof. Frane Božić | 12-14 h **LECTURE,** lecture room, Department of Physiology and Radiobiology | Course materials (LMS) |
| 28/11/2022 | Drugs acting on the Cardiovascular System | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 01/12/2022 | Drugs affecting Renal Function and Fluid-Electrolyte Balance; Hormones Affecting Reproduction | Prof. Frane Božić | 14-16 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 12/12/2022 | Drugs for treating Gastrointestinal Diseases & Respiratory System | Prof. Frane Božić | 14-16 h **LECTURE**, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 16/12/2022 | Chemotherapy of Microbial Diseases; ß-lactam Antibiotics | Prof. Frane Božić | 8-10 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 22/12/2022 | Aminoglycoside Antibiotics | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 10/01/2023 | Macrolides, lincosamides, tetracyclines | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 12/01/2023 | Fluoroquinolones, Sulphonamides | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 23/01/2023 | Antifungal and Antiviral Drugs | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 24/01/2023 | Chemotherapy of Parasitic Diseases; Antinematodes, Anticestodes  | Prof. Frane Božić | 10-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 25/01/2023 | Antitrematodal DrugsAntiprotozoan DrugsEctoparasiticides | Prof. Frane Božić | 9-12 h **LECTURE,** lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 26/01/2023 | Chemotherapy of Neoplastic Diseases | Prof. Frane Božić | 10-12 h **LECTURE**, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |

**Timetable for SEMINARS academic year 2022-2023**

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| **SEMINARS**  |
| **Date** | **Methodological unit** | **Teacher** | **Group**  | **Location / time** | **Literature** |
| 25/01/2023 | Drug allergies | Prof. Frane Božić | 1,2,3 | 12-14 h seminar, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 26/01/2023 | Intramammary formulations for bovine mastitis treatment | Prof. Frane Božić | 1,2,3 | 12-14 h seminar, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 27/01/2023 | Pharmacovigilance | Prof. Frane Božić, Hrvoje Pavasović, DVM | 1,2,3 | 12-13h seminar, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |

**Timetable for PRACTICALS academic year 2022-2023**

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| **PRACTICALS** |
| **Date** | **Methodological unit** | **Teacher** | **Type of practical** | **Group**  | **Location / time** | **Literature**  |
| 20/10/2022 | Principles of Pharmaceutics and Veterinary Dosage Forms, Drug nomenclature, ATC classification  | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 21/10/2022 | Principles of Pharmaceutics and Veterinary Dosage Forms, Drug nomenclature, ATC classification  | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 24/10/2022 | Evidence-based Pharmacotherapy | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 26/10/2022 | Evidence-based Pharmacotherapy | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 03/11/2022 | Drug research and development | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 14-16 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 04/11/2022 | Drug research and development | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 07/11/2022 | 1st colloquium R&DSolid drug formulations | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 10-12 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 08/11/2022 | 1st colloquium R&DSolid drug formulations | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 09/11/2022 | Semisolid drug formulations (ointments and pastes) | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3  | 10-12 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 11/11/2022 | Semisolid drug formulations (ointments and pastes) | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 14/11/2022 | Liquid drug formulations | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals,lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 15/11/2022 | Liquid drug formulations | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 12-14 h practicals,lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 25/11/2022 | 2nd colloquium – Drug formulationsDrug dosing and prescribing 1 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 25/11/2022 | 2nd colloquium – Drug formulationsDrug dosing and prescribing 1 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 14-16 h practicals, lecture room, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 28/11/2022 | Drug dosing and prescribing 2 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 14-16 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 29/11/2022 | Drug dosing and prescribing 2 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 10-12 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 02/12/2022 | Drug dosing and prescribing 3 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 02/12/2022 | Drug dosing and prescribing 3 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 14-16 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 05/12/2022 | Drug dosing and prescribing 4 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 08-10 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 06/12/2022 | Drug dosing and prescribing 4 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 10-12 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 14/12/2022 | Drug dosing and prescribing 5 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 2,3 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 15/12/2022 | Drug dosing and prescribing 5 | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1 | 14-16 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 16/12/2022 | Repetition for colloquium – drug dosing and prescribing | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 10-12 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 16/12/2022 | Repetition for colloquium – drug dosing and prescribing | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 20/12/2022 | Pharmacology problem solving 1a | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 21/12/2022 | Pharmacology problem solving 1a | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 08-10 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 22/12/2022 | Pharmacology problem solving 1b | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 22/12/2022 | Pharmacology problem solving 1b | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 14-16 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 09/01/2023 | Laboratory animals movies: the action of drugs on nervous system | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 10-12 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 10/01/2023 | Laboratory animals movies: the action of drugs on nervous system | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 14-16 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 12/01/2023 | Pharmacology problem solving 2a | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 08-10 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 12/01/2023 | Pharmacology problem solving 2a | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 12-14 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 13/01/2023 | Pharmacology problem solving 2b | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 1,2 | 10-12 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |
| 13/01/2023 | Pharmacology problem solving 2b | Assist. Ena Oster, DVM, Assist. Nikola Čudina, DVM | Practicum | 3 | 14-16 h practicals, lecture room, Department of Pharmacology and Toxicology | Course materials (LMS) |

**STUDENT OBLIGATIONS**

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| Lecture attendance  | 45 hours (3-6 points)1 hour of lectures = 0.13 points Minimum required is 3 points (equivalent to 23 hours of lecture attendance from maximum of 45) |
| Seminars attendance  | 5 hours (4,8-6 points)1 hour of seminar is 1.2 points Minimum required is 4,8 points (equivalent to 4 hours of seminars’ attendances from maximum of 5) |
| Practicals attendance  | 35 hours (4,8-6 points)1 hour of practicals attendance is 0.171 pointsMinimum required is 4,8 points (equivalent to 28 hours of practicals attendances from maximum of 35) |
| Active participation in seminars and practicals | **Seminars:** oral presentations or written seminars are evaluated and scored (min. 2,5 points, max.5 points)**Practicals:** Student effort and the engagement during pharmacology problem solving is evaluated and scored (min 2.5 points, max. 5 points) |
| Final exam | Oral exam, lecturesMinimum required exam entry are 36 points (from maximum of 60). |
| Examination requirements  | Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine. Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. **Article 41:** astudent can justifiably be absent from up to 50 % of the lectures; 20% of the seminars and 20 % of the exercises. |

**GRADING AND EVALUATING STUDENT WORK**

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| Continuous knowledge-checking (mid-terms) | 3 colloquiums:  1) Principles of Pharmaceutics, Drug R&D (max. 10 points, min. 6 points) – during practicals 7.11./8.11.2022. 2) Drug Dosage Forms (max. 8 points, min. 5 points) – during practicals 25.11.2022. 3) Drug prescribing (max. 14 points, min. 9 points) – 21.12.2022. at 10 o’clock in the Lecture room Department of Physics  |
| Final exams (dates) | 14/12/2022, 30/01/2023, 07/02/2023 |
| Form of final exam | Oral exam |

**LITERATURE**

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| Obligatory literature | Course materials (lecture handouts and notes) will be provided for every student (LMS) |
| Optional literature | Riviere, J, M. Papich: Veterinary Pharmacology and Therapeutics 10th edition. Wiley-Blackwell, 2020. Maddison, J., S. Page, D. Church: Small Animal Clinical Pharmacology. Saunders Elsevier, London, 2008.  |

**OBJECTIVES AND LEARNING OUTCOMES**

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| Course objectives | Preparing students for veterinary clinics where they can choose appropriate therapy for any disease diagnosed in vet patients as well as correct formulary writing. |
| Learning outcomes | Students will particularly learn to approach specific species and categories of animals individually, but to treat farm animals as a group, as well. As regard that an animal should be get rid of pain in any moment it suffers, students will learn mechanisms of pain occurrence and its importance as well as the meaning of “multimodal pain therapy” concept.On the basis of knowledge gained upon the completed course and passed the exam “General and special pharmacology” students will be able to understand pharmacological basis of medical effects as well as species, age and other factors impacting on it. Besides, students will gain knowledge of effecting mechanisms of particular drug groups and will be able to chose the most appropriate drug (or drugs) indicated for specific disease or a pathological state. While doing so they will know to apply the drug in its optimal dose according to prescribed dose, while in the case of possible combination of a couple of drugs they will be aware of their mutual effects on each other (desirable or undesirable).  |

**GRADING SCHEME**

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| *Points* | *Grade* |
| Up to 59 | 1 (F) |
| 60-68 | 2 (E) |
| 69-76 | 2 (D) |
| 77-84 | 3 (C) |
| 85-92 | 4 (B) |
| 93-100 | 5 (A) |

 Course leader: Head of Department/Clinic:

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Note: The course leader is required to submit a Course Syllabus to all teachers and associates pertaining to the Course.

**GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH LECTURES, SEMINARS and PRACTICALS**

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| **Type of activity** | **Minimum number of points** | **Maximum number of points** |
| Lectures attendance  | **3** | **6** |
| Seminar attendance  | **4,8** | **6** |
| Practicals attendance  | **4,8** | **6** |
| Active participation in seminars and practicals | **5** | **10** |
| Continuous knowledge checking (mid-terms) | **20** | **32** |
| Final exam | **24** | **40** |
| TOTAL | **60** | **100** |