UNIVERSITY OF ZAGREB
FACULTY OF VETERINARY MEDICINE
Heinzelova 55
Tel. 01/2390163
Division of Veterinary Public Health and Food Safety
Unit of Pharmacology and Toxicology
Email: bozic@vef.hr
Register no.: 61-10-24/123

Zagreb, 06/09/2024

COURSE SYLLABUS

Course name: Pharmacology

Academic year 2024/2025

Course leader: Prof. Frane Božić, PhD

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

First day of classes: 04/10/2024

Last day of classes: 24/01/2025

Activities - Pharmacology (1/5)

Start Date	Start T	End Ti	Subject	Group	Note	Length	Instructor	Room
14/10/2024	10:00	11:30	p1 Introduction	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
15/10/2024	12:00	13:30	p2 Pharmacodynamics	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
16/10/2024	9:00	10:30	p3 Pharmacokinetics, drug residues	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
16/10/2024	11:05	12:35	v1 Pharmaceutics and Veterinary Dosage Forms	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
17/10/2024	9:00	10:30	p4 Autonomic nervous system pharmacology	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
17/10/2024	11:00	12:30	v1 Pharmaceutics and Veterinary Dosage Forms	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
18/10/2024	9:45	11:15	v2 Evidence-based Pharmacotherapy	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
18/10/2024	11:30	13:00	p5 Central nervous system: premedication, sedatives	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
21/10/2024	12:00	13:30	p6 Antiepileptics	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
22/10/2024	10:00	11:30	p7 Opioid analgesic drugs	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
22/10/2024	12:00	13:30	v2 Evidence-based Pharmacotherapy	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
24/10/2024	10:00	11:30	p8 Nonsteroidal anti-inflammatory drugs	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
24/10/2024	11:45	13:15	v3 Drug research and development	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
25/10/2024	13:00	14:30	p9 Anticholinergic and myorelaxant drugs	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija

Activities - Pharmacology (2/5)

Start Date	Start T	End Ti	Subject	Group	Note	Length	Instructor	Room
29/10/2024	8:15	9:45	v3 Drug research and development	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
29/10/2024	10:00	11:30	p10 Local and general anesthetics, neuroleptanalgesia	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
30/10/2024	8:15	9:45	v4 1st colloquium R&D, Solid drug formulations	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
30/10/2024	10:00	11:30	v4 1st colloquium R&D, Solid drug formulations	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
04/11/2024	8:00	9:30	v5 Semisolid drug formulations	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
04/11/2024	9:45	11:15	v5 Semisolid drug formulations	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
05/11/2024	12:30	14:00	v6 Liquid drug formulations	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
06/11/2024	11:45	13:15	v6 Liquid drug formulations	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
07/11/2024	12:00	13:30	v7 2nd colloquium, Drug dosing and prescribing 1	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
08/11/2024	10:00	11:30	v7 2nd colloquium, Drug dosing and prescribing 1	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
11/11/2024	12:00	13:30	p11 Glucocorticoids	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
12/11/2024	10:00	11:30	v8 Drug dosing and prescribing 2	5E-3		1:30	Nastavnici na predmetu	P_farmakologija

Activities - Pharmacology (3/5)

Start Date	Start T	End Ti	Subject	Group	Note	Length	Instructor	Room
12/11/2024	12:00	13:30	v8 Drug dosing and prescribing 2	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
19/11/2024	9:45	11:15	p12 Cardiovascular pharmacology	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
21/11/2024	9:00	10:30	v9 Drug dosing and prescribing 3	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
21/11/2024	11:00	12:30	v9 Drug dosing and prescribing 3	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
22/11/2024	10:00	11:30	p13 Pharmacology of the gastrointestinal tract	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
25/11/2024	9:00	10:30	v10 Drug dosing and prescribing 4	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
25/11/2024	11:00	12:30	v10 Drug dosing and prescribing 4	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
28/11/2024	8:15	9:45	p14 Pharmacology of the respiratory system	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
28/11/2024	12:15	13:45	v11 Drug dosing and prescribing 5	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
28/11/2024	14:00	15:30	v11 Drug dosing and prescribing 5	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
29/11/2024	10:15	11:45	p15 Introduction to chemotherapeutics	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
02/12/2024	10:00	11:30	v12 Repetition for colloquium	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija

Activities - Pharmacology (4/5)

Start Date	Start T	End Ti	Subject	Group	Note	Length	Instructor	Room
03/12/2024	10:00	11:30	v12 Repetition for colloquium	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
04/12/2024	11:00	12:30	v13 Laboratory animals movies	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
04/12/2024	13:00	14:30	v13 Laboratory animals movies	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
09/12/2024	10:00	10:45	v14 3rd colloquium	5E-1, 5E-2, 5E-3		0:45	Nastavnici na predmetu	P_farmakologija
10/12/2024	14:05	15:35	p16 Beta-lactam antibiotics	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
11/12/2024	10:00	11:30	v15 Pharmacology problem solving 1a	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
12/12/2024	8:30	10:00	v15 Pharmacology problem solving 1a	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
16/12/2024	11:45	13:15	p17 Aminoglycosides, aminocyclitols and polypeptide antibiotics	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
17/12/2024	15:30	17:00	v16 Pharmacology problem solving 1b	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
18/12/2024	15:30	17:00	v16 Pharmacology problem solving 1b	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
07/01/2025	8:15	9:45	v17 Pharmacology problem solving 2a	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
08/01/2025	8:15	9:45	p18 Macrolides, lincosamides, tetracyclines and pleuromutilins	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija

Activities - Pharmacology (5/5)

Start Date	Start T	End Ti	Subject	Group	Note	Length	Instructor	Room
08/01/2025	14:00	15:30	v17 Pharmacology problem solving 2a	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
09/01/2025	8:15	9:45	v18 Pharmacology problem solving 2b	5E-1, 5E-2		1:30	Nastavnici na predmetu	P_farmakologija
10/01/2025	8:15	9:45	p19 Fluoroquinolones, amphenicols, sulfonamides and metronidazole	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
10/01/2025	14:00	15:30	v18 Pharmacology problem solving 2b	5E-3		1:30	Nastavnici na predmetu	P_farmakologija
20/01/2025	8:15	9:45	p20 Antiprotozoal drugs	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_fiziologija
21/01/2025	13:00	14:30	p21 Antitrematodal, anticestodal and antitrematodal drugs	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
22/01/2025	14:00	15:30	s01 Drug allergies	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
23/01/2025	9:05	10:35	p22 Ectoparasiticides	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
23/01/2025	10:55	12:25	s02 Intramammary formulations for bovine mastitis treatment	5E-1, 5E-2, 5E-3		1:30	Božić F.	P_farmakologija
24/01/2025	11:00	11:45	p23 Antimycotics	5E-1, 5E-2, 5E-3		0:45	Božić F.	P_farmakologija
24/01/2025	12:00	12:45	s03 Pharmacovigilance	5E-1, 5E-2, 5E-3		0:45	Pavasović H.	P_farmakologija
Total: 61						**89:15**		

STUDENT OBLIGATIONS

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 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 points Minimum required is 4 points (equivalent to 25 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, lectures Minimum 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 (2022). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. **Regulations On Intergraduate And Graduate Studies, Article 41**: a student can justifiably be absent from up to 50% of the lectures; 30% of the seminars and 30% of the exercises.

GRADING AND EVALUATING STUDENT WORK

Continuous knowledge-checking (mid-terms)	3 colloquiums: 1) Principles of Pharmaceutics, Drug R&D (max. 10 points, min. 6 points) 2) Drug Dosage Forms (max. 8 points, min. 5 points) 3) Drug prescribing (max. 14 points, min. 9 points) A student who does not achieve the minimum number of points from each colloquium has the right to a remedial colloquium, which will be organized during last practical
Final exams (dates)	17/12/2024., 7/02/2025., 21/02/2025.
Form of final exam	Oral exam

LITERATURE

Obligatory literature	Course materials (lecture handouts and notes) will be provided for every student (Merlin)
Optional literature	1. Riviere, J., M. Papich (2018): Veterinary Pharmacology and Therapeutics, 8th ed. Wiley Blackwell. 2. Maddison, Page and Church (2008): Small Animal Clinical Pharmacology. 2nd ed. Saunders Elsevier. 3. Papich, M.G. (2011): Saunders Handbook of Veterinary Drugs. 3rd Ed. Elsevier Saunders. 4. Booth D. M. (2012): Small animal Clinical Pharmacology, Elsevier (Saunders) 2nd ed., St. Louis, Missouri 63043.

OBJECTIVES AND LEARNING OUTCOMES

Course objectives	Based on 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 choose 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). 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.
Learning outcomes	1. choose the most suitable drug(s) indicated for a specific disease or pathological condition, taking into account species, age and other factors 2. differentiate the treatment approach with regard to the categories of animals (individual and group treatment) 3. choose pharmacotherapy in the optimal dose, dosing regimen and method of application 4. prescribe and dispense medicines correctly and responsibly in accordance with legislation and latest guidance 5. choose the appropriate analgesic therapy within the framework of multimodal pain therapy 6. access the appropriate sources of data on licensed medicines 7. explain the process of research and development of a new drug 8. describe and explain the general principles of pharmacodynamics and pharmacokinetics 9. report suspected adverse reactions of medicines through the appropriate channel

GRADING SCHEME

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:
Prof. Frane Božić, PhD

Head of Department:
Prof. Andreja Prevendar Crnić, PhD

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

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