**Veterinary pharmacology** course covers two semesters and includes module1-Veterinary pharmacology1 and module2- Veterinary pharmacology2 (V and VI semester respectively). We start in winter semester with Veterinary pharmacology1 (General pharmacology and pharmacology of nervous system) and after graduating this course You can continue the second – Veterinary pharmacology2 (chemiotherapeutics and systemic pharmacology). Each course includes in total 75 hours (including 45 h of lectures and 60 h of lab classes).

Frontal lectures take place every week (2 h), similarly as  lab classes (2h). All lectures and classes are on the same floor in Collegium Veterinarium building, Akademicka 12 street.

Person responsible for Veterinary pharmacology1 and Veterinary pharmacology2 courses:

**Prof. Cezary J. Kowalski**

phone: # 48 81 445 60 88

mail: cezary.kowalski@up.lublin.pl

Department of Pharmacology, Toxicology and Environmental Protection

Academic teachers conducting the lessons:

Artur Burmańczuk DVM, PhD, assoc.prof

Beata Łebkowska-Wieruszewska DVM, PhD, assoc.prof

**Module1- Veterinary pharmacology1**

**Aim of the course:** Acquainting with general pharmacology (mechanisms of drug action at the molecular, cellular, organism and the whole organism, pharmacokinetics, drug interactions) and with detailed pharmacology of drugs nervous system (characteristics of selected veterinary drugs representing the individual Anatomical Therapeutic Chemical Classification - ACTVet). Getting to know the classification of substances active substances used in the treatment of animals. Acquainting with the basics of veterinary pharmacotherapy (indications, contraindications, side effects and basic interactions in particular groups of drugs of the nervous system, in different species of animals). Acquainted with the correct prescription writing and the development of competence in a conscious and responsible use of the knowledge gained during the the course.

**Literature:**

1. Veterinary Pharmacology and Therapeutics, Jim E. Riviere, Mark G. Papich
2. Plumb s Veterinary Drug Handbook, Donald C. Plumb
3. Handbook of Veterinary Pharmacology, Walter H. Hsu.

**Lecture topics**:

1. Veterinary pharmacology - subject description. Pharmacodynamics: types of drug action, theories of drug receptor action, the effects of receptor stimulation, dose-effect relationship, drug interactions, hypersensitivity and insensitivity of the organism to drugs, side effects and adverse drug reactions. [6h]

2. Pharmacokinetics: drug fate in the organism, LADME, selected pharmacokinetic parameters, residues of veterinary drugs in food of animal origin. [6h]

3. ATCvet classification. Nervous System Pharmacology - Introduction. QN02 - L. analgesic-narcotic. [3h]

**Lessons topics:**

1. Organization of pharmacology exercises. Basic concepts of drugs and remedies. Legal provisions (Pharmaceutical Law). [2h]

2. Building a medical / veterinary prescription. Rules for wrighting drugs on a prescription. [2h]

3. Narcotic prescription (Legal regulations, Lists A, B, N), therapeutic dose. [2h]

4. Colloquium/test [2h]

5. Pharmacokinetic parameters [2h]

6. Colloquium/test [2h]

7. Autonomic system pharmacology - adrenergic system [2h]

8. Autonomic system pharmacology - cholinergic system [2h]

9. Colloquium/test. Characteristics of selected medicinal products of the autonomic system [2h]

10. QN 05 - Psycholeptics (05A neuroleptics, 05B anxiolytics. [2h]

11. QN05 - Psycholeptics (05C sedative-hypnotics including alpha 2 agonists). [2h]

12. QN03 - anticonvulsants, QN06 - Psychoanaleptics (antidepressants). [2 godz.]

13. NLPZ Drugs of the QN group: QN01B - Local anesthetics, QN02 - Analgesics-NSAIDs[2h]

14. QN01A - General anesthetics, QN06 - Psychoanaleptics (caffeine) + QR07AB - Drugs that stimulate the respiratory system. [2h]

15. Colloquium/test, Characteristics of selected medicinal products of the central nervous system [2h]

**Methods of verification and forms of documenting the achieved learning outcomes:**

The knowledge is checked in writing after the end of a given thematic block. There are 4 written tests (weight 12.5%) planned for the semester, consisting of open descriptive tasks, closed descriptive tasks and test tasks. The sum of the points obtained in the test is expressed in a relative percentage scale, where 100% is the maximum number of points that can be obtained in the test. The scope of knowledge tested in tests includes lecture and practice topics. Percentage points from each test are converted into grades according to the following scale: very good –91-100% points, plus good –81-90% points, good –71-80%, plus satisfactory –61-70%, satisfactory –51-60%., insufficient –0-50%. In addition, to pass module I, it is necessary to attend at least 85% of the exercises included in the module plan.

**Module1 Rating:** Colloquium 1 - weight 25% Colloquium 2 - weight 25% Colloquium 3 - weight 25% Colloquium 4 - weight 25% The final grade for completing the course is calculated on the basis of: module I grade (weight 12.5%), module II grade (weight 12.5%) and final exam grade (weight 75%).

**Other regulations:**

• 2 lessons may be omitted without any excuse, however, these exercises should be passed in the form of an oral or written answer to the academic teacher (within 2 weeks).

• Each unsatisfactory grade must be passed by the academic teacher in the form of an oral or written answer (within 2 weeks).

• Students who not pass ommited lessons or failing grades (within 2 weeks) will not be admitted to subsequent exercises and, consequently, will not be allowed to pass the final test.

**Module2-Veterinary pharmacology2**

**Aim of the course:** Acquainting with detailed pharmacology of organ-acting drugs (characteristics of selected veterinary drugs representing the individual anatomical-therapeutic-chemical classification group -ACTVet). Acquainting with the classification of active substances used in the treatment of animals. Acquainting with the basics of veterinary pharmacotherapy (indications, contraindications, side effects and basic interactions in individual groups drugs in different species of animals). Acquainting with chemotherapeutic agents used in the treatment of animals and the principles of chemotherapy. To familiarize with the detailed pharmacology of all groups of chemotherapeutic agents (antibacterial, antiviral, antiparasitic, antitumor) including. mechanisms of drug action, resistance mechanisms, pharmacokinetics, interactions, indications and contraindications, side effects, drug residues in tissues. Deepening the knowledge related to the correct writing of a medical prescription and developing competences in the conscious and responsible use of knowledge acquired during the course of the course.

**Literature:**

1. Veterinary Pharmacology and Therapeutics, Jim E. Riviere, Mark G. Papich

2. Plumb s Veterinary Drug Handbook, Donald C. Plumb

3. Handbook of Veterinary Pharmacology, Walter H. Hsu.

**Lecture topics**:

1. Principles of antibacterial chemotherapy. [1h]

2. Penicillins. Beta-lactamase inhibitors [3h]

3. Cephalosporins, carbapenems, monobactams [3h]

4. Aminoglycoside antibiotics [3h]

5. Antibiotics with a peptide structure [1h]

6. Quinolones and fluoroquinolones [3h]

7. Fenicols, nitrofurans, nitroimidazoles [3h]

8. Pleuromutilins, tetracyclines, lincosamides [3h]

9. Macrolides, azalides, ketolides [3h]

10. Sulfonamides, dihydropyrimidines [1h]

11. Antifungal drugs [3h]

12. Residues of veterinary drugs in food of animal origin. Principles of determining the withdrawal periods [1h]

**Lessons topics:**

1. Digestive system pharmacology - introduction. Drugs of the QA group - gastrointestinal tract and metabolism. QA04 - antiemetics, emetics, QA02 - affecting gastric secretion. [2 hours] QA03 - used in functional gastrointestinal disorders, QA06 - laxatives, QA07 – constipating drugs., QA05 - regulating liver function drugs, QA08 and QA15 influencing appetite, Selected drugs regulating functioning digestive system of ruminants. [2h]

2. Cardiovascular pharmacology - introduction. Drugs of the QC - cardiovascular group: QC01A - Cardiac glycosides, QC01C - stimulating the heart activity, QC01D - vasodilating in the therapy of heart muscle diseases drugs. QC07 - blocking beta-adrenergic receptors, QC08 - blocking the calcium channel, QC09 - acting on the renin-angiotensin system. QC01B - antiarrhythmics, QC02 - lowering blood pressure, QC04 - dilating peripheral vessels, QC05 - protecting vessels drugs. [2h]

3. Drugs of the QR group - respiratory system. [2h]

4. QC03 - diuretics. Water and electrolyte therapy. QC10 - Blood and Hematopoietic System Pharmacology. Drugs of the QB group - blood and hematopoietic system [2h]

5. Colloquium/test, Charakterystyka wybranych produktów leczniczych układu pokarmowego, krążenia i oddechowego Characteristics of selected medicinal products of the digestive, circulatory and respiratory systems [2h]

6. Pharmacology of mastitis [2h]

7. Pharmacology of the reproductive system (G01, G02). Drugs for the regulation of the sexual cycle (G03). Drugs in pregnancy. [2h]

8. Colloquium/test, Characteristics of selected medicinal products of the reproductive system and the regulation of the reproductive cycle and used in mastitis therapy [2h]

9. Principles of antiparasitic chemotherapy. Medicines against protozoa, Drugs against tapeworms and flukes, Drugs against nematodes, Drugs against ectoparasites [2h]

10. Antiviral and immunomodulating drugs [2h]

11. Biological drugs [2h]

12. Principles of anticancer chemotherapy. Anticancer chemotherapeutic agents. [2h]

13. Colloquium/test, Characteristics of selected antiparasitic, immunomodulating and anticancer medicinal products [2h]

14. Practical exercises - improving knowledge related to the correct wrighting of a medical prescription [2h]

15. Colloquium/test (verification of practical skills) [2h]

**Methods of verification and forms of documenting the achieved learning outcomes:**

The knowledge is checked in writing after the end of a given thematic block. There are 4 written tests in the semester, consisting of open descriptive tasks, closed descriptive tasks and test tasks. The sum of the points obtained in the test is expressed in a relative percentage scale. The scope of knowledge tested in tests includes lecture and practice topics.

Percentage points from each test are converted into grades according to the following scale: very good –91-100% points, plus good –81-90% points, good –71-80%, plus satisfactory –61-70%, satisfactory –51-60%., insufficient –0-50%.

The basis for crediting the semester / module 2 is:

• obtaining a minimum of 51% percentage points from each of the written tests.

• the semester grade is calculated as the arithmetic mean of grades ≥ 3.0 (satisfactory) from 4 written tests.

Moreover, to pass module 2 it is necessary to be present in at least 85% of the exercises included in the module plan.

The basis for admission to the EXAM is passing module 1 and 2 written exam, which may include open descriptive tasks, closed descriptive tasks, test tasks and the practical part (writing prescriptions for drugs - this part is 25% of the maximum number of points to be obtained in the exam, at the same time its result must be positive to pass the entire exam) . The sum of the points obtained in the exam is expressed as a relative percentage scale. The scope of knowledge in the exam covers all topics covered within the subject of veterinary pharmacology (module 1 and module 2).

Points are converted into grades according to the following percentage scale: grade very good –91-100%, plus good –81-90% points, good –71-80%, plus satisfactory –61-70%, satisfactory –51 -60%., Insufficient -0-50% points. The final grade is influenced by:

• grades from both modules (1 and 2),

• exam result.

The final grade for the Veterinary pharmacology subject is calculated as follows: [Course grade obtained in semester 1 (module 1) x 0.125] + [Semester grade for the course obtained in semester 2 (module 2) x 0.125] + [Exam grade x 0 , 75] The value calculated above is converted into the final grade in the following way: value in the range <0; 3,0) becomes 2; values ​​in the range <3.0; 3.25) is rounded to 3; a value in the range of <3.25; 3.75) is rounded to 3.5; values ​​in the range <3.75; 4.25) is rounded to 4; a value in the range of <4.25; 4.75) is rounded to 4.5; values ​​in the range <4.75; 5.0> is rounded to 5.0.

**Module2 Rating:** Test 1 - weight 25% Test 2 - weight 25% Test 3 - weight 25% Test 4 - weight 25% The final grade for completing the course is calculated on the basis of: module I grade (weight 12.5%), module II grade (weight 12.5%) and final exam grade (weight 75%).

**Other regulations:**

• 2 lessons may be omitted without any excuse, however, these exercises should be passed in the form of an oral or written answer to the academic teacher (within 2 weeks).

• Each unsatisfactory grade must be passed by the academic teacher in the form of an oral or written answer (within 2 weeks).

• Students who not pass ommited lessons or failing grades (within 2 weeks) will not be admitted to subsequent exercises and, consequently, will not be allowed to pass the final test.