



| Syllabus for academic year: 2021/2022 Training cycle: 2019/2020-2024/2025 | | | | | | | | | | | | | |
|--|--|---------------|-------------------------|-----------------------------------|-----------------------|-------------------------|---------------------------------------|--|-------------------------------------|---------------------------------------|--------------------------|---------------------------|-----------------|
| Description of the course | | | | | | | | | | | | | |
| Course | Pharmacology and toxicology | | | | | | | | Group of detailed education results | | | | |
| | | | | | | | | | Group code C | Group name PRECLINICAL SCIENCES | | | |
| Faculty | Faculty of Medicine | | | | | | | | | | | | |
| Major | medicine | | | | | | | | | | | | |
| Level of studies | <input checked="" type="checkbox"/> uniform magister studies <input type="checkbox"/> 1 st degree studies <input type="checkbox"/> 2 nd degree studies <input type="checkbox"/> 3 rd degree studies <input type="checkbox"/> postgraduate studies | | | | | | | | | | | | |
| Form of studies | <input checked="" type="checkbox"/> full-time <input type="checkbox"/> part-time | | | | | | | | | | | | |
| Year of studies | III | | | | | | Semester: | <input checked="" type="checkbox"/> winter <input checked="" type="checkbox"/> summer | | | | | |
| Type of course | <input checked="" type="checkbox"/> obligatory <input type="checkbox"/> limited choice <input type="checkbox"/> free choice / optional | | | | | | | | | | | | |
| Language of study | <input type="checkbox"/> Polish <input checked="" type="checkbox"/> English | | | | | | | | | | | | |
| Number of hours | | | | | | | | | | | | | |
| Form of education | | | | | | | | | | | | | |
| | Lectures (L) | Seminars (SE) | Auditorium classes (AC) | Major Classes – not clinical (MC) | Clinical Classes (CC) | Laboratory Classes (LC) | Classes in Simulated Conditions (CSC) | Practical Classes with Patient (PCP) | Foreign language Course (FLC) | Physical Education (PE) | Vocational Practice (VP) | Directed Self-Study (DSS) | E-learning (EL) |
| Winter semester: 75 hours | | | | | | | | | | | | | |
| Department of Pharmacology (Dep. in charge of the course) | | | | | | | | | | | | | |
| Direct (contact) education ¹ | | | | 45 | | | | | | | | | |
| Distance learning ² | 30 | | | | | | | | | | | | |
| Summer semester: 75 hours | | | | | | | | | | | | | |
| Department of Pharmacology (Dep. in charge of the course) | | | | | | | | | | | | | |
| Direct (contact) education | | | | 45 | | | | | | | | | |

¹ Education conducted with direct participation of university teachers or other academics

² Education with applied methods and techniques for distance learning



| Distance learning | 30 | | | | | | | | | | | | | |
|---|---|--|--|----|--|--|--|--|--|--|--|--|--|--|
| TOTAL per year: 150 hours | | | | | | | | | | | | | | |
| Department of Pharmacology (Dep. in charge of the course) | | | | | | | | | | | | | | |
| Direct (contact) education | | | | 90 | | | | | | | | | | |
| Distance learning | 60 | | | | | | | | | | | | | |
| Educational objectives (max. 6 items) | | | | | | | | | | | | | | |
| C1. equipping students with knowledge of the rational pharmacotherapy principles, the benefits and risks associated with drugs' usage | | | | | | | | | | | | | | |
| C2. acquisition by the students skills how to verify the sources of information about drugs and the evaluation (based on scientific evidences) of medical publications and advertisements about drugs | | | | | | | | | | | | | | |
| C3. acquisition by the students skills of general concepts and issues of pharmacodynamics, pharmacokinetics and pharmacoconomics | | | | | | | | | | | | | | |
| C4. equipping students with knowledge of principles of drugs action and dosage, routes of administration, their mechanisms of action, pharmacological and clinical effects, basic pharmacokinetic properties, the indications, contraindications, adverse effects, and main interactions | | | | | | | | | | | | | | |
| C5. acquisition by the students skills of determining the dosage of medicines in children and adults in various clinical conditions; equipping students with knowledge of the general rules of order writing and acquisition by the students skills of practical drug prescribing and orders for nurses | | | | | | | | | | | | | | |
| C6. Development social competences needed to practice the medical profession, in accordance with graduate's profile. | | | | | | | | | | | | | | |
| Education result for course in relation to verification methods of the intended education result and the type of class: | | | | | | | | | | | | | | |
| Number of detailed education result | Student who completes the course knows/is able to | | | | Methods of verification of intended education results | | | | Form of didactic class <i>*enter the abbreviation</i> | | | | | |
| C.W35 | the individual groups of medicinal products | | | | test MCQ, MRQ, SBA, EMQ, oral answer, oral presentations | | | | L, MC | | | | | |
| C.W36 | the main mechanisms of action of drugs and their age-dependent transformations in the body | | | | | | | | | | | | | |
| C.W37 | the impact of disease processes on drug metabolism and elimination | | | | | | | | | | | | | |
| C.W38 | the basic principles of pharmacotherapy | | | | | | | | | | | | | |
| C.W39 | the major adverse drug reactions, including those resulting from drug interactions | | | | | | | | | | | | | |
| C.W40 | the problem of drug resistance, including multi-drug resistance | | | | | | | | | | | | | |
| C.W41 | the indications for genetic testing to individualize pharmacotherapy | | | | | | | | | | | | | |
| C.W42 | the basic trends in the development of therapies, in particular the potential of cellular, gene and targeted therapies for specific diseases | | | | | | | | | | | | | |
| C.W43 | the basic concepts of general toxicology | | | | | | | | | | | | | |
| C.W44 | the groups of drugs whose abuse can lead to poisoning | | | | | | | | | | | | | |
| C.W45 | the symptoms of the most common acute poisonings, including those involving alcohol, drugs and other psychoactive substances as well as heavy metals and selected groups of drugs | | | | | | | | | | | | | |



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|-------|--|--|----|
| C.W46 | the basic principles of diagnostic procedures in poisoning | | |
| C.W48 | the consequences of vitamin or mineral deficiencies or their excess in the body | | |
| C.U13 | perform simple pharmacokinetic calculations | realization of assigned tasks in drug calculations and prescribing and task in pharmacokinetic calculations, practical exam part in drugs' prescribing | MC |
| C.U14 | select drugs in appropriate doses to correct pathological phenomena in the system and in individual organs | | |
| C.U15 | design regimens for rational, empirical and targeted chemotherapy of infections | | |
| C.U16 | prepare records of all formulations of medicinal substances | | |
| C.U17 | use pharmaceutical guides and databases on medicinal products | | |
| C.U18 | assess toxicological risks in specific age groups and in hepatic and renal failure states and prevent drug poisoning | | |
| C.U19 | interpret the results of toxicological tests | | |

* L- lecture; SE- seminar; AC- auditorium classes; MC- major classes (non-clinical); CC- clinical classes; LC- laboratory classes; CSC- classes in simulated conditions; PCP- practical classes with patient; FLC- foreign language course; PE- physical education; VP- vocational practice; DSS- directed self-study; EL- E-learning

Student's amount of work (balance of ECTS points):

| Student's workload (class participation, activity, preparation, etc.) | Student Workload |
|--|------------------|
| 1. Number of hours of direct contact: | 90 |
| 2. Number of hours of distance learning: | 60 |
| 3. Number of hours of student's own work: | 135 |
| 4. Number of hours of directed self-study | n/a |
| Total student's workload | 285 |
| ECTS points for course | 9,5 |

Content of classes: (please enter topic words of specific classes divided into their didactic form and remember how it is translated to intended educational effects)

Lecture – winter semester (15 x 2 hours)

1. General pharmacology - introduction
2. General pharmacology - LADME
3. General pharmacology – LADME – cont., pharmacokinetics
4. General pharmacology - variation in drugs' action. Adverse and toxic reactions
5. Autonomic nervous system – physiology, drugs acting on ganglia, endogenous catecholamines
6. Autonomic nervous system – synthetic adrenomimetics, adrenergics
7. Autonomic nervous system – cholinergic system
8. Hormones of hypothalamus, pituitary gland. Hormones of thyroid gland and antithyroid drugs.
9. Insulin and other hypoglycemic drugs
10. Hormones of adrenal gland (glucocorticoids, mineralocorticoids, adrenocortical antagonists)
11. Bone homeostasis.
12. Sex hormones.
13. Iron and hematopoiesis
14. Respiratory tract
15. Gastrointestinal tract

Lectures – summer semester (15 x 2 hours)

1. Diuretics
2. Lipid-lowering drugs
3. Heparins, oral anticoagulants. Antiplatelet drugs. Thrombolytic agents.



4. Therapy of chronic heart failure (RAA system - ACEI, ARB, RI, cardiac glycosides and other inotropic agents)
 5. Therapy of ischemic heart disease (BB, CCB, vasodilators)
 6. Therapy of arterial hypertension. Pulmonary hypertension.
 7. Antiarrhythmic drugs.
 8. Eicosanoids. NSAIDS. Non-opioid analgesics. Therapy of gout and rheumatoid arthritis.
 9. Opioid analgesics and antagonists.
 10. Autacoids – histamine, serotonin, and ergot alkaloids.
 11. Anticancer agents, biologic treatment.
 12. Vitamins, mineral substances.
 13. Toxicology. Therapeutic and toxic potential of OTC drugs. Herbal preparations and dietary supplements.
 14. Selected aspects of drug-induced toxicity.
 15. Selected aspects in pharmacology – review lecture.
- During the academic year, the order of the topics implemented may change.

Seminars

n/a

Classes – winter semester (15 x 3 hours)

1. Regulations of the classes and lectures in Pharmacology and Toxicology. General rules of order writing. Drug development and regulation.
2. Introduction to chemotherapy - clinical use of antimicrobial agents (Chapter 51). Management of anaphylactic shock. Dosage forms of drugs. Drug calculations.
3. Cell wall synthesis inhibitors and daptomycin. Dosage forms of drugs. Drug calculations.
4. Protein synthesis inhibitors. Dosage forms of drugs. Drug calculations.
5. Quinolones, sulphonamides, co-trimoxazole. Other antimicrobial drugs. Antimycobacterial drugs. Dosage forms of drugs. Drug calculations.
6. Antifungal drugs. Dosage forms of drugs. Drug calculations.
7. Antiviral drugs – part I. Dosage forms of drugs. Drug calculations.
8. Practical training in multiple choice tests (test 1). Dosage forms of drugs. Drug calculations.
9. Antiviral drugs – part II. Dosage forms of drugs. Drug calculations.
10. Antiprotozoal drugs. Anthelmintic drugs. Dosage forms of drugs. Drug calculations.
11. Immunomodulators. Dosage forms of drugs. Drug calculations.
12. Review class of theory. Dosage forms of drugs. Drug calculations
13. Practical training in multiple choice tests – part 2. Dosage forms of drugs. Drug calculations – review.
14. Practical training in drug calculations and prescription writing – part 1. Antiseptics.
15. Summary and discussion about the drugs discussed in the semester. Possibility for retakes of tests.

Classes – summer semester (15 x 135 minutes) – 45 lecture hours

1. General anesthetics. Dosage forms of drugs. Drug calculations.
2. Local anesthetics. Dosage forms of drugs (local anesthetics). Drug calculations.
3. Spasmolytics, myorelaxants, drugs affecting neuromuscular transmission. Dosage forms of drugs. Drug calculations.
4. The alcohols and drugs abuse. Dosage forms of drugs. Drug calculations.
5. Antipsychotic drugs and lithium. Dosage forms of drugs. Drug calculations.
6. Mood disorders, antidepressants. Drug calculations.
7. Review class. Dosage forms of drugs. Drug calculations.
8. Practical training in multiple choice tests – part 3. Dosage forms of drugs. Drug calculations.
9. Hypnotic-sedative and anxiolytic drugs. Dosage forms of drugs. Drug calculations.
10. Neurodegenerative disorders. Dosage forms of drugs. Drug calculations.
11. Antiepileptic drugs. Dosage forms of drugs. Drug calculations.
12. Review class. Dosage forms of drugs. Drug calculations.
13. Practical training in multiple choice tests – part 4. Dosage forms of drugs. Drug calculations – review.



14. Practical training in drug calculations and prescription writing – part 2. Review of basic pharmacokinetic calculations.
15. Summary and discussion about the drugs discussed in the semester. Possibility for retakes of tests.
16. During the academic year, the order of the topics implemented may change.

Other

n/a

Basic literature (list according to importance, no more than 3 items)

1. Basic & Clinical Pharmacology, Katzung BG, Mc Graw Hill, 15th Ed, 2020
2. Katzung & Trevor's Pharmacology Examination and Board Review, 13th Ed, 2021

Additional literature and other materials (no more than 3 items)

1. Brenner GM: Pharmacology Saunders/Elsevier, 5th Ed,
2. Rang and Dale's Pharmacology. HP Rang, MM Dale, JM Ritter, RJ Flower, Churchill Livingstone Elsevier, 9th Ed, 2019
3. Howland RD, Mycek MJ, Harvey RA, Champe PC: Lippincott's illustrated reviews: pharmacology, Lippincott Williams and Wilkins, 7th Ed, 2018

Preliminary conditions: (minimum requirements to be met by the student before starting the course)

– basic knowledge of selected aspects in anatomy, physiology, pathophysiology, microbiology and biochemistry

Conditions to receive credit for the course (specify the form, criteria and conditions of receiving credit for classes included in the module/course, admission terms to final theoretical or practical examination, its form and requirements to be met by the student to pass it and criteria for specific grades).

Conditions for completing the individual classes:

Presence on didactic classes (contact and distant) is obligatory and making the practical and theoretical assignments from the current lecture/seminar/class topics and/or previous topics. Conditions for completing each semester: Besides required presence on all didactic meetings student is obliged to gain in each semester 2 positive marks from multiple choice test (25-50 questions), 1 positive mark from practical drug calculations (3-6 examples) and 1 positive mark from oral answer.

All absences on planned didactic classes during the course, including Dean's hours or Rector's days, must be made up in a form set by the academic teacher.

To take the final exam:

Completing of classes at the date specified by the Rector in the ordinance regarding the organization of the academic year 2020/2021.

Final theoretical exam:

Final exam is in a form of test 50-100 questions in the first term and during the first retake. To pass the test 61% of correct answers are required. The level may be only decreased in some situations. Theoretical exam may be in written (open questions) or oral form (to pass the oral exam correct answers on all of 3 chosen questions are required) in case of a smaller number of students during e.g. first or second retake or commission exam.

Final practical exam (drug calculation and order writing):

Final practical exam is written before theoretical test and is required to take theoretical part of the exam. To pass drug calculation test correct calculations and writing of the 3 examples of prescriptions or orders for the nurse are required.

The examination and credit for the grade takes place in direct contact with the teacher. In justified cases, after the Rector's decision may take place with distant learning tools.



| Grade: | Criteria for courses ending with a grade ³ (based on average from all semester grades) |
|-------------------------|---|
| Very Good (5.0) | average 4,75 - 5,0 |
| Good Above (4.5) | average 4,25 - 4,74 |
| Good (4.0) | average 3,75 - 4,24 |
| Satisfactory Plus (3.5) | average 3,25 - 3,74 |
| Satisfactory (3.0) | average over 2,0 - 3,24 and it is necessary to obtain at least 2 positive marks from multiple choice question tests, 1 positive mark from practical drug calculations and at least 1 other positive mark from theory (e.g., test, oral answer, presentation etc.) in each semester. The credit for the grade takes place in direct contact with the teacher. In justified cases, after the Rector's decision may take place with distant learning tools. |

| Grade: | Criteria for exam (MCQ, 1 answer, 4 distractors) |
|-------------------------|---|
| Very Good (5.0) | from 93% points |
| Good Above (4.5) | from 85% points |
| Good (4.0) | from 77% points |
| Satisfactory Plus (3.5) | from 69% points |
| Satisfactory (3.0) | from 61% points The examination takes place in direct contact with the teacher. In justified cases, after the Rector's decision may take place with distant learning tools. |

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|------------------------------------|--|
| Department in charge of the course | Department of Pharmacology |
| Department address: | Mikulicza-Radeckiego 2, 50-345 Wrocław, Poland |
| Telephone: | +48 71-784-1438 |
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| | |
|----------------------------------|------------------------------|
| Person in charge for the course: | Anna Merwid-Ląd, MD, PhD |
| Telephone: | +48 71-784-1442 |
| E-Mail: | anna.merwid-lad@umed.wroc.pl |

List of persons conducting specific classes:

| Name and surname | Degree/scientific or professional title | Discipline | Performed profession | Form of classes |
|-------------------------|---|-----------------|----------------------|-------------------|
| Anna Merwid-Ląd | MD, PhD | medical science | academic tutor | lectures, classes |
| Beata Nowak | MD, PhD | medical science | academic tutor | classes |
| Tomasz Sozański | MD, PhD, prof. WMU | medical science | academic tutor | classes |
| Monika Skrzypiec-Spring | MD, PhD | medical science | academic tutor | classes |
| Dorota Książczyńska | MD, PhD | medical science | academic tutor | classes |

³ The verification must cover all education results, which are realized in all form of classes within the course



Date of Syllabus development

28.06.2021

Syllabus developed by

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Anna Merwid-Ląd
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Signature of Head(s) of teaching unit(s)

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Dean's signature

Wrocław Medical University
Faculty of Medicine
Vice Dean for English Studies
Beata Szmajdzka
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