SYLLABUS

The academic year when the cycle of instruction is commenced 2019-2025 [INT]

Module/course name:	**Pharmacology with Toxicology**	**Module code**	LK.3.C 004
Faculty:	Faculty of Medicine MUL		
Major:	Medical		
Specialty:			
Level of study:	I (Bachelor studies) ☐ II (Master studies) ☐ Integrated Master studies **X** Doctoral studies ☐		
Mode of study:	full-time **X** part-time (extramural) **X**		
Year of study:	I ☐ II ☐ III **X** IV ☐ V ☐ VI ☐	Semester:	1☐ 2☐ 3☐ 4☐ 5 **X** 6 **X** 7☐ 8☐ 9☐ 10☐ 11☐ 12☐
Module/course type:	obligatory **X** elective ☐		
Language of instruction:	Polish ☐ English **X**		

Form of education	**Hours**
Lecture	**40**
Seminar	
Laboratory class	**90**
E-learning	
Practical class	
Internship	
Other	
TOTAL	
Student's work input (participation in class, preparation, evaluation, etc.)	**Student's hourly workload**
1. In class	**130**
2. Student's own work including: 1 Preparation for class 2 Preparation for partials and finals	**170**
Summary of the student's workload	**300**
ECTS points for module/course	**12**

Educational objectives: Students are expected to

- discriminate among a body of pharmacological agents and substances, based upon the generic drug name, pharmacological classification, primary mechanism of action, major clinical uses and/or most prevalent/clinically significant adverse effects
- integrate previously acquired medical knowledge with newly acquired information concerning the actions of drugs at the cellular, organ, system and whole-body levels
- apply cognitive skills needed to analyze developmentally appropriate therapeutic scenarios and to select an appropriate pharmacological solution to that situation
- be familiar with rules and regulations involved in proper prescribing of drug
- write prescriptions for the drugs appropriate to treat given clinical condition; perform necessary calculations of the doses

The matrix of learning outcomes for module/ subject with reference to verification methods of the intended educational outcomes and forms of instruction:			
Learning outcome code	A student who has obtained a credit for the module/course has the knowledge/skill to:	Methods of verifying the achievement of the intended learning outcomes:	Form of instruction * provide the symbol
C.W35.	can characterize specific groups of medicinal drugs;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W36	knows the main mechanisms of medicinal drug action and their transformation in the body, depending on age;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W37.	can describe the effect of disease processes on metabolism and elimination of drugs;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W38.	knows the basic principles of pharmacotherapy;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W.39	knows the more important adverse effects of medicinal drugs, including those resulting from their interactions;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W40.	understands the problem of drug-resistance, including multidrug resistance;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W.41	knows indications to genetic tests with the purpose of individualization of pharmacotherapy;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W42.	knows the basic trends in the development of therapy, in particular, the possibilities offered by cellular, genetic and targeted therapy in specific diseases;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class

C.W.43	knows the basic issues of general toxicology;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W44.	knows groups of medicinal drugs which, when overused, may lead to poisoning;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W45.	knows the symptoms of most common types of poisoning, including those caused by alcohol, drugs, psychoactive substances, heavy metals and some groups of medicinal drugs;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.W46.	knows the basic principles of diagnostic procedures in cases of poisoning;	written exam - SSQ - MCQ - MRQ - matching test - true/false test	Lecture/ Lab class
C.U13.	performs simple pharmacokinetic calculations;	Written exam -MCQ -open test Open written test Practical exam	Lecture/ Lab class
C.U14.	selects medical drugs in adequately adjusted doses in order to correct pathological phenomena in the body and in specific organs;	Open written test Practical exam	Lecture/ Lab class
C.U15.	develops a schedule of rational, empirical or targeted chemotherapy of infections;	Written exam -MCQ -open test Open written test Practical exam	Lecture/ Lab class
C.U16.	can prepare adequate instruction for all prescriptive formulae of therapeutic substances;	Open written test Practical exam	Lecture/ Lab class
C.U17.	uses drug guides and medical products data bases;	Written exam -MCQ -open test Open written test Practical exam	
C.U.18.	can assess toxicological hazard in different age groups and in hepatic or renal failures, and also prevent drug poisoning;	Written exam -MCQ -open test Open written test Practical exam	Lecture/ Lab class

C.U19.	interprets toxicology test results.	- Mini-CEX (mini – clinical examination) - completion of a given assignment - project - presentation	Lecture/ Lab class

EXAMPLES OF METHODS VERIFYING THE ACHIEVEMENT OF THE INTENDED LEARNING OUTCOMES:

In terms of knowledge: Oral exam (*non-standardized, standardized, traditional, problem-based*).
Written exam – the student produces/identifies answers)*essay, report; structured short-answer questions /SSQ/; multiple choice questions /MCQ/; multiple response questions /MRQ/; matching test; true/false test; open cloze test*)
In terms of skills: practical exam; Objective Structured Clinical Examination /OSCE/; Mini-CEX (mini – clinical examination); completion of a given assignment; project, presentation.

In terms of social competences:
A reflective essay; an extended observation by a supervisor/tutor; 360-degree assessment (feedback from teachers, peers, patients, other co-workers); self-assessment (portfolio included).

Course content: (use keywords referring to the content of each class following the intended learning outcomes):

Lectures (1st and 2nd term) :

1. Pharmacology – general information. Antibacterial agents – general information. Sulphonamides, trimethoprim, nitrofuranes, quinolones. β-lactams – penicillins, β-lactamase inhibitors, glycopeptides.
2. Tetracyclines, macrolides, clindamycin, chloramphenicol, streptogramins, oxazolidinons, aminoglycosides, spectinomycin
3. Antifungal drugs, drugs to treat tuberculosis.
4. Antiviral drugs. Drugs to treat protozoal and parasitic infections.
5. Drugs in the therapy of GI disorders – peptic ulcer, inflammatory bowel diseases. Antiemetics.
6. Autacoids – histamine, serotonin, antihistamines, agonists and antagonists of serotonin receptors. NSAIDs. Disease modifying antirheumatoid drugs (DMARDs).
7. Hypothalamic and hypophyseal hormones. Glucocorticosteroids, mineralocorticosteroids.
8. Thyroid hormones. Antithyroid drugs. Pancreatic hormones. Oral hypoglycemic agents.
9. Gonadotropins. Gonadal hormones. Hormonal contraceptive agents. Hormonal replacement therapy.
10. Repetition of material from 1st semester. Lectures' test

2nd semester

11. Cholinergic and adrenergic system
12. Anticoagulants – oral and parenteral. Antiplatelet drugs. Fibrinolytics and drugs inhibiting fibrinolysis.
13. Drugs in hypertension and coronary heart disease
14. Drugs to treat chronic and acute heart failure
15. Antiarrythmic adrugs
16. Therapy of neurodegenerative disorders - Parkinson's, Huntington's, Alzheimer's diseases, ALS, SM. Antiepileptics.
17. Antipsychotic drugs. Antidepressants.
18. Opioids. Opioid receptors. Opioid agonists and antagonists. Acute and chronic analgesic therapy. Therapy of opioid dependence and acute abuse.
19. Drugs of abuse – Stimulants, Depressants, Hallucinogens, Cannabis, Volatile Solvents, Other.
20. Review of material from 2nd semester. Lectures' test (40 questions)

Laboratory classes (1st and 2nd term) :

1. Prescription and it's elements. Dosing of drugs. Routes of application. Solid drugs – powders, tablets, coated tablets, capsules, system SR and PR. Basic information about drugs – routes of administration, absorption, distribution, local and distant effects, metabolism, excretion. T1/2. Disinfectants. Antibacterial agents – groups, MoA, resistance. Sulphonamides, trimethoprim, nitrofurans, fluoroquinolones.
2. Liquid drugs for external uses – aqueous and alcoholic solutions, tincturae. β-lactam antibiotics – penicillins, cephalosporins, monobactams, β -lactamase inhibitors, carbapenems, glycopeptide antibiotics, other antibiotics acting on cell wall.
3. Liquid drugs for internal use – solutions, syrups, suspensions, drops; injections, infusions. Tetracyclines, macrolides, clindamycin, chloramphenicol, streptogramins, aminoglycosides, Spectinomycin.
4. Soft drugs – ointments, creams, pastes, suppositories – rectal and vaginal. Drugs to treat tuberculosis;

antifungal and dermatological drugs.

5. Prescription writing quiz (10 prescriptions; 45 min). Herbal drugs. Antiviral drugs.
6. Other form of drugs – aerosols, inhalational drugs, emulsions, patches, other. Drugs to treat protozoal and parasitic infections.
7. Anatoxins, antitoxins, vaccines, immunoglobulins.Review of prescription writing. Drugs to treat diseases of GI – antiemetic drugs, drugs to treat peptic ulcer, GERD, inflammatory bowel diseases; laxatives; drugs to treat diarrhea.
8. Partial 1 (classes 1-7; 25 questions; 30 min). Serotonin, agonists and antagonists of serotonin receptors. Drugs to treat migraine. Purines. Histamine and drugs affecting histamine receptors.
9. Local hormones continuation - vasoactive peptides, eicosanoids, etc. Cytokines. Nonsteroidal anti-inflammatory drugs (NSAIDs). Drugs to treat gout.
10. Immunosuppressive and immunomodulating drugs. Disease modifying antirheumatoid drugs (DMARDs).
11. Hormones of hypothalamus and hypophysis. Parathyroid hormones. Drugs affecting mineralisation of bone – calcium, vitamins D, K, biphosphonates, fluor. Thyroid hormones. Antithyroid drugs.
12. Glucocorticosteroids, mineralocorticoids. Inhibitors of steroids synthesis and antagonists of steroid receptors.
13. Pancreatic hormones. Oral hypoglycemic agents. Gonadotropins, gonadal hormones, hormonal contraceptive agents, hormonal replacement therapy (HRT). Obesity.
14. Antineoplasmatic drugs. Gene therapy. Test 2 (classes 8-14; 25 questions; 30 min).
15. Lifestyle drugs and drugs in sport. Repetition of term 1.

2nd semester

16. Muscarinic and nicotinic receptors. Second messengers. Direct and indirect cholinergic agonists (parasympathomimetics). Cholinergic antagonists (parasymapatholytics). Mechanism of action, clinical uses, side-effects, contraindications, interactions
17. Adrenergic system – α and β receptors. Direct and indirect agonists, antagonists. Sympatholytic agents. Drugs acting presynaptically. Mechanism of action, clinical uses, side-effects, contraindications, interactions.
18. Coagulation cascades. Anticoagulants – oral and parenteral. Antiplatelet drugs. Fibrinolytics and drugs inhibiting fibrinolysis. Drugs stimulating and inhibiting hematopoesis. Drugs to treat anemias. Drugs affecting myelopoesis.
19. Hypertension and antihypertensive drugs (mono- and polytherapy). Mechanism of action, clinical uses, side-effects, contraindications. Drugs used in the treatment of hypotension. Drugs used to treat coronary heart disease – nitrates, ACE-I, β -blockers, antiplatelet agents, etc.
20. Drugs to treat chronic and acute heart failure – ACE-I, AT1 antagonists, diuretics, cardiac glycosides, PDE inhibitors, sympathomimetics, vasodilators.
21. Drugs used in therapy of hyperlipidemias and atherosclerosis. Mechanisms initiating cardiac arrythmias. Supra- and ventricular arrhythmias. Antiarrythmic drugs class I-IV. Unclassified drugs.
22. Test 1 (classes 1-6; 25 questions, 30 min). Drugs in therapy of respiratory tract diseases – asthma, COPD (β2-mimetics, corticosteroids, parasympatholytics, leukotriene antagonists, methylxanthines, other). Antitussive drugs. Expectorants and mucolytics. Local decongestants.
23. Sedatives-hypnotics, anxiolytics. Drugs acting at GABAa and GABAb receptors. Antiepileptic drugs – classical and novel; therapy of status epilepticus.
24. General anesthesia – inhalational and intravenous drugs. Neuroleptoanalgesia. Premedication. Local anesthetics. Skeletal muscle relaxants.
25. Prescription writing test (classes 1-9; 10 prescriptions, 45 min). Therapy of neurodegenerative disorders - Parkinson's, Huntington's, Alzheimer's diseases, ALS, SM.
26. Antipsychotic drugs – typical and atypical. Antidepressants. Mechanisms of action, side-effects, interactions, contraindications. Drugs normalizing the mood – lithium salts, carbamazepine, valproate, etc.
27. Opioids. Opioid receptors. Opioid agonists and antagonists. Acute and chronic analgesic therapy. Drugs of abuse – Stimulants.
28. Drugs of abuse - cont.: Depressants, Hallucinogens, Cannabis, Volatile Solvents, Other drugs of abuse. Therapy of poisoning – organophosphates, iron, lead, mercury, methanol, ethanol. Chelating agents.
29. Test 2 (classes 8-14; 25 questions; 30 min). Therapy of poisoning and overdoses – cont.: enterotoxin, botulinum toxin, paracetamol, aspirin, atropine, beta-blockers, digoxin,. Review of 1st term.
30. Prescription writing final (material from both semesters; 12 prescriptions; 60 min). Review of 2nd term.

Obligatory literature for lectures:

1. Basic & Clinical Pharmacology, 12e, B. G. Katzung, S. B. Masters, A. J. Trevor

Complementary literature for lectures:

1. Goodman & Gilman's The Pharmacological Basis of Therapeutics, 12e, LL. Brunton, BA. Chabner, BC.

Knollmann
2. Pharmacology Brenner George M., Stevens Craig W Fourth Edition

Obligatory literature for labs:
1. Rang and Dale's Pharmacology, 8th edition
2. Pharmacology Brenner George M., Stevens Craig W Fourth Edition

Complementary literature for labs:
1. Lippincott Illustrated Reviews: Pharmacology 6th edition (Lippincott Illustrated Reviews Series)
2. Goodman & Gilman's The Pharmacological Basis of Therapeutics, 12e, LL. Brunton, BA. Chabner, BC. Knollmann

Requirements for didactic aids (e.g. laboratory, multimedia projector, others…)

- Laptop
- Multimedia projector
- TV

Conditions for obtaining a credit for the subject:

EVALUATION OF PROGRESS – student can obtain maximum **25 points during semester including**:

a) Minimum two scores from **lab evaluation** of knowledge, practical skills and attitude. Student **can be evaluated more than two times during semester**. In such situation, **two scores (representing two averages calculated as arithmetic mean value) will be drawn**. Teacher can use various forms to test the knowledge of students – e.g. oral questioning, quizzes in form of written assays, open-end questions etc. Scoring system will include following points:

- 0.0
- 3.0
- 3.5
- 4.0
- 4.5
- 5.0

b) Two scores from **partials** (25 questions each – test multiple choice and open-end questions); grades based on the number of correct answers:

▪ 0-13	0.0
▪ 14-16	3.0
▪ 17-19	3.5
▪ 20-21	4.0
▪ 22-23	4.5
▪ 24-25	5.0

c) **Prescription quiz** –

10 correct prescriptions	– 5.0
9	- 4.0
8	- 3.0
7 or less	- 0.0

Failing the prescription quiz requires passing it within two weeks; there will be NO additional score. Those who will fail prescriptions for the second time will have to pass the retake including prescriptions from the material covering **whole semester**. Failing prescriptions will be equivalent with failing the semester.

d) Additionally, students who would like to be exempted from the final, **should** participate in lecture tests (40 questions) and obtain minimum 70% correct answers.

Passing the semester –
1st term - collecting **minimum 13.0 points** and **passing the prescription quiz**.
2nd term - those who scored **5-12.9 points,** should pass 1st midterm (40 questions; open-end and multiple choice; 60% correct answers required to pass) which will be held during exam session but prior to final exam (when concerning the 2nd term)
3rd term - Students, **who obtained less than 5 points or failed the midterm** will have to participate in the 2nd midterm (40 questions; open-end and multiple choice; 60% correct answers required to pass) which will be held during retake exam session but prior to 1st retake final. Those who will fail the 2nd midterm will fail the whole semester.

Final grades from semester:

- <13.0 2.0 (failed)
- 13.0-16.5 3.0 (satisfactory)
- 16.6-18.5 3.5 (fairly good)
- 18.6-20.5 4.0 (good)
- 20.6-22.5 4.5 (above good)
- 22.6-25.0 5.0 (very good)

Final exam includes:

a) practical exam (12 prescriptions, min. 10 correct to pass; no grade)

b) **written theoretical exam** [60% correct answers to pass; questions will include multiple choice test questions (40-60%), open-end questions (30-40%), short descriptions or essays (10-20%)].

Those who failed practical exam will have one more chance to pass it, one day before the written final. Failing practical exam for the 2nd time is equivalent with failing the first term of whole exam. Third retake of practical exam will be scheduled during retake session.

Grading of final written exam:

<60% correct answers - 2.0 (failed)
60-68% - 3.0 (satisfactory)
69-76% - 3.5 (fairly good)
77-83% - 4.0 (good)
84-89% - 4.5 (above good)
90-100% - 5.0 (very good)

Exemptions from final test exam can be given to students who obtained an average score from both **semesters 4.75 or more,** with final grade **5.0 (very good) (i.e. scored 4.5 and 5.0 or twice 5.0) and passed both lectures' tests. The decision will be made by Course Coordinator.** Students exempted from final written exam **have to pass the prescription practical exam.**

Students who obtained score '0.0' from any partial or lab evaluation during the course cannot be exempted from the final.

RULES AND OBJECTIVES

1. Course schedule (classes and lectures) is posted and available to every student.
2. Presence is **obligatory** during classes and lectures. Students must attend the class sufficiently prepared (**current and previous class plus material from lectures**) and be able to:

- discriminate among a body of pharmacological agents and substances, based upon the generic drug name, pharmacological classification, primary mechanism of action, major clinical uses and/or most prevalent/clinically significant adverse effects; be familiar with interactions among drugs
- integrate previously acquired medical knowledge with newly acquired information concerning the actions of drugs at the cellular, organ, system and whole-body levels
- apply cognitive skills needed to analyze developmentally appropriate therapeutic scenarios and to select an appropriate pharmacological solution to that situation
- write prescriptions for the drugs appropriate to treat given clinical condition; perform necessary calculations of the doses

Attendance:

- **Two or more absences without justification result in failing the semester.** Students should come in time for labs and lectures. Student may enter the classroom up to 15 min after the planned beginning of the class. Late arrivals will be recorded. More than three late arrivals will be equivalent to one absence. Student coming later than within 15 min from the beginning of lab/lecture **cannot** participate in the respective class and is considered absent.
- **Sick leave has to be presented within 3 days after missed class to the teacher. In such case,** after obtaining permission from the course Coordinator, individually scheduled retake of the material can be arranged with the teacher, upon his/her agreement.
- Students are NOT allowed to change freely the group that they were assigned to in the beginning of semester.

Uniforms: Students should attend labs wearing white, clean lab coats and lab shoes or shoe covers (otherwise student WILL NOT be allowed to participate in the lab). Students are not permitted to attend labs or lectures wearing coats, jackets or hats/caps etc.

Mobile phones and electronic devices: Use of mobile phones or any other electronical devices during the labs, lectures, partials and exams is **strictly forbidden**.

Cheating during any partial or exam results in failing with grade 0.0 (partial) or 2.0 (exam) **without** possibility of retake and in notification of Dean's office!

The name and address of the department/clinic where the course is taught (module/course); contact details (phone number/ email address): The name and address of the department/~~clinic~~, where the course is taught (module/course); contact details (phone number/ email address):

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Date of submission: