

SYLLABUS
concerning the cycle of education 2024-2030
(date range)

1. BASIC INFORMATION CONCERNING THIS SUBJECT / MODULE

Subject / Module	CLINICAL PHARMACOLOGY
Course code / module *	FmK/E
Faculty of (name of the leading direction)	Medical College of Rzeszów University
Department Name	Department of Experimental and Clinical Pharmacology
Field of study	Medical
Level of education	Uniform Master's studies
Profile	General academic
Form of study	Stationary / Non-stationary
Year and semester	year V, semester IX
Type of course	Obligatory
Coordinator	prof. dr hab. n. med. Piotr Tutka
First and Last Name of the Teacher	prof. dr hab. n. med. Piotr Tutka dr hab. prof. UR Kamil Jurowski dr n. farm. Karol Wróblewski dr n. farm. Patrycjusz Kołodziejczyk dr inż. Bożena Czubat dr inż. Natalia Pieńkowska lek. Karolina Barczak lek. Wiktoria Płonka lek. Krzysztof Kiper

* - According to the resolutions of the Faculty of Medicine

2. Forms of classes, number of hours and ECTS

Lecture	Lecture	Conversation	Laboratory	Seminar	ZP	Practical	Self-learning	Number of points ECTS
			10	20				2

3. The form of class activities

- traditional classes
- at the patient's bedside classes
- classes at the Medical Simulation Center
- classes carried out with the use of distance learning methods and techniques, i.e. Office 365 - TEAMS APPLICATION, ClickMeeting, ZOOM, UR e-learning platform, UR mail

4. Examination Forms / module (exam, credit with grade or credit without grade)

2. REQUIREMENTS

Basics of knowledge in the field of anatomy, physiology, biochemistry, microbiology, pathology. Basics of knowledge, skills and competences in the field of clinical sciences according to the 3rd, 4th and 5th year programs.

3. OBJECTIVES, OUTCOMES, AND PROGRAM CONTENT USED IN TEACHING METHODS

3.1. Objectives of this course/module

C1	Obtaining knowledge about the principles of rational pharmacotherapy, including pharmacokinetics, pharmacodynamics and pharmacoeconomics of individual drug groups
C2	Acquisition of knowledge about clinical effects, indications, contraindications and adverse drug reactions
C3	Obtaining knowledge about the differences in pharmacotherapy of children, the elderly, pregnant women and patients with liver and kidney damage and the ability to modify drug doses in these conditions.
C4	Obtaining knowledge on the interaction between drugs with particular emphasis on polypharmacy
C5	Acquiring the ability to adapt therapeutic possibilities (resulting from the mechanisms of drug action) to pathological processes occurring in the body.
C6	Shaping the student's attitude to the use of knowledge about drugs in clinical practice.
C7	Acquiring the ability to individualize pharmacological treatment in specific clinical situations.
C8	Acquiring knowledge of formal and legal issues and ethical issues related to clinical trials of drugs.
C9	Acquiring the ability to analyze the results of scientific research.

3.2 OUTCOMES FOR THE COURSE / MODULE (TO BE COMPLETED BY THE COORDINATOR)

<p>EK (the effect of education)</p>	<p>The content of the learning effect defined for the course (module)</p>	<p>Reference to directional Effects (KEK)</p>
<p>EK_1</p>	<p>environmental and epidemiological conditions, causes, symptoms, principles of diagnosis and therapeutic procedures for the most common diseases occurring in children and their complications</p> <p>1) rickets, tetany, water-electrolyte and acid-base disorders;</p> <p>2) heart defects, myocarditis, endocarditis and pericarditis, cardiomyopathy, heart rhythm disorders, heart failure, arterial hypertension, pulmonary hypertension, fainting;</p> <p>3) respiratory diseases and allergies, including congenital respiratory defects, bronchiectasis, respiratory infections, tuberculosis, cystic fibrosis, asthma, allergic rhinitis, urticaria, atopic dermatitis, anaphylactic shock, angiomotor edema;</p> <p>4) anemia, hemorrhagic diathesis, bone marrow failure, childhood neoplastic diseases, including solid tumors typical of childhood, primary and secondary immunodeficiencies;</p> <p>5) acute and chronic abdominal pain, vomiting, diarrhea, constipation, bleeding from the digestive tract, peptic ulcer disease, nonspecific intestinal diseases, pancreatic diseases, cholestasis, liver diseases, food allergies, congenital defects of the digestive tract;</p> <p>6) acute kidney damage, chronic kidney disease, urinary tract infections, urination disorders, congenital urinary tract defects, vesicoureteral reflux disease, nephrolithiasis, glomerular diseases, tubulointerstitial diseases (tubulopathies, tubular acidosis), genetic kidney diseases, nephrogenic hypertension;</p> <p>7) growth disorders, thyroid and parathyroid diseases, adrenal diseases, diabetes, obesity, puberty disorders, gonadal function disorders;</p> <p>8) cerebral palsy, inflammation of the brain and</p>	<p>E.W3</p>

	<p>meninges, seizures, epilepsy;</p> <p>9) the most common infectious diseases of childhood;</p> <p>10) systemic connective tissue diseases, including juvenile idiopathic arthritis, systemic lupus erythematosus, dermatomyositis, systemic vasculitis, and other causes of musculoskeletal pain (non-inflammatory, infectious and reactive arthritis and juvenile spondyloarthropathies);</p>	
EK_2	<p>environmental and epidemiological conditions, causes, symptoms, principles of diagnosis and therapeutic procedures in the case of the most common internal diseases occurring in adults and their complications</p> <p>1) diseases of the circulatory system, including ischemic heart disease, heart defects, diseases of the endocardium, heart muscle, pericardium, heart failure (acute and chronic), diseases of the arterial and venous vessels, arterial hypertension (primary and secondary), pulmonary hypertension;</p> <p>2) diseases of the respiratory system, including diseases of the respiratory tract, chronic obstructive pulmonary disease, asthma, bronchiectasis, cystic fibrosis, respiratory infections, tuberculosis, interstitial lung diseases, pleura, mediastinum, obstructive and central sleep apnea, respiratory failure (acute and chronic), respiratory system neoplasms;</p> <p>3) diseases of the digestive system, including diseases of the oral cavity, esophagus, stomach and duodenum, intestines, pancreas, liver, bile ducts and gallbladder, gastrointestinal system neoplasms;</p> <p>4) diseases of the endocrine system, including diseases of the hypothalamus and pituitary gland, thyroid, parathyroid glands, adrenal cortex and medullary glands, ovaries and testicles, as well as neuroendocrine tumors, multiple gland syndromes, various types of diabetes, metabolic syndrome, obesity, dyslipidemia and hypoglycemia, ovarian, testicular and thyroid cancers, neuroendocrine tumors;</p> <p>5) kidney and urinary tract diseases, including acute kidney damage and chronic kidney disease in all stages and their complications, glomerular diseases (primary and secondary, including diabetic nephropathy and systemic diseases) and interstitial kidney diseases, nephrogenic hypertension, kidney cysts, nephrolithiasis, urinary tract infections (upper and lower section), kidney diseases during pregnancy, urinary tract neoplasms – kidney, bladder, prostate neoplasms;</p>	E.W7

	<p>6) diseases of the hematopoietic system, including bone marrow aplasia, anemia, granulocytopenia and agranulocytosis, thrombocytopenia, acute and chronic leukemia, myelomas, myelo- and lymphoproliferative neoplasms, myelodysplastic syndromes, hemorrhagic diathesis, thrombophilia, blood disorders in diseases of other organs;</p> <p>7) rheumatic diseases, including systemic diseases of the connective tissue (rheumatoid arthritis, early arthritis, systemic lupus erythematosus, Sjögren's syndrome, sarcoidosis, systemic sclerosis, idiopathic inflammatory myopathies), spondyloarthropathies, crystallopathy, erythema nodosum, arthritis associated with infectious factors, vasculitis and non-inflammatory diseases of the joints and bones (degenerative disease, soft tissue rheumatism, osteoporosis, fibromyalgia), soft tissue and bone sarcomas;</p> <p>8) allergic diseases, including anaphylaxis and anaphylactic shock and angioedema;</p> <p>9) water-electrolyte and acid-base disorders (dehydration, overhydration, electrolyte disorders, acidosis and alkalosis);</p>	
EK_3	principles of pharmacotherapy in patients with renal failure and renal replacement therapy	E.W8
EK_4	classification of pain (acute and chronic or nociceptive, neuropathic and nociplastic) and its causes, pain assessment tools and principles of its pharmacological and non-pharmacological treatment;	E.W27
EK_5	<p>environmental and epidemiological conditions, causes, symptoms, principles of diagnosis and therapeutic and preventive treatment of the most common infectious diseases and their complications</p> <p>1) bacterial diseases, including streptococcal, staphylococcal, pneumococcal and meningococcal infections, pertussis, tuberculosis, Lyme disease and gastrointestinal infections;</p> <p>2) viral diseases, including respiratory and gastrointestinal infections, viral hepatitis, infections with Herpesviridae viruses, human immunodeficiency virus and neurotropic viruses;</p> <p>3) parasitic diseases, including giardiasis, amoebiasis, toxoplasmosis, malaria, toxocariasis, trichinosis, ascariasis, taeniasis and enterobiasis;</p> <p>4) mycoses, including candidiasis, aspergillosis and pneumocystosis;</p>	E.W33

Course contents

	5) hospital infections;	
EK_6	indications for the implementation of monitored therapy	E.W41
EK_7	apply the principles of providing feedback (constructive, non-evaluative, descriptive) within team collaboration	E.U30
EK_8	obtain information from team members while respecting their diverse opinions and specialist competencies, and incorporate this information into the patient's diagnostic and therapeutic plan;	E.U32.
EK_9	Is able to establish and maintain deep and respectful contact with the patient, and shows understanding for worldview and cultural differences	K.01
EK_10	Is guided by the good of the patient.	K.02
EK_11	Adheres to the principles of medical confidentiality and patient rights	K.03
EK_12	Takes actions towards the patient based on ethical principles, with the awareness of social conditions and limitations resulting from the disease;	K.04
EK_13	Perceives and recognizes own limitations and makes a self-assessment of deficits and educational needs	K.05
EK_14	Uses objective sources of information	K.07

3. CONTENT CURRICULUM (filled by the coordinator)

A. Seminars

Course contents

1. The role of the clinical pharmacologist in the treatment process. Pre-registration drug development system. Pharmacoeconomic aspects of therapy.
2. Pharmacokinetics of drugs.
3. Principles and differences of pharmacotherapy in children and the elderly.
4. Principles and differences of pharmacotherapy in pregnant women, in renal and hepatic failure.
5. Adverse drug reactions and the principles of post-authorization drug safety supervision. Clinically significant adverse drug interactions, and between drugs, supplements and food.
6. Principles of pain pharmacotherapy.
7. Principles of pharmacotherapy of selected diseases of the cardiovascular system, part. I (with particular emphasis on arterial hypertension, ischemic heart disease and emergencies in cardiology) (part I).
8. Principles of pharmacotherapy of selected diseases of the cardiovascular system, part. I (with particular emphasis on arterial hypertension, ischemic heart disease and emergencies in cardiology) (part II).
9. Principles of pharmacotherapy of bronchial asthma, chronic obstructive pulmonary disease and selected allergic diseases.
10. Principles of chemotherapy for the most common infections. Rational antibiotic therapy.
11. Principles of treatment of selected hormonal diseases (with particular emphasis on diabetes I and II and thyroid diseases) (part I).
12. Principles of treatment of selected hormonal diseases (with particular emphasis on diabetes I and II and thyroid diseases) (part II).
13. Principles of pharmacotherapy of selected mental diseases (with particular emphasis on affective disorders and schizophrenia). Addiction to psychoactive substances.
14. Selected aspects of pharmacological treatment of neoplasms.
15. Clinical trials - practical aspects (part I).
16. Clinical trials - practical aspects (part II).
17. Monitored therapy.
18. Principles of pharmacotherapy of selected skin and allergic diseases.
19. Advances in pharmacotherapy.
20. Final credit.

B. Clinical laboratory issues

Course contents

1. Principles of pharmacotherapy in diseases of the urinary system. The peculiarities of pharmacotherapy in patients with impaired renal function.
2. Selected practical aspects of monitored therapy.
3. Selected practical aspects of pharmacotherapy of infections.
4. Selected practical aspects of diabetes therapy.
5. Selected practical aspects of pharmacological treatment of arterial hypertension.
6. Analysis of cases and clinical situations related to drug safety (part I).
7. Analysis of cases and clinical situations related to drug safety (part II).
8. Analysis of clinical cases and scenarios related to inappropriate pharmacotherapy (part I)
9. Analysis of clinical cases and scenarios related to inappropriate pharmacotherapy (part II).
10. The most common mistakes of doctors in the field of pharmacotherapy.

3.4 Teaching methods

Seminars: Problem-related and informative lecture with a multimedia presentation, taking into account the methods of distance learning.

Classes, including exercises at the patient's bedside. Working in groups. Solving tasks and clinical problems. Discussion. Analysis of clinical cases. Planning and performing of experiments. Formatting and analyzing research problems. Database searching. Preparing a multimedia presentation. Participation in scientific research projects.

4. METHODS AND EVALUATION CRITERIA

4.1. Methods of verification of learning outcomes

Symbol of effect	Methods of assessment of learning outcomes (Eg.: tests, oral exams, written exams, project reports, observations during classes)	Form of classes
EK_01	oral answer, final test	Seminar, Exercises, Classes
EK_02	oral answer, final test	Seminar, Exercises, Classes
EK_03	oral answer, final test	Seminar, Exercises, Classes
EK_04	oral answer	Exercises, Classes
EK_05	oral answer, final test	Seminar, Exercises, Classes
EK_06	oral answer, final test	Seminar, Exercises, Classes
EK_07	oral answer, final test	Seminar, Exercises, Classes

EK_08	oral answer, final test	Seminar, Exercises, Classes
EK_09	oral answer, final test	Seminar, Exercises, Classes
EK_10	oral answer	Exercises, Classes
EK_11	oral answer, final test	Seminar, Exercises, Classes
EK_12	oral answer, final test	Seminar, Exercises, Classes
EK_13	oral answer, final test	Seminar, Exercises, Classes
EK_14	oral answer	Exercises, Classes
EK_15	oral answer, final test	Seminar, Exercises, Classes
EK_16	oral answer, final test	Seminar, Exercises, Classes
EK_17	oral answer	Exercises, Classes
EK_18	oral answer, final test	Seminar, Exercises, Classes
EK_19	oral answer	Exercises, Classes
EK_20	observation during classes	Exercises, Classes
EK_21	observation during classes	Exercises, Classes
EK_22	observation during classes	Exercises, Classes
EK_23	observation during classes	Exercises, Classes
EK_24	observation during classes	Exercises, Classes
EK_25	observation during classes	Exercises, Classes
EK_26	observation during classes	Exercises, Classes
EK_27	observation during classes	Exercises, Classes
EK_28	observation during classes	Exercises, Classes

4.2. Conditions for completing the course (evaluation criteria)

I. The condition for completing the course is:

- attendance at all exercises / classes and seminars
- demonstrating knowledge and skills at least sufficient in the scope of the material applicable in accordance with the program (see the content)
- demonstrating the ability to critically analyze the acquired information and apply pharmacological knowledge in contact with the patient
- obtaining at least a satisfactory final grade (3,0)

The grade for completing the semester will be the result of all learning outcomes, i.e. the student's knowledge, skills and social competences, and will be based on internal regulations.

II. Detailed evaluation criteria:

The material from the current and previous exercise is valid for a given exercise. The material can be verified in an oral and / or written form (the form is decided by the teacher). The student may respond orally or in writing. Failure to complete the topic is tantamount to failure to complete the exercises.

A. Exam

The final exam will take place after the end of semester 9. The condition for taking the exam is passing the exercises. The final exam will be a test combined with an analysis of clinical cases and will test the knowledge and skills acquired during seminars, exercises and self-education. The single-choice test (five answers, one correct) will consist of 40 questions and, together with the case studies, will last 60 minutes. For each correct answer to the test question, the student will receive 1 point. For each case the student can get a maximum of 3 or 4 points - a total of 10 points. The criterion for passing the test will be to give correct answers to at least 60% of the total number of points.

The exam grades will be as follows:

below 30 points - insufficient (2.0)

30-33 points - satisfactory (3.0)

34-37 points - quite good (3.5)

38-41 points - good (4.0)

42-45 points - more than good (4.5)

46-50 points - very good (5.0)

Unauthorized absence from the exam results in receiving a failing grade (2.0). A student who is absent during the exam for justified reasons will be able to take the exam in a resit session and it will be treated as the first date. The form of the retake exam will be determined by the Head of the Department.

A student who fails the semester and / or does not receive at least a sufficient grade on the final credit will not receive a credit for the course (unsatisfactory grade).

C. Skill Assessment:

- rating 5.0:

Self-directed interview and physical examination.

Precise description of the somatic state,

Independent solving of complex and difficult diagnostic and therapeutic tasks,

Differentiation of clinical units,

Independent exercise of practical skills.

Presents an impeccable ethical attitude in relations with the patient and staff

- rating 4.5

Self-directed interview and physical examination.

Precise description of the somatic state,

Independent solving of basic and complex diagnostic and therapeutic tasks,

Differentiation of clinical units,

Independent exercise of practical skills

Presents the correct ethical attitude in relations with the patient and staff

- rating 4.0

Self-directed interview and physical examination.

Precise description of the somatic state,

Independent solving of basic diagnostic and therapeutic tasks,

Differentiation of basic clinical units,

Independent exercise of practical skills.

Presents the correct ethical attitude in relations with the patient and staff

- rating 3.5

Self-directed interviewing,

During the physical examination, a little teacher's help is needed,

Precise description of the somatic state,

Independent solving of basic diagnostic and therapeutic tasks,

Differentiation of basic clinical units,

When exercising practical skills, it requires guidance from the teacher

Presents the correct ethical attitude in relations with the patient. Has difficulties in relations with the therapeutic team.

- rating 3.0

Self-directed interviewing,

During the physical examination, the teacher's help is necessary,

Inaccurate description of the somatic state,

Independent solving of basic diagnostic and therapeutic tasks,

When exercising practical skills, it requires guidance from the teacher.

Presents the correct ethical attitude in relations with the patient. Has difficulties in relations with the therapeutic team.

C. Assessment of social competences:

- continuous assessment by the teacher (observation)
- discussion during classes
- opinions of patients and colleagues

5. Total student workload required to achieve the desired result in hours and ECTS credits

Activity	Hours / student work
Hours of classes according to plan with the teacher	30
Others with the participation of an academic teacher (participation in consultations, examination)	2
Non-contact hours - student's own work (preparation for classes, exam, writing a paper, etc.)	28
SUM OF HOURS	60
TOTAL NUMBER OF ECTS	2

* Please note that 1 ECTS point corresponds to 25-30 hours of total student workload

6. TRAINING PRACTICES IN THE SUBJECT / MODUL

Number of hours	
Rules and forms of apprenticeship	

7. LITERATURE

The obligatory books:

1. Craig W. Stevens, George M. Brenner. Brenner and Stevens' Pharmacology, 2022
2. James M. Ritter, Rod J. Flower, Graeme Henderson, Yoon Kong Loke, David MacEwan, Humphrey P. Rang. Rang & Dale's Pharmacology, 2021.

Recommended literature:

1. Anthony J. Trevor, Bertram G. Katzung. Basic and Clinical Pharmacology, 2017
2. Laurence L. Brunton, Björn C. Knollmann, Randa Hilal-Dandan. Goodman and Gilman's The Pharmacological Basis of Therapeutics, 2017
3. Karen Whalen. Lippincott Illustrated Reviews: Pharmacology. 2018 **and other academic books indicated by teachers**