Faculty of Medicine in Rijeka

Curriculum
2023/2024

For course

Clinical Pharmacology

Study program:	**Medical Studies in English (R)** University integrated undergraduate and graduate study
Department:	**Department of Basic and Clinical Pharmacology and Toxicology**
Course coordinator:	**prof. dr. sc. Vitezić Dinko, dr. med.**
Year of study:	**6**
ECTS:	**3**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

The Clinical Pharmacology course is a compulsory course at the sixth year of the Integrated Undergraduate and Graduate University Study of Medicine and consists of 10 hours of lectures and 45 hours of seminars, a total of 55 hours (3 ECTS). The course is conducted in the premises of the Faculty of Medicine, Clinical Hospital Center and the building of the Faculty of Health Studies. The aim of the course is to enable students to acquire knowledge of clinical pharmacology principles that are necessary for the implementation of rational pharmacotherapy. The student should acquire knowledge about the latest achievements in the field of medicines and the conditions prevailing in the health care system, which are important for the rational use of medicines (eg. lists of medicines, financial limits for medicines, patient's participation for medicines). The content of the course is as follows: A. General principles of clinical pharmacology - drug discovery and development, pharmacoeconomics, pharmacoepidemiology, drug side effects and interactions, principles of clinical drug use in certain groups of patients, pharmacogenomics (individualization of therapy) and basic principles of toxicology. B. Rational pharmacotherapy of selected clinical entities - this part of the course will cover the use of drugs in the treatment of the most common diseases and conditions, characterized with high utilisation and a significant share of financial consumption (eg. antimicrobial drugs, antihypertensives, hypolipemics, benzodiazepines, drugs for diabetes, pain treatment, supportive treatment of malignant diseases, etc.). Teaching: Classes are held in the form of lectures and seminars. Estimated duration of classes is up to a total of 2 weeks. During the seminar, the teacher discusses with students the specific principles of clinical pharmacology and the treatment of special clinical entities. During the classes there will be a written test and a written final exam. By completing all teaching activities and passing the above tests, the student acquires 3 ECTS credits. Up to 40% of classes can be held online and students will be informed about it. If a student justifiably or unjustifiably misses more than 30% of classes in which mandatory attendance monitoring is performed (seminars), he / she cannot continue the course and loses the possibility for the final exam. He thus collected 0 ECTS credits and was graded F.

List of assigned reading:

Katzung BG, Masters SB, Trevor AJ. Basic and Clinical Pharmacology. McGraw Hill / Medical

List of optional reading:

Francetić I, Vitezić D. Klinička farmakologija. Medicinska naklada, Zagreb 2014. Laurence DR, Bennett PN, Brown MJ. Clinical Pharmacology. Churchill Livingstone

Curriculum:

Lectures list (with titles and explanation):

L1 Introduction - principles of clinical pharmacology

Explain and know the principles how the medicines are choosen and prescribed for the patient. Explain curative, symptomatic and prophylactic treatment based on examples.

L2 Clinical drug trial

Know the basic principles of clinical pharmacology. Know and explain the principles of clinical drug trials and how they are performed in practice.

L3 Drug use in pregnancy

Explain the specifics of pregnancy with regard to drug therapy. Know the reasons how the pregnancy could influence the drug therapy. Know how to conduct clinical-pharmacological counseling in pregnant women.

L4 Adverse drug reactions and interactions

Be able to explain the side effects of medications and the types of side effects depending on the cause. Explain the cause-and-effect relationship between drug administration and side effects. Understand the mechanisms of drug-drug interactions. Explain individual interactions concerning their mechanism.

L5 Position of the Agency for Medicinal Products and Medical Devices of the Republic of Croatia in the national drug policy

Explain the meaning of the regulatory body in the field of medicines, i.e. the Croatian Agency for Medicinal Products and Medical Devices (HALMED). Know how to get information from HALMED. Explain the importance and position of HALMED in national drug policy.

L6 Generic drugs; National Drug Policy; Final considerations

Explain and know what generic drugs are and how they must meet regulatory criteria. Explain why it is adopted and what are the characteristics of national drug policy (generic drugs in national policy).

Seminars list (with titles and explanation):

S1 Use of drugs in special groups of patients (elderly, pregnant women and children)

Explain the specifics of special populations regarding the drug therapy. To know the reasons for individualization of treatment, i.e. adequate drug dosing. Know how to conduct clinical-pharmacological counseling on drug therapy in pregnant women. Explain side effects and interactions in the elderly and in the pediatric population.

S2 Pharmacoeconomics

Explain and know the basic principles of pharmacoeconomics that include the use of the most common analysis and techniques. Know and explain costs-effectiveness analysis (and benefits) and the way in which the value of the drug is estimated.

S3 Pharmacogenetics

Explain pharmacogenetics (the genetic basis of interindividual variability) and its significance to the pharmacotherapeutic response. Know the influence of gene polymorphism on pharmacokinetic parameters and drug pharmacodynamics.

S4 Fundamentals of Toxicology

Explain the principles of toxicology and the effects of toxic substances in the body. Know the routes of entry of toxic substances into the body, duration of exposure and the response to exposure to toxic substances. Explain toxicity testing and risk assessment tests.

S5 Treatment of bronchial asthma, COPD, cough and application of nasal decongestants

Explain the principles of treatment of bronchial asthma in accordance with recent GINA guidelines. Be able to explain the mechanisms of action and use of certain groups of drugs used in the treatment of asthma. Explain the treatment of asthma exacerbations.

S6 Pain and pain treatment

Be able to explain and recognize certain types of pain. Know the treatment of pain by type (treatment of acute pain, treatment of chronic pain, treatment of malignant pain). Know the most important principles in the treatment of malignant pain and the principles of analgesic use in accordance with WHO principles. Know the guidelines for the application of NSAIDs and their characteristics.

S7 Principles of treatment of patients with malignant disease

Know the guidelines for supportive care in patients with malignancies. To be able to treat anemia, nausea and vomiting caused by chemotherapy and anorexia-cachexia syndrome. Explain the groups of drugs used in these entities.

S8 Pharmacotherapy of mental disorders - rational use of antipsychotics and antidepressants

Be able to use guidelines in the use of antidepressants and the selection of antidepressants. Know the principles of treatment of schizophrenia and other psychotic disorders.

S9 Pharmacotherapy of mental disorders - rational use of anxiolytics

Know drugs with anxiolytic effect. Explain the general principles of anxiolytic treatment in the most common nosological entities.

S10 Most commonly used antimicrobial drugs in primary practice and rational use of antimicrobial drugs

Know the groups of antimicrobial drugs and explain the therapeutic principles according to the recommendations in cases of prophylactic use. Be able to make a choice of antimicrobial drug in empirical therapy depending on the site of infection. Explain the targeted use of antimicrobials and the problem of resistance.

S11 Pharmacotherapy of the most common cardiac diseases (hypertension, ischemic heart disease and heart failure) and treatment of anaphylaxis

Explain the principles of treatment of the most common cardiac diseases in accordance with recent guidelines. Be able to explain the mechanisms of action and use of certain groups of drugs in these clinical entities (drugs in acute coronary syndrome without ST-elevation, drugs in acute coronary syndrome with persistent ST-elevation, antihypertensives, hypolipemics, drugs in the treatment of chronic heart failure). Explain the guidelines for the treatment of anaphylaxis and know the groups of drugs used according to severity and the mechanism of action in this condition.

S12 Pharmacotherapy of diseases of the digestive system (peptic ulcers therapy, constipation treatment)

Be able to use guidelines for the peptic ulcer therapy. Know the recommendations for the treatment of peptic ulcer positive for H. pylori (eradication therapies), peptic ulcer caused by NSAIDs, H. pylori negative ulcer. Explain the principles of constipation treatment.

S13 Pharmacotherapy of diabetes (type I and II) and treatment of obesity

Know how to choose a rational therapy for the mentioned conditions. Explain the guidelines in the treatment of type I and II diabetes and obesity. Know and explain why certain drugs are used in certain lines of treatment.

S14 Biological drugs - principles of their use

Know how to define biological drugs. Explain the place of biological drugs in the treatment of certain medical entities.

Student obligations:

Students are required for regular attendance and active participation in all forms of teaching.

Exam (exam taking, description of the written/oral/practical part of the exam, point distribution, grading criteria):

ECTS credit grading system:
Student assessment is carried out according to the current Regulations on Studies of the University of Rijeka.
Student work will be evaluated and graded during classes and at the final exam. Out of a total of 100 points, during the classes the student can achieve 70 points, and at the final exam 30 points.
Student assessment is performed using ECTS (A-E) and number system (1-5). Grading in the ECTS system is performed by absolute distribution.
Out of a total of 100 points, during the classes the student can achieve 70 points, and at the final exam 30 points. During classes, the result achieved by solving the compulsory test is evaluated (up to a maximum of 70 points).
The final exam can be taken by those students who have achieved at least 50% of the maximum possible points during the classes.
Students who have achieved less than 35 points during classes are not eligible to take the final exam (final grade F). The final exam is written.

I. During classes, the following is evaluated (maximum up to 70 points):
Mandatory test (up to 70 points)
The written test consists of 70 questions, and carries 70 points (each correctly solved question carries one grade).
The material of the compulsory test contains questions that cover topics from general and special clinical pharmacology covered by lectures and seminars.

II. Final exam (total 30 points):
Who can take the final exam:
Students who have achieved more than 50% of points during the course must take the final written exam where they can achieve a maximum of 30 points.

Who cannot take the final exam:
Students who have achieved less than 35 points during the class do not have the right to take the final exam (enroll the course the next year).

The final exam is a written exam. Carries 30 points (range 15-30).
The written test consists of 50 questions (the criterion for obtaining grades is 50% of correctly solved questions), and it consists of questions that cover the entire content of the course.

Correct answers obtained on the written test are converted into points as follows:

Correct answers Points	**Points**
0-25	0
26	15
27	16
28	17
29	18
30	19
31	20
32	21
33,34	22
35,36	23
37,38	24
39,40	25
41,42	26
43,44	27
45,46	28
47,48	29
49,50	30

To pass the final exam and for the final grade (including adding up the previously obtained points during classes) the student must have a positive grade on the final exam and achieve a minimum of 15 points

(50%).
The final grade of the exam is formed on the basis of the achieved results, and in the following way:
90-100% (points) A (excellent, 5)
75-89,9% (points) B (very good, 4)
60-74,9% (points) C (good, 3)
50-59,9% (points) D (pass, 2)
0-49,9% (points) F (fail, 1)

Other notes (related to the course) important for students:

Teaching content and all information related to the course as well as exam dates can be found on the web pages.

COURSE HOURS 2023/2024

Clinical Pharmacology

Lectures (Place and time or group)	**Seminars** (Place and time or group)
05.02.2024	

L1 Introduction - principles of clinical pharmacology:
• Department of Basic and Clinical Pharmacology with Toxicology (08:15 - 10:00) [235]
  ○ CP_383
	S1 Use of drugs in special groups of patients (elderly, pregnant women and children):
	• Department of Basic and Clinical Pharmacology with Toxicology (10:30 - 15:30) [235]
	  ○ CP_383
	
	S2 Pharmacoeconomics:
	• Department of Basic and Clinical Pharmacology with Toxicology (10:30 - 15:30) [235]
	  ○ CP_383

prof. dr. sc. Vitezić Dinko, dr. med. [235]	
06.02.2024	
	S11 Pharmacotherapy of the most common cardiac diseases (hypertension, ischemic heart disease and heart failure) and treatment of anaphylaxis: • Department of Basic and Clinical Pharmacology with Toxicology (08:15 - 14:00) [1243] ○ CP_383
naslovni asistent Belančić Andrej, dr. med. [1243]	
07.02.2024	
	S13 Pharmacotherapy of diabetes (type I and II) and treatment of obesity: • Department of Basic and Clinical Pharmacology with Toxicology (08:15 - 12:00) [1243] ○ CP_383
naslovni asistent Belančić Andrej, dr. med. [1243]	
08.02.2024	

	S6 Pain and pain treatment:
	• ONLINE (08:15 - 12:00) [2723]
	  ○ CP_383
	
	S7 Principles of treatment of patients with malignant disease:
	• ONLINE (08:15 - 12:00) [2723]
	  ○ CP_383

naslovna docentica Erdeljić Turk Viktorija, dr.med. [2723]	
09.02.2024	

L2 Clinical drug trial:
• Department of Basic and Clinical Pharmacology with Toxicology (12:15 - 14:00) [235]
  ◦ CP_383
 	
L3 Drug use in pregnancy:
• Department of Basic and Clinical Pharmacology with Toxicology (14:00 - 16:00) [235]
  ◦ CP_383
	S8 Pharmacotherapy of mental disorders - rational use of antipsychotics and antidepressants:
	• Department of Basic and Clinical Pharmacology with Toxicology (08:15 - 12:00) [1099]
	  ◦ CP_383
	
	S9 Pharmacotherapy of mental disorders - rational use of anxiolytics:
	• Department of Basic and Clinical Pharmacology with Toxicology (08:15 - 12:00) [1099]
	  ◦ CP_383

Knežević Sandra, dr. med. [1099] · prof. dr. sc. Vitezić Dinko, dr. med. [235]	
12.02.2024	

L4 Adverse drug reactions and interactions:
• Department of Basic and Clinical Pharmacology with Toxicology (09:15 - 11:00) [235]
  ◦ CP_383
	S10 Most commonly used antimicrobial drugs in primary practice and rational use of antimicrobial drugs:
	• Department of Basic and Clinical Pharmacology with Toxicology (11:30 - 15:30) [1917] [239]
	  ◦ CP_383

naslovni asistent Rubinić Igor, dr. med. [1917] · prof. dr. sc. Vitezić Dinko, dr. med. [235] · prof. dr. sc. Vlahović-Palčevski Vera, dr. med. [239]	
13.02.2024	

	S3 Pharmacogenetics:
	• Department of Basic and Clinical Pharmacology with Toxicology (09:15 - 14:00) [1335] [1099]
	  ◦ CP_383
	
	S4 Fundamentals of Toxicology:
	• Department of Basic and Clinical Pharmacology with Toxicology (09:15 - 14:00) [1335] [1099]
	  ◦ CP_383

Knežević Sandra, dr. med. [1099] · prof. dr. sc. Petkova Markova Car Elitza, mag. biol. [1335]	
14.02.2024	
	S12 Pharmacotherapy of diseases of the digestive system (peptic ulcers therapy, constipation treatment): • Department of Basic and Clinical Pharmacology with Toxicology (11:30 - 15:30) [1917] ◦ CP_383
naslovni asistent Rubinić Igor, dr. med. [1917]	
15.02.2024	
	S5 Treatment of bronchial asthma, COPD, cough and application of nasal decongestants: • Department of Basic and Clinical Pharmacology with Toxicology (09:15 - 14:00) [233] ◦ CP_383
prof. dr. sc. Pilipović Kristina, dr. med. [233]	
16.02.2024	

L5 Position of the Agency for Medicinal Products and Medical Devices of the Republic of Croatia in the national drug policy:
• ONLINE (13:15 - 15:00) [235]
  ○ CP_383
 	
L6 Generic drugs; National Drug Policy; Final considerations:
• ONLINE (13:15 - 15:00) [235]
  ○ CP_383
	S14 Biological drugs - principles of their use:
	• Department of Basic and Clinical Pharmacology with Toxicology (09:15 - 13:00) [241]
	  ○ CP_383

izv. prof. dr. sc. Skelin Marko, mag. pharm. [241] · prof. dr. sc. Vitezić Dinko, dr. med. [235]	

List of lectures, seminars and practicals:

LECTURES (TOPIC)	Number of hours	Location
L1 Introduction - principles of clinical pharmacology	2	Department of Basic and Clinical Pharmacology with Toxicology
L2 Clinical drug trial	2	Department of Basic and Clinical Pharmacology with Toxicology
L3 Drug use in pregnancy	2	Department of Basic and Clinical Pharmacology with Toxicology
L4 Adverse drug reactions and interactions	2	Department of Basic and Clinical Pharmacology with Toxicology
L5 Position of the Agency for Medicinal Products and Medical Devices of the Republic of Croatia in the national drug policy	1	ONLINE
L6 Generic drugs; National Drug Policy; Final considerations	1	ONLINE

SEMINARS (TOPIC)	Number of hours	Location
S1 Use of drugs in special groups of patients (elderly, pregnant women and children)	3	Department of Basic and Clinical Pharmacology with Toxicology
S2 Pharmacoeconomics	2	Department of Basic and Clinical Pharmacology with Toxicology
S3 Pharmacogenetics	3	Department of Basic and Clinical Pharmacology with Toxicology
S4 Fundamentals of Toxicology	2	Department of Basic and Clinical Pharmacology with Toxicology
S5 Treatment of bronchial asthma, COPD, cough and application of nasal decongestants	5	Department of Basic and Clinical Pharmacology with Toxicology
S6 Pain and pain treatment	2	ONLINE
S7 Principles of treatment of patients with malignant disease	2	ONLINE
S8 Pharmacotherapy of mental disorders - rational use of antipsychotics and antidepressants	2	Department of Basic and Clinical Pharmacology with Toxicology
S9 Pharmacotherapy of mental disorders - rational use of anxiolytics	2	Department of Basic and Clinical Pharmacology with Toxicology
S10 Most commonly used antimicrobial drugs in primary practice and rational use of antimicrobial drugs	4	Department of Basic and Clinical Pharmacology with Toxicology
S11 Pharmacotherapy of the most common cardiac diseases (hypertension, ischemic heart disease and heart failure) and treatment of anaphylaxis	6	Department of Basic and Clinical Pharmacology with Toxicology

S12 Pharmacotherapy of diseases of the digestive system (peptic ulcers therapy, constipation treatment)	4	Department of Basic and Clinical Pharmacology with Toxicology
S13 Pharmacotherapy of diabetes (type I and II) and treatment of obesity	4	Department of Basic and Clinical Pharmacology with Toxicology
S14 Biological drugs - principles of their use	4	Department of Basic and Clinical Pharmacology with Toxicology

EXAM DATES (final exam):

1.	19.02.2024.
2.	03.05.2024.
3.	19.06.2024.
4.	03.07.2024.
5.	09.09.2024.
6.	23.09.2024.