Faculty of Medicine in Rijeka

Curriculum
2026/2027

For course

Chemistry Essentials for Medical Practice

Study program:	**Medical Studies in English (R)** (elective) University integrated undergraduate and graduate study
Department:	**Department of Medical Chemistry, Biochemistry and Clinical Chemistry**
Course coordinator:	**izv. prof. dr. sc. Petković Didović Mirna, dipl. ing. kemije**
Year of study:	**1**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

The aim of this course is to apply the basic chemical concepts to problems pertaining to medical chemistry. Through topics relevant in modern medicine, the understanding and the interconnections of the concepts met in mandatory chemistry courses will be deepened and further integrated into medical studies.

List of assigned reading:

1. R.H. Petrucci, F.G. Herring, J.D. Madura, C. Bissonnette: General Chemistry - Principles and Modern Applications, 10th edition, Pearson Canada Inc., Toronto, Ontario, 2011; McMurry, J.: Fundamentals of Organic Chemistry, 8th Edition, Cengage Learning, 2017;
2. McMurry, J.: Fundamentals of Organic Chemistry, 8th Edition, Cengage Learning, 2017;

List of optional reading:

1. Berg, Tymoczko, Stryer: Biochemistry, 5th edition, NY
2. Any general or medical chemistry textbook.
3. Any biochemistry textbook.

Curriculum:

Seminars list (with titles and explanation):

S1 Introduction. Assignment of the seminar topics.

Introduction to the course content and modus operandi. Discussion of the potential topics.

S 5 Intermolecular bond in biological molecules

Explain and exemplify the relevance of intermolecular bonds in the structure of major biological molecules.

S 7 Phosphate buffers.

Define the types and explain the mechanism and relevance of phosphate buffers in medicine.

S8 - 10 Redox processes.

Solve redox equations. Apply redox terminology to organic molecules.

S 13 Colligative properties.

Explain the relevence and peculiarities of the colligative properties. Apply stoichiometry to solve colligative properties assignments.

S 14 Acids in dermatology.

Explain the use and the molecular mechanism of acids in dermatological treatments.

S 15,16,17 Anaesthetics.

Explain the molecular mechanism behind different anaesthetics' action.

S 18 - 20 Aspirin. Osmolality.

Explain the molecular basis of the aspirin action. Explain osmolality/osmolarity vs. molality/molarity.

S 22, 23 Blood pH regulatory mechanisms

Explain how the buffers regulate blood pH on a molecular basis.

S 24,25 Thalidomide tragedy

The importance of sugar configurations, through the analysis of the molecular mechanism behind thalidomide tragedy.

S 2 - 4 Oxidation states, acids, bases, salts.

Oxidation states, acids, bases, salts.

S6 Buffers

Explain the molecular basis of various buffers' action, sans phosphate.

S11, 12 Stoichiometry.

Solve stoichiometric problems.

S 21 Lipids in general.

Give an overview of the lipids chategorisation.

Student obligations:

Regular class attendance and active participation in discussions. Preparing and holding the seminar on the chosen topic.

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

Active attendance at a minimum of 70 % of classes. Succesfully held seminar on the chosen topic.

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

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COURSE HOURS 2026/2027

Chemistry Essentials for Medical Practice

Seminars (Place and time or group)
16.10.2026
S1 Introduction. Assignment of the seminar topics.: • Department of Med. chemistry, biochemistry and clin. chemistry 2 (14:00 - 14:45) [349]   ○ CEFMP00
izv. prof. dr. sc. Petković Didović Mirna, dipl. ing. kemije [349]
23.10.2026
S 2 - 4 Oxidation states, acids, bases, salts.: • v (10:00 - 11:00) [349]   ○ CEFMP00
izv. prof. dr. sc. Petković Didović Mirna, dipl. ing. kemije [349]
13.11.2026
S 2 - 4 Oxidation states, acids, bases, salts.: • v (14:00 - 15:00) [349]   ○ CEFMP00
izv. prof. dr. sc. Petković Didović Mirna, dipl. ing. kemije [349]

List of lectures, seminars and practicals:

SEMINARS (TOPIC)	Number of hours	Location
S1 Introduction. Assignment of the seminar topics.	1	Department of Med. chemistry, biochemistry and clin. chemistry 2
S 5 Intermolecular bond in biological molecules	1	
S 7 Phosphate buffers.	1	
S8 - 10 Redox processes.	3	
S 13 Colligative properties.	1	
S 14 Acids in dermatology.	1	
S 15,16,17 Anaesthetics.	3	
S 18 - 20 Aspirin. Osmolality.	3	
S 22, 23 Blood pH regulatory mechanisms	2	
S 24,25 Thalidomide tragedy	2	
S 2 - 4 Oxidation states, acids, bases, salts.	3	v

S6 Buffers	1	
S11, 12 Stoichiometry.	2	
S 21 Lipids in general.	1	

EXAM DATES (final exam):
