Sveučilište u Rijeci
University of Rijeka

Sveučilište u Rijeci • Fakultet dentalne medicine
University of Rijeka • Faculty of Dental Medicine

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Phone : + 385 51 559 200; 559 202, 559 203

Course: MEDICAL CHEMISTRY
Course Coordinator: Professor Lara Batičić, PhD (lara.baticic@uniri.hr)
Course Collaborators:
Professor Srećko Valić, PhD
Professor Gordana Čanadi Jurešić, PhD
Professor Marin Tota, PhD
Associate Professor Mirna Petković Didović, PhD
Associate Professor Damir Klepac, PhD
Assistant Professor Iva Vukelić, PhD
Assistant Professor Iva Suman, PhD
Hrvoje Križan, MMLSc
Antonijo Grčić, MSc
Department: Medical Chemistry, Biochemistry and Clinical Chemistry, Faculty of Medicine, University of Rijeka
Study program: University Integrated Undergraduate and Graduate Study of Dental Medicine (in English)
Study year: first
Academic year: 2026/27

SYLLABUS

Course description (a brief description of the course, general instructions, where and in what form the lessons are organized, necessary equipment, instructions for attendance and preparation for classes, student obligations, etc.):

The course Medical Chemistry is a compulsory first-year course in the Integrated Undergraduate and Graduate University Study Programme of Dental Medicine. It comprises 80 contact hours (7 ECTS credits), including 30 hours of lectures, 30 hours of seminars, and 20 hours of numerical exercises and laboratory practicals.

Course objectives:
The main goal of the Medical Chemistry course is to provide students with an understanding of the fundamental properties of chemical compounds and the principles of chemical reactions through selected topics from different branches of chemistry. The course aims to equip students in the Integrated Undergraduate and Graduate University Study Programme of Dental Medicine with the foundational chemical knowledge required to understand biological and biochemical processes. Particular emphasis is placed on applying chemical principles to biological systems, enabling students to better understand human metabolism in both physiological and pathological conditions.

Course content:
The course "Medical Chemistry" includes following topics: Basic chemical laws. Atom structure. Intra- and intermolecular bonds and forces. Biologically significant inorganic compounds. Complex compounds. Biological chelates. Solutions. The structure and properties of water. Colligative properties of aqueous solutions. Electrolyte solutions. pH and buffers. The mechanism of action of buffers. Biological buffers. Chemical kinetics. The rate of chemical reactions and factors that affect chemical kinetics. Catalysis. Collision theory. Transitional theory. The order and molecularity of the reaction. Thermodynamics. Gibbs energy. Bioenergetics. Chemical equilibrium. Kinetic and thermodynamic equilibrium condition. The impact of external factors on chemical equilibrium. Le Chatelier's principle. Balance in homogeneous and heterogeneous systems. Electrochemical processes. Nernst equation. Organic chemistry. Classification and reactivity of organic compounds. Types of reactions in organic chemistry. Organic compounds containing oxygen: alcohols and phenols, ethers, aldehydes and ketones, carbohydrates, carboxylic acids, and fatty acids and their derivatives. Isomerism. Chemical properties and characteristic reactions of each group of

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organic compounds. Biologically significant representatives.

Development of general and specific competencies (knowledge and skills):
Developing awareness of the similarity and inseparability of chemical reactions within living and non-living matter, the relationship between structure and reactivity, chemical and energetic transitions, and the laws of thermodynamics. Developing skills to use acquired knowledge for understanding the biochemical reactions in human organisms. Expanding the knowledge on relations between the structure and physical/chemical properties of matter based on simple molecules and applying it to biomolecules. Solving numerical and logical problems from the field of Medical Chemistry. Developing skills necessary for experimental work, mastering the basic laboratory techniques and methods. Encouraging students to apply information technology and use scientific literature. Building a sense of teamwork and developing their ability of creative and critical thinking needed for drawing conclusions based on data obtained through analysis. Developing methods and skills necessary for the presentation of obtained results.

Course correlativity and correspondence:
The content of the course "Medical Chemistry" correlates with and is complementary to the following courses: Medical Physics and Biophysics, Medical Biology, Biochemistry.

Approaches to teaching and learning:
The course "Medical Chemistry" is conducted through lectures, seminars, and numerical and laboratory practicals.

Assigned reading:

B. Blagović and M. Tota (Eds.): Handbook for Seminars and Laboratory Practicals in Medical Chemistry and Biochemistry I, Faculty of Medicine, University of Rijeka, Rijeka, 2019;
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

Optional/additional reading:

Reed, D.: Chemistry for Biologists, Pearson Education Ltd., Harlow, UK, 2013;
Mahaffy, P., Tasker, R., Bucat, B., Kotz, J.C., Weaver, G.C. and Treichel, P.M.: Chemistry – Human activity, Chemical Reactivity, Nelson Education, USA, 2015.

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COURSE TEACHING PLAN:

The list of lectures (with topics and descriptions):

L1,2 The Importance of Medical Chemistry in the Study of Dental Medicine. Main Chemical Laws. Atomic Structure.
Define and explain the main chemical laws. Describe the structure of the atom and relate atomic structure to chemical properties important for dental tissues, biomaterials and clinical practice.

L3 Intermolecular Interactions and Chemical Bonds.
Define and describe chemical bonds. Explain intermolecular interactions and their role in the structure of enamel, dentin, saliva, proteins and dental restorative materials.

L4 Complex Compounds. Complex Salts. Chellates. Biological Chelates. Applications of Chelators in Dental Medicine.
Describe the role of chelation in biological systems. Explain the effects of chelators and their applications in medicine and dental medicine, including endodontic irrigation. Explain the principles of complexometric analysis. Relate the structure and properties of hydroxyapatite and fluorapatite to tooth mineralization, demineralization and fluoride protection.

L5 Water and Aqueous Solutions. Electrolyte Solutions.
Explain the quantity, distribution and physiological role of water in the human body. Describe the structure and properties of water and the dissolution of gases and solids in aqueous solutions. Distinguish electrolytes from nonelectrolytes and relate these principles to saliva, oral fluids and dental treatments.

L6 Colligative Properties and Colloids.
Define colligative properties and explain vapour-pressure lowering, freezing-point depression and boiling-point elevation. Explain osmosis, dialysis and osmotic pressure. Classify colloids and describe their importance in biological fluids, saliva and dental materials.

L7 Acids and Bases. pKw.
Define acids and bases according to Arrhenius, Brønsted-Lowry and Lewis. Explain the significance of pKw and relate acid-base chemistry to oral pH, enamel demineralization and dental caries.

L8 Buffers.
Define buffers and explain their mechanism of action. Describe the importance of physiological buffering systems, particularly salivary buffers, in maintaining oral health and protecting dental hard tissues.

L9,10 Thermochemistry. Thermodynamic Quantities.
Define the basic concepts of thermodynamics and thermodynamic quantities. Apply the First Law of Thermodynamics to biochemical systems. Explain extensive and intensive properties, the Second Law of Thermodynamics and Gibbs free energy, and relate these principles to biochemical reactions occurring in oral tissues.

L11 Chemical Kinetics. Reaction Rate, Order and Molecularity.
Define the principles of chemical kinetics. Explain reaction rate, reaction order and factors affecting reaction rates. Distinguish chemical catalysts from enzymes and relate kinetic principles to salivary enzymes, bacterial metabolism and dental biomaterials.

L12 Chemical Equilibrium.
Define Le Chatelier's principle and explain the effects of external factors on equilibrium. Distinguish dynamic equilibrium from steady-state systems and relate equilibrium to mineral balance between tooth enamel and saliva.

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L13 Electrochemical Reactions. Galvanic Cells. Standard Redox Potential.
Explain the structure of a galvanic cell and the meaning of standard reduction potential. Relate electrochemical principles to corrosion of metallic dental restorations and oral galvanic phenomena.

L14 Electromotive Force. The Nernst Equation. Biological Redox Systems.
State and explain the Nernst equation. Identify biologically important oxidation-reduction systems and explain the standard redox potential and Gibbs free energy of biological redox reactions relevant to oral tissues.

L15,16 Structure of Organic Compounds. Types of Organic Reactions. Hybridization. Resonance. Inductive Effect.
Classify organic compounds according to functional groups. Explain the main types of organic reactions, nucleophiles, electrophiles, hybridization, resonance and the inductive effect. Relate these concepts to biologically important molecules and dental biomaterials.

L17,18 Biologically Important Oxygen Compounds: Alcohols, Phenols and Ethers.
Explain the chemical properties and reactivity of alcohols, phenols and ethers. Identify biologically important representatives and relate phenolic compounds and alcohols to antiseptics, disinfectants and dental materials.

L19,20 Thiols and Amines.
Explain the chemical properties and reactivity of thiols and amines. Identify biologically important representatives and explain their role in proteins, enzymes and compounds relevant to oral biology.

L21,22 Biologically Important Oxygen Compounds: Aldehydes and Ketones.
Explain the chemical properties, reactivity and biological significance of aldehydes and ketones. Define tautomerism and explain aldol condensation. Relate these compounds to carbohydrate metabolism and biologically important reactions.

L23,24 Stereochemistry.
Define isomerism and distinguish structural, positional, stereochemical, geometrical and conformational isomerism. Define chiral molecules and explain D/L configuration and the R/S nomenclature. Relate stereochemistry to biologically active molecules used in medicine and dental medicine.

L25,26 Carbohydrates.
Explain the structure and chemical properties of carbohydrates. Identify biologically important monosaccharides, disaccharides and polysaccharides. Relate carbohydrate chemistry to dental plaque formation, bacterial metabolism and the development of dental caries.

L27,28 Carboxylic Acids and Their Derivatives. Substituted Carboxylic Acids.
Explain the chemical properties and reactivity of carboxylic acids and their derivatives. Identify biologically important mono- and polycarboxylic acids and explain the structure and synthesis of important derivatives. Relate these compounds to metabolism and dental biomaterials.

L29,30 Fatty Acids and Lipids.
Explain the chemical and physical properties of fatty acids and lipids. Identify important biological representatives and explain their role in cell membranes, oral soft tissues, inflammation and the maintenance of oral health.

The list of seminars with descriptions:

S1,2 Elements and Compounds.
Explain the structure of atoms, the periodic system and periodic trends of elements. Identify the biogenic elen and explain their biological role. Describe the structure and properties of compounds and relate them tc composition of dental tissues and biomaterials.

S3,4 Acids and Bases. Define acids and bases according to Arrhenius, Brønsted-Lowry and Lewis. Explain the strength of acids and bases and relate acid-base concepts to oral pH, enamel demineralization and dental caries.

S5,6 Salts. Hydrolysis.
Define simple salts and write neutralization equations. Explain the hydrolysis of salts and relate these processes to mineral balance in teeth and oral tissues.

S7,8 Buffers. Buffers in the Human Body.
Define buffers and explain their mechanism of action. Explain acid-base equilibrium, apply the Henderson-Hasselbalch equation and calculate the pH of buffer solutions. Relate buffer systems to saliva and the maintenance of oral health.

S9,10 Solutions and Concentrations.
Define the mole concept and different expressions of concentration, including fractions, molar concentration, mass concentration and molality. Distinguish intensive and extensive properties. Solve concentration calculations relevant to laboratory practice and the preparation of dental solutions.

S11 Chemical Kinetics.
Define the basic principles of chemical kinetics, reaction rate and reaction order. Explain factors affecting reaction rates and the mechanism of catalyst action. Relate reaction kinetics to salivary enzymes, bacterial metabolism and dental materials.

S12 Chemical Equilibrium.
Define Le Chatelier's principle and explain the effects of external factors on chemical equilibrium. Relate equilibrium to mineralization, demineralization and the oral environment.

S13,14 Redox Reactions.
Define oxidants and reductants, identify oxidation and reduction processes and balance redox reactions. Relate redox principles to biological processes and corrosion of dental materials.

S15,16 Hydrocarbons.
Classify and name hydrocarbons. Write characteristic reactions of hydrocarbons and aromatic compounds. Relate their chemical properties to organic compounds used in dental materials.

S17,18 Reactions of Organic Compounds.
Describe and solve characteristic reactions of organic compounds. Apply reaction mechanisms to biologically important molecules and dental biomaterials.

S19,20 Alcohols, Ethers and Phenols.
Classify and name alcohols, ethers and phenols. Explain their chemical properties and reactivity. Identify biologically important representatives and relate these compounds to antiseptics, disinfectants and dental materials.

S21,22 Thiols and Amines.

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Classify and name thiols and amines. Explain their chemical properties and reactivity. Identify biologically important representatives and explain their importance in proteins, enzymes and oral biology.

S23,24 Aldehydes and Ketones.
Classify and name aldehydes and ketones. Explain their chemical properties and reactivity. Identify biologically important representatives and relate them to carbohydrate metabolism and biological processes relevant to dental medicine.

S25,26 Stereochemistry. Carbohydrates.
Explain different types of isomerism. Identify biologically important carbohydrates, explain the formation of cyclic forms and describe the reactivity and stereoisomers of monosaccharides. Relate carbohydrate chemistry to dental plaque formation and dental caries.

S27,28 Carboxylic Acids and Their Derivatives.
Explain the chemical properties and reactivity of carboxylic acids and their derivatives. Relate these compounds to metabolism and materials used in dental medicine.

S29,30 Substituted Carboxylic Acids. Fatty Acids. Lipids.
Identify substituted carboxylic acids, including halogen-, oxo-, hydroxy- and amino acids. Explain the chemical and physical properties of fatty acids and lipids and relate them to cell membranes, oral soft tissues and inflammatory processes relevant to dental medicine.

The list of practicals with descriptions:

NP 1, 2 Structural formulas of inorganic compounds (acids, bases, salts).
Draw Lewis structural formulas of inorganic compounds. Identify chemical bonds and intermolecular forces and explain how they determine the properties of compounds relevant to dental hard tissues, saliva and dental biomaterials. Relate inorganic compounds to enamel mineralization, demineralization and fluoride chemistry in Dental Medicine.

LAB1 (LP3,4) General Laboratory Safety Procedures and Rules. Introduction to Qualitative Analysis – Identification of Cations and Anions. Qualitative Inorganic Analysis of Salt Solutions.
Apply laboratory safety procedures and good laboratory practice. Use basic laboratory equipment and techniques correctly. Detect and identify common cations and anions using qualitative analytical methods. Relate the identification of calcium, phosphate and fluoride ions to tooth mineralization and clinically relevant dental materials.

NP5,6 Solutions and Solution Concentration.
Define the mole concept and different expressions of concentration, including molar concentration, mass concentration, molality and fractions. Perform concentration calculations relevant to laboratory work and the preparation of dental solutions, disinfectants and irrigating agents used in clinical practice.

LAB2 (LP7,8) Quantitative Chemical Analysis.
Distinguish the main types of quantitative chemical analysis. Perform volumetric analyses using alkalimetric, manganometric and complexometric methods. Interpret analytical results and relate complexometric determination of calcium and other ions to biological tissues, saliva and dental biomaterials.

NP9–11 Hydrolysis and Buffers.
Solve problems involving salt hydrolysis. Explain the mechanism of buffer action in body fluids and describe acid-base equilibrium in the human body. Apply the Henderson-Hasselbalch equation to calculate pH values of buffer

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solutions. Relate buffering systems, particularly salivary buffers, to the prevention of enamel demineralization and the maintenance of oral health.

LAB3 (LP12,13) Chemical Kinetics. Experimentally investigate the effects of temperature, concentration, pH and catalysts on reaction rates. Analyse experimental results and relate reaction kinetics to enzymatic activity in saliva, bacterial metabolism in dental plaque and the performance of dental materials.

NP14 Chemical Equilibrium.
Apply Le Chatelier's principle to chemical systems and explain the effects of external factors on equilibrium. Relate equilibrium concepts to the dynamic balance between enamel demineralization and remineralization in the oral environment.

LAB4 (LP15,16) Buffer Solutions.
Prepare phosphate buffer solutions, measure pH and evaluate buffer capacity. Interpret the buffering properties of phosphate systems and relate them to saliva, oral physiology and clinical management of acid-base balance in the oral cavity.

LAB5 (LP17,18) Qualitative Organic Analysis.
Detect and identify functional groups in organic compounds. Identify amides and purines using qualitative analytical methods. Relate these compounds to proteins, nucleic acids and biologically important molecules involved in oral tissues and Dental Medicine.

NP19,20 Nomenclature and Reactions of Organic Compounds.
Apply IUPAC and trivial nomenclature to organic compounds. Solve characteristic reactions of major classes of organic compounds and relate their chemical behaviour to pharmaceuticals, dental biomaterials, adhesives and restorative materials used in Dental Medicine.

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Students' obligations:

Class attendance including test attendance is mandatory. Students may be absent from 20% of each form of teaching provided they have a justifiable cause. Absence from laboratory practicals is obligatory compensated by an oral colloqy.

Assessment (exams, description of written / oral / practical exam, the scoring criteria):

Assessment of students' work:
Students can obtain a total of 100 credits: a maximum of 70 credits during the course (writing two midterm exams and on laboratory practicals) and a maximum of 30 credits on the final exam. Students are allowed to take the final exam if they gain a minimum of 35 credits during the course.
At all written and oral exams, the student must give at least 50% of the correct answers. Students who did not obtain 50% on each midterm may once retake the midterms, which will be held during the final exam period. Students who are not satisfied with the obtained credits are also allowed to retake their midterm exams, but thereafter only the credits gained from the retaken midterms will be considered.

Table 1. Evaluation of students' progress during classes, midterms and the final exam

		CREDITS
Midterm exams	I General and inorganic chemistry with Stoichiometry	30 (x % of score)
	II Organic chemistry	30 (x % of score)
	Total	**60**
Laboratory practicals	Practicals and reports	10
TOTAL		**70**
Final exam	Written exam	15 (x % of score)
	Oral exam	15
	Total	**30**
TOTAL		**100**

Midterm exams:
Two midterm exams will be held during the course. The first one covers the content of bioinorganic, general and physical chemistry with stoichiometry while the second one covers organic chemistry (theory, nomenclature, reactivity and structural formulas).

Laboratory practicals:
Students can gain a maximum of 10 credits through 5 laboratory practicals. Each completed practical brings 2 credits: 1 for successfully executed laboratory work and 1 for a completed written report after each practical. An absence (for any reason) from a laboratory practical must be compensated by an oral colloquy within a week from the practical. Retakes of the colloquy will not be allowed.

Final exam:
The final exam comprises a written exam (15 credits) and an oral exam (15 credits). Students are required to pass both parts of the final exam.

Assessment of the oral part of the final exam:
7.5 – 8 credits: minimum criteria satisfied
9 – 11 credits: average criteria satisfied with noticeable errors
12 – 13 credits: answer with a few errors
14 – 15 credits: outstanding answer.

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The ECTS grading system is defined by the following criteria:
A (5, excellent) 90-100 credits
B (4, very good) 75-89.99 credits
C (3, good) 60-74.99 credits
D (2, sufficient) 50-59.99 credits
F (1, insufficient, fail) less than 50 credits

Retaking the course:
A student, who gains less than 35 credits during the pre-exam period, has failed the course.

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COURSE SCHEDULE (for the academic year 2026/2027)

Date	Lectures (time and place)	Seminars (time and place)	Practicals (time and place)	Instructor
Tuesday 19/01/2027	L1,2 (8:15-10:00) Lecture room 9			Professor Lara Batičić, PhD
	L3,4 (10:15-12:00) Lecture room 3			Assoc. prof. Mirna Petković Didović, PhD Professor Marin Tota, PhD
		S1,2 (14:15-16:00) Lecture room 6		Assist. prof. Iva Vukelić, PhD
Wednesday 20/01/2027		S3,4 (14:15-16:00) Lecture room 2		Assoc. prof. Mirna Petković Didović, PhD
	L5 (16:15-17:00) Lecture room 7			Assoc. prof. Mirna Petković Didović, PhD
Thursday 21/01/2027			NP1,2 (9:15-11:00) Lecture room 2	Assist. prof. Iva Vukelić, PhD Professor Lara Batičić, PhD
	L6,7 (12:15-14:00) Lecture room 2			Professor Lara Batičić, PhD Assoc. prof. Mirna Petković Didović, PhD
		S5,6 (14:15-16:00) Lecture room 2		Assoc. prof. Mirna Petković Didović, PhD
Friday 22/01/2027	L8 (8:15-9:00) Lecture room 15 Vijećnica (3rd Floor)			Professor Lara Batičić, PhD
		S7,8 (9:15-11:00) Lecture room 15 Vijećnica (3rd Floor)		Professor Lara Batičić, PhD
		S9,10 (11:15-13:00) Lecture room 15 Vijećnica (3rd Floor)		Professor Lara Batičić, PhD Assist. prof. Iva Vukelić, PhD
			NP 5,6 (14:15-16:00) Lecture room 15 Vijećnica (3rd Floor)	Assist. prof. Iva Vukelić, PhD
Tuesday 26/01/2027			LAB1 (LP3,4) (8:00-10:00) Laboratory*	Assist. prof. Iva Vukelić, PhD
			NP 9-11 (11:15-14:00) Lecture room 4	Professor Lara Batičić, PhD
Wednesday 27/01/2027	L9,10 (08:15-10:00) Lecture room 6			Assoc. prof. Mirna Petković Didović, PhD

	L11 (10:15-11:00) Lecture room 6			Assoc. prof. Damir Klepac, PhD
		S11 (11:15-12:00) Lecture room 6		Assoc. prof. Damir Klepac, PhD
			LAB2 (LP 7,8) (13:15-15:00) Laboratory*	Assist. prof. Iva Vukelić, PhD
Thursday 28/01/2027	L12 (8:15-9:00) Lecture room 9			Professor Srećko Valić, PhD
		S12 (9:15-10:00) Lecture room 9		Professor Srećko Valić, PhD
			NP14 (10:15-11:00) Lecture room 9	Professor Srećko Valić, PhD
			LAB3 (L12,13) (12:00-14:00) Laboratory*	Assist. prof. Iva Vukelić, PhD
Friday 29/01/2027	L13,14 (09:15-11:00) Lecture room 9			Professor Marin Tota, PhD
			LAB4 (LP 15,16) (13:00-15:00) Laboratory*	Assist. prof. Iva Vukelić, PhD
		S13,14 (15:15-17:00) Lecture room 7		Assoc. prof. Damir Klepac, PhD
Tuesday 02/02/2027	**MIDTERM I** (9:00-11:00)			Professor Lara Batičić, PhD
Wednesday 03/02/2027	L15,16 (8:15-10:00) Lecture room 6			Professor Lara Batičić, PhD
		S15,16 (10:15-12:00) Lecture room 6		Professor Lara Batičić, PhD
Thursday 04/02/2027		S17,18 (8:15-10:00) Lecture room 1		Professor Lara Batičić, PhD
	L17,18 (10:15-12:00) Lecture room 1			Professor Marin Tota, PhD
		S19,20 (13:15-15:00) Lecture room 1		Assoc. prof. Damir Klepac, PhD
Friday 05/02/2027	L19,20 (8:15-10:00) Lecture room 6			Professor Lara Batičić, PhD
		S21,22 (10:15-12:00) Lecture room 6		Professor Lara Batičić, PhD

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Tuesday 09/02/2027	L21,22 (08:15-10:00) Lecture room 6			Professor Gordana Čanadi Jurešić, PhD
		S23,24 (10:15-12:00) Lecture room 6		Professor Gordana Čanadi Jurešić, PhD
Wednesday 10/02/2027	L23,24 (08:15-10:00) Lecture room 6			Professor Gordana Čanadi Jurešić, PhD
	L25,26 (10:15-12:00) Lecture room 6			Professor Gordana Čanadi Jurešić, PhD
Thursday 11/02/2027		S25,26 (08:15-10:00) Lecture room 6		Professor Gordana Čanadi Jurešić, PhD
	L27,28 (10:15-12:00) Lecture room 6			Professor Lara Batičić, PhD
		S27,28 (12:15-14:00) Lecture room 6		Professor Lara Batičić, PhD
Friday 12/02/2027	L29,30 (8:15-10:00) Lecture room 6			Professor Lara Batičić, PhD
		S29,30 (10:15-12:00) Lecture room 6		Professor Lara Batičić, PhD
Tuesday 16/02/2027			LAB5 (LP17,18) (08:15-10:00) Laboratory*	Assist. prof. Iva Vukelić, PhD
Wednesday 17/02/2027			NP19,20 (8:15-10:00) Lecture room 4	Assoc. prof. Damir Klepac, PhD
Friday 19/02/2027	**MIDTERM II** (9:00-11:00)			Professor Lara Batičić, PhD
Wednesday 24/02/2027	**FINAL EXAM**			

* Department of Medical Chemistry, Biochemistry, and Clinical Chemistry, ground floor, Faculty of Medicine, University of Rijeka, Braće Branchetta 20, Rijeka.

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List of lectures, seminars and practicals:

	LECTURES (Topics)	Teaching hours	Location/Lecture room
L1,2	The importance of Medical Chemistry in the Study of Dental Medicine. Main chemical laws. Atom structure.	2	Lecture room *
L3	Intermolecular interactions and chemical bonds.	1	Lecture room *
L4	Complex Compounds. Complex Salts. Chelates. Biological Chelates. Application of Chelators in Dental Medicine.	1	Lecture room *
L5	Water and Water Solutions. Solutions of Electrolytes.	1	Lecture room *
L6	Colligative Properties. Colloids.	1	Lecture room *
L7	Acids and Bases, pKw.	1	Lecture room *
L8	Buffers.	1	Lecture room *
L9,10	Thermochemistry. Thermodynamic Quantities.	2	Lecture room *
L11	Chemical Kinetics. Rate, Order and Molecularity of Reaction.	1	Lecture room *
L12	Chemical Equilibrium.	1	Lecture room *
L13	Electrochemical Reactions. Galvanic Cells. Standard Redox Potential.	1	Lecture room *
L14	Electromotive Force. The Nernst Equation. Biological Redox Systems.	1	Lecture room *
L15,16	Structure of Organic Compounds. Types of Reactions in Chemistry of Organic Compounds. Hybridization. Resonance, Inductive Effect.	2	Lecture room *
L17,18	Biologically Important Oxygen Compounds: Alcohols, Phenols and Ethers.	2	Lecture room *
L19,20	Thiols and Amines.	2	Lecture room *
L21,22	Biologically Important Oxygen Compounds: Aldehydes and Ketones.	2	Lecture room *
L23,24	Stereochemistry.	2	Lecture room *
L25,26	Carbohydrates.	2	Lecture room *
L27,28	Carboxylic Acids and their Derivatives. Substituted Carboxylic Acids.	2	Lecture room *
L29,30	Fatty Acids and Lipids.	2	Lecture room *
	TOTAL TEACHING HOURS	**30**	

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	SEMINARS (Topics)	Teaching hours	Location/Lecture room
S1,2	Elements and Compounds.	2	Lecture room *
S3,4	Acids and Bases.	2	Lecture room *
S5,6	Salts. Hydrolysis.	2	Lecture room *
S7,8	Buffers. Buffers in human body.	2	Lecture room *
S9,10	Solutions. Solution Concentration.	2	Lecture room *
S11	Chemical Kinetics.	1	Lecture room *
S12	Chemical Equilibrium.	1	Lecture room *
S13,14	Redox reactions	2	Lecture room *
S15,16	Hydrocarbons.	2	Lecture room *
S17,18	Reactions of Organic Compounds.	2	Lecture room *
S19,20	Alcohols, Ethers, Phenols.	2	Lecture room *
S21,22	Thiols. Amines.	2	Lecture room *
S23,24	Aldehydes and Ketones.	2	Lecture room *
S25,26	Stereochemistry. Carbohydrates.	2	Lecture room *
S27,28	Carboxylic Acids and their Derivatives.	2	Lecture room *
S29,30	Substituted Carboxylic Acids. Fatty Acids. Lipids.	2	Lecture room *
	TOTAL TEACHING HOURS	**30**	

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	PRACTICALS (Topics)	Teaching hours	Location/Lecture room
NP1,2	Structural formulas of inorganic compounds (Acids, bases, salts).	2	Lecture room *
LP3,4 (LAB1)	General Laboratory Safety Procedures and Rules. Introduction to Qualitative Analysis – Identification of Cations and Anions. Qualitative Inorganic Analysis: Testing Salt Solutions for Anions and Cations.	2	Laboratory (Department of Medical Chemistry, Biochemistry and Clinical Chemistry) *
NP5,6	Solutions. Solution Concentration.	2	Lecture room *
LP7,8 (LAB2)	Quantitative Chemical Analysis.	2	Laboratory (Department of Medical Chemistry, Biochemistry and Clinical Chemistry) *
NP9-11	Hydrolysis. Buffers.	3	Lecture room *
LP12,13 (LAB3)	Chemical Kinetics.	2	Laboratory (Department of Medical Chemistry, Biochemistry and Clinical Chemistry) *
NP14	Chemical Equilibrium.	1	Lecture room *
LP15,16 (LAB4)	Buffer Solutions.	2	Laboratory (Department of Medical Chemistry, Biochemistry and Clinical Chemistry) *
LP17,18 (LAB5)	Qualitative Organic Analysis.	2	Laboratory (Department of Medical Chemistry, Biochemistry and Clinical Chemistry) *
NP19,20	Nomenclature of organic compounds and reactions of organic compounds.	2	Lecture room *
	TOTAL TEACHING HOURS	**20**	

	FINAL EXAM DATES
1.	24.02.2026.
2.	14.7.2027.
3.	15.9.2027.

	Lectures	Seminars	Practicals	Total
Total number	30	30	20	80
On-line	0	0	0	0
Percentage	0%	0%	0%	0%