Faculty of Medicine

Course: MEDICAL CHEMISTRY AND BIOCHEMISTRY I
Course coordinator: Gordana Čanadi Jurešić, PhD, Associate Professor
Collaborators: Srećko Valić, PhD, Full Professor
Marin Tota, PhD, Associate Professor
Lara Batičić, PhD, Associate Professor
Mirna Petković Didović, PhD, Assistant Professor
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Iva Vukelić, PhD, Assistant

Department: Medical Chemistry, Biochemistry and Clinical Chemistry
Study programme: Integrated Undergraduate and Graduate University Study of Medicine in English
Year: first
Academic year: 2021/2022

SYLLABUS

Course information (basic description, general information, teaching overview, required equipment and preparation, etc.)

Workload: 35 L + 40 S + 30 P
Course objectives:
Acquiring the knowledge of chemical compounds - both inorganic and organic - that constitute living cells or are used in their synthesis, of chemical processes that arise during their transformations, of electrochemical processes, chemical kinetics and thermochemistry. Acquiring the capability to apply that knowledge on biological systems, which is important for understanding the human metabolism, both in physiological and pathological conditions.

Development of general and specific competences (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, 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 and Biochemistry. Developing skills necessary for experimental work, mastering the basic laboratory techniques and methods (chromatography, optical methods, pH-measurement). 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 and Biochemistry I correlates with and is complementary to the following courses: Medical Physics and Biophysics, Biochemistry II.

Approaches to teaching and learning:
Lectures, seminars, 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;
Murray R.K., Bender D.A., Botham K.M., Kennelly P.J., Rodwell V.W., and Weil P.A. (Eds): Harper's Illustrated Biochemistry, 30th Edition,The McGraw-Hill Companies, 2015.

***Optional / additional reading*:**

Reed, D.: Chemistry for Biologists, Pearson Education Ltd., Harlow, UK, 2013;
McMurry, J., Ballantine, D.S., Hoeger, C.A. and Peterson, V.E.: Fundamentals of General, Organic and Biological Chemistry, 7th Edition, Pearson Education Inc., USA, 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.

Course teaching plan:

The list of lectures (with the titles and learning outcomes):

L1 The Meaning of Chemistry and Biochemistry in the Study of Medicine. Matter.
- Explain the classification of matter.

L2 Water and Water Solutions.
- Provide the basic facts about the quantity, distribution and the role of water in the body.
- Explain the structure and properties of water.
- Explain the dissolution of gasses and solid compounds in water.

L3 Solutions of Electrolytes.
- Distinguish electrolytes and nonelectrolytes.
- Explain the properties of solutions of acids, bases, ampholytes and salts.

L4 Colligative Properties.
- Define the principle of colligative properties.
- Explain vapour-pressure lowering, freezing point depression and boiling point elevation.

L5 Colligative Properties. Colloids.
- Explain osmosis and dialysis. Define osmotic pressure.
- Explain colloids.
- Name and describe the types and properties of colloids.
- Explain the difference between the sol and gel state of colloids.
- Explain the principle of Donnan equilibrium.
- Describe electrophoresis.

L6 Complex Compounds. Complex Salts. Chelates. Biological Chelates. Application of Chelators in Medicine.
- Describe the role of chelation in biological systems.
- Explain the effect of chelators and their use in medicine.
- Explain the principles of the complexometric method.
- Relate the structure and properties of apatite minerals (hydroxyapatite, fluorapatite).

L7 Chemical Kinetics. Rate, Order and Molecularity of Reaction.
- Define the basic principles of chemical kinetics.
- Define the rate of reaction and reaction order.

L8 Factors Affecting the Rate of Reaction. Catalysis.
- Explain how various factors affect the rate of reaction.
- Describe the mechanism of action of catalysts.
- Explain the difference between chemical and biochemical catalysts.

L9 Chemical Equilibrium
- Describe the law of mass action and the equilibrium constant.
- Define Le Chatelier's principle.
- Explain the impact of external factors on equilibrium.

L10 Chemical Equilibrium.
- Define the equilibrium of homogeneous and heterogeneous systems and electrolyte solutions.
- Define Ostwald’s dilution law. Define the solubility product.
- Describe calcified tissues and the formation of concrements.
- Distinguish dynamic equilibrium and consistent flow and its importance in biological systems.

L11 Equilibrium of Chemical Reactions. Hydrolysis. Buffers.
- Write the equilibrium constant of the chemical reaction.
- Write and explain hydrolysis constant.
- Explain the mechanism of buffer action. Write and explain Henderson-Hasselbalch equation.

L12 Thermodynamics. The First Law of Thermodynamics. Thermodynamic Quantities, State Functions of Thermodynamic Systems. Extensive and Intensive Properties.
- Define the basic concepts of thermodynamics and basic thermodynamic quantities.

- Apply the first law of thermodynamics to biochemical systems.

L13 The Second Law of Thermodynamics. Free (Gibbs) Energy and the Direction of Chemical Reactions. Heat Capacity and Temperature.

- Explain the effect of ΔG, ΔH, ΔS values on the spontaneity of reaction.
- Relate Gibbs' energy with the equilibrium constant.

L14 Electrochemical Reactions. Galvanic Cells. Standard Redox Potential.

- Explain the structure of the galvanic cell.
- Explain the meaning of standard reduction potential.

L15 Electromotive Force. The Nernst Equation. Biological Redox Systems.

- Write down and explain the Nernst equation.
- Name biologically important oxidation-reduction systems.
- Define the standard redox potential of biological systems.
- Explain Gibbs' energy of redox-systems.

L16 Structure of Organic Compounds. Types of Reactions in Chemistry of Organic Compounds.

- Classify organic compounds according to functional groups and explain their chemical properties.
- Define the types of reactions of organic compounds.
- Explain the concept of nucleophile and electrophile.

L17 Structure of Organic Compounds. Hybridization.

- Explain hybridization.

L18 Structure of Organic Compounds. Resonance, Inductive Effect.

- Explain resonance and inductive effect.

L19 Isomerism

- Define isomerism. Explain the types of isomerism (structural, positional, stereoisomerism, geometrical isomerism and conformational isomerism).

L20 Stereoisomerism: Optical Isomerism.

- Define the chiral molecules.
- Explain D,L-steric order and R,S-system.

L21 Biologically Important Oxygen Compounds: Alcohols, Phenols and Ethers.

- Explain the chemical properties of these classes of compounds and their reactivity.
- Explain the reactions of oxygen compounds.

L22 Biologically Important Oxygen Compounds: Aldehydes and Ketones.

- Explain the significance of this group of compounds, their chemical properties and their reactivity.

L23 Biologically Important Oxygen Compounds: Aldehydes and Ketones.

- Define tautomerism.
- Explain aldol condensation.

L24 Carbohydrates

- Explain their structure and chemical properties.

L25 Carbohydrates

- Name and explain the structure of biologically most important monosaccharides, disaccharides and polysaccharides.

L26 Carboxylic Acids and their Derivatives.

- Explain the chemical properties of this class of compounds and their reactivity.
- Thioesters and acetyl-CoA
- Name biologically important mono- and polycarboxylic acids.

L27 Substituted Carboxylic Acids.

- Name the biologically significant representatives.
- Explain the structure and preparation of organic derivatives of carbonic acid.

L28 Lipids: Properties and Classification. Structure and Function of Important Lipid Classes.

- Define lipids and explain their classification.
- Explain the structure and function of simple lipids.

L29 Structure and Function of Complex Lipids.

- Explain the structure and function of phospholipids and sphingolipids.

L30 Structure and Function of Glycolipids. Isoprenoid Compounds.

- Define and explain the classification and structure of glycolipids.
- Explain the structure and function of steroids and carotenoids.

L31 Proteinogenic Amino Acids: Structure, Properties and Reactions. Classification. Peptides: The Principle

of Formation. Natural Peptides.
- Classify proteinogenic amino acids.
- Distinguish essential and nonessential amino acids and glucogenic and ketogenic amino acids.
- Explain the principle of peptide formation.
- Name the most important natural peptides and explain their role.

L32 Role and Structure of Proteins. Relation Between Protein Structure and Function. Primary Structure.
- Describe the structural levels in the architecture of proteins.
- Define the primary structure

L33 Conformation of Peptide Chain and Secondary Structure of Proteins. Tertiary Structure. Myoglobin.
- Define the secondary and tertiary structure of proteins.
- Explain the structure of myoglobin.

L34 Quaternary Protein Structure. Haemoglobin. Mechanism of Oxygen Binding. Allosteric Effect. Cooperative Binding. The Bohr Effect.
- Define the quaternary protein structure.
- Explain the allosteric properties of haemoglobin.
- Explain Bohr effect.

L35 Heterocyclic Nitrogen, Oxygen and Sulphur Compounds.
- Define heterocyclic compounds.
- Name biologically significant representatives.

The list of seminars with descriptions:

S1,2 Elements and Compounds.
- Explain the structure of atoms, the periodic system and properties of elements that change periodically
- List the biogenic elements and define their biological role.
- Explain the structure and define the properties of compounds.

S3,4 Chemical Bonds and Intermolecular Forces
- Explain and identify chemical bonds and intermolecular forces.

S5 Acids and Bases
- Define acids and bases according to Arrhenius, Brønsted and Lewis.

S6,7,8,9 Salts. Hydrolysis. Buffers
- Define simple salts. Write equation of neutralisation.
- Explain the hydrolysis of salts.
- Define buffers and explain the mechanism of buffer action.

S10 Solutions. Solution Concentration.
- Define the concept of mole and the concentration of solutions (fractions, molar and mass concentration, molality).
- Define intensive and extensive properties.
- Solve the exercises with concentrations.

S11,12 Solution Concentration.
- Solve the exercises with concentrations.
- Define saline solution (physiological solution).

S13,14 Colligative Properties (Lowering of Vapour Pressure, Elevation of Boiling Point, Depression of Freezing Point and Osmotic Pressure)
- Define colligative properties.
- Solve exercises relating colligative properties.

S15,16 Equilibrium in the Solutions of Weak Electrolytes. Dissociation Constants of Acids and Bases. The Ionic Product of Water. pH.
- Define and write down the dissociation constants of acids and bases.
- Explain the ionisation of water and define the ionic product of water. Define pH.
- Define the pH of body fluids.

S17,18 Equilibrium in the Solutions of Weak Electrolytes. Numeric Exercises
- Solve exercises using pH, the ionic product of water and dissociation constants.

S19,20 Reactions of Organic Compounds

- Describe the characteristic reactions of organic compounds.

S21,22 Hydrocarbons
- Classify and name hydrocarbons.
- Write down the characteristic reactions of hydrocarbons and aromatic compounds.

S23,24 Alcohols, Ethers, Phenols and Thiols
- Explain the chemical properties and reactivity of these groups of compounds.
- List biologically important representatives.

S25 Amines
- Explain the chemical properties and reactivity of this group of compounds.
- List biologically important representatives.

S 26,27,28 Aldehydes and Ketones
- Explain the chemical properties and reactivity of these groups of compounds.

S29,30 Monosaccharides and Disaccharides
- List biologically important representatives.
- Explain the formation of cyclic form.
- Explain the reactivity of monosaccharides and specify their stereoisomers.

S31,32 Carboxylic Acids and their Derivatives
- Explain the chemical properties and reactivity of these compounds.

S33,34 Substituted Carboxylic Acids
- Name and define substituted carboxylic acids (halogen-, oxo-, hydroxy-, amino acids).
- Explain their chemical properties.

S35,36 Lipids. Fatty Acids.
- Explain the physical properties of lipids.
- Define fatty acids and name important biological representatives.
- Explain the chemical properties of fatty acids.

S37,38 Amino Acids
- Define chemical properties and general reactions.
- Classify amino acids.
- Define and calculate the isoelectric point of amino acids.

S39,40 Peptides.
- Explain the principles of synthesis and determination of sequence.
- List the physiologically active peptides.
- List the methods of protein chemistry.

The list of numerical practicals (NP) and laboratory practicals (LP) with short explanations:

LP1 (3 h) 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.

- Basic chemistry lab equipment and techniques.
- Detection and identification of different cations and anions in a solution.
- Detection and identification of cations and anions in salt solutions.

LP2 (3 h) Quantitative Chemical Analysis.

- Name the main types of quantitative chemical analysis.
- Describe and exemplify the volumetric methods.
  Volumetric analysis.
- Employ the alkalimetric, manganometric and complexometric methods.

NP1,2 (2 h) Chemical Kinetics

- Describe the influence of temperature, concentration, pH and catalyst on the rate of oxidation of oxalic acid with potassium permanganate.
- Solve numerical exercises.

LP3 (2 h) Buffer Solutions.

- Prepare the phosphate buffer solution.
- Measure the pH and buffer capacity.

NP 3,4 (2h) pH and Buffer Solutions.

- Describe the mechanism of buffer action in body fluids.
- Calculate the pH value of buffer solutions.

NP 5,6,7 (3h) Redox Reactions.

- Define the oxidant and reductant in redox reactions.
- Balance the redox reactions.

LP4 (2 h) Chemical Kinetics.

- Investigate experimentally the influence of temperature, concentration, pH and catalyst on rate of reaction

LP5 (3 h) Qualitative Organic Analysis

- Detect and identify functional groups.
- Detect and identify amides and purines in solution.

LP6 (4 h) Optical Methods
Spectrophotometry.

- Determine the wavelength of maximum absorbance.
- Determine the influence of a concentration on absorbance.
- Determine the concentration of $CuSO_4$ in a solution using a spectrophotometer.

Polarimetry

- Determine the specific rotation angle of sugar.
- Make a calibration graph using sugar solutions with different concentrations.
- Determine the mass concentration of sugar in a sample by measuring the angle of rotation.

LP7 (3 h) Qualitative Analysis of Proteins and Amino Acids. Detection and Identification of Different Amino Acids in Various Sample Solutions. Quantitative Determination of Serum Proteins. Isoelectric Point. Thin Layer Chromatography (TLC) of Amino Acids.

- Determine the isoelectric point of a given protein solution.
- Perform a TLC for a given amino acids mixture.
- Quantitatively determine the concentration of serum proteins using the Biuret method.

Students' obligations:

Students' obligations:
Class attendance including test attendance is mandatory. Students may be absent from 30% of each form of teaching provided they have a justifiable cause. Absence from laboratory practicals is obligatory compensated by an oral colloquy.

Assessment of students' work:
Students can obtain a total of 100 credits: a maximum of 70 credits during the course of the semester (writing three 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 semester.
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.

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

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

Table 1

		CREDITS
Midterm exams	I General and inorganic chemistry	17 (x score)
	II Stoichiometry	11 (x score)
	III Organic chemistry and biochemistry I	28 (x score)
	Total	**56**
Laboratory practicals	Practicals and reports	**14**
TOTAL		**70**
Final exam	Written exam	15 (x score)
	Oral exam	15
	Total	**30**
TOTAL		**100**

Midterm exams:
Three midterm exams will be held during the semester. The first one covers the content of bioinorganic, general and physical chemistry, the second one covers stoichiometry and the third one covers organic chemistry and biochemistry (theory, nomenclature and structural formulas).

Laboratory practicals:
Students can gain a maximum of 14 credits through 7 laboratory practicals. Each completed practical brings 2 credits: 1 for successfully executed laboratory work and 1 for a completed written report after each practical. Grading of the laboratory work will be made based on the initial written test (5 short questions; student with 2 or less correct answers will not be allowed to attend the practical), activity during work and laboratory skills. For each exercise, a report must be written and submitted in due time. The mistakes, if any, must be corrected upon resubmission, which takes place together with a following report. Only one correction is allowed and the grading of the report will be done upon it. Grading will be based primarily on the quality of the initial report (accuracy and neatness), but if the corrections are not addressed in an appropriate matter or in a given deadline, the report will be graded 0. If more than 30 % of laboratory work or 30 % of reports are graded 0, or if the total sum of all practicals' credits is less than 7 (*i.e.* 50 % of total practicals' credits), the student will not be allowed to take the final exam. An absence (for any reason) from a laboratory practical must be compensated by an oral colloquy within a week from the practical; successful colloquy brings a total of 0,5 credits. 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.

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

Other important information regarding the course:

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

Communication with professors and assistants:
Contact with professors and assistants can be done directly during/after classes, by consultations, by e-mail or by the Merlin platform (Forum or Chat).

Consultations are held in agreement with professors and assistants at the scheduled time.

e-mails:
Course coordinator: Assoc. Prof. Gordana Čanadi Jurešić, gordanacj@medri.uniri.hr
Collaborators: Prof. Srećko Valić, svalic@medri.uniri.hr
Assoc. prof. Marin Tota, marin.tota@medri.uniri.hr
Assoc. prof. Lara Batičić, lara.baticic@medri.uniri.hr
Assist. prof. Mirna Petković Didović, mirnapd@medri.uniri.hr
Assist. prof. Jelena Marinić, Jelena.marinic@medri.uniri.hr
Assist. prof. Damir Klepac, damir.klepac@medri.uniri.hr
Iva Vukelić, PhD, iva.vukelic@medri.uniri.hr

The results of the midterm and the final exam, notifications and all other informations about the course will be published regularly by the Merlin platform.

COURSE SCHEDULE (for academic year 2021/2022)

	Date	Lectures (Time), Lecture Hall*	Seminars (Time) Seminar Group, Lecure Hall*	Laboratory Practicals (Practicum at the Department)	Lecturer
	1st Week				
Wed	06/10/2021	L1, 2,3 (10:15 -13:00), LH8			Assoc. Prof. G. Čanadi Jurešić
			S 1-3 (13:15-16:00) SG1, LH 9		Assist. Prof. M. Petković Didović
Thu	07/10/2021		S 1-3 (8:00-10:30) SG2, LH 9		Assist. Prof. M. Petković Didović
Fri	08/10/2021		S 4-6 (08:15-11:00) SG1,LH 9 S 4-6 (11:00-14:00) SG2, LH 9		
	2nd Week				
Tue	12/10/2021		S 7,8 (8:15 -10:00) SG2, LH 4 S 7,8 (10:15 -12:00) SG1, LH 4		Assoc. Prof. L. Batičić Assist. Prof. M. Petković Didović
Wed	13/10/2021	L 4,5 (10:15-12:00), 8			Assoc. Prof. L. Batičić
Thu	14/10/2021		S 9,10 (8:15 -10:00) SG2, LH 8		Assoc. Prof. L. Batičić
				LP 1 (12:15-15:00) G1 LP 1 (13:15-16:00) G2	Assoc. Prof. L. Batičić I. Vukelić, PhD
Fri	15/10/2021		S 9,10 (08:15 -10:00) SG1,LH 9		Assoc. Prof. L. Batičić
				LP 1 (08:15-11:00) G3	Assist. I. Vukelić
	3rd Week				
Mon	18/10/2021	L 6 (11:15-12:00), LH 8			Assoc. Prof. M. Tota
Thu	21/10/2021		S 11,12 (14:15-16:00)SG1,LH 6 S 11,12 (14:15-16:00)SG2,LH 4		Assist. Prof. M. Petković Didović Assoc Prof. L. Batičić
Fri	22/10/2021		S 13,14 (8:15-10:00) SG1, LH7 S 13,14 (8:15-10:00) SG2, LH8		Assist. Prof. Petković Didović/ Assist. Prof. D. Klepac
	4th Week				
Wed	27/102021	L 7,8 (10:15 -12:00), LH 8			Assist. Prof. D. Klepac
Thu	28/10/2021		NP 1,2 (8:15-10:00) SG2, LH 9	LP 2 (12:15-15:00) G1 LP 2 (13:15-16:00) G2	NP: Assist. Prof. D. Klepac / LP: Assist. Prof. M. Petković Didović I. Vukelić, PhD
Fri	29/10/2020		NP 1,2 (8:15-10:00) SG1, LH7		Assist. Prof. D. Klepac
				LP 2 (08:15-11:00) G3	I. Vukelić, PhD
	5th Week				
Wed	3/11/2021	L9,10,11(10:15 -13:00), LH8			Prof. S. Valić
Thu	4/11/2021		S 15,16 (08:15-10:00)SG2, LH5		Assist. Prof. D. Klepac
Fri	5/11/2021		S 15,16 (8:15-10:00) SG1, LH4		Assist. Prof. D. Klepac

	6th Week				
Tue	9/11/2021		NP3,4 (8:15-10:00) SG2, LH4		Assoc. Prof. L. Batičić
Wed	10/11/2021	L12,13 (10:15 -12:00), LH1			Assist. Prof. M. Petković Didović
			NP 3,4 (12:15 -14:00) SG1,LH 4		Assoc. Prof. L. Batičić
Thu	11/11/2021		S 17,18 (8:15-10:00), SG2, LH 8 S 17,18 (13:15-15:00) SG1, LH 4		Assist. Prof. D. Klepac
				LP 3 (13:00-15:00) G3 LP 3 (15:00-17:00) G2	LP: Assoc. Prof. L. Batičić I. Vukelić, PhD
Fri	12/11/2021			LP 3 (08:00-10:00) G1	Assist. Prof. M. Petković Didović
	7th Week				
Wed	17/11/2021	L14,15 (10:15-12:00), LH8	NP 5,6,7 (13:15-16:00) SG1,LH4		Assoc. Prof. Marin Tota NP - Assist. Prof. D. Klepac
Fri	19/11/2021		NP 5,6,7(12:15-15:00) SG2,LH9	LP 4 (08:00-10:00) G2 LP 4 (10:00-12:00) G3 LP 4 (12:00-14:00) G1	Assist. Prof. D. Klepac LP: Assist. I. Vukelić Assoc.Prof.L.Batičić I. Vukelić, PhD
	8th Week				
Wed	24/11/2021	L16-18 (10:15-13:00), LH 8			Assoc. Prof. L. Batičić
Fri	26/11/2021		**1st Midterm Exam** (8:00-9:00), S 19,20 (09:15-11:00) SG2, LH 6 S 19,20 (11:15-13:00) SG1, LH 6		Assoc. Prof. L. Batičić
	9th Week				
Wed	1/12/2021		**2nd Midterm Exam** (10:30/11-12:30/13) LH 4, 5, inf.		
Thu	2/12/2021		S 21,22 (08:15-10:00) SG2, LH4 S 21,22 (11:15-13:00) SG1, LH4		Assoc. Prof. L. Batičić
Fri	3/12/2021	L 19,20 (14:15-16:00), LH 8			Assoc. Prof. G. Čanadi Jurešić
	10th Week				
Wed	08/12/2021	L 21-23 (10:15-13:00), LH 8			Assoc. Prof. G. Čanadi Jurešić
Thu	9/12/2021		S 23-25 (08:00-10:45) SG2, LH4		Assist. Prof. D. Klepac Assoc. Prof. G. Čanadi Jurešić
				LP 5 (12:00-15:00) G1 LP 5 (13:00-16:00) G2	Assist. Prof. M. Petković Didović I. Vukelić, PhD
Fri	10/12/2021		S 23-25 (08:15-11:00) SG1, LH4		Assist. Prof. D. Klepac Assoc. Prof. G. Čanadi Jurešić
				LP 5 (08:00-11:00) G3	I. Vukelić, PhD

	11th Week				
Wed	15/12/2021	L 24,25 (10:15-13:00), LH8			Assoc. Prof. G. Čanadi Jurešić
Thu	16/12/2021		S 26-28 (08:15-11:00) SG2, LH 4		Assoc. Prof. G. Čanadi Jurešić
Fri	17/12/2021		S 26-28 (8:15-11:00) SG1, LH 7		Assoc. Prof. G. Čanadi Jurešić
	12th Week				
Mon	20/12/2021		S 29,30 (14:15-16:00) SG1, LH 9		Assoc. Prof. G. Čanadi Jurešić
Tue	21/12/2021		S 29,30 (14:15-16:00) SG2, LH 4		Assoc. Prof. G. Čanadi Jurešić
Wed	22/12/2021	L26,27 (10:15-12:00), LH8			Assoc. Prof. L. Batičić
Thu	23/12/2021		S 31,32 (08:15-10:00) SG2, LH 4 S 31,32 (11:15-13:00) SG1, LH 4	ON-LINE	Assoc. Prof. L. Batičić
	13th Week				
Tue	11/01/2022		S 33,34 (12:15-14:00) SG2, LH5 S 33,34 (14:15-16:00) SG1, LH5		Assoc. Prof. L. Batičić
Wed	12/01/2022	L 28-30 (10:15-13:00), LH9			Assoc. Prof. G. Čanadi Jurešić
Thu	13/01/2022			LP 6 (12:00-16:00) G1 LP 6 (13:00-17:00) G2	LP: Assist. Prof. M. Petković Didović I. Vukelić, PhD
Fri	14/01/2022		S 35,36 (08:15-10:00) SG1, LH 8 S 35,36 (12:15-14:00) SG2, LH 8	LP 6 (8:00-12:00) G3	S: Assoc. Prof. G. Čanadi Jurešić/ LP: Assist. Prof. M. Petković Didović
	14th Week				
Mon	17/1/2022		S 37,38 (12:15-14:00) SG1, LH 7		Assoc. Prof. G. Čanadi Jurešić
Wed	19/1/2022	L 31,32 (10:15-12:00), LH 8	S 37,38 (8:15-10:00) SG2, LH 9		L: Assist. Prof. J.Marinić; S: Assoc. Prof. G. Čanadi Jurešić
Thu	20/1/2022			LP 7 (12:00-15:00) G1 LP 7 (13:00-16:00) G2	Assist. Assoc. Prof. L. Batičić I. Vukelić, PhD
Fri	21/1/2022			LP 7 (08:00-11:00) G3	I. Vukelić, PhD
	15th Week				
Mon	24/1/2022		S 39,40 (12:15-14:00) SG1, LH 8		I. Vukelić, PhD
Wed	26/1/2022	L 33-35 (10:15-13:00),LH 8	S 39,40 (08:15-10:00) SG2, LH 8		L: Assist. Prof. J.Marinić/Assist. Prof. M. Petković Didović Assoc. S: I. Vukelić, PhD
Fri	28/1/2022	**3rd Midterm Exam** (12:15-14:00), LH			

* Note: In the winter semester of AY 2021/212 due to the epidemiological situation, lectures (and some seminars) will be performed *online*. In the case of *on-site* classes, lecture halls or practicals as scheduled will be used. Any change in the schedule, made by course coordinator, will be notified in advance.

Midterm	Date	Time	Lecture Hall
I	26/11//2021		
II	1/12/2021		
III	28/1/2022		

	FINAL EXAM
1.	3.2.2022..
2.	17.02.2022.
3.	4.7.2021.
4.	1.9.2021.
5.	15.09.2021.