

Plan of the course

Medical Chemistry and Biochemistry **1**

Academic year **2016/2017**

doc. dr. sc. Igor Picek

I. COURSE AIMS

: The teaching of the preclinical courses is devoted to give students an overview of morphology and function of the body systems in health. Therefore the course Medical Chemistry and Biochemistry is integrated and composed in such a way to enable students to become familiar with chemical structures, chemical and energetic changes, as well as with the regulation of metabolic processes in human organism. Conceived in such a way, this course offers biochemical basis for the teaching of physiology, as well as for the understanding of the vast number of diseases caused by pathobiochemical processes. The basic principles of chemistry and biochemistry are grouped around principal thematic units structured pedagogically into a coherent whole comprised of lectures, seminars and practical.

The content of the Medical Chemistry and Biochemistry I course comprises: basic stoichiometry, bio-thermodynamics, chemical equilibrium, properties of solutions, electrochemistry, colloid systems, biologically significant inorganic substances, structure and properties of organic compounds, structure and function of biological membranes, equilibrium and kinetics of chemical reactions with special emphasis on the enzymatic reactions, structure and function of nucleic acids.

The practical part of the course covers: preparation of solutions and optical methods, colloidal disperse systems, acids, bases and buffers, properties and analysis of amino acids, proteins and enzymes, carbohydrates and lipids.

II. COURSE STRUCTURE

Course hours:

Lectures: 30

Seminar: 40

Practicum: 30

Total hours: 100

Lectures (L): 30

Seminars (S): 40

Practicals (P): 30

Total: 100

III. PLAN OF THE COURSE AND COURSE SCHEDULE

BLOCKS OF THE COURSE

Number of blocks: 1

Block number	Start	End
1.	6.2.2017	12.6.2017

BLOCKS OF THE COURSE

Number of blocks: 1

Block number	Start	End
1.	6.2.2017	12.6.2017

BLOCKS OF THE COURSE SCHEME

Block 1

Date	Time	Group	Course hours type	Theme	Teaching staff
Monday 6.2.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Lectures	Intermolecular forces. Structure and properties of water.	doc. dr. sc. Igor Picek
	11:30-13:00; MEF Kemija Predavaonica	A,B	Lectures	Gaseous state of matter. Gas laws.	doc. dr. sc. Igor Picek
Monday 13.2.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Seminar	Solutions: composition, preparation and solution stoichiometry.	dr. sc. Vladimir Damjanović, izv. prof. dr. sc. Daria Pašalić
	11:00-12:30; MEF Kemija Predavaonica	A,B	Seminar	Electrolyte and nonelectrolyte solutions.	doc. dr. sc. Igor Picek, izv. prof. dr. sc. Daria Pašalić
	13:45-15:15; MEF Kemija Predavaonica	A,B	Seminar	Colligative properties of solutions	dr. sc. Danijela Cvijanović, izv. prof. dr. sc. Željka Vukelić
Monday 20.2.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Lectures	Colloidal dispersions.	doc. dr. sc. Igor Picek
	11:00-12:30; MEF Kemija Predavaonica	A,B	Seminar	Spectrophotometry and polarimetry.	dr. sc. Ivana Furač, izv. prof. dr. sc. Daria Pašalić
	14:00-17:45; MEF Kemija laboratorij	A,B	Practicum	Preparation of solutions and optical methods	doc. dr. sc. Igor Picek, dr. sc. Ivana Furač, dr. sc. Vladimir Damjanović, izv. prof. dr. sc. Željka Vukelić
Monday 27.2.2017.	11:00-12:30; MEF Kemija Predavaonica	A,B	Lectures	Equilibrium in homogenous and heterogenous systems.	izv. prof. dr. sc. Željka Vukelić
	13:30-15:00; MEF Kemija Predavaonica	A,B	Seminar	Application of the equilibrium law.	izv. prof. dr. sc. Željka Vukelić, doc. dr. sc. Igor Picek
Monday 6.3.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Seminar	Acids and bases. Buffers.	dr. sc. Vladimir Damjanović, izv. prof. dr. sc. Željka Vukelić
	11:00-12:30; MEF Kemija Predavaonica	A,B	Seminar	Acids, bases and buffers: problem solving	dr. sc. Vladimir Damjanović, doc. dr. sc. Igor Picek
	14:00-17:45; MEF Kemija laboratorij	A,B	Practicum	Colloidal dispersions.	dr. sc. Danijela Cvijanović, izv. prof. dr. sc. Željka Vukelić, doc. dr. sc. Igor Picek, izv. prof. dr. sc. Daria Pašalić
Monday 13.3.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Lectures	Fundamentals of thermodynamics.	izv. prof. dr. sc. Željka Vukelić
	11:00-12:30; MEF Kemija Predavaonica	A,B	Seminar	Biothermodynamics. Coupled reactions.	izv. prof. dr. sc. Željka Vukelić, izv. prof. dr. sc. Daria Pašalić
	14:00-17:45; MEF Kemija laboratorij	A,B	Practicum	Acids and bases. pH and Buffers.	dr. sc. Vladimir Damjanović, dr. sc. Danijela Cvijanović, doc. dr. sc. Igor Picek, izv. prof. dr. sc. Željka Vukelić

Date	Time	Group	Course hours type	Theme	Teaching staff
Monday 20.3.2017.	11:00-12:30; MEF Kemija Predavaonica	A,B	Lectures	Fundamentals of electrochemistry.	izv. prof. dr. sc. Željka Vukelić
	13:00-14:30; MEF Kemija Predavaonica	A,B	Seminar	Redox-reaction potentials and bioenergetics.	izv. prof. dr. sc. Željka Vukelić, doc. dr. sc. Igor Picek
Monday 27.3.2017.	10:00-11:30; MEF Kemija Predavaonica	A,B	Lectures	Reaction kinetics.	doc. dr. sc. Igor Picek
	12:30-14:00; MEF Kemija Predavaonica	A,B	Seminar	Problem solving	doc. dr. sc. Igor Picek, izv. prof. dr. sc. Daria Pašalić
Monday 3.4.2017.	12:30-14:00; MEF Kemija Predavaonica	A,B	Lectures	Classes of organic compounds. Physical properties and isomerism.	izv. prof. dr. sc. Daria Pašalić
	14:30-16:00; MEF Kemija Predavaonica	A,B	Lectures	Major types of organic reactions.	doc. dr. sc. Igor Picek
Monday 10.4.2017.	12:30-14:00; MEF Kemija Predavaonica	A,B	Seminar	Saturated and unsaturated hydrocarbons. Haloalkanes.	doc. dr. sc. Igor Picek, dr. sc. Danijela Cvijanović
	14:30-16:00; MEF Kemija Predavaonica	A,B	Seminar	Alcohols and phenols. Ethers. Thiols.	izv. prof. dr. sc. Daria Pašalić, doc. dr. sc. Igor Picek
Monday 24.4.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Seminar	Aldehydes and ketones.	izv. prof. dr. sc. Daria Pašalić, doc. dr. sc. Igor Picek
	11:00-12:30; MEF Kemija Predavaonica	A,B	Seminar	Carboxylic acids. Substituted carboxylic acids.	izv. prof. dr. sc. Daria Pašalić, doc. dr. sc. Igor Picek
	14:15-15:45; MEF Kemija Predavaonica	A,B	Seminar	Derivatives of carboxylic and phosphoric acids.	izv. prof. dr. sc. Željka Vukelić, dr. sc. Ivana Furač
Monday 8.5.2017.	13:00-14:30; MEF Kemija Predavaonica	A,B	Lectures	Amines. Heterocyclic compounds. Vitamins.	doc. dr. sc. Igor Picek
	15:00-16:30; MEF Mašek	A,B	Seminar	Amino acids and peptides.	dr. sc. Ivana Furač, dr. sc. Vladimir Damjanović
Monday 15.5.2017.	09:30-11:00; MEF Kemija Predavaonica	A,B	Lectures	Proteins: structure and biological roles. Extracellular matrix proteins.	prof. dr. sc. Svjetlana Kalanj- Bognar
	11:30-13:00; MEF Kemija Predavaonica	A,B	Seminar	Hemoglobin and myoglobin.	prof. dr. sc. Svjetlana Kalanj- Bognar, izv. prof. dr. sc. Željka Vukelić
	14:00-17:45; MEF Kemija laboratorij	A,B	Practicum	Amino acids and proteins.	dr. sc. Vladimir Damjanović, izv. prof. dr. sc. Željka Vukelić, doc. dr. sc. Igor Picek, prof. dr. sc. Svjetlana Kalanj- Bognar
Monday 22.5.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Lectures	Enzymes: mechanism of action. Coenzymes. Regulation of enzyme activity.	prof. dr. sc. Svjetlana Kalanj- Bognar
	11:00-12:30; MEF Kemija Predavaonica	A,B	Seminar	Enzyme kinetics.	prof. dr. sc. Svjetlana Kalanj- Bognar, dr. sc. Ivana Furač
Monday 29.5.2017.	09:00-10:30; MEF Kemija Predavaonica	A,B	Lectures	Carbohydrates.	prof. dr. sc. Svjetlana Kalanj- Bognar

Date	Time	Group	Course hours type	Theme	Teaching staff
	11:00-12:30; MEF Kemija Predavaonica	A,B	Seminar	Carbohydrates. Stereochemistry and Reactions	prof. dr. sc. Svjetlana Kalanj- Bognar, dr. sc. Danijela Cvijanović
	13:30-15:00; MEF Kemija podrum	A,B	Lectures	Lipids.	izv. prof. dr. sc. Željka Vukelić
Monday 5.6.2017.	11:30-13:00; MEF Kemija podrum	A,B	Seminar	Biological membranes.	izv. prof. dr. sc. Daria Pašalić, prof. dr. sc. Svjetlana Kalanj-Bognar
	14:00-17:45; MEF Kemija laboratorij	A,B	Practicum	Enzymes.	doc. dr. sc. Igor Picek, dr. sc. Danijela Cvijanović, prof. dr. sc. Svjetlana Kalanj- Bognar, izv. prof. dr. sc. Daria Pašalić
Monday 12.6.2017.	11:00-12:30; MEF Kemija Predavaonica	A,B	Lectures	Nucleotides and nucleic acids. Protein biosynthesis.	izv. prof. dr. sc. Daria Pašalić
	14:00-17:45; MEF Kemija laboratorij	A,B	Practicum	Carbohydrates and lipids.	izv. prof. dr. sc. Daria Pašalić, prof. dr. sc. Svjetlana Kalanj-Bognar, izv. prof. dr. sc. Željka Vukelić, doc. dr. sc. Igor Picek

IV. EXAMINATIONS

Requirements: Attendance at lectures, seminars and laboratory exercises (practices) is mandatory. Missed lectures, seminars as well as missed or not accepted practices are recorded. The justified absence from 4 teaching units (lectures and/or seminars) and 0 practices will be tolerated, but absence from 15 to 30 % teaching units will result in assignment of negative points on the final exam.

Two control tests, including the topics of the lectures, seminars and laboratory exercises, will be given during the course.

B. Types of examination and examination dates

Final written exam (test).

Regular terms

Date

Summer

Friday, June 30, 2017

Monday, July 17, 2017

Friday, September 1, 2016

Autumn

Friday, September 15, 2016

V./I. LIST OF LECTURERS AND TEACHING STAFF

1. doc. dr. sc. Igor Picek
2. prof. dr. sc. Svjetlana Kalanj-Bognar
3. izv. prof. dr. sc. Željka Vukelić
4. izv. prof. dr. sc. Daria Pašalić
5. dr. sc. Ivana Furač
6. dr. sc. Vladimir Damjanović
7. dr. sc. Danijela Cvijanović

V./II EXTERNAL ASSOCIATES:

V./III UNTENURED LECTURERS:

VI. LITERATURE

1. Silberberg M. S.: Chemistry, The Molecular Nature of Matter and Change, McGraw-Hill, 4nd Ed., 2006. **or** Chang R.: General Chemistry; The Essential Concepts, McGraw-Hill, 4th Ed., 2006.
2. Carey F.A.: Organic Chemistry, McGraw-Hill, 5th Ed., 2003.
3. Lehninger: Principles of Biochemistry (4th or 5th or 6 th or 7th ed.): Nelson, D., and Cox, M.
4. Laboratory Manual - Handbook of Chemistry for Medical Students (internal script)