

Higher education institution: Slovak Medical University in Bratislava	
Faculty: Faculty of Medicine	
Course code: GM008	Course title: Medical Chemistry
Type, extent and method of educational activity: Number of hours per semester: 70 LECTURES: 28 (2 hours per week: 14 x 2 = 28) LABORATORY EXERCISES: 42 (3 hours per week: 14 x 3 = 42) Student workload: 125 hrs.	
Number of credits: 5 credits	
Recommended semester study: 1st semester	
Level of higher education study: 1. + 2. Level	
Prerequisite courses:	
Conditions for passing the course: EXAM: written test + verbal part. Overall evaluation A, B, C, D, E, Fx. Minimum success rate: E. Rating: A: 95% -100% ; B: 88% - 94% ; C: 82% -87% ; D: 76% -81% ; E: 70% -75% ; Fx: less than 70%. Attendance at lectures: optional. LABORATORY EXERCISES: 100% attendance; Credit Tests; Practical Exam; Protocols; Activity at lessons.	
The result of education in Medical Chemistry: To deep the knowledge from general, physical, inorganic and organic chemistry necessary for medical students. To see the reasons of some disease at molecular level and to learn to think chemically. Application of Medical Chemistry into practice.	
Brief content of the course (syllabus): LECTURES: atom composition and structure: nucleus, isotopes, nuclides, quantum mechanical description of electron orbitals, electron envelope; periodic system, trends in periodic table, properties of elements; biogenic elements; chemical bonds and intermolecular interactions, molecular orbitals; matter: classification, main characteristics, phases, phase changes, physical and chemical properties, pure substances and mixtures, crystalline and amorphous matters, homogeneous and heterogeneous systems, disperse systems, processes of solution and dissociation, osmotic pressure, osmolarity; acids and bases: definitions, strength, pH, pH indicators, neutralisation, titration, buffers, acid-base equilibria; redox processes: oxidation numbers, oxidation and reduction in chemistry and biochemistry, redox potentials; energetics and kinetics of chemical reactions; organic chemistry: general characteristics and classification of organic compounds, composition, structure and structural formulas, isomerism, functional groups and nomenclature, types of organic reactions; characteristic properties and biologically important reactions of hydrocarbons and their main derivatives (halogen derivatives, hydroxyderivatives, thiols, disulfides, sulfides, carbonyl compounds, carboxylic acids and their functional and substitutional derivatives, amines, ethers); biologically important organic compounds (including heterocycles); short chemical view to saccharides, lipids, proteins. LABORATORY EXERCISES: laboratory order and safety rules; International System of Units, non-SI units, metric system of measurement (unit prefixes, suffixes, symbols and relationships); unit conversions; common laboratory equipment, glassware (names, parameters, classification, usage, accuracy); measuring the volumes of liquids; pipette techniques; weighing the right way/weighing techniques; accuracy vs. precision; expressions of solution composition (different ways of expressing concentrations); laboratory solution preparation; basic, step and serial dilution; acid-base titrations; measuring the pH, pH indicators; redox reactions; basics of spectrophotometry (absorbance spectrum, Lambert-Beer law); separation techniques, thin-layer chromatography; centrifugation; chemical calculations: expressing concentrations of solutions, mixing equations, dilutions, ideal gas law and standard molar volume, titrations, pH, osmolarity, stoichiometry.	
Recommended literature: 1. ORSZÁGHOVÁ, Z. – ŽITŇANOVÁ, I. et al.: Medical Chemistry, 1st edition. Comenius University Bratislava, Bratislava, 2008. ISBN 978-80-223-2426-7 2. Hudecová Lucia: Seminar and Practical Exercises from Medical Chemistry for students of General Medicine. SZU Bratislava, 2018, 172 s. ISBN 978-80-89702-55-8 3. https://courses.lumenlearning.com/boundless-chemistry/	

4. <http://2012books.lardbucket.org/books/principles-of-general-chemistry-v1.0/index.html>
5. SILBERBERG, M.: Chemistry - The Molecular Nature of Matter and Change, 4th edition. McGraw – Hill, New York, 2006. ISBN 0-07-111658-3
6. BURDGE, J.: Chemistry, 2nd edition. McGraw - Hill, New York, 2009.
7. BURNS, R.A.: Fundamentals of Chemistry, 4th edition. Prentice Hall, 2003.
8. CHANG, R.: Chemistry, 4th edition. McGraw-Hill, New York, 1991.

Language requirements: English

Notes:

Course assessment

Assessed students in total:

A	B	C	D	E	FX
12.2 %	18.9 %	21.5 %	29.6 %	14.2 %	3.6 %

Lecturers:

Ing. Lucia Hudecová

Date of last modification: 18. 08. 2022

Supervised by: *person responsible for realization, development and ensuring of the study program quality*
prof. MUDr. Iveta Šimková, CSc.