MEDICAL CHEMISTRY 1st Semester Academic Year 2007 / 2008

LECTURES **Wednesday 10:40 – 12:30**

Week	Date	
1	**19 Sept.**	Solutions of substances. Colligative properties of solutions, osmotic pressure. Dissociation of electrolytes, the equilibria in electrolyte solutions. Protolytic reactions: acids and bases, pH values, calculations.
2	**26 Sept.**	Hydrolysis of ions. Buffers. Buffers in the human body. Liquid colloid dispersions. Surfactants (tensides).
3	**3 Oct.**	Chemical reactions – kinetics, chemical equilibrium. The driving force of chemical reactions, free Gibbs energy.
4	**10 Oct.**	Oxidation-reduction reactions. Redox potentials, the e.m. force of a voltaic cell and the relation of it to the reaction free energy change and equilibrium constant. Dissolution equilibria. Precipitation reactions.
5	**17 Oct.**	Essential macroelements important for living matter, properties of some of their compounds. Hazardous inorganic chemicals. Carbon compounds: Their constitution, configuration, isomerism, and conformation.
6	**24 Oct.**	Main types of organic compounds, the principles of chemical nomenclature. Hydrocarbons and derivatives of hydrocarbons: alcohols, thioalcohols, phenols, carbonyl compounds.
7	**31 Oct.**	Carboxylic acids. Derivatives of the acids (esters, amides, anhydrides, halides) and substituted carboxylic acids. Amines. Some biochemical conversions of organic compounds (oxidations and reductions, the citric acid cycle, transaminations of amino acids).
8	**7 Nov.**	Heterocyclic compounds of biological importance (cofactors, synthetic pharmaceuticals, drugs).
9	**14 Nov.**	Structures and properties of monosaccharides and simple sugar derivatives. Oligosaccharides.
10	**21 Nov.**	Polysaccharides. Glycosides, nucleosides. Nucleotides, nucleic acids.
11	**28 Nov.**	Fatty acids and lipids-comprising alcohols. Triacylglycerols. Phospholipids and glycolipids.
12	**5 Dec.**	Eicosanoids. Isoprenoids. Steroids, structures of representative compounds.
13	**12 Dec.**	Standard α-amino acids, polarity of the side chains, ionization of amino acids, amino acids as buffers. Peptides, some examples of peptides exhibiting biological activity.
14	**19 Dec.**	Proteins – main features of structures. Globular, fibrous, and membrane proteins.
15	**9 Jan.**	Glycoproteins. Haemoproteins (haem and other tetrapyrroles).

Recommended textbooks:
Táborská, Sláma, et al.: Medical Chemistry I (General and Inorganic Chemistry). Masaryk Univ., 2006
Dostál et al.: Medical Chemistry II (Bioorganic Chemistry). Masaryk University, 2006

(Preliminary requirements: Kaplan, Sláma: An Overview of Chemistry. Masaryk University, l998)