

Week	Lectures	Practical exercises http://portal.lf.upjs.sk
1	INTRODUCTION TO MEDICAL CHEMISTRY - International (English) nomenclature - Properties and biological importance of water RNDr. Stupák	<u>Principle of laboratory technique I.</u> 1. Safety in chemical laboratory (1.1) 2. Basic equipment of laboratory (1.3, 1.4) 3. Volume measurements and pipetting (1.5) RNDr. Stupák
2	SOLUTIONS - Solution, their properties (disusion and osmosis) - Electrolytes in body liquids - Solubility product RNDr. Stupák	<u>Principle of laboratory technique II.</u> 1. Recrystalization of lead (II) iodine (2.2) Seminar- Calculations I. - Stoichiometric calculations (16.1) RNDr. Stupák
3	ACID BASE REACTIONS, pH, BUFFERS - Acid base reactions - pH of weak acids and bases, hydrolysis of salts - Buffer system and colloid solution. RNDr. Stupák	<u>Volumetric analysis I.</u> 1. Preparation of NaOH solution 2. Standardization of NaOH solution (4.5) Seminar- Calculations II. - Calculations of concentration of solutions calculations RNDr. Stupák
4	BASIC CHEMICAL PROCESSES I. - Properties of colloidal solution - Thermodynamics in living sastems - Energy and kinetics of chemical reactions RNDr. Stupák	<u>Volumetric analysis II.</u> 1. Determination of ammonia in waste water (4.6) Seminar- Calculations III. - The principles of volumetric analysis RNDr. Stupák
5	BASIC CHEMICAL PROCESSES II. - Oxidation-reduction reactions in living organisms - Reduction potentials Mgr. Urban	<u>pH of acids and bases</u> 1. Determination of iodine in Lugol solution (5.3) 2. Effect of acids and bases for pH buffering system. Buffering capacity (5.2) Seminar –Calculation IV. - Calculations of pH of the solutions - Hendersom-Hasselbach equation, buffers RNDr. Stupák
6	CLASSIFICATIONS OF ELEMENTS - Classification of biogenic elements - Importance of elements in the organism - Toxicity of biogenic elements Mgr. Urban	Kinetics and chemical reactions 1. Dependence of the reaction rate on the concentration of reactants Repeating test from inorganic chemistry (1 st to 5 th week) RNDr. Stupák
7	DERIVATES OF HYDROCARBONS I. - Classification of organic compounds, reactions of organic compounds - Alkanes, alkenes, alkynes - Cyclic hydrocarbons Mgr. Urban	<u>Volumetric analysis III.</u> 1. Solubility of halides (6.1) 2. Solubility of silver halides (6.3) Seminar- Calculations V. - Calculations associated with the solubility of substances RNDr. Stupák

8	<p>DERIVATES OF HYDROCARBONS II.</p> <ul style="list-style-type: none"> - Alcohol, aldehydes, medical and toxicological significance - Medical and toxicological importance of alkyl halides and hydroxyderivates - Biochemically important reactions of aldehydes, ketones and quinones <p style="text-align: right;"><i>Mgr. Urban</i></p>	<p><u>Volumetric analysis IV.</u></p> <ol style="list-style-type: none"> 1. Complexometric determination of calcium 2. Complex formation of tetraamminocopper (II) ion <p style="text-align: right;"><i>RNDr. Stupák</i></p>
9	<p>DERIVATES OF HYDROCARBONS III.</p> <ul style="list-style-type: none"> - Carboxylic acids and their derivates (salicylic acid, nicotinic acid, fatty acids) - Medical and toxicological significance <p style="text-align: right;"><i>Doc. Tomečková</i></p>	<p><u>Optical method</u></p> <ol style="list-style-type: none"> 1. Spectrophotometric determination of copper <p><u>Seminar- Calculations VI.</u></p> <ol style="list-style-type: none"> 1. Calculation of substance concentration based on spectrophotometric measurements 2. Spectrophotometric calculation <p style="text-align: right;"><i>RNDr. Stupák</i></p>
10	<p>DERIVATES OF HYDROCARBONS IV.</p> <ul style="list-style-type: none"> - Significant organic nitrogen compounds, derivates of carbonic acid (urea and its derivates), guanidine and its derivates (creatine and creatinine) - Organic compounds of sulfur, phosphorus, esters of phosphorus acid and their biological significance <p style="text-align: right;"><i>Doc. Tomečková</i></p>	<p><u>Properties of organic compounds I.</u></p> <ol style="list-style-type: none"> 1. Evidence of ethylalcohol by iodoform reaction 2. Ethanol oxidation with KMnO_4 by different pH 3. Reaction of phenols (8.1.3) <p>Seminar: reactions of derivates of hydrocarbons</p> <p style="text-align: right;"><i>RNDr. Stupák</i></p>
11	<p>HETEROCYCLES</p> <ul style="list-style-type: none"> - Five membered ring heterocycles with 1 or more heteroatoms (including condensed rings) - Biochemically and medically important derivates of heterocyclic compounds (co-enzymes, vitamins, amino acids, purines, pyrimidines, carbohydrates, hormones, medicines, dyes). <p style="text-align: right;"><i>Doc. Tomečková</i></p>	<p><u>Properties of organic compounds II.</u></p> <ol style="list-style-type: none"> 1. Reduction of Fehling reagent (8.2.1) 2. Lestradet test for acetone (8.2.2) <p>Seminar: reactions of carboxylic acids, their derivates, derivates of carbonic acid</p> <p style="text-align: right;"><i>RNDr. Stupák</i></p>
12	<p>HETEROCYCLES</p> <ul style="list-style-type: none"> - Six membered ring heterocycles with 1 or more heteroatoms (including condensed rings) <p>Heterocyclic compounds as drugs</p> <p style="text-align: right;"><i>Doc. Tomečková</i></p>	<p><u>Properties of organic compounds III.</u></p> <p>Repeating test from organic chemistry (7th to 11th week)</p> <ol style="list-style-type: none"> 1. Detection of lactic acid (8.3.2) 2. Preparation of carboxylic acid esters (8.3.5) <p style="text-align: right;"><i>RNDr. Stupák</i></p>
13	<p>NATURAL COMPOUNDS</p> <ul style="list-style-type: none"> - Terpenes, alcaloids, phlavonoids, their structure, physicochemical characteristic, biological importance and usage in medicine - General properties of vitamines <p style="text-align: right;"><i>prof. Mareková</i></p>	<p><u>Properties of organic compounds IV.</u></p> <ol style="list-style-type: none"> 1. Solubility of uric acid (9.1) 2. Reducing properties of uric acid (9.2) 3. Detection of uric acid (9.3) <p>Seminar: heterocyclic compounds – their reactions - principle of chromatographic methods</p> <p style="text-align: right;"><i>RNDr. Stupák</i></p>
14	<p>NATURAL COMPOUNDS</p> <ul style="list-style-type: none"> - Structure and importance of vitamins in biochemistry (coenzymes) and in medicine - Vitamines as coenzymes <p style="text-align: right;"><i>prof. Mareková</i></p>	<ol style="list-style-type: none"> 1. Summary and evaluation of student work 2. Credit tests