Preliminary course in Chemistry for 1-6 students 2016.

Recommended literature:
James E. Brady, Neil D. Jespersen, Alison Hyslop, Chemistry, International Student Version, 6^{th} – 7^{th} edition
Harold Hart, Leslie E. Craine, David J. Hart, Christopher M. Hadad, Organic Chemistry, a short course 10-13^{th} edition

Recitation 1

1. Basic concepts of chemistry -reminder lecture:
   a. Periodic table of elements, elements, atomic number and mass of elements
   b. Definitions: Dalton, Mole, molar mass, calculations the molar mass of :molecules, ions and compounds
   c. The rules of naming acids, bases and salts

Recitation 2

1. Percentage % and molar concentrations - calculations
2. Dilution. Dilution factor and Mixing rule ("Rule of the Cross")
3. Concentrations – recalculations: M, mM and µM
4. Calculation of products concentrations in reaction mixtures.
5. Logarithms – calculations

Recitation 2

1. Chemical equilibria
   a. Chemical equilibrium, equilibrium law(expression), equilibrium constant.
   b. Le Chatelier's Principle.
   c. Weak and strong electrolytes.

II. Ionic equilibria
   a. Ionic equilibria – dissociation reactions. Brönsted-Lowry concept of acids and bases. Acid-base conjugated pair. Strong and weak acids and bases. Dissociation constants of weak acids (Ka) and bases (Kb). pK.
   b. Water dissociation. Ion product of water. pH concept. pH calculations.
   c. Percentage dissociation □.

Recitation 4

1. Naming hydrocarbons (IUPAC). Alkanes, alkenes alkynes, cycloalkanes, cycloalkenes, aromatic compounds, halogen substitutions, alcohols, ketons, thiols, aldehydes and carboxylic acids, esters, ethers, thioeters.
2. Selected reactions of alkanes, alkenes, alkynes and aromatic compounds:
   a. Products of substitution and elimination reactions - organic halides
   b. Electrophilic addition to alkenes (addition of unsymmetric reagents to alkens; Markownikov's rule)
   c. aromatic substitution
   d. Alcohols - dehydratation, oxidation and ester formation

e. Alcohols - addition reaction to the carbonyl group – hemiacetal,
f. Thiols (oxidation to disulphide or sulfo derivatives)