

Analytical chemistry (2)

**1st Semester, second year
College of pharmacy**

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Content of course

Quantitative analysis

This course includes quantitative inorganic analysis depending on classical methods, which are still described in pharmacopoeia.

Pharmaceutical applications including drugs and pharmaceutical dosage forms should be discussed during this course.

Content of course

Gravimetry

Types, steps of precipitation method, colloidal particles, precipitating form and weighing form, Calculations.

Titrimetry

Definition, concentration units (normality, molarity, equivalent, percent, ppm, interchange of units), standards, dilution process, dilution factors, standardization, blank titration, types of titrimetry: Acid-base-, redox -, precipitation -, complexometric titration.

Content of course

Acid –Base Titration

Fundamentals of acid-base, definition, k_a , k_b , pH calculations (strong and weak acid, strong and weak base, salts, amphoteric salts, mixture), buffers (Henderson - Hesselbalch equation, drug partition, pharmaceutical application e.g. borate, tris, acetate, carbonate buffers), indicators and their selection, titration curves, Kjeldhal method, titration in non-aqueous media (titrants, role of solvent, titrants: Perchloric acid, methoxide, tetrabutyl ammonium hydroxide, indicators,----) examples and calculations.

Content of course

Redox titration

SHE, Standard electrode potential, Nernst equation, fundamentals of electrochemistry, Balance of redox equations, Important redox titrimetric methods: like iodimetry, permanganatometry, iodometry, cerimetry, nitritometry (diazotitration), bromatometry, --etc including condition, special problems, preparations, indicators, and pharmaceutical applications e.g. ascorbic acid, metamizol sodium, sulfanilamide, paracetamol, thymol, isoniazide, examples and calculations.

Karl Fisher Method: instrument, reagents, determination of water in solvents, instrumental end point detection.

Content of course

Precipitation titration

K_{sp} , fractional precipitation, factors to be considered in precipitation (pH, temperature, common ion effect, hydrolysis, metal oxide, ionic strength)

Argentometry: Mohr's-, Volhard's- and Fajan's methods (conditions, problems, pH, indicators, analytes,--), , pharmaceutical applications, examples and calculations.

Content of course

Complexometric titration

Ligands, coordination number, chelate, EDTA: (structure, salts, stability, K_f , pH, titration condition, advantages, Indicator, blocking of indicator, --), factors affecting stability of EDTA complex, different techniques of EDTA titration (Auxiliary complexing agent, masking agents, demasking, direct- and indirect titration, displacement), Examples and calculation.

Content of course

Potentiometric titration

Instrumental end point detection, general consideration, reference electrode, indicator electrode, automatic titrator, description in pharmacopoeia.

References

Textbook:

[Fundamentals of Analytical Chemistry](#), **Douglas A Skoog**, [Donald M West](#), **F James Holler**, 7th Edition.

Other References:

Pharmaceutical Drug Analysis, **Ashutosh Kar**, ISBN (13) : 978-81-224-2718-9.

Pharmazeutische Analytik, **Hermann J. Roth**, **Gottfried Blaschke**, 3rd Edition.