האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Fundamentals of Analytical Chemistry - 64101

Last update 09-02-2023

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Pharmacy

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Ein Karem

Course/Module Coordinator: Dr. Rachel Ta-Shma

Coordinator Email: rachelt@ekmd.huji.ac.il

Coordinator Office Hours: by appointment

Teaching Staff:

Dr. Rachel Ta-Shma

Course/Module description:

The course provides basic theoretical background to quantitative analytical methods accepted in chemical and pharmaceutical laboratories.

Course/Module aims:

See learning Outcomes

Learning outcomes - On successful completion of this module, students should be able to:

At the end of this course;
The students will understand the principles of analytical methods used in main quantitative determination.
The students will be able to analyze the results in the lab and the possible error sources.
The students will be able to choose a good analytical method for a given compound.

Attendance requirements(%):

100

Teaching arrangement and method of instruction: The course will be conducted in the "reverse class" format. That is, the study of the new material will be done by the students from dubbed presentations and films and will be accompanied by computerized exercises and/or tasks that must be submitted by a fixed time. Success in the exercises and submitting tasks will earn the student a score. In addition, a frontal meeting will be held each week with the students at one of the allotted times for the lesson in the system. The meeting will be devoted to practicing and deepening the understanding of the material based on the exercises and chores submitted that week.

Course/Module Content:

List of topics:

1. Refreshing mathematical skills and some statistics: Scientific notation, value and units, units, systematic errors and random errors, normal error curve, average and standard deviation, finding the best linear dependence between two variables and the correlation coefficient.
2. Different concentration units and dilution; molarity, molality, volume and weight

percentage, ppm and ppb.
3. Acids and bases: Bronshtad acids and bases, equilibrium constants of acids and bases, acids and bases in nonaqueous solvents, the ionization of water, pH, ionic strength and activity, indicators, neutralization, buffers.
4. Titrations of acids and bases: Basic terms in volumetric analysis, types of titration, standards, calculation of titration curves for strong and weak acids and bases and for polyprotic acids, equivalent concentrations and the normal.
5. Solubility of insoluble salts and product of solubility, precipitation titrations.
6. Oxidation-reduction: oxidizing and reducing reactants, balance of oxidation-reduction processes, equivalent concentration in redox reactions.
7. Electrochemistry: electrochemical cell and cell voltage under standard conditions, Nerenst
equation, cell voltage and chemical equilibrium, concentration cell, reference electrodes, glass electrode for measuring pH.
8.Introduction to chromatography: extraction, LC and TLC liquid chromatography.
9. Complexometry: metal complexes with an emphasis on EDTA and its uses, formation constants of complexes and complexometric titrations.

Required Reading:
course presentations

Additional Reading Material:
D.C. Harris
Quantitative Chemical
Analysis
any edition

Course/Module evaluation:
End of year written/oral examination 90 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 10 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
Passing grade in final exam 60