האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

General Chemistry For Bio-Medical-Sciences and Earth Sciences - 69132

Last update 27-08-2025

HU Credits: *6*

Degree/Cycle: *1st degree (Bachelor)*

Responsible Department: *Chemistry*

Academic year: *0*

Semester: *1st Semester*

Teaching Languages: *Hebrew*

Campus: *E. Safra*

Course/Module Coordinator: *Dr. Daphna Shimon*

Coordinator Email: *daphna.shimon@mail.huji.ac.il*

Coordinator Office Hours: *email me to schedule a time that works for both of us*

Teaching Staff:

Course/Module description:

We will learn about the general principles of chemistry, the atomic and molecular structure, various definitions and calculations, equilibrium, acid & bases, inter-molecular forces, and more.

Course/Module aims:

To learn the fundamentals of chemistry

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

Apply concepts of electronic structure; bonding and chemical equilibrium in chemical processes
Apply principles of acid/base and redox reactions in biological reactions.
Demonstrate practical skills required for a basic chemistry laboratory.
Calculate concentrations, acidity of solutions, and solubility of materials in aqueous solutions.
Balance chemical equations in terms of mass.
Balance oxidation-reduction in terms of electrons.

Attendance requirements(%):

0

Teaching arrangement and method of instruction: Lecture and Exercise

Course/Module Content:

Basic concepts: scientific measurments nad units, errors and units conversion

Atomic structure: electronic configurations, atomic orbitals, periodic table of elements and its characteristics, core and valence electrons

Chemical bonding: Lewis structures, ionic and covalent bonding
VSEPR method, VB theory and hybridized orbitals

Electronegativity: polarization, and families of compounds
Molecules, ions, acid/base, salts, organic compounds

Stoichiometry: mole, writing and balancing chemical equations, limiting reactant and yield, solution concentration

Chemical reactions: electrolytes, acid-base reactions, precipitation reactions and titrations

Chemical equilibrium: Le Chatelier's principle

Acid/base reactions: definitions of acids and bases, strengths of acids and bases acid-base equilibrium, pH, polyprotic acids
common ion effect, buffers, neutralization reactions and titrations

Precipitation reactions: solubility products, complete precipitation

Redox: reduction-oxidation reactions, oxidation numbers, electrochemical series, redox titrations and balancing redox reactions

Thermochemistry: energy, enthalpy, calorimetry, heat of formation

Electrochemistry: electrode potential and the Nernst equation

Intermolecular forces: state of matter and classification of intermolecular forces

Solutions: Solubility, enthalpy of solvation
Colligative properties: osmotic pressure, vapor pressure

Required Reading:
General Chemistry, 4th ed. by Hill, Petrucci, McCreary, Perry

Additional Reading Material:
None

Grading Scheme:
Written Exam % 70
Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 10 %
Mid-terms exams 20 %

Additional information:
Must get a grade of 60 or above in at least 8 homework sets, out of 13.

If you do not get a passing grade in 10 homework sets, you will need to talk to me at the end of the course.

The final grade for the homework will be the average of the 8 best.

Every quiz will be 10% of the grade. There will be 2 during the semester. You must participate in the quizzes, but the grade will be "magen". Meaning if the quiz lowers your final grade, it will not be calculated and the test will be worth more.
If you do not participate in a quiz and do not let get the OK from me in advance, you will lose 5 points from the final grade of the course (for each quiz).

Bonus of up to 2 points for students that come to at least 70% of classes.

Bonus of up to 2 points for students that come to at least 70% of tutorials ("tirgulim").