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 05-10-2021

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*

Teaching Staff:
Dr. Daphna Shimon,
Mr. Tal Duanias,
Mr. Nathan Rahat,
Ms. zohar shpilt,
Mr. Adar Levi

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

Course/Module evaluation:
End of year written/oral examination 70 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 10 %

Reports 0 %
Research project 0 %
Quizzes 20 %
Other 0 %

Additional information:
Must hand in 10 homework assignments at least.
The final grade for the homework will be the average of the 10 best, out of 14 all together.

Every quiz will be 10% of the grade. There will be 2 during the semester.