



Faculty of Health, Science and Technology
Chemistry

Syllabus

Introductory Chemistry

Course Code:	KEGA21
Course Title:	Introductory Chemistry <i>Inledande kemi</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has only upper-secondary level entry requirements (G1N)

Major Field of Study:
KEA (Chemistry)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2016-02-17, and is valid from the Autumn semester 2016 at Karlstad University.

Prerequisites

General admission requirement and either field-specific eligibility A6 c - Chemistry (Biology 1, Chemistry 2 and Mathematics 4) with the exception of Biology 1, or field-specific eligibility 6 c - Chemistry (Biology A, Chemistry B and Mathematics D) with the exception of Biology A, or equivalent.

Learning Outcomes

The aim of the course is that students acquire the basic knowledge and skills required for chemically oriented activities and for further studies.

Upon completion of the course students shall be able to:

1. explain the principles behind the periodic table,
2. use different models to describe chemical bonding,
3. explain important concepts in introductory chemistry,
4. calculate on cubic unit cells,
5. determine the geometry of molecules and decide which intermolecular forces are at work between them and how these affect the properties of the molecule,
6. act and work safely in a laboratory environment,
7. plan, carry out and report chemical laboratory tasks according to instruction and within given time frames,
8. name ionic compounds with simple and compound ions,
9. explain the concepts of basic chemical thermodynamics.

Content

The course comprises a theoretical and a laboratory module. Learning outcomes 6 and 7 are only part

of the laboratory module while the other components can be treated in either module.

Learning outcome 1: The periodical system and its background, periods, groups, electron configuration, Pauli principle, Hund's rule, Aufbau principle, trends in the periodic system regarding atom radius, ion radius, ionisation energies, electron affinity, electronegativity, describe the properties of the most common elements.

Learning outcome 2: Chemical bonding, Lewis structures (including resonance structures and formal charge); ionic bonding, covalent bonding, hybridization, electron sharing, LCAO-MO.

Learning outcome 3: Important concepts; empirical formula, formula unit, dipole moment, band theory, ligand theory, crystal structure, cubic cell unit.

Learning outcome 4: scc, simple cubic cell, bcc, space centred cubic cell, fcc, surface-centred cubic cell.

Learning outcome 5: Lewis structures, determine geometry on the basis of electron groups, bonding electron groups, free electron pairs. On the basis of molecular geometry and possible dipole moments, determine the type of intermolecular forces between the molecules. Van der Waals' forces and solubility.

Learning outcome 6: Lecture on safety and safety test. How to work in a laboratory and the names of the most common equipment in a chemical laboratory.

Learning outcome 7: Instructions and safety analysis before a laboratory session, Performing the laboratory procedures practically and reporting the task according to instructions within a given time.

Learning outcome 8: Nomenclature for ionic bonds and compound ions.

Learning outcome 9: Zeroth, first, second and third laws of thermodynamic. Work, heat, internal energy, enthalpy, entropy, temperature, isobaric process, isochoric process, isothermic process and adiabatic process, heat capacity and heat of reaction.

Reading List

See separate document.

Examination

Assessment of the theoretical module is based on individual hand-in assignments and a written exam. The laboratory module is assessed on the basis of a safety test, mandatory attendance and a lab report according to instructions and within a given time limit.

Grades

One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.