



Faculty of Health, Science and Technology  
Chemistry

# Syllabus

## Chemistry Preparatory A

<b>Course Code:</b>	KEBX13
<b>Course Title:</b>	Chemistry Preparatory A <i>Kemi Bas A</i>
<b>Credits:</b>	7.5
<b>Degree Level:</b>	Preparatory
<b>Progressive Specialisation:</b>	( )

**Major Field of Study:**

### Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2019-02-20, and is valid from the Autumn semester 2019 at Karlstad University.

### Prerequisites

General admission requirements and upper secondary school level Mathematics B or Mathematics 2a, 2b, or 2c, or equivalent

### Learning Outcomes

The aim of the course is that students acquire basic knowledge of the concepts, theories, models, and procedures used in chemistry. Students are expected to develop knowledge of natural as well as artificially created chemical processes and prepare for further studies in science and technology.

Upon completion of the course, students should be able to:

1. explain important concepts in basic chemistry,
2. explain the principles of the periodic system,
3. identify and differentiate between models of chemical bonding and dispersion force, and give examples of their effect on the existence, properties, and areas of use for inorganic and simple organic substances,
4. apply basic chemical calculations and use correct units,

5. define and use the law of mass action,
6. conduct simple chemical experiments and interpret and report results according to instructions and within a given time limit,
7. give an account of security regulations for chemistry laboratory work, and
8. identify and explain hazard pictograms for chemicals.

## **Content**

Learning outcome 1: Scientific method, matter and its aggregated forms, elements, chemical compounds, pure substances and alloys, Bohr's atom model and atomic mass, acids and bases (acid and basic solutions, pH-scale, neutralisation, buffert effects), reaction velocity and chemical equilibrium, thermo chemistry (endotherm and exotherm reactions, enthalpy, heat capacity), oxidation and reduction (redox reactions, reducing agents, oxidation agents, oxidation number) electro chemistry (galvanic cells, electro motor tension, normal potentials, corrosion, hydrogen gas electrode, electrolysis).

Learning outcome 2: Electron configuration, the structure of the periodic system (periods and groups), alkali metals, alkaline earth metals, the borate, carbon, nitrogen, and oxygen groups, halogens, and noble metals.

Learning outcome 3: Metal binding, ionic binding, the names and properties of ionic bindings, covalent bindings, polar and non-polar molecules, dipol-dipol binding, van der Waal's binding, hydrogen binding, solubility, precipitation reactions, simple organic carbohydrates, and alcohols.

Learning outcome 4: Units, metrics and physical quantity (amount of substance, molar mass, mass, molarity), concentration of solutions, yield, dilution of solutions, reductive reactants, general gas law, crystal water, molecular formula, and empirical formula.

Learning outcome 5: Balancing reaction formula, equivalent substance amounts, and masses.

Learning outcome 6: Simple laboratory tasks related to the theory covered in the course.

learning outcome 7: Security regulations and laboratory directives.

Learning outcome 8: Hazard pictograms for chemicals.

## **Reading List**

See separate document.

## **Examination**

Assessment of the theoretical module is based on an individual hand-in assignment and an individual written exam. Laboratory sessions are mandatory and results must be reported in accordance with instructions and within given time limits. Assessment of laboratory safety is based on an individual hand-in assignment.

If students have a decision from Karlstad University entitling them to special pedagogical support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

## **Grades**

One of the grades Pass (G) or Fail (U) is awarded in the examination of the course (Ref.no C2018/824)

**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 course overlaps to a great extent with KEBX12.

The course corresponds to Chemistry A of the science and technology programmes in upper secondary education.

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