



Faculty of Health, Science and Technology
Chemistry

Syllabus

Biochemistry

Course Code:	KEGA11
Course Title:	Biochemistry <i>Biokemi</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 2016-02-19, and is valid from the Autumn semester 2016 at Karlstad University.

Prerequisites

General admission requirements and either field-specific eligibility 6c - Chemistry (Biology 1, Chemistry 2 and Mathematics 4) with the exception of Biology 1, or field-specific eligibility A6c - Chemistry (Biology A, Chemistry B and Mathematics D) with the exception of Biology 1, or equivalent.

Learning Outcomes

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

1. describe the structure of different cell types
2. explain the function of the macro molecules in the cell based on their structure and chemical properties
3. describe the flow of genetic information, from the DNA to the protein
4. describe some common biochemical methods to analyse and separate proteins and to use in the field of gene technology, and give examples of their application
5. describe some metabolic reactions of the cell
6. explain the principle of oxidative phosphorylation
7. perform simple experiments on protein separation and use some basic methods of DNA technology
8. document and report with a scientific approach the performance of experimental work orally and in writing.

Content

Learning outcome 1: Animal and plant cells and prokaryote cells

Learning outcome 2: Proteins, carbohydrates, lipids and nucleic acids. The function of proteins as catalysts, receptors and transporters. Inhibition of enzymatic catalysing reactions. The function of carbohydrates and lipids in energy conversion. The functions of lipids and proteins in membrane. The function of DNA as conveyor of the genetic information. The function of RNA in expressing the

genetic information.

Learning outcome 3: Replication, transcription and translation.

Learning outcome 4: Chromatographic methods such as gel filtration, ionic and affinity chromatographic exchange. Electrophoretic methods such as native and denaturing polyacrylamide gel electrophoresis, isoelectric focusing, two-dimensional electrophoresis, and agarose gel electrophoresis. DNA technological methods such as PCR, DNA cleavage with restriction enzymes, gene cloning, DNA sequencing.

Learning outcome 5 & 6: Glycolysis, citric acid cycle, the mitochondrial electron transport chain and the light and dark reactions of the photosynthesis. The chemiosmotic principle.

Learning outcome 7: Laboratory experiments according to instructions.

Learning outcome 8: Protocol and reports based on laboratory experiments.

Reading List

See separate document.

Examination

Assessment of the theoretical part is based on hand-in assignments and a written exam. Assessment of the laboratory part is based on mandatory attendance and lab reports according to instruction within given time limits.

Grades

One of the grades Fail (U), Pass (G), or Distinction (VG) or Fail (U), Pass (3), Some Distinction (4), or Distinction (5) 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.