



LUND
UNIVERSITY

Faculty of Science

MOBA02, Chemistry of the Cell, 15 credits

Kemi: Cellens kemi, 15 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-03-01 and was last revised on 2011-02-07. The revised syllabus applies from 2011-01-01, spring semester 2011.

General Information

The course is included in the main fields of Chemistry and Molecular Biology at the Faculty of Science. When one of these fields comprises the main field of the degree, the course shall be included in the main field.

The course is a compulsory first-cycle course for a Bachelor's degree in Science, with the main fields of Chemistry and Molecular Biology.

Language of instruction: English and Swedish
When necessary, the course in full is given in English.

Main field of studies

Chemistry

Molecular Biology

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that the students should achieve advanced knowledge and understanding of chemical reactions in the cell with focusing on the structure and function of proteins, enzyme catalysis and the total metabolism of the cell. The students should after the course have a good basis for in-depth studies within biochemistry and adjacent fields. The aim is also that the students should have practical skills in experimental biochemistry and basic skills in bioinformatics.

The aim of the course is that on its completion students will have acquired the following skills and knowledge:

- have a thorough understanding of how protein structure is decided and how it decides the function of a protein, how enzymes catalyse vital reactions and how these reactions are regulated
- be able to account for common catalytic mechanisms
- master enzyme kinetics and be able to describe how this is used to study enzymes
- have good understanding of the cell metabolism including glyconeogenesis, glycogen metabolism, metabolism of fatty acids and turnover of proteins and amino acids
- be familiar with the procedure to develop new medicines
- be well familiar with the theory behind methods that are used for purification of proteins and protein studies, such as electrophoresis-, chromatographic, centrifugation- and spectroscopic methods and X-ray crystallography
- having achieved basic skills in bioinformatics and its fields of use. This includes searching in protein databases and literature databases for bioinformatic information and interpretation of this information by means of computer software
- master common laboratory biochemistry including purification of proteins, affinity chromatography, electrophoresis and activity analysis with fluorometrics
- have experience in experimental design and analysis of biochemical data including enzyme kinetic calculations
- be capable to bring a biochemical discussion on a higher intellectual level with an emphasis on argument rather than knowledge learnt by heart

Course content

Lectures: The structure of the cell, the structure and function of nucleic acids, the structure and function of proteins and membranes, enzyme catalysis, the metabolism of the cell and its regulation, bioinformatics and proteomics, and cell biology related methods.

Laboratory work: A computer exercise in bioinformatics and a laboratory task for several days that includes experimental design and common biochemical methods including protein purification, affinity chromatography, electrophoresis and activity analysis with fluorometrics.

Course design

The teaching consists of lectures, group work, a computer exercise in bioinformatics and a laboratory task over several days. The two latter practical parts are compulsory and also include oral and written presentation of obtained results.

Assessment

The course is examined by a written examination at the end of the course.

A re-sit examination is offered soon after the examination to students who do not pass.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

To be awarded Pass students must pass the examination, pass the laboratory work and participate in all compulsory course elements.

The examination grades are: Pass with Distinction, Pass or Fail. Grades for laboratory work and the compulsory elements included therein are: Pass and Fail.

The final grade for the course is determined by the grade on the final examination.

Entry requirements

To be eligible for this course students must have basic eligibility and passes in courses equivalent to:

- KEMA00 General and Analytical Chemistry 7.5 credits, KEMA01 Organic Chemistry – Basic Course 7.5 credits, KEMA02 Inorganic Chemistry – Basic Course 7.5

and

- KEMA03 Biochemistry – Basic Course 7.5 credits or MOBA01/BIMA10 Cell Biology 15 credits

Equivalent knowledge that has been gained in another way also provides eligibility for the course.

Further information

The course cannot be credited as part of a degree programme that also includes MOB102 Chemistry of the Cell 15 credits or KEM114 Biochemistry 15 credits.

Subcourses in MOBA02, Chemistry of the Cell

Applies from H13

- 0711 Chemistry of the Cell, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 0712 Chemistry of the Cell, Laboratory Work, 7,5 hp
Grading scale: Fail, Pass

Applies from H07

- 0701 Chemistry of the Cell, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 0702 Chemistry of the Cell, Laboratory Work, 0,0 hp
Grading scale: Fail, Pass