



**Karolinska  
Institutet**

Course syllabus for

## **Cell biology and genetics, 20 credits**

Cellbiologi och genetik, 20 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Please note that the course syllabus is available in the following versions:

Spring2008 , Spring2010 , Spring2013 , Spring2014

Course code	1BI003
Course name	Cell biology and genetics
Credits	20 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedicine
Level	G2 - First cycle 2
Grading scale	Excellent, Very good, Good, Satisfactory, Sufficient, Fail, Fail
Department	Department of Biosciences and Nutrition
Participating institutions	<ul style="list-style-type: none"><li>• Department of Cell and Molecular Biology</li><li>• Department of Molecular Medicine and Surgery</li></ul>
Decided by	Programnämnden för biomedicinprogrammet
Decision date	2007-10-09
Revised by	Programnämnd 7
Last revision	2012-11-07
Course syllabus valid from	Spring 2013

## **Specific entry requirements**

At least the grade E at the course Introduction to Biomedical Science (1BI001).

## **Objectives**

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

- account for the most important functions of the cell, its microscopical structure and the structure and function of the different cell organelles,
- account for basic genetic terminology at a general level, account for the organisation and development of the genetic make-up on cellular, chromosomal and gene level and be able to explain the basic molecular genetic mechanisms in relation to the structure and function of the cells,

- account for the developmental biology molecular mechanisms for development and renewal of the cells in the main tissue types and the individual's development from formation of germ cells to embryo in relation to inheritance and environment,
- account for cell growth, cell death, cell specialisation, cell motility and interactions between cells and explain how these facilitate development of a multicellular organism together,
- account for different hereditary patterns for genetic diseases and be able to account for different ways at a general level to identify pathogens,
- account for and use basic cell biology-related methods such as sterilisation technique, cell-culture technique, transfection methods and microscopy technique and practically be able to carry out simple cloning of DNA and be able to account for and apply the PCR technique,
- account for various types of molecular biological methods that are used to study gene expression and gene regulation and methods to study the interactions of the protein:protein and DNA:protein interactions,
- account at a general level for the use of different model systems at studies of specific biological questions and the function of genes,
- account for biomolecules, with an emphasis on proteins, structure and structure and be able to account at a general level for the most commonly occurring methods for determination and analysis of the three-dimensional structure of biomolecules,
- account for the most important public databases for biological information and be able to use these to search literature information and sequence data and be able to carry out and interpret comparisons of sequences.

## Content

The course is divided into three parts:

**Cell biology, 6 hp** The part includes the molecular and cellular basic functions of life with specific foci on mechanisms that facilitate development of a multicellular organism (growth and heredity, interactions between cells, cell motility and transport and cell specialisation). The part is built around human development from germ cells to an embryo and gives an introduction to the most important functions of the cell and its structures, embryology and the molecular mechanisms of the developmental biology. **Molecular Biology and genetics, 9 hp** The part includes elementary gene regulation with an emphasis on eukaryotes and molecular biological methods to study gene regulation. Usage of bioinformatics to study complex regulatory relationships. Clinical Genetics with an emphasis on human hereditary diseases. The part gives an overview of the latest methods that are used in medical research.

The part treats on an integrated way

molecular biology

model systems

structural biology

genetics

bioinformatics **Integration of cell and molecular biology, 5 hp** The course is completed with an

integrating part where the contents from the parts Cell biology and Molecular biology and genetics are examined summationally.

## Teaching methods

The teaching includes lectures, discussions, demonstrations, concept maps and models, self-study and question times and an integrating project work. The project work is in-depth studies in groups with an emphasis on own work and literature studies. The course is completed with a written final examination.

## Examination

Cell biology (6 credits). Graded with Fail/Pass and examined through concept maps participation in

compulsory discussions, laboratory reports and a written, oral or IT-supported tests.

Molecular biology and genetics (9 credits). Graded with Fail/Pass and examined through participation in compulsory discussions seminars and laboratory reports and a written, oral or IT-supported test.

Integration of cell and molecular biology (3 credits). Graded with F/Fx/E/D/C/B/A and examined through an oral project presentation and a written final examination.

For the tests, two are organised conditional pass occasions before the written final examination.

The final grade of the course is based on the part Integration of cell and molecular biology.

#### Compulsory participation

Participation is compulsory at laboratory sessions, certain stated seminars, safety lectures and safety sessions. The course director assesses if and in that case how absence may be compensated. Before the student has participated in compulsory parts, or compensated absence in accordance with the course director 's instructions the student' s course result will not be registered in LADOK.

#### Limitation of number of occasions to write the exam

Students who have not passed the regular examination are entitled to participate in five more examinations. If the student is not approved after four examinations, he/she is recommended to retake the course at the next regular course date, and may, after that, participate in two more examinations. If the student has failed six examinations/tests, no additional examination or new admission is provided.

The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination for which the student registered but not participated in, will not be counted as an examination.

## Transitional provisions

After each course, there will be at least 6 occasions for examination within a two-year period after the end of the course.

## Other directives

The course languages are Swedish and English.

Course evaluation will be carried out according to the guidelines established by the Board of Higher Education.

Oral evaluation in the form of course council meetings will be carried out during the course.

## Literature and other teaching aids

### Mandatory literature

*Alberts, Bruce*

#### Molecular biology of the cell

5. ed. : New York : Taylor & Francis, cop. 2008 - xxxiii, 1268 s.

ISBN:9780815341062 (paperback) LIBRIS-ID:10645719

URL: <http://www.loc.gov/catdir/toc/ecip0710/2007005475.html>

[Library search](#)

### In-depth literature

*Strachan, Tom; Read, Andrew P.*

#### Human molecular genetics 3

3. ed. : London : Garland Science, cop. 2004 - xxv, 674 s.

ISBN:1-85996-315-3 LIBRIS-ID:9061628

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