



**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:

Spring2015 , Spring2016

Course code	1BI022
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	Pass with distinction, Pass, Fail
Department	Department of Biosciences and Nutrition
Participating institutions	<ul style="list-style-type: none">• Department of Cell and Molecular Biology• Department of Molecular Medicine and Surgery
Decided by	Programnämnd 7
Decision date	2014-12-09
Revised by	Programme committee for study programmes in biomedicine
Last revision	2020-06-10
Course syllabus valid from	Spring 2016

Specific entry requirements

At least the grade Pass on the course Introduction to Biomedical Science.

Objectives

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

Regarding knowledge and understanding

- describe the most important functions of the cell, its microscopic structure and the structure and function of the different cell organelles,
- provide basic genetic terminology at a general level and describe the organisation and development of the genetic makeup 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,

- describe 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,
- describe basic mechanisms for cell growth, cell death, cell specialisation, cell motility and interactions between cells and explain how these together facilitate the development of a multicellular organism,
- explain different hereditary patterns for genetic diseases and be able to describe different ways at a general level to identify disease genes,
- explain various types of molecular biological methods that are used to study the regulation and function of biomolecules,
- describe at a general level the use of different model systems at studies of specific biological questions and the function of genes,
- describe structures of biomolecules, with an emphasis on proteins, and explain at a general level the most commonly occurring methods for determination and analysis of the three-dimensional structure of biomolecules.

Regarding competence and skills

- describe and perform basic cell biology and molecular biology-related methods, and analyse and present own laboratory work by writing a well-structured report,
- describe the most important public databases for biological information and be able to use these to search literature information and sequence data and to perform and interpret comparisons of sequences,
- demonstrate the ability to carry out and orally present biomedical projects.

Regarding judgement and approach

- describe ethical aspects of research on human biological materials and animals.

Content

The course is divided into the following parts:

Cell biology, 6.0 hp

Grading scale: GU

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, 9.0 hp

Grading scale: GU

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, 5.0 hp

Grading scale: VU

The course is completed with an integrating project 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). The examination consists of concept maps, participation in compulsory discussions, laboratory reports and a written, oral or IT-supported test. Graded Fail/Pass

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

Integration of cell and molecular biology (5 credits). The examination consists of an oral project presentation and a written final examination. Graded Fail/Pass/Pass with distinction.

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

The final grade for the whole course is based on the grade for the part Integration of cell and molecular biology. To pass the whole course (grade pass or above), the grade pass must have been obtained for the other parts on the course.

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 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

The course is cancelled and was offered for the last time VT2017. Examination according to this syllabus will be offered for the last time VT2021 for students who have not completed the course with a passing grade.

Other directives

The course language is 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

Molecular biology of the cell

Johnson, Alexander; Lewis, Julian; Morgan, David; Raff, Martin; Roberts, Keith; Walter, Peter

6. ed. : New York : Garland Science, cop. 2015 - xxxiv, 1342, 34, 53, 1 s.

ISBN:9780815344322 LIBRIS-ID:17205117

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In-depth literature

Strachan, Tom; Read, Andrew P.; Strachan, T.

Human molecular genetics

4. ed. : New York : Garland Science, c2011 - xxv, 781 p.

ISBN:978-0-8153-4149-9 (pbk.) LIBRIS-ID:11816769

[Library search](#)