



**Karolinska
Institutet**

Course syllabus for

Cell-, Stem Cell and Developmental Biology, 12 credits

Cell, stamcells- och utvecklingsbiologi, 12 hp

This course syllabus is valid from autumn 2017.

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

Autumn2017 , [Autumn2019](#) , [Autumn2021](#) , [Autumn2023](#)

Course code	1BI037
Course name	Cell-, Stem Cell and Developmental Biology
Credits	12 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 Cell and Molecular Biology
Decided by	Programme committee for study programmes in biomedicine
Decision date	2017-04-19
Course syllabus valid from	Autumn 2017

Specific entry requirements

General requirements (with exemption from Swedish proficiency) and Biology 2, Chemistry 2, Mathematics 4. Or: Biology B, Chemistry B, Mathematics D. And proficiency in English equivalent to English 6/English B.

Objectives

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

Regarding knowledge and understanding

- account for fundamental processes that occur within the cell,
- relate the microscopic structures of different cellular organelles to their function,
- describe developmental biology molecular mechanisms,
- demonstrate an understanding for the developmental origin of the main tissue types and the development from germ cells to embryo,
- account for how selected molecular biological methods are used to study the regulation and function of biomolecules,

- demonstrate an understanding for the concept of stem cells, and how they relate to tissue development, tissue homeostasis and repair/regeneration,
- demonstrate an understanding for how stem cells can be applied in medical research and disease treatments,
- account for, at a general level, the use of different model systems to study specific biological questions,
- demonstrate an understanding for the different types of literature related to scientific research,

Regarding skills and abilities

- perform basic literature search using the most important public databases,
- perform basic cell biology and molecular biology-related methods, and present own laboratory work by writing a well-structured report,
- show proficiency in following instructions to perform experiments, and some basic laboratory skills,
- show basic skills in scientific communication and teamwork by orally presenting biomedical project work in teams,

Regarding judgement and approach

- critically analyse one's own data, and data presented in scientific literature,
- describe ethical aspects of research on human biological materials and animals.

Content

This course includes the molecular and cellular basic functions of life. First the course focuses on intracellular mechanisms by which a cell function and replicate (from DNA through RNA to protein), this is then complemented by examining the mechanisms that facilitate development of a multicellular organism (growth, interactions between cells, and cell specialization). This course gives a foundation in cell biology, and an introduction to stem cell biology and developmental biology.

The course is divided into the following parts:

Communication and critical thinking project, 2 hp This part contains a project integrating communication skills, scientific literature studies, and critical thinking where contents from parts of cell biology, developmental biology and stem cell biology are related to disease. This part of the course specifically focuses on introducing scientific literature and developing communication and an understanding of how to critically evaluate scientific research.

Laboratory Practicals, 4 hp This part consists of three practicals that incorporate basic cell biology techniques such as cell culture and fluorescent microscopy. There is a specific focus on achieving competence in basic laboratory skills.

Integration Cell, Stem cell and Developmental biology, 6 hp Integration of theory and practice in Stem Cell, cell biology and developmental biology.

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

A voluntary half-time test in the form of a written, oral or IT-supported test that covers the first parts of

the course. The students under guidance of teachers correct the half time test. The performance in the half time test can generate bonus points, which are added to the points obtained in the final exam (part 3), if the final exam is passed.

Part 1. Communication and critical thinking project (2 credits). The examination consists of concept maps, oral presentations of project work and active participation in the obligatory discussions, workshops and exhibition. Graded Fail/Pass.

The performance in the oral presentations of project work and exhibition can generate bonus points, which are added to the points obtained in the final exam (part 3), if the final exam is passed.

Part 2. Laboratory Practicals (4 credits). The examination consists of laboratory reports and an assessment of basic laboratory skills. Graded Fail/Pass. The performance in the lab reports and laboratory practical skills assessment can generate bonus points, which are added to the points obtained in the final exam (part 3), if the final exam is passed.

Part 3. Integration of Cell, stem cell and developmental biology (6 credits). Examination consists of a written exam covering the entire contents of the course. Graded Fail/Pass/Pass with Distinction.

To pass the whole course the grade of at least pass must have been obtained for all parts of the course. The final grade for the whole course is based on the result of the exam in part 3 combined with any bonus points earned from part 1, part 2 and the half time test.

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

After each course occasion there will be at least six occasions for the examination within a two-year period from the end of the course.

Other directives

The course language is English.

Course evaluation will be carried out in accordance with 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

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.

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