



**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 2023.

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                 | Programnämnden för biomedicinprogrammen                 |
| Decision date              | 2017-04-19  |
| Revised by                 | Programme committee for study programmes in biomedicine |
| Last revision              | 2023-03-07  |
| Course syllabus valid from | Autumn 2023   |

## **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

- demonstrate an understanding of intracellular processes fundamental for cell structure, maintenance, growth and communication,
- describe developmental biology molecular mechanisms, and demonstrate an understanding of the developmental process from egg to fetus,
- explain the theoretical background and the rationale underlying methods in cell biology,

- developmental biology and stem cell research including different model systems,
- demonstrate an understanding of the concept of stem cells, and how they relate to tissue development, tissue homeostasis and repair/regeneration,
- demonstrate an understanding of how stem cells can be applied in medical research and disease treatments,
- demonstrate an understanding of 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,
- design an experimental approach to investigate molecular mechanisms in cell biology.

## 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, 2.0 hp**

Grading scale: GU

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, 4.0 hp**

Grading scale: GU

This part consists of course laboratory work and a Team-Based Learning (TBL) module. The course laboratory work incorporates basic cell biology techniques such as cell culture and fluorescent microscopy. The TBL module focuses on biomedical research methods and experimental design related to concepts in cell biology developmental biology and stem cell research. There is also a specific focus on achieving competence in basic laboratory skills.

### **Integration Cell, Stem cell and Developmental biology, 6.0 hp**

Grading scale: VU

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

## Teaching methods

The learning and teaching activities include hybrid learning activities, TBL activities and integrating project work. There are lectures, demonstrations, course laboratories, written and oral communication exercises, including small and large group sessions. The parts of the course with TBL include peer learning and team work elements. The project work is in-depth studies in groups with an emphasis on own work, literature studies and communication skills.

## Examination

A voluntary half-time written 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, written tests and an assessment of basic laboratory skills. Graded Fail/Pass. The performance in the TBL module 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

The course examiner assesses if and, in that case, how absence from compulsory components can be compensated for. A student's study results cannot be finalised/registered until the student has participated in the compulsory components or compensated for their absence in accordance with the examiner's instructions. Absence from a compulsory component may mean that the student cannot compensate for absence until the next time the course is given.

### 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.

If there are special grounds, or a need for adaptation for a student with a disability, the examiner may decide to deviate from the syllabus's regulations on the examination form, the number of examination opportunities, the possibility of supplementation or exemptions from the compulsory section/s of the course etc. Content and learning outcomes as well as the level of expected skills, knowledge and abilities may not be changed, removed or reduced.

## 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 Committee for Higher Education.

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

## Literature and other teaching aids

*Alberts, Bruce*

### **Molecular biology of the cell**

Seventh edition, International student edition : New York : W.W. Norton and Company, [2022] - 1552 sidor med varierande paginering

ISBN:9780393884852 LIBRIS-ID:q58h190nnwjcfgcp

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