Course syllabus for

Genetics, Genomics and Functional Genomics, 10 credits

Genetik, genomik och funktionell genomik, 10 hp
This course syllabus is valid from spring 2025.
Please note that the course syllabus is available in the following versions:
Autumn2024 , Spring2025

Course code	1BI050
Course name	Genetics, Genomics and Functional Genomics
Credits	10 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 Medicine, Huddinge
Participating institutions	• Department of Molecular Medicine and Surgery
Decided by	Programme committee for study programmes in biomedicine
Decision date	2024-03-11
Revised by	Programme committee for study programmes in biomedicine
Last revision	2024-10-10
Course syllabus valid from	Spring 2025

Specific entry requirements

At least the grade Pass (G) on the course Introduction to Biomedical Science, at least grade Pass (G) on the part Organic-chemical laboratory work, (5 credits), in the course General and Organic Chemistry, and the part Laboratory practicals (4 credits) of the course Cell-, stem cell and developmental biology, at the Bachelor's programme in Biomedicine

Objectives

Regarding knowledge and understanding

- explain different hereditary patterns for human genetic diseases,
- describe different approaches to identify disease genes a basic level,
- explain different methods that are used to study the expression, regulation and function of

biomolecules,
- describe strategies and methods to generate and analyse DNA sequence and gene expression data on genome-wide and single gene level,
- describe at a basic level the use of different model systems for the studies of specific biological questions and the function of genes,

Regarding competence and skills

- perform standard practical methods in molecular biology,
- analyse and present his/her own laboratory work by writing a well-structured report,
- be able to use relevant public databases to search literature 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 related to the generation of human genetic information and biological materials.

Content

The course is divided into the following two parts:

Practical part, 4.0 hp

Grading scale: GU

Practice of the theoretical content of the course including laboratory work using molecular biology methods and lab-report writing in the format of a scientific article. This part also includes a written test, bioinformatics computer labs and exercises in clinical genetics and the ethics of human genetic information.

Integration of genetics, genomics and functional genomics, 6.0 hp

Grading scale: VU

Gives an overview of the relevant methods that are used in medical research to analyse DNA, gene expression and gene function; training in bioinformatics to study complex regulatory relationships and introduction to clinical genetics with an emphasis on human hereditary diseases.

The part integrates genomics and functional genomics, model systems, bioinformatics and genetics.

Teaching methods

The teaching includes lectures, discussions, demonstrations, self-study, seminars and a project work.

Examination

Practical part (4 credits). The examination consists of seminars, written reports and a written, oral or IT-supported test. Graded Fail/Pass

Integration of genetics, genomics and functional genomics (6 credits). The examination consists of an oral project presentation and a written final examination. Graded Fail/Pass/Pass with distinction.

For the tests, one additional occasion is organised before the written final examination.

The final grade for the whole course is based on the grade for the part Integration of genetics, genomics and functional genomics. 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. Absence from a compulsory part may lead to that the student can't compensate the absence before 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.

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.

This course replaces the course Genetics, Genomics and Functional Genomics, 10 credits (1BI038) and cannot be included in a degree together with the latter course.

Literature and other teaching aids

Mandatory literature

Strachan, Tom; Read, Andrew P.
Human molecular genetics

Fifth edition. : Boca Raton, Florida : CRC Press, 2019 - xiii, 770 pages
ISBN:0815345895 LIBRIS-ID:gq514rnfd2cr6zcw
Library search

In-depth literature

Lesk, Arthur M.
Introduction to bioinformatics

Fifth edition : Oxford : Oxford University Press, 2019 - xx, 408 pages
ISBN:9780198794141 LIBRIS-ID:lw49h2qtj72kxxxj
Library search