Course syllabus for

Molecular Biology 2, 7.5 credits

Molekylärbiologi 2, 7.5 hp
This course syllabus is valid from spring 2020.
Please note that the course syllabus is available in the following versions:
Spring2019 , Spring2020

Course code	1BA148
Course name	Molecular Biology 2
Credits	7.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedical Laboratory Science
Level	G2 - First cycle 2
Grading scale	Pass, Fail
Department	Department of Laboratory Medicine
Decided by	Utbildningsnämnden LABMED
Decision date	2018-10-30
Revised by	Education committee LABMED
Last revision	2019-10-18
Course syllabus valid from	Spring 2020

Specific entry requirements

General entry requirements for higher studies, and specific entry requirements as stated in the programme syllabus for the Biomedical laboratory science education or the equivalent. In addition to this is required that at least 105 credits are passed from semester 1-4 in Biomedical laboratory science program or equivalent knowledge. In these credit points should be included Molecular Biology and methods in molecular biology equivalent to at least 5 HE credits.

Objectives

The aim of the course is to provide in-depth knowledge of the genetic material, structure and function in eukaryotic cells, as well as in-depth and extended knowledge and skills in molecular biology methodology. The student will also train his / her scientific approach by independently planning, performing, evaluating and documenting a laboratory project according to the program's scientific progression syllabus.

Knowledge and understanding
After passing the course, the student should be able to

- comprehensively explain the organization and content of the human genome
- explain causes of damage and changes in the genome and the different mechanisms behind these changes
- explain how function and expression of genes can be affected in different ways
- explain different methods for identifying, isolating and analyzing gene sequences
- explain different methods for analyzing gene products

Skills and abilities
After passing the course, the student should be able to

- show how to develop a research plan to carry out a scientific study
- independently, based on methodological descriptions, be able to perform commonly used molecular biology methods with use of relevant controls
- critically interpret, evaluate and compare own data with expected results and general principles
- present a scientific study orally and in writing according to scientific structure
- critically review a written scientific work

Ability to evaluate and approach
After passing the course, the student should be able to

- apply a scientific approach.
- demonstrate understanding of the importance to critically reviewing sample material, analysis procedures and results for a correct assessment of the results.
- demonstrate the ability to analyze and identify his / her need for additional knowledge to develop his / her skills

Theory and methods in molecular biology, 4.0 hp

Grading scale: GU

The theoretical part of the course intends to deepen and increase the knowledge in molecular biology and methodology. Important parts in molecular biological theory are a deepening in the human genome's organization, function and content. Mechanisms that cause instability and changes in the genome, and how it influences the function of the cell. How genes expression can be affected in different ways including chromatin organization, epigenetics and non-coding RNA.

Molecular biology methodology includes how to isolate and analyze genes in different ways. Among the methods discussed are linkage analyses, cloning, PCR, sequencing and mutation analyses. Here are also included different methods to analyse gene products such as blotting, hybridisation techniques and analyses of protein interactions, RT-PCR, microarray, massspectrometry. Comparison of methods is made and which information one can obtain from different methods is discussed. Work in databases is included during primer design.

Laborationer experiments, 3.5 hp

Grading scale: GU

A large part of the course consists of a laboratory project, where the student will write a project plan to be approved by the supervisor before the laboratory work begins. During the lab-project, the student works independently with the analysis and interpretation of the results. The laboratory project is presented in writing in a report written according to scientific structure.This also includes critically reviewing another student's report.

Laboratory methods included in the project are purification of nucleic acid , RT-qPCR including primer design, immunohistochemistry and Western blot. The work is documented continuously in a workbook

Teaching methods

Teaching is given form of seminars, lectures and laboratory project.
The students work, during the theoretical part of the course, with scientific articles within the different fields. The articles are discussed in groups based on different issues.

The course director assesses if, and in that case how, absence can be compensated. Before the student has participated in all compulsory parts or compensated absence in accordance with the course director's instructions, the student's results for respective part will not be registered. Absence from a compulsory activity may result in that the student cannot compensate the absence until the next time the course is given.

Examination

The theoretical part of the course is examined through a written take-home examination and an oral examination (4hp). Grading scale Fail/Pass.
The laboratory part is examined regarding planning, practical work in the laboratory, submitting of workbook, written report and critical review of the report of a fellow student (3.5hp). Grading scale Fail/Pass.
To pass the course, it is required that both parts are passed.

In the case of failed laboratory work, the student is entitled to do the laboratory work one more time at the next course
Students who are not approved after the ordinary examination opportunity are entitled to participate in further five examinations. If the student completed six failed examinations / tests, no further examination opportunity will be given. As an exam opportunity
count the times the student participated in one and the same test. Examination opportunity to which the student enrolled but did not participate is not counted as an examination opportunity.
In the case of failed laboratory work, the student is entitled to do the laboratory work one more time at the next course.

Seminars and laboratory sessions are mandatory.
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

Course evaluation will be carried out in accordance with the guidelines established by the Board of Higher Education. Teaching in English may occur.

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.
ISBN:9780815344322 LIBRIS-ID:17205117
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