Molecular Genetics and Epigenetics

Molekylär Genetik och Epigenetik
6 credits

Programme course

8BKG17

Valid from: 2022 Spring semester

Determined by	**Main field of study**	
Chairman of The Board for First and Second Cycle Programmes	Medical Biology	
Date determined	**Course level**	**Progressive specialisation**
2019-06-03	First cycle	G1X
Revised by	**Disciplinary domain**	
	Medicine	
Revision date	**Subject group**	
2020-09-11; 2021-05-03	Medical Biology	
Offered first time	**Offered for the last time**	
Autumn semester 2019		
Department	**Replaced by**	
Medicinska fakulteten		

Course offered for

- Bachelor´s Programme in Experimental and Industrial Biomedicine

Entry requirements

General entry requirements for undergraduate studies
and
English corresponding to the level of English in Swedish upper secondary education
(English 6)
And
Chemistry, Mathematics and Biology corresponding to the level in Swedish upper secondary education (Chemistry 2, Mathematic 4 and Biology 2)
Exemption from Swedish 3

Intended learning outcomes

Knowledge and understanding
On completion of the course, the student shall be able to:

- Explain how genetic information is structured, inherited, expressed and regulated in eukaryotes
- Describe what epigenetics is and its role in gene transcription
- Describe the mechanisms that contribute to genetic variation in humans and explain the relationship between genetic variation and complex diseases
- Describe the basic ethical problems arising from the medical application of genetics

Skills and abilities
On completion of the course, the student shall be able to:

- Identify the relevant techniques employed in classical genetic experiments
- Determine the genetic and/or epigenetic causes and inheritance patterns of familial conditions and evaluate the risk of passing them on
- Execute basic genetic and epigenetic experiments and present the laboratory results in a scientific report

Judgement ability and approach
On completion of the course, the student shall be able to:

- Evaluate the advantages, disadvantages and ethical problems that arise in connection with the use of genetic information in healthcare
- Demonstrate a critical approach to the assessment of basic laboratory experiments
- Reflect on the use of model organisms in genetic studies

Course content

The course involves the study of basic medical genetics. The course focuses on molecular genetics, including the structure and function of the human genome, transcriptional regulation and epigenetics. This molecular knowledge will be applied in order to understand the genetics of simple and complex diseases, the role
of genetics in modern healthcare and ethical issues arising from its use in diagnostics and care. In addition, molecular genetic techniques that can be used in research and medical applications are introduced.

The course covers medical genetics, molecular biology and epigenetics, with links to
pathology and medical ethics.

Teaching and working methods

At the Faculty of Medicine and Health Sciences student centred and problem based
learning make up the foundation of the teaching. The student takes responsibility for, studies and researches current content of the courses and study programme. The methods of the course work challenge the students to independently formulate
questions for learning, to seek knowledge and in dialogue with others judge and evaluate achieved knowledge. Students in the Bachelor's programme in Experimental and Industrial Biomedicine work together in groups based on reality based and course related biomedical issues to apply their knowledges, develop their
own learning, contribute to the fellow students' learning and to practice cooperation. Throughout the study programme theory is integrated with practical modules. The course methods and integration modules stimulates and support the student's ability to apply their knowledge and professional competence.

The working methods used in this course are tutorial groups, lectures, seminars and
laboratory exercises.

Examination

Teaching and examination are performed in English.
The forms of examination are one individual written and one individual practical exam. In addition, active participation in compulsory components is required to pass the course. Compulsory elements include tutorial groups, seminars, laboratory

sessions with associated reports and assignments.

Resource-demanding examinations, in this syllabus the individual practical examination, are limited to five attempts. The written examination may be performed an unlimited number of times by those students who have not achieved a
passing grade.

Grades
The course is graded with the grades Fail or passing grades 3-5, where 3 corresponds to approved, 4 corresponds to approved with credit and 5 corresponds
to approved with distinction. An aggregation of the grades from the individual written exam and the individual practical exam forms the basis of the final grade of
the course.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

Application for examination

Instructions on how to apply for examinations are given prior to the beginning of each course.

Re-examination

The date for re-examination should normally be announced by the date of the regular examination at latest; in which case the scope must be the same as at the regular examination.

Examination for students with disabilities

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the

course.

Nomination of another examiner

A student who has taken two examinations in a course or a part of a course without obtaining a pass grade is entitled to the nomination of another examiner, unless there are special reasons to the contrary.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Course literature

A literature reference list must be set no later than two months before the course begins by the programme committee for the Bachelor's Programme in Experimental and Industrial Biomedicine. There is no compulsory course literature.

Other information

Planning and implementation of the course is to be based on the wordings in the course syllabus. A course evaluation is compulsory for each course and should include how the course is in agreement with the course syllabus. The course coordinator will analyse the course evaluation and propose appropriate development of the course. The analysis and proposal will be returned to the students, the Director of Studies, and as needed to the Education Board, if related to general development and improvement.

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If the course is cancelled or undergoes major changes, examination is normally offered under this course syllabus, at a total of three occasions, within/in connection to the two following semesters, of which one in close proximity to the first examination.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.