

Gene Technology and Molecular Genetics

Programme course

6 credits

Genteknik och molekylärgenetik

TVCB02

Valid from: 2017 Spring semester

Determined by

Board of Studies for Chemistry, Biology
and Biotechnology

Date determined

2017-01-25

Main field of study

Biotechnology, Engineering Biology

Course level

First cycle

Advancement level

G2X

Course offered for

- Engineering Biology, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Biochemistry and Cell Biology

Intended learning outcomes

The course intends to provide theoretical knowledge in basic genetics and molecular genetic mechanisms. Furthermore, the course should illuminate theoretical and practical knowledge in gene technology and its application in biomedicine. By the end of the course the student will be able to:

- Integrate knowledge on how genetic information is inherited, expressed and regulated.
- Understand and explain how genetic variation originates, and affects traits and development of disease in individuals.
- Understand the theoretical background as well as perform and analyse the results of basic molecular genetic methods.
- Understand the theoretical background of more advanced gene technologies for analysis of expression and variation in the genome, mapping and cloning of genes.
- Identify relevant analytical methods for application on a specific biomedical problem.
- Independently identify a genetic topic, as a foundation for searching scientific information, which will be structured, evaluated and presented in written and oral form.

Course content

- Genetic and molecular genetic principles for inheritance, meiosis, mitosis, recombination and linkage analysis.
- Mutations, polymorphisms, DNA repair and control of gene expression in eukaryotic cells.
- Medical genetics and application of gene technologies within biomedicine, disease diagnostics, prenatal diagnostics and genetic counselling as well as applications in forensic science.
- Basic gene technologies: restriction enzymes and RFLP, separation, labelling and hybridisation of nucleic acids, PCR-based techniques and DNA sequencing. Utilising of bioinformatic tools and databases for molecular genetic studies.
- Advanced gene technologies: mutation- and expression analysis, isolation and mapping of genes, animal models for functional studies, cytogenetics.

Teaching and working methods

The course consists of lectures, seminars and laboratory work.

Examination

UPG1	Exercise	1.5 credits	U, G
LAB1	Laboratory Work	1.5 credits	U, G
TEN1	Examination	3 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Genome Analysis.

Department

Institutionen för klinisk och experimentell medicin

Director of Studies or equivalent

Kajsa Holmgren Peterson

Examiner

Peter Söderkvist

Education components

Preliminary scheduled hours: 52 h

Recommended self-study hours: 108 h

Course literature

Additional literature

Books

Alberts B. et al, (2002) *Molecular Biology of the Cell* 4th ed

Hyde David, *Introduction to Genetic Principles*

ISBN: 978-0-07-110675-7

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.