Faculty of Science

BIOR31, Biology: Molecular Biotechnology, 15 credits

Biologi: Molekylär bioteknik, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-04-12 and was last revised on 2018-09-28. The revised syllabus applies from 2018-09-28, spring semester 2019.

General Information

The course is an elective advanced course for a Degree of Bachelor of Science or Degree of Master (120 credits) in biology and molecular biology.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Biology	A1F, Second cycle, has second-cycle course/s as entry requirements
Molecular Biology	A1F, Second cycle, has second-cycle course/s as entry requirements

Learning outcomes

The general aim of the course is that student should acquire advanced knowledge of applied molecular biology, production of heterologous proteins, yeast and its use in industry as well as a general understanding of innovation in biotechnology and drug development.

Knowledge and understanding

On completion of the course the student shall be able to:

- account for the fundamentals of applied eukaryote genetics as well as molecular and quantitative biology

- explain the importance of yeast in food industry and in production of heterologous proteins
- describe the mammalian cell and the process for development of drugs
- account for innovation process: patents, start of biotechnology companies and legislation regarding molecular biotechnology

Competence and skills
On completion of the course the student shall be able to:

- carry out an experimental laboratory project
- perform the theoretical planning of a project
- present scientific results/projects in writing and orally

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

- account for and evaluate knowledge required for work in the biotechnology industry

Course content

- Genetics and molecular biology of yeast, including: biodiversity and ecology; cell organisation; metabolism; genetic systems; genomics; cell cycle and replication; gene expression and secretion.
- Aspects on the quantitative biology of yeast: "flux modeling" and redox balances.

- Applications of yeast biology, including: baking; brewing; diary products; genetically modified industrial strains; bioethanol, pathogenesis and expression of human hormones.
- Theories of drug development, including identification of genes for diagnostics, protein and drug interactions, models for "knock-out" and "knock-down" of genes, gene therapy, cancer and stem cell biology, as well as clinical assessment.
- Applied aspects on: innovations, patents, start of biotechnology companies, legislation regarding genetically modified organisms, cooperation between university and industry.
- Experimental laboratory part in one of the following subject areas: proteins; the molecular biology of bacteria, yeast or mammals, or bioinformatics.

Course design

Teaching consists of lectures, laboratory sessions, group discussions and project work. Laboratory sessions, group discussions, project work and associated components, including lectures with invited guest lecturers, are compulsory.

Assessment

The examination takes place through written examinations during the course as well as through written reports and oral presentations. For students who have not passed the regular examination, an additional examination in close connection to this is offered.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.
For the compulsory components laboratory sessions and projects the grading is Fail, Pass. To pass the entire course, approved examinations and approved compulsory parts, are required. The final grade is determined by a weighing of the results of the parts that are included in the examination.

Entry requirements

For admission to the course is required 135 credits scientific studies, including knowledge equivalent to MOBA01 Cell biology 15 credits BIOA01 Genetics and microbiology 15 credits, MOBA02 Chemistry of the Cell15 credits, MOBA03 Molecular Biology 15 credits, 30 credits in chemistry as well as an optional advanced molecular biological course of 15 credits. English 6/English B.

Subcourses in BIOR31, Biology: Molecular Biotechnology

Applies from V14

0711 Theory, 10,0 hp
Grading scale: Fail, Pass, Pass with distinction
0712 Laboratory Work and Assignments, 5,0 hp
Grading scale: Fail, Pass

Applies from H07

0701 Molecular Biotechnology, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction