BIOR31

Syllabus for Molecular Biotechnology, 15 higher education credits

1. Basic information
The syllabus was approved by the Education Committee of the Faculty of Science on 12 April 2007. The syllabus comes into effect on 1 July 2007. The course is at second-cycle level.

2. General information
The course is part of the main fields of Biology or Molecular Biology at the Faculty of Science. The course is an optional second-cycle course for a degree of Bachelor or Master of Science in Biology or Molecular Biology. The course is also offered as a freestanding course. The language of instruction may be English.

3. Learning outcomes
On completion of the course the student shall be able to

- demonstrate in-depth knowledge of applied eukaryote genetics and molecular and quantitative biology
- demonstrate in-depth knowledge of yeast and its role in food technology and the production of heterologus proteins
- demonstrate in-depth knowledge of the mammalian cell and the development of novel drugs
- demonstrate basic knowledge of innovation, patents, start-up of biotech companies and the legal aspects of molecular biotechnology
- implement an experimental laboratory project
- implement a theoretical project plan
- be prepared for work within the biotech industry
- communicate orally and in writing.

4. Course content
- **Y**east genetics and molecular biology: biodiversity and ecology, cell organisation, metabolism, genomics, cell cycle and replication, gene expression and protein secretion.
- Yeast quantitative biology: flux modelling and redoxbalance.
- Applied yeast biology: baking, beer fermentation, dairy products, genetically modified strains, bioethanol, pathogens, gene expression and secretion of human hormones.
- Development of novel drugs: identification of genes for diagnostic purposes, protein-drug interactions, models to study gene knock-outs and knock-downs, gene therapy, cancer and stem-cell biology, clinical trials.
- Innovation, patents, start-up of biotech companies, the legal aspects of biotechnology, collaboration between universities and industry.
- Experiments in the following areas: protein, bacterial, yeast or mammal molecular biology and bioinformatics.

5. Teaching and assessment
Teaching consists of lectures, practicals, group discussions and a major piece of project work (in groups of 2–4 students). All course elements, except certain lectures, are compulsory, including submitted written reports and oral presentations of a literature and a laboratory project.

Assessment is carried out through written reports, oral presentations and written examinations during the course.

A re-sit examination is offered soon after the examination to students who do not pass.

6. Grades
Students are awarded one of the following grades: Pass with Distinction, Pass or Fail.

To be awarded Pass on the whole course the student must pass the examinations, pass the assignments and project report and participate in all compulsory course components.

The final grade for the course is determined by the overall results for the different parts of the examination.

7. Admission requirements
To be eligible for the course applicants must have 135 higher education credits in Science subjects, including knowledge equivalent to MOB101 Cell Biology 10 credits, BIO006 Genetics and Microbiology 10 credits, MOB102 The Chemistry of the Cell 10 credits, Chemistry 20 credits, MOB103 Molecular Biology 10 credits and a relevant second-cycle molecular biology course 10 credits.

8. Course literature
In accordance with an approved literature list, which will be available on the department website (http://www.biol.lu.se/biologi) at least five weeks before the start of the course.

9. Further information
The course cannot be credited as part of a degree that includes BIO739 Molecular Biotechnology 10 credits.