



DEPARTMENT OF CHEMISTRY AND MOLECULAR BIOLOGY

BIO448 Experimental Systems Biology, 15 credits

Experimentell Systembiologi, 15 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Chemistry and Molecular Biology on 2014-01-14 and was last revised on 2018-11-27 to be valid from 2018-11-29, autumn semester of 2018.

Field of education: Science 100%

Department: Department of Chemistry and Molecular Biology

Position in the educational system

This is a course in biology at an advanced level that is designed to provide advanced knowledge in Experimental Systems Biologi. The course is included in the master's program in Genomics and Systems Biology. The course is also offered as a separate course.

Main field of studies

Biology

Molecular Biology with Specialization in
Genomics and Systems Biology

Molecular Biology

Specialization

A1F, Second cycle, has second-cycle
course/s as entry requirements

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Entry requirements

Passed courses in Cell Biology, BIO900, 15 hec, Molecular Genetics, BIO905, 15 hec, Biological Form and Function, BIO910, 15 hec, Ecology and Evolution, BIO915, 15 hec, and Biodiversity and Systematics, BIO920, 15 hec, or equivalent courses.

English proficiency is required to the level of English 6/English Course B from Swedish Upper Secondary School, or be certified by an international recognized test, for example TOEFL, IELTS. In addition, a passed advanced course in Biology is required. One of the courses Bioinformatics and Functional Genomics (e.g. 210), Advanced Functional Genomics (e.g. BIO406), Advanced Bioinformatics (e.g. BIO403) or Genetics (e.g. BIO555) is recommended.

Learning outcomes

After completing the course student will be able to:

Knowledge and understanding

- Design and modify System Biology tools for genome-wide genetic analysis
- Have an understanding of how the Synthetic Genetic Array (SGA) approach works in theory and practice.
- Conduct SGA experiments and other similar yeast genome-wide screens
- Verify and summarize data acquired from the SGA experiments

Competence and skills

- Demonstrate ability to independently search, read, understand and critically evaluate scientific literature and research information
- Demonstrate ability to present, explain and discuss current topics, research results and questions regarding advanced systems biology
- Demonstrate ability to propose and implement systematic genome-wide approaches to answer relevant biological questions.
- Collect, analyses and interpret genome-wide screening data and generate hypotheses based on the data collected.

Judgement and approach

- Evaluate the quality of genome-wide screening results
- Have a broader understanding of how genomics and systems biology affecting society, including our health.

Course content

The course aims to provide a theoretical and practical introduction of the advanced working methods in system biology by using the SGA analysis as an example. Student will have the chance to access the infrastructure at the Center for Large-scale cell-based screening at our department and use the robotic systems for performing the required System Biology experiments for the course. Students learn to design and modify a working protocol, perform a complete SGA experiment and confirm the screening results during the course. The course also provides in-depth knowledge of how to

analyses, summarize and present the screening results based on requirements for a scientific publication.

The course is divided into lectures, seminars, project works as well as laboratory works. In addition, there are also lectures/group activities to provide insight regarding scientific writing. All scheduled events except lectures are mandatory.

Form of teaching

Compulsory subjects include case studies from the literature (scientific publications), individual project work, laboratory work and exercises.

Language of instruction: English

Assessment

The student's knowledge is continually assessed during the course of the teaching. Course finishes with a final written report. Missed compulsory sessions can be made up during the course if possible but otherwise the next time the course runs.

A student who has failed a test twice has the right to change examiner, if it is possible. A written application should be sent to the Department.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Course evaluation

A written and oral course evaluation is done at the end of the course. The results of the evaluation will function as a guide for the development of the course.