FSK3512 Molecular Biology for Imaging, Theory and Practice 6.0 credits

Molekylärbiologi för avbildning, teori och praktik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FSK3512 valid from Autumn 2013

Grading scale

Education cycle

Third cycle

Specific prerequisites

Admitted to PhD studies in Physics, Biological physics or related fields of study.

Basic knowledge of chemistry and biology

English good enough to follow the course and participate in discussions

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completing the course, the student should be able to

- Identify the general structure and function of carbohydrates, phospholipids, proteins, enzymes and nucleic acids.
- Outline the general processes used by the cell to generate cellular energy from sugar through glycolysis and the citric acid cycle
- Describe how DNA was shown to be the genetic material and how DNA is copied.
- Describe the structure and regulation of genes, and the structure and synthesis of proteins.
- Understand the general tools and reagents used in recombinant DNA technologies.
- Outline a general strategy for making a recombinant DNA library, screening a recombinant DNA library, and analyzing the DNA fragment identified.
- Design a general strategy for identifying a gene of interest using recombinant DNA techniques.
- Under some supervision, make a successful transfection of a recombinant fluorescent protein into a cell line.

Course contents

This course focuses on the basic principles of biochemistry, molecular biology, and recombinant DNA technologies. The material presented introduces modern biology at the molecular level: the structure and function of biological macromolecules, the basics of cellular metabolism, DNA replication, the basics of gene expression, and general recombinant DNA techniques. This basis is then used to show how the technology can be employed for imaging purposes, specifically using fluorescent recombinant proteins.

Course literature

MIT Open CourseWare: http://ocw.mit.edu/courses/biology/7-01sc-fundamentals-of-biology-fall-2011/index.htm

Campbell Biology, 10th Ed. (ISBN-10: 0321775651; ISBN-13: 978-0321775658) rekommenderad litteratur/recommended literature

Lab instructions (handed out)

Equipment

The student will need a computer with internet access for the online material. This will not be supplied.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Oral examination/Seminar (TEN1, 3.0 credits, grading scale P/F)

Completed laboratory test (LAB1, 3.0 credits, grading scale P/F)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.