BB1030 Microbiology 9.0 credits

Mikrobiologi

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

Establishment

Course syllabus for BB1030 valid from Autumn 2012

Grading scale

A, B, C, D, E, FX, F

Education cycle

First cycle

Main field of study

Technology, Biotechnology

Specific prerequisites

Completed upper secondary education including documented proficiency in English corresponding to English A. For students who received or will receive their final school grades after 31 December 2009, there is an additional entry requirement for mathematics as follows: documented proficiency in mathematics corresponding to Mathematics A. Specific requirements in mathematics, physics and chemistry are corresponding to Mathematics E, Physics B and Chemistry A.

Language of instruction

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

Intended learning outcomes

After passing the course, the student should:

- have a general knowledge about micro-organisms and their occurrence in nature
- understand micro-organism replication and physiology
- have an awareness of micro-organism cooperation with and ability to harm other living organisms
- understand micro-organism implications for science and industry
- master presentation techniques to be able convey scientific observations

Course contents

The course handles micro-organism morphology and structure along with their occurrence in nature. Taxonomical and physiological aspects of viruses, bacteria, protozoon, algae and fungi are covered. Special consideration is given to the bacteria cell, its nourishment demands and growth. Control of growth is clarified through sterilization, disinfection and antibiotics. The basics of bacterial genetics are covered along with bacterial genetic development toward modern phylogenetics with the help of gene sequencing of 16s rRNA. Mechanisms for sickness, for example: toxins and bacteria which are resistant against the body's defenses, are also covered. Some meaningful microbial sicknesses are given as examples. Significant microbial processes for application within traditional and modern biotechnology are also covered. A couple of examples of such processes are biological water purification and ground-decontamination.

Disposition

_Labs
_The course begins with light and phase contrast microscopy, general sterilization techniques and measurements of bacterial concentration. Next comes a connected, coherent lab which consists of planning and execution: isolation, clean cultivation, and characterization of bacteria from a natural environment with the help of microscopy, cultivation of selective and differentiated mediums, proof by enzymes and other microbial products along with antibiotic spectrums. Also, in this lab, nourishment mediums and substrates are to be prepared to cultivate aerobically and anaerobically as well as searching for information about isolated bacteria being cultivated. The results are presented in a seminar orally, in a written report, and as a poster. In a virus lab, differences and similarities between bacterial viruses and animal viruses are shown. The influenza virus is shown using the help of fluorescent microscopy. A modern technique to color bacteria's ribosome with the help of fluorescent-labeled probes is taught. This technique, FISH, is used to see specific bacteria in their natural environment. With this, 16s rRna is isolated and sequenced for further work with the bioinformatics course.

_Practice Assignments
_During the exercises, the students are provided with knowledge of how to search for information in the library using different search engines. The students will learn and utilize presentation techniques into two of the exercises. As a conclusion, the students may choose

a microbial-related inquiry, search for information about it, write a paper (around 5 pages) and present it orally for the other students.

Course literature

Brock Biology of Microorganisms, 12th edition, 2009. M. T. Madigan, J. M. Martinko, P. V. Dunlap, and D. P. Clark. ISBN 978-0321-53615-0.

Examination

- TENA - Written Exam, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- LABA - Laboratory Work, 3.0 credits, grading scale: P, F

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.

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

Other requirements for final grade

Passed examination (TENA; 6,0 credits, grading scale A-F), passed laboratory exercises (LABA; 3 credits, grading scale Pass/Fail)

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.