BB2015 Environmental Toxicology 7.5 credits

Miljötoxikologi

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

Establishment

Course syllabus for BB2015 valid from Spring 2022

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

Requirements for program students at KTH:
At least 150 ECTS from year 1, 2 and 3, of which at least 100 ECTS from year 1 and 2 and bachelor's degree work must be completed. The 150 ECTS must include completed courses in a program that includes: at least 20 ECTS in chemistry 6 ECTS in biotechnology, biochemistry or molecular biology.

Requirements for non-programme students:
A total of 6 higher education ECTS in biochemistry, microbiology and genetics / molecular biology. 20 ECTS in chemistry, as well as documented knowledge of English corresponding to English B.

Language of instruction

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

Intended learning outcomes

After taking this course, the student should be able to:

- describe how foreign substances can cause damage on human hormonal systems and macromolecules in the cell
- describe biotransformation of foreign substances in animal cells
- give examples of how human activities can damage other organisms and cause ecological imbalance, and also how to prevent this

These aims are relevant in order to pass the course.

Course contents

The environmental toxicology course is a broad course, which spans from molecules to ecosystems. The course consists of an application of the bio program's basic chemical and biochemical knowledge in an environmental toxicological context. The course gives an understanding for how xenobiotics (substances or materials unknown to the cell/organism) can influence humanity and the environment; consequently, animals and plants.
Among natural life processes, there are inherently, potentially dangerous processes and molecules which can be abused if the protection around them is disturbed. For example, the activation of oxygen which results in reactive oxygen compounds like free radicals. The activation of programmed cell death at the wrong time is another example. Water-soluble and fat-soluble are central molecular properties which become significant in a new respect. Heredity is not only the sequence of DNA-bases; but also the power to make use of those sequences that are hereditary, but with another hereditary mechanism (epigenetics), which can be affected by the environment.
Important knowledge which is mediated is that organisms' biochemical/physiological control systems are sensitive to xenobiotics, and interferences result in extensive, increasing, and often long-term harmful effects on gene activity, cell differentiation, embryo development, reproduction, and behaviour. The student becomes aware of those connections and develops sensitivity for environmental toxicology problems. Risk assessment and regulations are discussed in the course.
An overall goal is that the student in his/her own future occupation as an engineer will avoid including environmental toxicology problems in products and processes, but also, in the early stages identify problems if they come up, and try to find environmentally friendly alternatives.

Other parts of the course include independent achievements regarding environmentally toxicological problems.

Examination

- LIT1 - Literature assignment, 2.5 credits, grading scale: P, F
- TEN1 - Written exam, 5.0 credits, grading scale: A, B, C, D, E, FX, 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.

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.