

Syllabus

for course at advanced level

Radiation Biology and Cellular Toxicology
Strålningsbiologi och cellulär toxikologi

15.0 Higher Education Credits
15.0 ECTS credits

Course code:	BL7067
Valid from:	Autumn 2021
Date of approval:	2021-01-11
Department	Department of Biology Education
Main field:	Biology
Specialisation:	A1N - Second cycle, has only first-cycle course/s as entry requirements

Decision

This course syllabus was approved by the Board of Science at Stockholm University on 11/01/21.

Prerequisites and special admittance requirements

For admission to the course, knowledge is required equivalent to 120 credits in Science. English 6 or equivalent.

Course structure

Examination code	Name	Higher Education Credits
DEL1	Theory	10
DEL2	Laboratory exercises	5

Course content

a. The course addresses the following: Radiation physics and radiation chemistry, microdosimetry, dose concepts, medical use of radiation. Toxic substances, absorption, level of exposure, use of cytotoxic drugs (cytostatics) and other forms of cancer treatment within the clinic. Genome organization and function, endogenously and exogenously formed free radicals, DNA damage, DNA adducts, mutations, epigenetic effects, carcinogenesis and cell transformation, repair of DNA damage, mechanisms of cell death, the Adverse Outcome Pathway concept (AOP). Methods for measuring cytotoxicity, genotoxicity and mutations. The importance of radiation quality for the biological effect. Biological dosimetry, introduction to epidemiology, radiation accidents and their effects on health, risk perception. Protection issues against radiation and chemical substances, comparative risk assessment.

b. The course consists of the following modules:

1. Teori (Theory), 10 credits
2. Laborationer och projekt (Laboratory exercises and project), 5 credits

Learning outcomes

After completing the course, the student is expected to be able to:

- explain how ionizing radiation and outline how toxic substances act on different components in cells and what biological consequences can occur at cellular level and organism level (modules 1 and 2)
- present knowledge of different cellular protection systems that counteract the effects of ionizing radiation and toxic substances (module 1)
- describe the medical and biological uses of ionizing radiation and toxic substances (module 1)

- explain the principles of risk assessment when exposed to ionizing radiation and toxic substances as well as the principles of protection (module 1)
- perform tests to measure cytotoxicity, genotoxicity and mutations and interpret the results (modules 1 and 2).

Education

Teaching consists of lectures, laboratory work, group discussions, study visits, essay work and seminars. The course is offered in English.

Forms of examination

a. The course is examined as follows: Assessment of module 1 takes place through written tests.

Assessment of module 2 takes place through laboratory reports, written and oral presentations.

The examiner can decide on adapted or alternative examination formats for students with disabilities.

The examination will be conducted in English.

b. A passing final grade requires participation in laboratory sessions, group discussions, essay work and seminars. If special reasons exist, following consultation with the teacher involved, the examiner may grant the student exemption from the obligation to participate in certain compulsory instruction.

c. Grading: The course's final grade is set according to a seven-point criterion-referenced scale:

A = Excellent

B = Very good

C = Good

D = Satisfactory

E = Adequate

Fx = Fail, some additional work required

F = Fail, much additional work required

Grades of module 1 will be set according to a seven-point criterion-referenced scale.

Grades of module 2 will be set according to a two-point grading scale: fail (U) or pass (G).

d. The course's grading criteria are handed out at the start of the course.

e. Students who receive a failing grade on a regular examination are allowed to retake the examination as long as the course is still provided. The number of examination opportunities is not limited. Other mandatory course elements are equated with examinations. A student who has received a passing grade on an examination may not retake the examination to attain a higher grade. A student who has failed the same examination twice is entitled to have another examiner appointed, unless there are special reasons to the contrary. Such requests should be made to the department board. The course includes at least three examination opportunities (if necessary: for each course module) per academic year the course is offered. For the academic years that the course is not offered, at least one examination opportunity is offered.

f. There is no possibility to improve the grade Fx to a pass grade in this course.

Interim

Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two-year period after the course was discontinued. Requests must be made to the departmental board. The provision also applies in the case of revisions of the course syllabus and revisions of the required reading.

Limitations

This course may not be included in a degree together with the course Radiation biology (BL7016).

Misc

This course is part of the Molecular life science programme, but may also be taken as a separate course.

Required reading

The required reading is decided by the department board and published on the course page in the course catalogue at least 2 months before the start of the course.