Department of Physics

Stockholm University

Syllabus

for course at advanced level

Radiation Protection and Environmental Radiology
Strålskyddslära med omgivningsradiologi

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	FK8030
Valid from:	Autumn 2017
Date of approval:	2017-03-13
Department	Department of Physics
Main field:	Medical Radiation Physics
Specialisation:	A1F - Second cycle, has second-cycle course/s as entry requirements

Decision

The course syllabus is approved by the Science faculty at Stockholm University 2017-03-13.

Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent to passed courses (excluding introductory courses) of 45 credits in mathematics and 60 credits in physics. Additionally knowledge corresponding to the courses Radiation Sources with Medical Applications, 7.5 hp (FK5028), Interaction of Ionizing Radiation with Matter, 9 hp (FK5029), Radiation Dosimetry, 7.5 hp (FK5031) and Basic Radiology, 9 hp (FK7065) are required. Also admission to the course requires knowledge equivalent to Swedish upper secondary course English B/English 6.

Course structure

Examination code	Name	Higher Education Credits
TEOR	Theory	5.5
LABB	Laboration	2

Course content

a. The course deals with radiation protection quantities and units, international radiation protection recommendations as well as Swedish radiation protection legislation and risk assessment. Radiation dose calculations for point, line, area and volume radiation sources as well as radiation shielding calculations around radioactive radiation sources are performed using analytical and Monte Carlo methods. Background radiation from natural and artificial radiation sources is studied. The Radon problem is discussed. Radiation protection problems in connection with nuclear power are analyzed. Transport of radioactive substances in the environment through air, water and ground as well as compartment models are treated. Intake and uptake in different organs are discussed and calculated. Measurement methods, field measurements and measurement of internal contamination are analyzed and their applications are discussed.

b. The course consists of the following modules:
• TEOR Teori, Theory, 5.5 hp
• LABB Laboration, Laboration, 2 hp

Learning outcomes

After completing the course, the student is expected to be able to:
Module TEOR, Teori, Theory:

• account for radiation shielding of ionizing radiation considering radiation protection principles, risk assessment, legislation and practical radiation protection shielding techniques
• select appropriate radiation protection instruments to measure and control radioactivity and account for their properties
• account for natural and artificial radiation sources in the environment and their transport routes
• discuss the Radon problems and radiation protection problems as well as risk assessment in connection with nuclear power in case of normal operation and nuclear accidents
• perform radiation dose calculations for radioactive sources as well as radiation shield calculations using analytical methods and Monte Carlo methods.
Module LABB, Laboration Laboration:
• carry out practical exercises to measure and control the radioactivity and dose level in our environment.

Education

Teaching consists of lectures, group work, seminars, study visits, laboratory work and home work assignments. Participation in home work assignments and laboratory work and any associated integrated group work is compulsory. In the event of special circumstances, the examiner may, after consultation with the teacher concerned, grant a student exemption from the obligation to participate in certain compulsory instruction.

The course will be given in English if requested by any student enrolled.

Forms of examination

a. The course is examined as follows: Assessment of
TEOR, Teori, Theory: written and oral examination
LABB, Laboration, Laboration: written and oral examination

If the teaching takes place in English, the examination may also be in English.

b. 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 = Failed, some additional work is required
F = Failed, much additional work is required

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

c. Grading criteria for the course will be distributed at the start of the course.

d. A passing final grade requires passing grades on all included parts as well as participation in all mandatory parts.

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 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. Students awarded the grade Fx are given the opportunity to improve their grade to E. The examiner decides on the supplementary assignments to be performed and the pass mark criteria. The supplementary assignments will take place before the next examination opportunity.

Interim

Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board.

Limitations

The course may not be included as a part of the Master programme in Medical physics together with the course Radiation Protection and Environmental Radiology 7.5 hp (FK4017) or similar.

Misc

The course is part of the Master programme in Medical Physics. It can 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 digital course catalogue at least 2 months before the start of the course.