

Syllabus

for course at first level

Radiation Dosimetry
Strålningsdosimetri

**7.5 Higher Education
Credits**
7.5 ECTS credits

Course code:	FK5031
Valid from:	Spring 2017
Date of approval:	2016-08-23
Department	Department of Physics
Main field:	Medical Radiation Physics
Specialisation:	G2F - First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Decision

The course syllabus is approved by the Science faculty at Stockholm University 2016-08-23.

Prerequisites and special admittance requirements

For access to the course knowledge and skills equivalent to the following courses is required:

- Mathematics for Natural Sciences I, 15 hp (MM2002)
- Mathematics for Natural Sciences II, 15 hp (MM4001)
- Mathematics II - Analysis, part A, 7.5 hp (MM5010)
- Mathematics II - Analysis, part B, 7.5 hp (MM5011)
- Mathematics II - Linear Algebra, 7.5 hp (MM5012)
- Classical Physics, 30 hp (FK3014)
- Programming, numerical methods and statistics for physicists, 15 hp (FK4026) or both of the courses Physics with digital tools, 7.5 hp (FK4025) och Probability theory and statistics for teachers, 7.5 hp (MT1011)
- Quantum Mechanics, 7.5 hp (FK5020)
- Electromagnetism and waves, 7.5 hp (FK5019)
- Experimental physics, 7.5 hp (FK5021)
- Quantum Phenomenology and Radiation Physics, 7.5 hp (FK5015)
- Radiation Sources with Medical Applications, 7.5 hp (FK5028)
- Interaction of Ionizing Radiation with Matter, 9 hp (FK5029)
- Radiation Detectors and Measuring Methods, 7.5 hp (FK5030)

Course structure

Examination code	Name	Higher Education Credits
DEL1	Theory	5.5
DEL2	Laboration	2

Course content

a. The course addresses fundamental dosimetric quantities, units and radiation field parameters. Different types of radiation equilibrium and calculations of absorbed dose are covered. Relation between dose in dosimeter and surrounding medium (cavity theories) is studied in detail. The Fano theorem, perturbation correction factors and interface problems are studied. The course will also cover experimental dosimetry,

absolute- and relative measuring dosimeters as well as calibration of ionization chambers. Neutron dosimetry and micro dosimetry are also studied.

b. The course consists of the following modules: DEL1, 5.5 hp Theory.
DEL2, 2 hp Laboration

Learning outcomes

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

DEL1:

- demonstrate insight and understand the fundamental methods for calculation of absorbed dose in different equilibrium situations when irradiating with different radiation qualities
- explain different cavity theories and be able to calculate absorbed dose in different radiation situations
- describe the properties of different dosimeters and to choose a suitable dosimeter for a measuring situation.
- use experimental methods for determining of dose with different types of dosimeters
- read and report on scientific papers within the subject

DEL2:

- describe and use the Monte Carlo method and apply a general Monte Carlo code to a specific dosimetric problem
- perform measurements of absorbed dose.

Education

Teaching consists of lectures, group work, seminars, practical exercises and laboratory work. Participation in seminars and laboratory work and any associated integrated instruction 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 DEL1 takes place through written and oral exams. DEL2 is examined through oral presentation, exercises, laboratory work and activity at seminars.

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 DEL2 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 courses Radiation Dosimetry, 7.5 hp (MF4001) or Radiation Dosimetry, 7.5 hp (FK4014).

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.