



**Karolinska  
Institutet**

Course syllabus for

# **Target Organ Toxicology - Toxicokinetics and Toxicodynamics, 17.5 credits**

System- och vävnadstoxikologi - toxikokinetik och toxikodynamik, 17.5 hp

This course syllabus is valid from autumn 2024.

Please note that the course syllabus is available in the following versions:

Autumn2017 , Autumn2018 , Autumn2020 , Autumn2023 , Autumn2024

Course code	4TX029
Course name	Target Organ Toxicology - Toxicokinetics and Toxicodynamics
Credits	17.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Toxicology
Level	AV - Second cycle
Grading scale	Fail (U), pass (G) or pass with distinction (VG)
Department	Institute of Environmental Medicine
Decided by	Utbildningsnämnden IMM
Decision date	2017-03-30
Revised by	Education committee IMM
Last revision	2024-03-13
Course syllabus valid from	Autumn 2024

## **Specific entry requirements**

Bachelor of science or professional qualification of at least 180 credits in biomedicine, biology, cell and molecular biology, pharmacy, nutrition, chemistry, medicine or biotechnology. Furthermore, knowledge in English equivalent to English B at Swedish upper secondary school is required.

## **Objectives**

Upon completion of the course, the student should be able to:

Regarding knowledge and understanding

- describe and explain basic concepts of toxicokinetics and the turnover of chemical substances in living organisms, and describe toxicokinetic time-courses generated using computer-based modelling,
- describe and explain central concepts of toxicity and the underlying mechanisms,

### Regarding skills and ability

- interpret, analyse and describe the signs of toxicity that toxic compounds cause and relate this to the structure and function of the tissues and organs,
- suggest approaches to assess causes of organ toxicity,

### Regarding judgement and approach

- scientifically assess alternative interpretations of causes of toxicity and critically evaluate literature,
- discuss own conclusions on relevant features of toxicity and underlying mechanisms, as well as the knowledge and arguments on which they are based.

## Content

The course includes kinetics and dynamics for toxicity of chemical substances that can be hazardous to human health or to sustainable development in an individual, population and global perspective.

The course consists of the following parts:

### **Kinetics, mechanisms and effects in different organ systems, 9.0 hp**

Grading scale: GU

Kinetics (absorption, distribution, metabolism and elimination) of toxic compounds. Toxic effects and their underlying mechanisms in different organ systems (e.g. liver, kidney, lung, nervous, immune- and reproductive systems). Mechanisms and principles for genotoxicity and chemical carcinogenesis. Clinical toxicology.

### **Integration of target organ toxicology, 8.5 hp**

Grading scale: VU

Integration of kinetics, mechanisms and effects of toxic compounds.

## Teaching methods

The course builds largely on problem-based learning in the form of different case studies with oral and written presentation. Furthermore, lectures, seminars, group discussions, practical demonstrations and study visits are included.

## Examination

Kinetics, mechanisms and effects in different organ systems (9 credits). The examination consists of written and oral presentation. Graded Pass/Fail.

Integration of target organ toxicology (8.5 credits). The examination consists of written examination. Graded Pass with Distinction/Pass/Fail.

The course grade is based on the grade of the part Integration of target organ toxicology. To pass the whole course the grade pass must have been obtained for both parts of the course.

### Compulsory participation

All practical demonstrations, computer exercises, study visits and group exercises including presentations are compulsory. The examiner assesses if, and in that case how, absence can be compensated. Before the student has participated in all compulsory parts or compensated absence in accordance with the examiner's instructions, the student's results for respective part will not be

registered. Absence from a compulsory activity may result in that the student cannot compensate the absence until the next time the course is given.

If there are special grounds, or a need for adaptation for a student with a disability, the examiner may decide to deviate from the syllabus's regulations on the examination form, the number of examination opportunities, the possibility of supplementation or exemptions from the compulsory section/s of the course etc. Content and learning outcomes as well as the level of expected skills, knowledge and abilities may not be changed, removed or reduced.

## Other directives

The course language is English.

## Literature and other teaching aids

### Mandatory literature

**Casarett and Doull's toxicology : the basic science of poisons**

*Klaassen, Curtis D.*

Ninth edition. : New York : McGraw-Hill Education, [2019] - xiii, 1620 pages

ISBN:9781259863745 LIBRIS-ID:x6d58hkqv7v7v3bk

URL: [Länk](#)

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Handouts and other assigned literature