



**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 2017.

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	Pass with distinction, Pass, Fail
Department	Institute of Environmental Medicine
Decided by	Education committee IMM
Decision date	2017-03-30
Course syllabus valid from	Autumn 2017

## **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 central concepts of toxicity and the underlying mechanisms,
- describe and explain basic concepts of toxicokinetics and related enzyme kinetic concepts and describe the turnover of chemical substances in living organisms,

Regarding skills and ability

- critically, independently, and creatively identify and formulate toxicological questions,
- 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,
- analyse toxicokinetic time courses and apply common computer-based models and simulation methods for toxicokinetic analysis,

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 hp** 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 and reproductive systems). Mechanisms and principles for genotoxicity and chemical carcinogenesis. Clinical toxicology and the toxicology of environmental pollutants. **Integration of target organ toxicology, 8.5 hp** 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, computer exercises 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 course director 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 course director's instructions, the student's results for respective part will not be registered in LADOK.

## Transitional provisions

After each course occasion there will be at least six occasions for the examination within a two-year period from the end of the course.

## Other directives

The course language is English.

Course evaluation will be carried out in accordance with the guidelines established by the Board of Higher Education.

Oral evaluation in the form of course council meetings will be carried out during the course.

## Literature and other teaching aids

### Mandatory literature

*Casarett, Louis J.; Doull, John*

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

*Klaassen, Curtis D.*

8th ed. : New York : McGraw-Hill, 2013. - 1454 s.

ISBN:9780071769235 (Book + DVD) LIBRIS-ID:14293294

URL: [Contributor biographical information](#)

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Handouts and other assigned literature