



**Karolinska
Institutet**

Course syllabus for

Applications of Methods in Toxicological Research, 18 credits

Tillämpningar av metoder inom toxikologisk forskning, 18 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

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

Spring2016 , Spring2017 , Spring2018

Course code	4TX021
Course name	Applications of Methods in Toxicological Research
Credits	18 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	Programme Committee 7
Decision date	2015-11-09
Course syllabus valid from	Spring 2016

Specific entry requirements

At least the grade Pass for the courses Principles in toxicology, Toxicokinetics, Target organ toxicology and Histopathology and clinical pathology. within the Master's programme in toxicology.

Objectives

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

Regarding knowledge and understanding

- account for current methods that are used in biochemical and molecular toxicology
- account for alternative methods for toxicological testing
- account for statistical methods within biochemical and molecular toxicology
- account for epidemiological methods within toxicological research.

Regarding skills and ability

- plan laboratory experiments that can be used to answer biochemical and molecular toxicological

issues

- in a safe way implement methods and analyses within toxicological laboratory work including working with toxic chemicals,
- analyse and evaluate results of toxicological laboratory work and, orally and in writing account for and discuss the conclusions,
- analyse and evaluate results from epidemiological studies,
- identify and discuss sources of errors, weaknesses and strengths for different methods within biochemical and molecular toxicology and for alternative methods for toxicological testing,
- Identify and apply relevant statistical methods for the analysis of data from laboratory experiments and interpret results and draw statistical conclusions.

Regarding judgement and approach

- make assessments considering scientific and ethical aspects regarding toxicological methodology,
- analyze and critically review an epidemiological research report.

Content

The course is divided into the following parts:

Practical laboratory methods in toxicology, 8.5 hp This part contains theory and practical application of current laboratory research methods within toxicology, including alternative methods such as in vitro and alternative animal models.

Laboratory technology and laboratory safety is included. The methods that are included can vary from course to course depending on current research issues. Examples of methods that may be included are: molecular biological methods for the analysis of DNA, RNA levels, protein levels and enzyme activity. Cell culture. Methods within epigenetics. Methods for determination of DNA-damage and cell toxicity. Methods within endocrine toxicology.

Methods for analysis of dose-effect relationships and relative toxic potency. **Alternative methods for toxicity testing, 1.5 hp** This part contains analysis of need, development, validation and regulatory acceptance of alternative methods (according to 3R) for toxicological testing. **Integration of methods in toxicological research, 6.5 hp** The course is completed with an integrating part where the contents from the parts Practical laboratory methods in toxicology, Alternative methods for toxicological testing and lectures related to epidemiology, OMICS, in silico technologies and bioinformatics are examined. **Biostatistics, 1.5 hp** This part contains theory and practically application of basic statistical principles and methods that are applied within experimental toxicological research.

Teaching methods

The teaching includes laboratory sessions (including computer exercises), lectures, written reports and oral presentations.

Examination

Practical laboratory methods in toxicology (8.5 credits). The examination consists of individual written laboratory reports. Graded Fail/Pass/Pass with distinction.

Alternative methods for toxicological testing (1.5 credits). The examination consists of individual written reports and oral presentations. Graded Fail/Pass/Pass with distinction.

Integration of methods in toxicological research (6.5 credits). The examination consists of written examination. Graded Fail/Pass/Pass with distinction.

Biostatistics (1.5 credits). The examination consists of written examination. Graded Fail/Pass/Pass with distinction.

The final grade of the course is based on the grades for all parts. To pass the whole course the grade pass must have been obtained for all parts of the course.

Compulsory participation

All practical modules including presentations and occasional lectures (indicated in the schedule) are compulsory. The course director decides if and in that case how absence may be compensated. Before the student has participated in compulsory parts or compensated absence in accordance with the course director's instructions, results for each module are not registered in LADOK.

Transitional provisions

After each course, there will be at least 6 occasions for examination within a two-year period after 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

Hayes, A. Wallace; Kruger, Claire L.

Hayes' principles and methods of toxicology

6. ed. : - xxvi, 2157 p.

ISBN:9781842145364 (hardcover : alk. paper) LIBRIS-ID:16954170

[Library search](#)

Recommended 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](#)

[Library search](#)

Handouts, scientific papers and other assigned literature.