



**Karolinska  
Institutet**

Course syllabus for

## **Pharmacology and Toxicology, 10 credits**

Farmakologi och toxikologi, 10 hp

This course syllabus is valid from spring 2020.

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

Spring2019 , Spring2020

Course code	1BI045
Course name	Pharmacology and Toxicology
Credits	10 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedicine
Level	G2 - First cycle 2
Grading scale	Fail (U), pass (G) or pass with distinction (VG)
Department	Department of Physiology and Pharmacology
Decided by	Programnämnden för biomedicinprogrammen
Decision date	2018-10-30
Revised by	Programme committee for study programmes in biomedicine
Last revision	2019-10-21
Course syllabus valid from	Spring 2020

### **Specific entry requirements**

At least grade pass (G) at the courses Introduction to biomedical science; General and organic chemistry; Cell-, stem cell and developmental biology; Biochemistry; Genetics, genomics and functional genomics; Chemical biology; and Tissue biology, and at least grade pass (G) at the parts Laboratory work and seminars (4 credits) and Project work (2 credits) of the course in Immunology and microbiology, and the part Practical features (4 credits) of the course Neuroscience, at the Bachelor's programme in Biomedicine.

### **Objectives**

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

*Regarding knowledge and understanding*

- describe basic pharmacological principles within the field of pharmacokinetics,
- describe interindividual differences in drug metabolism as well as interactions between different drugs,
- describe different classes of receptors which interact with drugs, and describe intracellular

- transduction mechanisms coupled to some of these receptors,
- explain principles for central and peripheral neurotransmission,
- describe and explain toxicological principles,
- discuss and reflect upon mechanisms of action of drugs,
- discuss preclinical and clinical drug development.

#### *Regarding competence and skills*

- understand and interpret laboratory results.

#### *Regarding judgement and approach*

- show an understanding for how to decide which type of drug family to develop against a specific target.

## **Content**

Medication is a very important part in the overall treatment of various diseases. This course intends to equip the students with basic knowledge of how drugs affect cells, organs and entire organisms. The pharmacological part will mainly focus on general pharmacological principles. Mechanisms of action of drugs within the following fields: neuropsychopharmacology, neurology, general anaesthesia, local anaesthesia, analgesia, cardiovascular pharmacology, diuretic drugs, respiratory pharmacology, and gastrointestinal pharmacology. Preclinical and clinical aspects on drug development. The toxicology part intends to give the students knowledge of toxicological principles such as dose response, and how bioactivation and toxicity of xenobiotic substances are studied.

### **Pharmacokinetics and Pharmacodynamics, 2.0 hp**

Grading scale: GU

This component of the course contains pharmacokinetics as well as effects of pharmaceuticals on different diseases.

### **Laboratory work in pharmacology, 1.5 hp**

Grading scale: GU

Three laboratory practices.

### **Group assignments in pharmacology and toxicology, 2.5 hp**

Grading scale: GU

This component constitutes three group seminars and a PBL task in toxicology.

### **Integration of pharmacology and toxicology, 4.0 hp**

Grading scale: VU

Integration of the content of the course.

## **Teaching methods**

Teaching will be in the form of lectures, supervised laboratory practicals, and supervised group seminars. The group seminars will review and substantially expand upon the material provided in the lecture series. These seminars train the students to independently search for and assess relevant information, and provide an opportunity to discuss problems and theoretical concepts with faculty

members that are actively involved in research in the fields above. The course also includes a seminar task which will be solved by using the pedagogical approach "Problem based learning".

## Examination

Pharmacokinetics and pharmacodynamics (2 credits). The examination consists of an oral exam. Graded Fail/Pass.

Laboratory work in pharmacology (1.5 credits). Graded Fail/Pass.

Group assignment in pharmacology and toxicology (2.5 credits). Graded Fail/Pass.

Integration of pharmacology and toxicology (4 credits). The examination consists of a written exam. Graded Fail/Pass/Pass with distinction.

The grade of the course is based on the grade of the part Integration of pharmacology and toxicology.

### Compulsory participation

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

### Limited number of examinations or practical training sessions

Students who have not passed the regular examination are entitled to participate in five more examinations. If the student has failed six examinations/tests, no additional examination or new admission is provided.

The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination for which the student registered but not participated in, will not be counted as an examination.

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.

## 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 is 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

**Rang and Dale's pharmacology**

*Rang, Humphrey Peter; Dale, M. Maureen; Ritter, James M.; Flower, Rod J.; Henderson, G.*

8th ed. : London : Churchill Livingstone, cop. 2016 - xv, 760 s.

ISBN:9780702053627 LIBRIS-ID:17415221

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## Reference literature

*Casarett, Louis J.; Klaassen, Curtis D.4 ed; Doull, John*

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

7. ed. : New York : McGraw-Hill, cop. 2008 - xv, 1310 s.

ISBN:978-0-07-147051-3 (hardcover : alk. paper) LIBRIS-ID:10616935

URL: <http://www.loc.gov/catdir/toc/ecip0715/2007015656.html>

[Library search](#)

**FASS : förteckning över humanläkemedel.**

Stockholm : Läkemedelsindustriföreningen (LIF), 2012 - 2 vol. (4273 s.)

ISBN:978-91-85929-10-8 (A-L) ISSN:1400-6588 LIBRIS-ID:12488996

URL: [Länk](#)

[Library search](#)

**Läkemedelsboken 2011-2012**

Uppsala : Läkemedelsverket, 2011 - 1269 s.

ISBN:978-91-979605-0-2 LIBRIS-ID:12199360

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