

## Pharmaceutical Development

Läkemedelsutveckling

6.0 credits

Programme course

8BKG44

Valid from: 2022 Spring semester

<b>Determined by</b>	<b>Main field of study</b>	
Chairman of The Board for First and Second Cycle Programmes	Medical Biology	
<b>Date determined</b>	<b>Course level</b>	<b>Progressive specialisation</b>
2018-09-04	First cycle	G2X
<b>Revised by</b>	<b>Disciplinary domain</b>	
	Medicine	
<b>Revision date</b>	<b>Subject group</b>	
2020-09-11; 2021-05-03	Medical Biology	
<b>Offered first time</b>	<b>Offered for the last time</b>	
Spring semester 2020		
<b>Department</b>	<b>Replaced by</b>	
Medicinska fakulteten		

## Course offered for

- Experimental and Industrial Biomedicine
- Bachelor´s Programme in Experimental and Industrial Biomedicine

## Entry requirements

General entry requirements for undergraduate studies and

English corresponding to the level of English in Swedish upper secondary education (English 6)

And

Chemistry, Mathematics and Biology corresponding to the level in Swedish upper secondary education (Chemistry 2, Mathematic 4 and Biology 2)

Exemption from Swedish 3

## Intended learning outcomes

### *Knowledge and understanding*

Having completed the course, the student is expected to be able to:

- Describe the principles of selection and validation of target molecules in drug development
- Describe how candidate molecules are identified and then developed into drugs
- Describe how drug candidates are evaluated with respect to potential toxicity in animal models
- Describe the principles of clinical trials and the regulatory process
- Describe the principles and methods of the production and quality monitoring of drugs
- Describe how protein drugs are produced

### *Skills and abilities*

Having completed the course, the student is expected to be able to:

- Assess and communicate the results of preclinical and clinical drug trials

### *Judgement ability and approach*

Having completed the course, the student is expected to be able to:

- Critically appraise and evaluate drug development from a medical, ethical and social perspective.

## Course content

The course is a basic theoretical course in drug development that is taught in parallel with Project Course: Pharmaceutical Development. The course aims to provide a general understanding of how small molecules and proteins are developed into drugs within areas such as cancer, cardiovascular diseases and inflammatory diseases. The course also aims to provide an understanding of clinical trials and the regulatory process, as well as the monitoring of side effects. A general overview of the production of drugs and pharmaceutical preparations is included.

The course encompasses the fields pharmaceutical development and pharmacology, with links to cell biology, physiology, pathology and biochemistry.

## Teaching and working methods

At the Faculty of Medicine and Health Sciences student centred and problem based learning make up the foundation of the teaching. The student takes responsibility for, studies and researches current content of the courses and study programme. The methods of the course work challenge the students to independently formulate questions for learning, to seek knowledge and in dialogue with others judge and evaluate achieved knowledge. Students in the Bachelor's programme in Experimental and Industrial Biomedicine work together in groups based on reality based and course related biomedical issues to apply their knowledges, develop their own learning, contribute to the fellow students' learning and to practice cooperation. Throughout the study programme theory is integrated with practical modules. The course methods and integration modules stimulates and support the student's ability to apply their knowledge and professional competence.

Work methods used in this course are lectures and seminars.

## Examination

The form of examination is an individual written examination. In addition, active participation in compulsory course elements is required in order to pass the course. Compulsory course elements include seminars and written assignments.

The written examination may be performed an unlimited number of times by those students who have not achieved a passing grade.

## **Grades**

The course is graded with the grades Fail (U) or passing grades 3-5, where 3 corresponds to approved, 4 corresponds to approved with credit and 5 corresponds to approved with distinction. The grade of the individual written examination (U, 3-5) is the basis for the final grade of the course.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

## **Application for examination**

Instructions on how to apply for examinations are given prior to the beginning of each course.

## **Re-examination**

The date for re-examination should normally be announced by the date of the regular examination at latest; in which case the scope must be the same as at the regular examination.

## **Examination for students with disabilities**

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

## **Nomination of another examiner**

A student who has taken two examinations in a course or a part of a course without obtaining a pass grade is entitled to the nomination of another examiner, unless there are special reasons to the contrary.

## Grades

Four-grade scale, LiU, U, 3, 4, 5

## Course literature

A literature reference list must be set no later than two months before the course begins by the programme committee for the Bachelor's Programme in Experimental and Industrial Biomedicine. There is no compulsory course literature.

## Other information

Planning and implementation of the course is to be based on the wordings in the course syllabus. A course evaluation is compulsory for each course and should include how the course is in agreement with the course syllabus. The course coordinator will analyse the course evaluation and propose appropriate development of the course. The analysis and proposal will be returned to the students, the Director of Studies, and as needed to the Education Board, if related to general development and improvement.

The course is carried out in such a way that knowledge of gender, gender identity/expression, ethnicity, religion or other belief system, disability, sexual orientation and age is addressed, highlighted and communicated as part of the programme.

If the course is cancelled or undergoes major changes, examination is normally offered under this course syllabus, at a total of three occasions, within/in connection to the two following semesters, of which one in close proximity to the first examination.