



**Karolinska  
Institutet**

Course syllabus for

## **Frontiers in Translational Medicine, 16.5 credits**

Kunskapsfronten inom translationell medicin, 16.5 hp

This course syllabus is valid from autumn 2019.

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

Autumn2017 , Autumn2018 , Autumn2019

Course code	5MT006
Course name	Frontiers in Translational Medicine
Credits	16.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Molecular Life Science
Level	AV - Second cycle
Grading scale	Fail (U), pass (G) or pass with distinction (VG)
Department	Department of Medicine, Solna
Decided by	Programnämnden för biomedicinprogrammen
Decision date	2017-04-19
Revised by	Programme committee for study programmes in biomedicine
Last revision	2019-03-27
Course syllabus valid from	Autumn 2019

### **Specific entry requirements**

A Bachelor's degree or a professional degree worth at least 180 credits . At least 10 credits should be in theoretical mathematics and

20 credits in life sciences (such as cell biology, biochemistry, microbiology or molecular biology). And proficiency in English equivalent to English B/English 6.

### **Objectives**

The aims of the course are that the student should acquire knowledge about human biology, disease aetiology and pathogenesis, understand why and how molecular techniques improve understanding of human biology, disease aetiology and pathogenesis, as well as the implications of these interdisciplinary approaches for the discovery of novel diagnostic tools and pharmaceuticals. The student should also acquire a global health perspective. This course serves as an introduction to the whole Master's Programme. On completion of the course, the student should be able to:

Regarding knowledge and understanding

- describe and explain fundamental functions and mechanisms at the level of the cell and organ in relation to the whole human body and be able to apply the same to the development of disease and treatment and to consider these processes from a global health perspective,
- describe and explain basic and fundamental principles (theory) and work-flow (practice) of molecular techniques,
- describe and explain the application of molecular techniques to the study of human diseases,

#### Regarding skills and ability

- integrate understanding of molecular techniques with molecular biology in studying human diseases (molecular medicine),
- differentiate between the pros and cons of molecular techniques commonly used in molecular medicine.
- search for, collect, evaluate, interpret and discuss (in both written and oral forms) specialised information in relation to topics covered within the course,

#### Regarding judgement and approach

- reflect on ethical aspects of research involving human and animal material,
- take responsibility for his/her own learning.

## Content

The course focuses on common human diseases such as metabolic diseases (eg obesity, diabetes and cardiovascular diseases), cancer and inflammation/immunological disorders. The global health perspective will also be discussed. Molecular techniques used within the field of advanced translational research are reviewed.

The main theme is to gain understanding of common human diseases from a translational medicine perspective involving high-throughput data analyses. A central concept is to understand why and how huge datasets of cellular, molecular biological and molecular genetic data are generated from a biomedical perspective and applied to improve our knowledge of human diseases.

The course is divided into the following parts:

### **Disease mechanisms and translational medicine,, 5.0 hp**

Grading scale: VU

Advanced biomedical knowledge of different diseases covered within the course and basic knowledge of molecular techniques. Theoretical background (concerning diseases covered within the course) is integrated with practical methodologies utilising appropriate molecular techniques.

### **Applications of molecular techniques in biomedical research,, 5.0 hp**

Grading scale: VU

In depth self-directed studies on the integration of theoretical biomedical knowledge of different diseases with appropriate molecular techniques.

### **Practicals and demonstrations, 2.0 hp**

Grading scale: GU

Theoretical background (concerning diseases covered within the course) is integrated with practical sessions utilising appropriate molecular techniques.

## Journal club, 4.5 hp

Grading scale: GU

In depth studies of recent scientific articles. Emphasis is placed on individual preparation, ability to perform oral presentations and active participation in the analytical discussions of the theories and scientific concepts.

## Teaching methods

The course is at master's level, where students are assumed to be familiar with the most common study methods in higher education. The fundamental pedagogical view is based on learning as an active research process. The structured learning activities include workshops, seminars, expert lectures and practical sessions. Particular emphasis is placed on peer-learning and self-studies (both theoretical and practical) in groups and at the individual level. Students are mentored to facilitate self-initiated learning activities.

## Examination

Disease mechanisms and translational medicine (5 credits). The examination consists of a written exam. Graded Fail/Pass/Pass with distinction.

Application of bioinformatics in biomedical research (5 credits). The examination consists of a written assignment and an oral presentation. Written work is to be handed in before the end of the course according to the times specified in the schedule. Graded Fail/Pass/Pass with distinction.

Practicals and demonstrations (2 credits). The examination consists of active participation in demonstrations and practical workshops and evaluation of the student's practical performance. Graded Fail/Pass.

Journal club (4.5 credits). The examination consists of oral and written analysis of scientific articles. Graded Fail/Pass.

The final grade for the whole course is a combination of the grades for the parts Disease mechanisms and translational medicine and application of molecular techniques in biomedical research. To attain the grade Pass with distinction for the whole course, a grade of at least "Pass" must have been obtained for all parts of the course and the grade "Pass with distinction" must be obtained for at least one part of the course.

### Compulsory participation

The introduction to the course, seminars, group assignments and demonstrations as well as presentations and lectures linked to these parts 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.

### Limitations of the 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 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**

Specific study material and reference articles will be provided during the course.