



**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 2017.

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	Pass with distinction, Pass, Fail
Department	Department of Medicine, Solna
Decided by	Programme committee for study programmes in biomedicine
Decision date	2017-04-19
Revised by	Programme committee for study programmes in biomedicine
Last revision	2017-04-19
Course syllabus valid from	Autumn 2017

### **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 bioinformatics tools 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 bioinformatics tools,
- describe and explain the application of bioinformatics tools to the study of human diseases,

#### Regarding skills and ability

- integrate understanding of bioinformatics tools with molecular biology in studying human diseases (molecular medicine),
- differentiate between the pros and cons of bioinformatics tools 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. Bioinformatics tools 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, 7 hp** Advanced biomedical knowledge of different diseases covered within the course and basic knowledge of bioinformatics.

Theoretical background (concerning diseases covered within the course) is integrated with practical methodologies utilising appropriate bioinformatics tools. **Applications of bioinformatics in**

**biomedical research, 5 hp** In depth self-directed studies on the integration of theoretical biomedical knowledge of different diseases with appropriate bioinformatics tools. **Journal club, 4.5 hp** 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 (7 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.

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 bioinformatics 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.

## 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.