



**Karolinska  
Institutet**

*Programme syllabus for*

# **Master's Programme in Translational Physiology and Pharmacology, 120 credits**

*Masterprogrammet i translationell fysiologi och farmakologi, 120 hp*

## **Basic programme information**

Programme code	4FF22
Name of the programme	Master's Programme in Translational Physiology and Pharmacology
Number of credits	120.0 credits (120.0 ECTS credits)
Starting date	The syllabus applies to students who commence their studies in or after autumn 2022.
	Approved revisions of the syllabus are described under the heading Transitional Provisions.
Decision date	2021-05-18
Decided by	Committee for Higher Education
Last revision	2021-12-08
Revised by	Committee for Higher Education
Reference number	3-4393/2021
Specific eligibility requirements	A Bachelor's degree or a professional degree worth at least 180 credits in biomedicine, biotechnology, cellular and molecular biology, pharmaceuticals, health care, medicine, or the equivalent. Proficiency in English equivalent to the Swedish upper secondary school course English 6/English B.
Main field of study	Translational Physiology and Pharmacology
Qualification	Degree of Master of Medical Science (120 credits) with a Major in Translational Physiology and Pharmacology <i>(Medicine masterexamen med huvudområdet translationell fysiologi och farmakologi)</i>
	Upon request, a student who meets the requirements for a qualification is to receive a diploma.

## Outcomes

### Outcomes of second cycle education according to the Higher Education Act

Second-cycle courses and study programmes shall be based fundamentally on the knowledge acquired by students during first-cycle courses and study programmes, or its equivalent.

Second-cycle courses and study programmes shall involve the acquisition of specialist knowledge, competence and skills in relation to first-cycle courses and study programmes, and in addition to the requirements for first-cycle courses and study programmes shall:

- further develop the ability of students to integrate and make autonomous use of their knowledge,
- develop the students' ability to deal with complex phenomena, issues and situations, and
- develop the students' potential for professional activities that demand considerable autonomy, or for research and development work.

### Outcomes of the Degree of Master (120 credits) according to the Higher Education Ordinance

#### *Knowledge and understanding*

For a Degree of Master of Science (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

#### *Competence and skills*

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work
- demonstrate the ability in speech and writing both nationally and internationally to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

#### *Judgment and approach*

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

## Content and structure

The primary purpose of the Master's Programme in Translational Physiology and Pharmacology is to provide students an in-depth understanding of physiological mechanisms and pharmacological treatment principles at the molecular, cellular and system levels. By integrating basic science and clinical application, students acquire knowledge, competences and skills instrumental in mechanisms that promote health or lead to illness. Such competences are in great demand within higher education, healthcare and the private sector for the development and implementation of methods for prevention, diagnosis and prediction.

Semester 1 provides a foundation in integrated physiology and pharmacology so that students later in the programme will be able to benefit from practical elements and understand how to use basic physiological and pharmacological principles in clinical situations. The course modules range from molecular and cell-based physiology and mechanism-oriented pharmacology to organ-based physiology and disease treatment. Semester 1 also includes a course in professional development where students can reflect on ethics, attitudes and sustainability in a global perspective.

Semester 2 helps students expand their understanding of integrated physiology and pharmacology and of the connections from cell and molecule to the whole human body through a course that supplements the physiological perspective with pharmacological principles and basic active mechanisms in drug treatment. Through project work, students can immerse themselves in a relevant subject area. A course in bioinformatics lays a foundation for students to perform basic computer-controlled analyses, build models, simulate processes and manage large datasets.

Semester 3 includes 15-credit, second-cycle elective courses. The purpose of the elective courses is to allow students to expand their knowledge in areas that can help in their future career choices or to delve into a research domain relevant to the main field of study. Through project courses conducted in collaboration with a research team or a Life Sciences company, students then develop and improve their ability to apply their subject-specific knowledge in basic research, clinical activities or drug development.

Semester 4 is devoted to the degree project, which involves an in-depth study of an area relevant for the programme. Through the degree project, students gain a more solid grasp of the scientific process and an increased ability to critically evaluate information, which is good preparation for later third-cycle education or for a future career in the life sciences.

### **Scientific knowledge, competence and approach**

During the programme, students develop scientifically based knowledge with a focus on scientific theory and methodology, and they are trained in how new knowledge can be interpreted and understood in relation to existing knowledge. Students practice searching for, reflecting on, critically reviewing, and presenting and discussing scientific information and hypotheses. An important aspect highlighted by several parts of the programme is the ability to think critically, to analyse and to discuss ethical perspectives. This is achieved through reflection on one's own writing, reviewing the work of others, and discussions. During several of the programme's courses, students also have supervised laboratory assignments that train practical skills and introduce relevant methods and experimental models.

### **Practice Integrated Learning**

Practice integrated learning is a generic term for the pedagogical models based on interaction and integration between higher education and working life. Practice integrated learning may take the form of placements, study visits, observing teaching activities, staff exchange training schemes or field studies within out-patient and in-patient healthcare, municipal care and social care or other relevant activities.

The Master's Programme in Translational Physiology and Pharmacology is given in close collaboration with research teams within the faculty and clinical operations. Students have the opportunity to conduct project work and/or degree projects in collaboration with life science companies.

## **Internationalisation**

The Programme is international in its entirety. Programme courses have an international perspective with a clear focus on global health issues. Examples are based on issues and research that are relevant for preparing students for an international career. The programme offers opportunities for international exchanges.

## **Elective courses**

Semester 3 includes 15-credit, second-cycle elective courses. The purpose of the elective courses is to allow students to expand their knowledge in areas that facilitate employability, independence or leading research and development projects, such as within scientific communication, science management or entrepreneurship. Alternatively, students can immerse themselves in a research domain with a course relevant to the programme.

## **Other guidelines**

### **Grading scale**

The grades used are Fail, Pass or Pass with distinction. Alternative grading scales may apply to courses within the programme or to elective courses. The grading scale is detailed in the course syllabus.

### **Language of instruction**

The language of instruction is English.

### **Specific eligibility requirements within the programme**

There are specific eligibility requirements for the courses within the programme. The eligibility requirements can be found in the syllabi. In cases where requirements are linked to the admission to a later semester, they are described on the programme website. There may also be specific eligibility requirements within a specific term if a course requires certain prior knowledge. Requirements for elective courses may also differ from requirements for other courses during the programme semester.

## Study plan with constituent courses

Term	Course name	Credits	Mail field of study	Cycle
1	Integrated physiology and pharmacology	25	Translational physiology and pharmacology	Second
1	Professional development and ethics	5	Translational physiology and pharmacology	Second
2	Physiological and pharmacological mechanisms and experimental approaches	15	Translational physiology and pharmacology	Second
2	Project work in translational physiology and pharmacology	7.5	Translational physiology and pharmacology	Second
2	Bioinformatics from a physiological and pharmacological perspective	7.5	Translational physiology and pharmacology	Second
3	Elective courses	15	--	
3	Applied physiology and pharmacology - research project 1	7.5	Translational physiology and pharmacology	Second
3	Applied physiology and pharmacology - research project 2	7.5	Translational physiology and pharmacology	Second
4	Degree project in translational physiology and pharmacology	30	Translational physiology and pharmacology	Second