



**Karolinska  
Institutet**

*Programme syllabus for*

# **Joint Master's Programme in Health Informatics, 120 credits**

*Masterprogrammet i hälsoinformatik, 120 hp*

## **Basic programme information**

|                                   |  |
|-----------------------------------|--|
| Programme code                    | 5HI17  |
| Name of the programme             | Joint Master's Programme in Health Informatics   |
| 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 2017.   |
|                                   | Approved revisions of the syllabus are described under the heading Transitional Provisions.  |
| Decision date                     | 2016-04-14   |
| Decided by                        | Board of Higher Education  |
| Last revision                     | 2017-09-12   |
| Revised by                        | Board of Higher Education  |
| Reference number                  | 3-3529/2017  |
| Specific eligibility requirements | A Bachelor's degree or a professional degree equivalent to a Swedish Bachelor's degree of at least 180 credits in healthcare, biomedicine, medical technology, computer and systems sciences, informatics or the equivalent. And proficiency in English equivalent to English B/English 6. |
| Main field of study               | Health Informatics   |
| Qualification                     | Masterexamen<br><i>Master of Science (120 credits)</i>   |

A student who fulfils the requirements for the award of qualification shall, upon request, be provided with a certificate.

# 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 (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 (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 clearly report 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 (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.

## Outcomes of the study programme at Karolinska Institutet

In addition to the national objectives, the following objectives apply for the study programme at Karolinska Institutet:

### *Knowledge and understanding*

On completion of the programme students shall have advanced knowledge

- of health and social care in terms of its organisation, its governance and its objectives,
- of basic computer and systems science, information security, applications in health informatics and e-services,
- of how IT can be used within health and social care,
- of terms and concepts within health and social care, and
- of the research process within health informatics.

### *Competence and skills*

On completion of the programme students shall be able to

- analyse and assess the need for health information systems for the public, patients and care providers,
- analyse, characterise, evaluate and improve healthcare work processes with the help of IT,
- develop, introduce, improve and evaluate data analysis methods that support clinical decision-making,
- participate in the procurement and ordering of health information systems,
- adapt, develop, introduce, maintain, evaluate and improve health information systems,
- critically examine, select and apply health informatics standards,
- independently formulate relevant research problems within the health informatics field and, on the basis of these, to plan and implement projects, and
- lead/manage projects and to function well in interdisciplinary teams.

### *Judgement and approach*

On completion of the programme students shall

- be able to safeguard the integrity and safety of the patients,
- be able to evaluate information and relate this to established knowledge within the health informatics field, and
- have the capability to see the value in, and seek to collaborate with other professional categories.

## **Content and structure**

The programme includes four semesters with different themes based on a progression from previous semesters: bridging knowledge (semester 1), basic knowledge (semester 2) and in-depth knowledge of methods and their applications in current health informatics topics (semester 3), and finally a degree project in health informatics (semester 4).

The purpose of the first semester is to bridge the knowledge gap between students with an educational background in health care and those with a technical background. The first course conveys a common understanding of the main field of study as an academic as well as a practical discipline, and an understanding of the key challenges in health care, related to information and knowledge management. Bridging courses of a total of 15 credits provides basic knowledge in computer and systems science to students with a health care background. Likewise, the students who have a technical background will be provided with an understanding of the fundamentals of medical science and health care organisation. The semester's final course connects to the first course of the semester where challenges in health care were raised. Here, solutions are dealt with in the form of IT systems in health care.

The second semester includes courses dealing with basic knowledge and skills in health informatics; methods to carry out business analytics and modelling of user requirements, methods for evaluating

different aspects of health care information systems after their introduction and health informatics standards.

Semester 3 provides an introduction to project management where methodological knowledge in data analytics is applied in the form of project work. Furthermore, the students can choose to study a course in either information security or entrepreneurship and they acquire an insight into current research themes within health informatics through a research preparatory course.

A degree project is written during the 4th semester.

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

The programme has an overarching course, Scientific Research Methods where research design, scientific writing and source criticism are discussed. In addition, different qualitative and quantitative methods and ethical issues are handled. Current research issues for the subject are discussed in a special research preparatory course where the students examine and summarise the literature concerning specific questions at issue.

### **Practice Integrated Learning**

*Practice integrated learning is a generic term for the pedagogical models based on collaboration 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 in-patient and out-patient healthcare, social care or other relevant activities.*

During the programme, a number of study visits to different medical care units, IT companies and agencies/public authorities are carried out. Moreover, visiting lecturers are invited in from these activities. In addition, there are great opportunities for writing degree projects in collaboration with clinics and industry.

## **Transitional provisions**

--

## **Other guidelines**

### **Grading scale**

An objective-related seven-point scale is used for grading on courses. The pass grades are A, B, C, D and E. The fail grades are Fx and F. Alternative grading scales may apply to modules within courses. The grading scale is detailed in the course syllabus.

### **Language of instruction**

The teaching language is English.

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

There are specific eligibility requirements for the courses within the programme. In cases where the requirements are connected to the admission to a later term, they are described in the respective course syllabi.

### ***Executive and Professional Education***

The program is also given in the form of executive and professional education with the program code **9HI17**.

## Study plan with constituent courses

| Term | Name of the course  | Credits | Main field of study | Cycle and depth of the course<br>(for first cycle courses within the main field of study) |           |
|------|---|---------|---------------------|---|-----------|
| 1    | Health informatics needs, objectives and limitations          | 5       | Health informatics  | First (G2)  | KI        |
| 1    | <i>Bridging courses:</i>                                      | 15      | --                  | First   | SU        |
|      | • Supplementary course in computer and systems science (15cr) |         |                     |   |           |
|      | <i>OR</i>   |         |                     |   |           |
|      | • Basic medical science                                       | 7.5     | --                  | First   | KI        |
|      | and   | +       |                     |   |           |
|      | • Health care organisation and management                     | 7.5     | --                  | First   | KI        |
| 1    | Computer applications in health care and biomedicine          | 10      | Health informatics  | Second  | KI        |
| 2    | User needs, requirements engineering and evaluation           | 10      | Health informatics  | Second  | KI        |
| 2    | Standardisation within health informatics                     | 5       | Health informatics  | Second  | KI        |
| 2    | Data science for health informatics                           | 7.5     | Health informatics  | Second  | SU        |
| 2    | Scientific research methods                                   | 7.5     | Health informatics  | Second  | KI        |
| 3    | Project management and tools for health informatics           | 7.5     | Health informatics  | Second  | SU        |
| 3    | Current research and trends in health informatics             | 15      | Health informatics  | Second  | KI        |
| 3    | Introduction to information security                          | 7.5     | --                  | Second  | SU        |
|      | <i>OR</i>   |         |                     |   |           |
|      | Entrepreneurship in the digital society                       | 7.5     | --                  | Second  | SU        |
| 4    | Degree project in health informatics                          | 30      | Health informatics  | Second  | KI and SU |