

# Education plan

for

**Joint Master's Programme in Health Informatics**  
**Masterprogram i hälsoinformatik**

**120.0 Higher Education**  
**Credits**  
**120.0 ECTS credits**

**Programme code:** SHINO  
**Valid from:** Autumn 2012  
**Date of approval:** 2011-09-07  
**Department:** Department of Computer and Systems Sciences

## Decision

This education plan was approved by the Faculty of Social Sciences, 2011-09-07.

## Prerequisites and special admittance requirements

A Bachelor's degree or a professional degree equivalent to a Swedish Bachelor's degree of at least 180 ECTS in healthcare, biomedicine, medical technology, computer and systems sciences, informatics or the equivalent.

Proficiency in English equivalent to the Swedish upper secondary school course English 6/English B (with at least "pass" grade).

## Programme structure

The programme is given as a joint programme between Stockholm University and Karolinska Institutet.

The program includes four semesters with different themes based on a progression from previous semesters: bridging knowledge (semester 1), basic knowledge (semester 2) in-depth health care informatics methods knowledge and applications (semester 3), and finally research in health informatics (semester 4).

The purpose of the first semester is to bridge the knowledge gap between students with a health care education background and those with a technical education background. The first course conveys a common understanding of the main area as an academic as well as practical discipline, and an understanding of the key challenges in health care, related to information and knowledge management. There is then a course total of 15 credits that provides basic knowledge in computer and systems science to students with a health care background.

Likewise, it provides students who have a technical background with an understanding of the fundamentals of medical science and health care organizations.

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 analysis and modeling of user requirements, methods for evaluating different aspects of health care information systems after their introduction, methods within the area of clinical decision support, and health informatics standards.

Parallel to the courses in health informatics' methods knowledge, a course with case pedagogy is given, in which scenarios from real health informatics projects are presented.

This provides a starting point for a discussion of problems where students have the opportunity to apply their knowledge of methods. Students will thus have an insight into a broad range of complex but relevant projects. The semester ends with a project course that allows for the application of method knowledge. The theme of the project is that students define a specification for a solution based on a previously discussed problem.

The 3rd semester includes a course in modeling, simulation and visualization in health informatics. The semester includes additional project work in health informatics.

During the 3rd semester there is a block of 20 credits consisting of elective courses.

This block provides an opportunity for a profile of the education in health informatics according to personal preferences.

This block also provides an opportunity for international studies with one of the international universities that the program has agreements with.

A thesis of 30 credits is written during the 4th semester.

The courses are given in English.

## **Goals**

### **Objectives for the advanced level according to the Higher Education Act**

Education at the advanced level shall essentially entail building on the knowledge that students acquire at the basic level, or equivalent knowledge.

Education at the advanced level shall entail building on knowledge, skills and capabilities in relationship to the basic level education and, in addition to what applies to the basic education,

- further develop students' ability to independently integrate and use knowledge,
- develop students' ability to deal with complex phenomena, questions and situations, and
- develop students' potential for professional activities that place considerable demands on independence or on research and development work.

### **Objectives for the masters degree according to the Higher Education Ordinance**

#### *Knowledge and understanding*

For master's degree, the student shall

- demonstrate knowledge and understanding in his/her main field of study, including both broad knowledge in the field and substantially deeper knowledge of certain parts of the field and insight into current research and development, and
- demonstrate deeper method knowledge in his/her main field of study.

#### *Skills and abilities*

For master's degree, the student shall

- demonstrate an ability to critically and systematically integrate knowledge and to analyze, assess and deal with complex phenomena, issues and situations, even with limited information,
- demonstrate an ability to critically, independently and creatively identify and formulate issues, plan and use appropriate methods for carrying out qualified assignments within specified time frames, thereby contributing to the development of knowledge and to evaluate this work;
- demonstrate an ability to present and discuss their conclusions and the knowledge and arguments behind them, orally and in writing, in dialogue with different groups, both nationally and internationally,
- demonstrate the skills required to participate in research and development work or to work independently in other advanced activities.

#### *Assessment ability and approach*

For the master's degree, the student shall

- demonstrate an ability to make assessments in the main field of study taking into account relevant scientific, social and ethical aspects, and demonstrate an awareness of ethical aspects of research and development,
- demonstrate insight into the possibilities and limitations of science, as well as its role in society and the responsibility for its use, and
- demonstrate an ability to identify his/her need for further knowledge and to take responsibility for his/her own development of his/her own knowledge.

### **Objectives of the master's programme in health informatics at Karolinska Institutet and Stockholm University**

In addition to the national objectives, the following goals apply for the master's programme in health

informatics at Karolinska Institutet and Stockholm University

### *Knowledge and understanding*

After completing the course the student will demonstrate knowledge and understanding

- of health care and social care as an organization, its management and objectives,
- of basic computer and systems science, databases and web-based applications that are used within health informatics,
- of how IT can be used in health care and social care,
- of the terms and concepts in health care and social care, and
- of the health informatics research process

### *Skills and abilities*

After completing the course, students must demonstrate skills and ability to

- analyze and assess the need for health information systems for public, patients and care providers,
- analyze, characterize, evaluate and improve care's processes using information technology,
- develop, implement, improve and evaluate methods that support clinical decision-making,
- be involved in the procurement and the commissioning of health information systems;
- adapt, develop, implement, maintain, evaluate and improve health information systems;
- critically evaluate, select and apply health informatics standards,
- independently formulate relevant research questions within the health informatics field and a basis of these, plan and implement projects;
- model, develop and implement systems for simulation and visualization in health informatics, and
- manage projects and work successfully in collaboration with colleagues

### *Assessment ability and approach*

After completing the education the student should

- be able to protect patients' privacy and security,
- be able to evaluate information and relate it to the established knowledge in the health informatics field, and
- have the ability to see the value of, as well as seek, collaboration with other professionals.

## **Courses**

### **Semester 1**

- Health informatics – needs, goals and limitations(5 credits, basic level) Karolinska Institutet

### *Bridging courses:*

- Supplementary course in computer and systems science (15 credits, basic level) or Basic medical science (7,5 credits, basic level) and Organization and control of care and welfare (7,5 credits, basic level) Stockholm University (Supplementary courses in computer and systems science) Karolinska Institutet (Basic medical science and Organization and control of care and welfare)

- Information systems in health care and medical care (10 credits, advanced level) Karolinska Institutet

### **Semester 2**

- Business analysis and requirements engineering (7,5 credits, advanced level) Karolinska Institutet
- Evaluation within health informatics (5 credits, advanced level) Karolinska Institutet
- Standardisation within health informatics (2,5 credits, advanced level) Karolinska Institutet
- Clinical decision support (5 credits, advanced level) Karolinska Institutet
- Field studies in health informatics (5 credits, advanced level) Karolinska Institutet
- Project in health informatics - from specification to product (5 credits, advanced level) Karolinska Institutet

### **Semester 3**

- Modeling, simulation and visualization within health informatics (5 credits, advanced level) Stockholm University
- Project in health informatics - from specification to product (5 credits, advanced level) Stockholm University
- Elective courses\* (20 credits, advanced level) Karolinska Institutet and Stockholm University

### **Semester 4**

Degree project in health informatics (30 credits, advanced level) Karolinska Institutet and Stockholm University

\* Students choose from a range of courses at Stockholm University and Karolinska Institutet.

Before each school year, KI and SU will determine a number of courses from each university's regular course offerings which will form a pool of eligible courses.

Among the elective courses is a course in research methodology. Students who do not already have this knowledge must choose this course.

**Degree**

The programme leads to a Master's degree.

**Misc**

Students admitted to the programme and have not completed it within the planned two years of study, may request to complete the programme even after the education plan has expired. In this regard the limitations specified in the education plan for the courses of the education, apply.

**Admission requirements to the higher level semester**

To be eligible for semester 3 all courses in semester 1 and at least 10 credits from courses in semester 2 need to have been passed.