Medical Information Systems

Programme course

6 credits

Medicinska informationssystem

TBMI19

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Biomedical Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Biomedical Engineering, Master's Programme
- Computer Science and Engineering, M Sc in Engineering
- Information Technology, M Sc in Engineering
- Biomedical Engineering, M Sc in Engineering
- Computer Science and Software Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
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- Computer Science, Master's programme

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Basic laboratory skills and computer proficiency, basic skills regarding structured and systematic problem analysis; basic knowledge of anatomy and physiology is recommended but not required

Intended learning outcomes

The overall aim of the course is that students should acquire knowledge and skills in the form of structures and tools to be able to analyze information systems and the role of information technology in the health care sector. After completing the course, students are expected to be able to independently:

- Explain fundamental concepts of information retrieval and discuss sources of error associated with indexing and retrieval
- Describe the structure of the MEDLINE database and the MeSH controlled vocabulary, plan and carry out searches, combine different search approaches, and analyze results based on established quality measures
- Model data and design databases based on simple requirement specifications
- Describe the content, structure, and use of the patient record and contrast different ways of structuring record notes
- Analyze advantages and disadvantages of structured data entry in different contexts
- Relate the expected added value of the electronic health record to identified problem areas
- Describe the general idea of standardization efforts relating to patient record structure
- Describe how medical terminologies can be categorized and analyze how their properties influence the use in different situations
- Describe principles of formal concept representation and build ontologies with the help of ontology tools
- Search and utilize relevant literature and integrate the different parts of the course in order to elucidate and analyze problems within the area of the course

Course content

- Indexing and retrieval of general medical knowledge and patient-specific information
- Search engine, search service, and directory
- Measures of information quality and results of information retrieval
- MEDLINE and MeSH: search field, focus, explode, subheadings, and filters
- Categorization and evaluation of information sources
- ER modeling
- Databases: properties, structure, and use
- Regulations, structure, content, and use of the medical record
- Aspects of interoperability
- Security and confidentiality in patient information processing
- Audit and quality assurance
- The meta concepts of concept, term, relationship, and code
- Classifikation and coding
- Representation, abstraction, and aggregation
- Properties of terminologies: coverage, dimensions, hierarchies, compositionality, and synonymy
- Representation of medical terminology
- Interface, reference, and administrative terminologies; terminology services
- Needs for and possibilities of standardization

Teaching and working methods

The course runs over the entire autumn semester and is divided into three themes with scheduled lectures, laboratory experiments, and seminars; in addition, home work is required. The course requires personal commitment to and driving force for learning.

Examination

MOM1	Seminars	1 credits	U, G
UPG1	Essay assignments	3.5 credits	U, 3, 4, 5
LAB1	Laboratory Work	1.5 credits	U, G

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för medicinsk teknik

Director of Studies or equivalent
Marcus Larsson

Examiner
Mikael Nyström

Course website and other links
http://www.imt.liu.se/edu/courses/TBMI19/

Education components
Preliminary scheduled hours: 58 h
Recommended self-study hours: 102 h

Course literature

Additional literature

Books

Hersh, WR, (2003/2009) *Information retrieval: a health and biomedical perspective*. 2nd/3rd ed. New York:Springer
Taylor P., (2006) *From patient data to medical knowledge: the principles and practice of health informatics*. Malden (MA): Blackwell Publishing

Compendia

Supplementary compendium

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.