Karolinska Institutet

Course syllabus for

Applied Artificial Intelligence (AI) in Healthcare, 15 credits

Tillämpad artificiell intelligens (AI) i hälso- och sjukvården, 15 hp
This course syllabus is valid from autumn 2022.

Course code	2QA338
Course name	Applied Artificial Intelligence (AI) in Healthcare
Credits	15 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Not applicable
Level	Second cycle, in-depth level of the course cannot be classified
Grading scale	Pass, Fail
Department	Department of Clinical Science, Intervention and Technology
Decided by	Education committee CLINTEC
Decision date	2021-12-23
Course syllabus valid from	Autumn 2022

Specific entry requirements

A Bachelor's degree or a professional degree equivalent to a Swedish Bachelor's degree of at least 180 credits in health care, medicine or engineering sciences. And proficiency in English equivalent to English B/English 6.

Objectives

Artificial intelligence (AI) affects and changes various aspects of society and its activities. Healthcare is also at the beginning of this transformation. The potential use of AI technologies in healthcare needs healthcare professionals with knowledge of AI to enable interactive and explanatory AI and ensure the quality of AI-based systems to increase patient safety. Knowledge of AI is also important for people involved in decision-making, procurement and implementation of AI-based systems. The course introduces and provides basic knowledge about artificial intelligence (AI) and its application in health care.

After completing the course, the student should be able to:

- Describe different AI methods and their strengths and limitations
- Compare and select relevant AI methods for the development of AI applications in healthcare
- Reason about legal conditions and ethical challenges in AI
- Reflect on obstacles and driving factors for how AI-based solutions can be applied in healthcare

Content

In this course, students will learn about the basics of AI and its application in healthcare such as medical image analysis, data analysis and data extraction, natural language processing and decision support systems. The course will also address ethical issues and data protection issues, regulations and entrepreneurship aspects of AI in healthcare. The course will be completed in the following four thematic modules:

Introduction to AI, 4.5 hp

Grading scale: GU

- Overview of techniques and applications
- Traditional machine learning methods
- Artificial neural networks
- Supervised, semi-, and non-supervised learning
- Pattern recognition
- Interactive process mining
- Tools and real-world examples

AI in health care, 4.5 hp

Grading scale: GU

- Medical image analysis without AI
- AI for medical image analysis and imaging
- AI for data analytics and data mining
- Future applications and techniques

From AI solutions to success stories, 3.0 hp

Grading scale: GU

- Innovation and entrepreneurship for AI in health care
- Ethical and data protection issues in AI-based solutions
- Regulatory framework
- Design and deployment of AI solutions in health care: stakeholder's views

Group project work, 3.0 hp

Grading scale: GU

- Student activity using tools to implement AI for healthcare

Teaching methods

The course uses different learning activities, such as online lectures, seminars, interactive sessions live and online, study visits and individual project work.

Examination

Written assignments (Module 1-3)
Online quizzes for each lesson (Modules 1-3)

Written and oral presentation of group project work (Module 4)

Compulsory participation: Course introduction, seminars.

The course coordinator assesses whether, and if so how, absence can be compensated.

Before the student has participated in all compulsory parts, or compensated absence according to the course leader's instructions, the student's results for the course are not registered in LADOK.

Limitation of the number of occasions for examinations:
The student has the right to write the examination six times. If the student has not passed the examination after four participations, he/she is encouraged to visit the study counselor. The number of times the student has participated in the same exam is considered an exam occasion. Submission of an empty examination is considered an examination opportunity. An examination for which the student registered but did not participate does not count as an examination.

Transitional provisions

The examination will be given for a period of two years after a possible closure of the course. Examination may spatially own previous literature for one year after the date on which a major renewal of the course literture has been made.

Other directives

The course is given in English.

Literature and other teaching aids

There is no literature specified for this course. Please contact the department for more information.