

Data-driven Healthcare 4 credits

Datadriven sjukvård 4 hp

Second cycle

Main field: Computer Science and Engineering, Second cycle, has only first-cycle course/s as entry requirements (AIN)

Syllabus is adopted by the Research and Education Board (2022-09-22) and is valid for students admitted for the spring semester 2023.

Placement in the Academic System

The course is given as a single subject course.

Prerequisites and Conditions of Admission

Degree of Bachelor in Computer science or Degree of Bachelor of Science in Engineering or the equivalent of 180 Swedish credit points or 180 ECTS credits at an accredited university. Programming 7.5 credits, and Machine Learning 5 credits or equivalent. Applicants must have written and verbal command of the English language equivalent to English course 6 in Swedish Upper-Secondary School.

Course Objectives

The aim of the course is that the student will learn the concepts and techniques for framing the healthcare problems using a data-driven approach, and gain practice analyzing a set of real-world healthcare related data using predictive analytics methods.

Following successful completion of the course the student should be able to:

Knowledge and understanding

- describe the nature and form of healthcare data, its ethical issues
- explain the conceptual and practical issues related to the healthcare data collection, preprocessing, structuring, and analysis

Skills and ability

- apply data analytics techniques to clean and prepare healthcare data for analysis
- apply classification techniques on real-world healthcare datasets
- choose appropriate approaches to visualize healthcare data
- interpret the results of healthcare datasets' analysis

Judgement and approach

- evaluate the classification approaches presented during the lectures on various healthcare datasets
- assess the performance and the accuracy of predictive analytics methods

Primary Contents

The course is broken down into four parts:

- Part 1: Healthcare data understanding and ethics
- Part 2: Data preparation and visualization
- Part 3: Applying classification techniques in healthcare datasets
- Part 4: Practical examples in healthcare with Python

Teaching Formats

Each lecture is delivered through a video conference tool. One online practical labs are also provided in the lectures via Jupyter notebooks in Python. Students can work on a project in the healthcare domain, which allows them to dig into the concepts presented in the lecture and put them to practice. Presentation slides, videos of the lectures, announcements, and assignments will be available online via The university's learning platform. Teaching is in English and fully online.

Examination

The overall grades of Fail or Pass will be awarded for the course.

Exams will consist of a oral examination and a project presented by student.

Name of the test		Grading
Examination	1 credits	U/G
Project	3 credits	U/G

If there are special reasons, the examiner may make exceptions from the specified examination format and allow a student to be examined in another way. Special reasons can e.g. be a decision on learning support.

For elite sports students according to Riktlinjer för kombinationen studier och elitidrott vid Högskolan i Halmstad, DNR: L 2018/177, the examiner has the right to decide on an adapted examination component or let the student complete the examination in an alternative way.

Course Evaluation

Course evaluation is part of the course. This evaluation should offer guidance in the future development and planning of the course. Course evaluations should be documented and made available to the students.

Course Literature and Other Study Resources

Main textbook

Kumar, V. V. *Healthcare Analytics Made Simple: Techniques in healthcare computing using machine learning and Python*. Packt Publishing Ltd, 2018

Recommended textbooks

El Morr, C., & Ali-Hassan, H. *Analytics in Healthcare: A Practical Introduction*. Springer. 2019

Reddy, C. K., & Aggarwal, C. C. (Eds.). *Healthcare data analytics* (Vol. 36). CRC Press. 2015

Recommended papers

Gotz, D., & Borland, D. Data-driven healthcare: challenges and opportunities for interactive visualization. *IEEE computer graphics and applications*, 36(3), 90-96. 2016

Kumar, S., & Singh, M. (2018). Big data analytics for healthcare industry: impact, applications, and tools. *Big Data Mining and Analytics*, 2(1), 48-57.

Online materials

How to learn Python: <https://www.learnpython.org/>

Predictive analytics on healthcare datasets: <https://www.kaggle.com/tags/healthcare>

A list of healthcare datasets: <https://data.world/datasets/health>