

**SYLLABUS**

# **Advanced Data Mining 7.5 credits D7043E**

**Avancerad Data Mining**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2022-06-17**

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## Avancerad Data Mining

### Second cycle, D7043E

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	U G VG *	Datateknik	Computer Technology

### Main field of study

Information Systems Sciences

## Entry requirements

In order to meet the general entry requirements for the course, you must have accomplished a minimum of 120 ECTS of university studies, out of which 60 ECTS in the areas of computer or system science. The studies shall have included Introductory Programming (for example D0009E Introduction to Programming or D0007N Objectoriented programming) and Fundamentals of Databases (for example D0004N Database Systems I or D0018E Database Technology) . The Advanced Data Mining Course also requires the completion of a basic data mining course such as D0025E Data Mining.

Knowledge in English, equivalent to English 6.

## Selection

The selection is based on 30-285 credits

## Course Aim

The objective of the course is for the student to develop their knowledge and skills in Advanced Data Mining. After passing the course, the student should be able to:

- [1]. Use the advanced data mining concepts & techniques
- [2]. Explain how those concepts and techniques work
- [3]. Explain how concepts and techniques are, or should be, used in organizations
- [4]. Evaluate results of applying the concepts and techniques discussed above
- [5]. Analyze and reflect on the relationship between the techniques, the dataset, the problem or opportunity in hand, and the tools and technology used

## Contents

The course is an advanced course in data mining. The course provides knowledge to address various data science problems and datasets. Focus lies on advanced machine learning techniques for classification, regression, clustering, and anomaly detection, for example decision trees, random forests, neural networks, including Support Vector Machines and Deep Learning, Expectation Maximization (EM), Markov models, and Bayesian networks.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures, labs, assignments, case studies and project work. Laboratory work requires access to very high computational capacity. During the course, the students work in small groups. Some assignments or case studies in the course might contain work in contact with or about the industry. The student uses different methods and techniques, and it is important to choose the right method, technique or computer support for each task. Before and after the tasks are solved, there are lectures to present and discuss different solutions.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Through individual tests and group/project assignment, different student abilities are examined. Those are: the ability to explain and use advanced data mining techniques and the ability to solve business problems using data mining individually and in groups.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Remarks

Technical Requirements: access to PC with Windows XP, microphone, Web cam and permission to install software. Internet connection (minimum 0,5 Mbps).

## Course offered by

Department of Computer Science, Electrical and Space Engineering

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Individual exam	U G VG	4	Mandatory	A19	
0002	Individual tasks	U G#	1.5	Mandatory	A19	
0003	Group/Project work	U G#	2	Mandatory	A19	

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Jonny Johansson, HUL SRT 2022-06-17

## Syllabus established

by Jonny Johansson, HUL SRT 2018-11-21