MJ2528 AI applications in Sustainable Energy Engineering 5.0 credits

Tillämpad AI i för hållbar energiteknik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

On 27/03/2024, the Director of First and Second Cycle Education at the ITM school decided to establish this official course syllabus to apply from autumn term 2024 , registration number M-2024-0608

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

Knowledge in renewable energy corresponding to course MJ2411 "Renewable energy" 6 credits

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The purpose of the course is to give the students sufficient knowledge about background, theory and tools related to AI to independently be able to use machine learning for applications in sustainable energy technology.

Upon completion of the course, the students should be able to

1. Describe and explain background and fields of use for AI with a focus on machine learning including main properties of commonly occurring technologies.
2. Describe and explain the method for development of a machine learning model including choice of technology, treatment of data, design and model evaluation and improvement of the model.
3. Identify existing trends for AI in the energy sector and for companies and consequences of AI for activities in the energy sector.
4. Describe advantages, limitations and risks linked to AI and its role in society, and more specifically from an energy perspective.

Course contents

The course aims to provide students with knowledge of central concepts in artificial intelligence (AI), and their applications in energy technology. The course focuses on machine learning for energy applications and students will be given an insight into the basic theory and algorithms used in machine learning models, as well as how to select methods and data in different situations. In addition, the importance and implications of AI for the energy industry will be introduced, as well as the ethical aspects of using AI. Students will learn how to handle data for the purpose of machine learning, and how to create, integrate and use machine learning for analysis and design in the energy context. At the end of the course, students are expected to be able, based on the course content, to describe the benefits and limitations of AI applications in the energy field, and to discuss trends and potential risks related to the topic.

Examination

- INL1 - Home assignment, 1.0 credits, grading scale: P, F
- KON1 - Quiz, 1.0 credits, grading scale: A, B, C, D, E, FX, F
- PRO1 - Project, 3.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

The final mark is weighted according to the number of higher education credits for the different assignments.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.