

## Machine Learning for Smart Cities

Maskininlärning för smarta städer  
6 credits

Programme course

TNK129

Valid from: 2023 Spring semester

<b>Determined by</b> Board of Studies for Industrial Engineering and Logistics	<b>Main field of study</b> Computer Science and Engineering	
<b>Date determined</b> 2022-08-31	<b>Course level</b> Second cycle	<b>Progressive specialisation</b> A1X
<b>Revised by</b>	<b>Disciplinary domain</b> Technology	
<b>Revision date</b>	<b>Subject group</b> Computer Technology	
<b>Offered first time</b> Autumn semester 2023	<b>Offered for the last time</b>	
<b>Department</b> Institutionen för teknik och naturvetenskap	<b>Replaced by</b>	

## Course offered for

- Master of Science in Communications, Transport and Infrastructure
- Master's Programme in Intelligent Transport Systems and Logistics

## Prerequisites

Basic knowledge in linear algebra, calculus, statistics and probability theory as well as computer programming.

## Intended learning outcomes

In this course, you will learn how to utilize advanced models and deep learning architectures to learn from data in order to gain insights for decisions in smart city applications.

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

- Explain assumptions and theory behind different type of machine learning methods
- Explain and motivate differences in characteristics between different type of methods and give examples of when they should be applied
- Evaluate and choose among different methods for a specific problem instance and dataset
- Use existing datasets to train and evaluate different machine learning models
- Use selected machine learning models for prediction, inference and decision-making for smart city applications

## Course content

The course aims to provide knowledge in machine learning. The course will cover both conventional machine learning methods as well as deep learning. The course content includes statistical inference, bias-variance tradeoff, Bayesian learning, Gaussian processes, support vector machines, kernels, neural networks, deep learning and reinforcement learning.

## Teaching and working methods

Lectures, tutorials and labs.

## Examination

UPG1	Individual assignments	2 credits	U, 3, 4, 5
PRA1	Project work	2 credits	U, G
LAB1	Lab assignments	2 credits	U, G

Grades for examination modules are decided in accordance with the assessment criteria presented at the start of the course.

## Grades

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