KURSPLAN
Mathematics for Intelligent Systems, 6 högskolepoäng

Mathematics for Intelligent Systems, 6 credits

Kurskod:	TMIR29	**Utbildningsnivå:**	Avancerad nivå
Fastställd av:	VD 2019-06-01	**Utbildningsområde:**	Naturvetenskapliga området
Gäller fr.o.m.:	2019-08-01	**Ämnesgrupp:**	MA1
Version:	1	**Fördjupning:**	A1N

Lärandemål

After a successful course, the student shall

Kunskap och förståelse
- show familiarity with the mathematical language used in set, vector and matrix calculations, as well as in probability and statistics theory

Färdighet och förmåga
- demonstrate the ability to compute partial derivatives, find directional derivatives and identify the directions of fastest increase and decrease of a differentiable function
- demonstrate the ability to identify and classify local critical points of a function
- demonstrate ability to perform basic probability calculations involving random variables
- demonstrate ability to compute point and interval estimates of relevant statistical parameters from a random sample

Värderingsförmåga och förhållningssätt
- demonstrate an understanding of the concept of random variability and judge the benefits and risks of using different statistical models

Innehåll

The course contains elements from various fields of mathematics and mathematical statistics used when intelligent systems and machine learning are developed, used and analyzed.

The course includes the following elements:
- Vector and matrix calculations, linear maps Rn to Rm, eigenvectors and eigenvalues.
- Partial and total order relations, complexity, Big-O notation
- Partial derivatives, gradients, local convexity and extrema for smooth functions Rn to R
- Basic probability theory, Bayes' theorem
- Discrete and continuous random variables
- Probability distributions, in particular binomial and normal distribution
- Point and interval estimation

Undervisningsformer

Lectures and tutorials.

Undervisningen bedrivs på engelska.

Förkunskapskrav

The applicant must hold the minimum of a bachelor's degree (i.e the equivalent of 180 ECTS credits at an accredited university) with at least 90 credits in computer engineering, electrical engineering (with relevant courses in computer engineering), or equivalent. The bachelor's degree should comprise a minimum of 15 credits in mathematics. Proof of English proficiency is required.

Examination och betyg

Kursen bedöms med betygen 5, 4, 3 eller Underkänd.

Poängregistrering av examinationen för kursen sker enligt följande system:

Examinationsmoment	Omfattning	Betyg
Skriftlig tentamen	6 hp	5/4/3/U

Kurslitteratur

Litteratur
The litterature list for the course will be provided one month before the course starts.

Title: Probability, Statistics and Stochastic Processes,
Author: Olofsson, Andersson
Publsher: Wiley
ISBN: 9780470889749