



## KURSPLAN

# Embedded and Distributed AI, 7,5 högskolepoäng

*Embedded and Distributed AI, 7.5 credits*

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<b>Kurskod:</b>	TEDS20	<b>Utbildningsnivå:</b>	Avancerad nivå
<b>Fastställd av:</b>	VD 2019-12-01	<b>Utbildningsområde:</b>	Tekniska området
<b>Gäller fr.o.m.:</b>	2020-01-01	<b>Ämnesgrupp:</b>	DT1
<b>Version:</b>	1	<b>Fördjupning:</b>	A1F
		<b>Huvudområde:</b>	Produktutveckling

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### Lärandemål

After a successful course, the student shall

Kunskap och förståelse

- display knowledge of knowledge representation with Knowledge Graphs, including RDF-based graphs and property graphs
- display knowledge of distributed systems and its applications for knowledge representation and machine learning, within the scope of distributed AI
- display knowledge of deep learning and its applications for natural language processing and image recognition, within the scope of embedded AI

Färdighet och förmåga

- demonstrate the ability to design and implement a distributed architecture suitable for data gathering of sensors using edge computing facilities
- demonstrate the ability to design and implement a deep-learning architecture suitable for image analysis using GPGPU facilities

Värderingsförmåga och förhållningssätt

- demonstrate the ability to identify trade-offs in the design and implementation of distributed systems

### Innehåll

The course aims to create an overall understanding of knowledge representation and processing in AI, covering the span from the semantic web through distributed systems all the way to deep learning and edge computing.

The course covers the following topics:

- Semantics, Ontologies, and Knowledge Graphs
- Distributed Sensors
- Edge computing
- Deep learning
- Image analysis

The course will include laboratory work with the following main themes:

- Applying semantics to sensor environments: enriching data with contextual or externally sourced information, integrating heterogenous data sources and sensors, basic inference reasoning over knowledge graphs
- Data gathering with a distributed sensor network, implemented using Raspberry Pi/C++
- Image analysis using deep learning, implemented using GPGPU with CUDA/C++

### Undervisningsformer

The course consists of lectures and laboratory work.

Undervisningen bedrivs på engelska.

### Förkunskapskrav

Passed courses at least 90 credits within the major subject Product Development, and completed course Machine Learning, 7,5 credits or equivalent. Proof of English proficiency is required.

### Examination och betyg

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

The final grade will only be issued after satisfactory completion of all assessments.

Poängregistrering av examinationen för kursen sker enligt följande system:

Examinationsmoment	Omfattning	Betyg
Digital tentamen <sup>1</sup>	4,5 hp	5/4/3/U
Laboratory work	3 hp	U/G

<sup>1</sup> Bestämmer kursens slutbetyg vilket utfärdas först när samtliga moment godkänts.

### Kurslitteratur

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