KURSPLAN
Kunskapsrepresentation och resonerande, 7,5 högskolepoäng

Knowledge Representation and Reasoning, 7.5 credits

Kurskod:	TKRR25	**Utbildningsnivå:**	Avancerad nivå
Fastställd av:	VD 2024-10-15	**Utbildningsområde:**	Tekniska området
Gäller fr.o.m.:	2025-08-01	**Ämnesgrupp:**	DT1
Version:	1	**Fördjupning:**	A1N
		Huvudområde:	Datavetenskap

Lärandemål

After a successful course, the student shall

Kunskap och förståelse
- show familiarity with the principles of knowledge representation and reasoning
- demonstrate comprehension of the knowledge representation methods, such as description logics, ontologies, and semantic web technologies
- display knowledge of current research in the various areas of knowledge representation, such as knowledge graphs, answer-set programming and reasoning about actions and change

Färdighet och förmåga
- demonstrate skills of modelling knowledge using different knowledge representation methods
- demonstrate the ability to use established tools to work on knowledge representation and reasoning tasks

Värderingsförmåga och förhållningssätt
- demonstrate the ability to choose applicable knowledge representation methods and tools for AI systems
- demonstrate an understanding of the limitations of chosen knowledge representation methods and tools

Innehåll

Knowledge representation and reasoning (KR) is an established area in Artificial Intelligence (AI) since the 1960s. It deals with explicit, symbolic, declarative representations of knowledge and inference procedures for deriving further and implicit information from these representations. It remains crucial for the overall development of AI. Although recent developments in statistical approaches and machine learning have been very successful, limitations of these methods are apparent. It is believed that some of these limitations can only be overcome with advances in knowledge representation. This course aims to introduce students to various topics in KR. The course covers both fundamental principles and recent advancements in the field, including those developed from the area of the Semantic Web, whose backbone is based on theories and methods built in knowledge representation.

The course includes the following elements:
- Description Logics
- Ontology and Ontology Engineering
- Knowledge Graphs
- Standard Semantic Web technologies
- Answer-Set Programming and reasoning about actions and change

Undervisningsformer

Instruction will consist of lectures and practical exercises.

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, Computer Science or Electrical Engineering (with relevant courses in computer engineering), or equivalent, or passed courses at least 150 credits from the programme Computer Science and Engineering. 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
Projekt[I]	2,5 hp	5/4/3/U
Laboration	5 hp	U/G

[I] Bestämmer kursens slutbetyg vilket utfärdas först när samtliga moment godkänts.

Kurslitteratur

The literature list for the course will be provided eight weeks before the course starts.

Allemang, D., & Hendler, J. (2011). Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Elsevier Science & Technology.

Rudolph, S. (2011). Foundations of description logics. In Reasoning Web International Summer School (pp. 76-136). Springer, Berlin, Heidelberg.

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