

Die Modulbeschreibung sollte direkt über diesen [Link](#) in HISinOne eingepflegt werden.

Module code	Module title	Category
MAIE2040	Knowledge Engineering	MA
	Degree program	MA Software Engineering
	Faculty	Building Services Engineering and Computer Science

Module coordinator	Prof.Dr.in Nadine Steinmetz
Module type	Mandatory module
Frequency	1x annually in WiSe
Recommended semester	2. semester
Credit (ECTS-Points)	5
Academic Assessment Method	Coursework requirement PrP = Project / Assignment with presentation Project documentation + 20 minute presentation
Teaching language	English
Admission requirements for this Module	none
Module duration	1 Semester
Required Registration	Students enrolled in the above-mentioned degree program/standard semester will be registered automatically upon re-enrollment; all other participants, please refer to the information below. none

Course		Lecturer	Type	Group Size (max.)	Number of Groups	Contact hours per week (SWS)	Workload (in h)	
							Face-to-face	Self-study
1	Knowledge Engineering	Steinmetz	Seminar	30	1	4	60	65
Sum						4,0	60	65
Total Workload for Module								125

Learning Objectives / Learning outcomes	The students will learn to define knowledge and explain its relationship to data and information and they are able to distinguish between knowledge management and knowledge engineering. Specifically, the students will learn the fundamentals of Semantic Web technologies and how they are applied for knowledge representation using RDF in the World Wide Web. They will learn how to represent knowledge with ontologies using OWL and how to access and benefit from semantic data on the Web. Another focus are applications that make use of Linked Data and the Web of Data. The key element of knowledge engineering processes are knowledge graphs (KG). The students will learn how applications – knowledge-based systems (KBS) – use knowledge graphs for retrieval or recommendation scenarios. The students will learn how to generate a knowledge graph out of (semi)structured information (re)using ontological structures. The practical project will include the following steps:
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	• Examine a given use case of data/information • Find suitable ontologies/classes, properties for the use case • Generate a knowledge graph using or enhancing the existing structures • Generate SPARQL queries on the use the use cases in terms of recommendation and retrieval scenarios
Contents	• Basic knowledge about data, information • Semantic Web technologies RDF, RDF(S), OWL • Definition of knowledge graphs • Query language SPARQL • Application of knowledge graphs for retrieval and recommendation tasks • Working with sample knowledge graphs from the Linked Open Data cloud
Literature	• Sören Auer: Introduction to Knowledge Engineering and Semantic Web, Leibniz University Hannover, https://av.tib.eu/media/62287 • Tassilo Pellegrini, Harald Sack, Sören Auer (Hrsg.): <i>Linked Enterprise Data: Management und Bewirtschaftung vernetzter Unternehmensdaten mit Semantic Web Technologien</i>. Springer, 2014, ISBN 978-3-642-30273-2 • Sören Auer, Volha Bryl, Sebastian Tramp: <i>Linked open data – creating knowledge out of interlinked data: results of the LOD2 Project</i>. Springer, 2014, ISBN 978-3-319-09846-3 • Grigoris Antoniou, Paul Groth, Frank Van Harmelen, Rinke Hoekstra: <i>A Semantic Web Primer</i>, MIT Press, 2025, ISBN 978-0262052887