

# Semantic data processing and representation

Module no. or code	9
Module name	Semantic data processing and representation
(If applicable) the module's courses	
Module content	<ul style="list-style-type: none"><li>• Introduction</li><li>• Text and Speech Basics<ul style="list-style-type: none"><li>○ Morphological Analysis</li><li>○ Lexical Representations</li><li>○ Syntactic Representations</li><li>○ Semantic Representations</li><li>○ Discourse Representations</li><li>○ Language Models</li><li>○ Distributed Representations / Word Embeddings</li></ul></li><li>• Natural Language Processing Applications</li><li>• Deep Learning for Natural Language Processing<ul style="list-style-type: none"><li>○ Convolutional Neural Networks and their Application to NLP</li><li>○ Recurrent Neural Networks and their Application to NLP</li></ul></li></ul>

Module's learning outcomes	After successfully completing the module: <ul style="list-style-type: none"> <li>• students are able to apply the basic methods of Natural Language Processing and related applications. The students are able to develop result-oriented applications that integrate Natural Language Processing methods. These methods can be based in whole or in part on various forms of artificial neural networks (deep neural networks).</li> <li>• students are able to analyse concrete tasks in the field of natural language processing from applied science or industrial practice and evaluate and select suitable methods and software components from the field of natural language processing. In particular, students are also able to describe and develop suitable Deep Learning architectures.</li> <li>• students are also able to describe, implement and present a corresponding overall software architecture. In doing so, they draw on common frameworks from the field of deep learning (e.g. KERAS, TensorFlow, PyTorch, etc.). They organise themselves and their team independently in the application of learned methods of Natural Language Processing.</li> </ul>		
Semester	2 <sup>nd</sup> semester		
Duration of module	one semester		
Frequency	Winter term only		
ECTS-Credits	5 ECTS		
Workload	Workload (Total)	Attendance time	Self-Study time (incl. exam preparation)
	150 h	30h	120h
Type of module	Compulsory		
Applicability of module	Applicable in the practical module		
Conditions for participation	Core modules of the first semester		
Responsible for module	Prof. Dr. Frank-M. Schleif		
Lecturer	Dr. Sebastian Furth		
Language of instruction, L. of examination	English / English		

Type of examination; Conditions for the award of CPs	soP (G)
Teaching and learning formats of the module	Seminar-based teaching
Literature	<ul style="list-style-type: none"> <li>• <i>Kamath, Uday, John Liu, and James Whitaker. Deep learning for NLP and speech recognition. Vol. 84. Cham: Springer, 2019.</i></li> <li>• <i>Chris Manning and Hinrich Schütze, Foundations of Statistical Natural Language Processing, MIT Press. Cambridge, MA: May 1999.</i></li> </ul>