Module MA-INF 4114	**Robot Learning**				
Workload 180 h	**Credit points** 6 CP	**Duration** 1 semester	**Frequency** every year		
Module coordinator	Prof. Dr. Sven Behnke				
Lecturer(s)	Prof. Dr. Sven Behnke, Dr. Nils Goerke				
Classification	**Programme** M. Sc. Computer Science	**Mode** Optional	**Semester** 1. or 2.		
Technical skills	This lecture is one of two introductory lectures of the intelligent systems track. Creating autonomous robots that can learn to assist humans in situations of daily life is a fascinating challenge for machine learning. The lecture covers key ingredients for a general robot learning approach to get closer towards human-like performance in robotics, such as reinforcement learning, learning models for control, learning motor primitives, learning from demonstrations and imitation learning, and interactive learning. This module complements MA-INF 4113 and can be taken before or after that module.				
Soft skills	Communicative skills (oral and written presentation of solutions, discussions in small teams), self competences (ability to accept and formulate criticism, ability to analyze problems)				
Contents	Reinforcement learning, Markov decision processes, dynamic programming, Monte Carlo methods, temporal-difference methods, function approximation, liear quadratic regulation, differential dynamic programming, partially observable MDPs, policy gradient methods, inverse reinforcement learning, imitation learning, learning kinematic models, perceiving and handling of objects.				
Prerequisites	none				
Format	**Teaching format**	**Group size**	**h/week**	**Workload[h]**	**CP**
	Lecture	60	2	30 T / 45 S	2.5
	Exercises	30	2	30 T / 75 S	3.5
	T = face-to-face teaching; S = independent study				
Exam achievements	Oral exam (graded)				
Study achievements	Successful exercise participation (not graded)				
Forms of media					
Literature	• R. Sutton and A. Barto: Reinforcement Learning, MIT-Press, 1998. • O. Sigaud and J. Peters (Eds.): From Motor Learning to Interaction Learning in Robots. Springer, 2010.				