Module MA-INF 4201	**Artificial Life**		
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., 2. or 3.
Technical skills	Detailed understanding of the most important approaches and principles of artificial life. Knowledge and understanding of the current state of research in the field of artificial life		
Soft skills	Capability to identify the state of the art in artificial life, and to present and defend the found solutions within the exercises in front of a group of students. Critical discussion of the results of the homework.		
Contents	Foundations of artificial life, cellular automata, Conway's "Game of Life"; mechanisms for structural development; foundations of nonlinear dynamical systems, Lindenmeyer-systems, evolutionary methods and genetic algorithms, reinforcement learning, artificial immune systems, adaptive behaviour, self-organising criticality, multi-agent systems, and swarm intelligence, particle swarm optimization.		
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	Written exam (graded)		
Study achievements	Successful exercise participation (not graded)		
Forms of media	Pencil and paper work, explain solutions in front of athe exercise group, implementation of small programs, use of simple simulation tools.		
Literature	• Christoph Adami: Introduction to Artificial Life, The Electronic Library of Science, TELOS, Springer-Verlag • Eric Bonabeau, Marco Dorigo, Guy Theraulaz: Swarm Intelligence: From Natural to Artificial Systems, Oxford University Press, Santa Fe Institute Studies in the Science of Complexity. • Andrzej Osyczka: Evolutionary Algorithms for Single and Multicriteria Design Optimization, Studies in Fuzzyness and Soft Computing, Physica-Verlag, A Springer-Verlag Company, Heidelberg		