Module MA-INF 3105	**Principles of Distributed Systems**		
Workload 180 h	**Credit points** 6 CP	**Duration** 1 semester	**Frequency** every year
Module coordinator	Prof. Dr. Peter Martini		
Lecturer(s)	Dr. Markus Esch		
Classification	**Programme** M. Sc. Computer Science	**Mode** Optional	**Semester** 1., 2. or 3.
Technical skills	The students learn fundamental principles of distributed computer systems and learn to apply them in practice. This includes architectures of distributed systems, key concepts like fault tolerance and consistency as well as important algorithms for synchronization, distributed mutual exclusion, election etc. Moreover concepts of structured and unstructured overlay networks as self-organization, overlay routing, modeling of complex random networks etc. will be taught.		
Soft skills	Theoretical exercises are given in order to support in-depth understanding of the lecture topics. In the course of these exercises students learn to present their results and discuss their own and others' solutions. In the course of practical assignments that need to be solved in small teams the students learn teamwork, time management, targeted organization of practical work as well as presentation and discussion of their solutions.		
Contents	• Architectures of distributed systems • Physical clock synchronization and logical clocks • Distributed termination • Distributed mutual exclusion • Election in distributed systems • Fault tolerance of distributed systems • Consistency in distributed systems • Structured and unstructured overlays • Distributed hash tables • Modeling and characteristics of complex random networks • Overlay routing		
Prerequisites	**Recommended:** BA-INF 101 "Kommunikation in Verteilten Systemen", or Bachelor-level knowledge of Data Communication and Internet Technology		

	Teaching format	Group size	h/week	Workload[h]	CP
Format	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	Scientific articles as mentioned on the lecture slides Tanenbaum, van Steen: Distributed Systems: Principles and Paradigms (2nd Edition), Prentice Hall, 2007; Steinmetz, Wehrle (Eds.): Peer-to-Peer Systems and Applications, Springer, 2005; Barrat, Barthelemy, Vespignani, Dynamical Processes on Complex Networks, Cambridge University Press, 2008