Module:	**Reliability of Computer Systems**
Lecturer:	Prof. Dr.-Ing. habil. Peter Sobe
Language:	English
Teaching Method:	Lecture, practical demonstration and tutorial
Credit Points:	1 ECTS
Attendance requirements:	Computer architecture, basics in combinatorics, probabilistic evaluation
Goals / Skill:	This lecture introduces reliability issues of computer hardware, networks and distributed applications. The students obtain an overview of techniques to improve the reliability of systems (e.g. use of stand-by resources, failover, fault-tolerant network topologies and routing). Measures for evaluation of systems (failure probabilities, availability, probabilities of operation) are introduced and modeling techniques to obtain them from component parameters and from the system structure are explained. A result of the lecture should be an intensified attention on reliability, the ability to assess risks and to interpret measures, and the ability to model systems and their structural and operational variants.
Detailed Content:	1. Concepts: common systems and reliable, fault-tolerant systems, overview on fault-tolerance techniques, structural system models 2. Measures and their interpretation: reliability, failure probability, availability, mean time to failure, mean time to repair 3. Models: Boolean models and their variants (fault-trees, reliability-block-diagrams), calculation of reliabilities based on component parameters and on the system structure 4. Models of systems with repair/reconfiguration: Markov models, simulative analysis of Markov models
Media Used:	Electronic Presentation, Blackboard Illustrations, Practical Demonstrations
Literature / References:	• http://www.kaymgee.com/Kevin_Greenan/Software.html
Assigned Tutorial:	Reliability modeling of distributed systems • The first tool is an application-specific calculator that calculates failure probabilities according to standard configurations of fault-tolerant systems. • The second tool is a Markov chain simulator that can be used to model systems that include states with faulty components that are tolerated and can be repaired during operation of the system.
Selected for further reading:	• A.L. Reibman and M. Veeraraghavan: Reliability Modeling: An Overview for System Designers.In: Advances in Ultra-Dependable Systems, N. Suri ; C.J. Walter; M M. Hugue (Eds.), IEEE Computer Society Press, 1995 • M. Walter ; W. Schneeweiss: The modeling world of reliability/safety engineering. Hagen : LiLoLe, 2005.