Modulbeschreibung zum Modul 16.3

Module Title	Cloud Computing
Module number	16.3
Study program	M.Sc. Program High-Integrity Systems
Module code	
Units	2 weekly hrs: Lectures Cloud Computing 2 weekly hrs: Exercises Cloud Computing
Level	Advanced Level
Applicability	Applicable in other computer science and engineering master curricula
Duration	1 Semester
Status	Elective module
Recommended semester	3rd semester
Credits	5
Conditions for module participation	None
Recommended prerequisites	Good knowledge in software engineering, computer networks, databases and distributed applications and one high-level programming language.
Requirements for module examination	None
Module examination	Written examination of 90 minutes duration at the end of the semester
Education goals/ capabilities	Cloud Computing provides scalable IT resources "on demand" using technologies such as virtualization. Access to these resources is abstracted via APIs and frameworks - often based on Web-Services. It is expected that Cloud Computing has a major impact on IT infrastructure of enterprises and business models. Upon completion of this course, the students - understand the concepts and technologies fundamental for Cloud Computing - understand the economical and operational impact of Cloud Computing for providing IT-resources within the

	enterprise
	• is able to apply a structured, scientific process to evaluate architecture alternatives for Cloud Computing
	• are able to architect and implement Cloud Computing solutions.
	Non specialist competencies (15% of the total workload): • Team work • Communication in international teams
Module contents	Lectures Cloud Computing Exercises Cloud Computing
Teaching mode	Lectures and Exercises
Total workload (h)	150 h
Language	English
Module frequency	Annuel
Module coordination	Prof. Dr. Jörg Schäfer
Hints	

Unitbeschreibung zum Modul 16.3

Unit name	Cloud Computing - Lectures
Code	
Module name	Cloud Computing
Lecturer	Prof. Dr. Martin Kappes, Prof. Dr. Jörg Schäfer
Content	The course will cover selected subjects from the following areas. The depth of coverage might vary: • Definitions of Cloud Computing and Core Foundations of Cloud Computing • Virtualization technologies • SOA and Web-Services • Different Cloud Computing architectures (SaaS, PaaS, IaaS) • Different Cloud Computing vendor stacks including open source • Service Management for the cloud • Algorithms for Cloud Computing (e.g. MapReduce) • Security aspects of Cloud Computing • Operational aspects of Cloud Computing • Economical aspects of Cloud Computing
Teaching mode	Lectures
SWS	2
Total workload (h)	70
Attendance	30
Exam incl. exam preparation	10
Practical part	0
Self study	30
Language	English
Literature	• Nick Antonopoulos and Lee Gillam: Cloud Computing: Principles, Systems and Applications, Springer, 2010 • Charles Babcock, Management Strategies for the Cloud Revolution: How Cloud Computing Is Transforming Business and Why You Can't Afford to Be Left Behind, Mcgraw-Hill Professional; Edition: 1, 2010 • Iain D. Craig, Virtual Machines, Springer; Softcover reprint of hardcover 1st ed. 2006 edition 2011

	• Tim Mather, Subra Kumaraswamy, and Shahed Latif: Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance O'Reilly Media; Edition: 1, 2009 • Frank Munz, Middleware and Cloud Computing: Oracle on Amazon Web Services (AWS), Rackspace Cloud and Rightscale, munz & more; Edition: 1, 2011 • Jim Smith and Ravi Nair,Virtual Machines: Versatile Platforms for Systems and Processes (The Morgan Kaufmann Series in Computer Architecture and Design), Morgan Kaufmann; 1 edition 2005 • Georg Reese, Cloud Application Architectures: Transactional Systems for EC2 and Beyond, O'Reilly Media; Edition: 1, 2009 Current literature recommendations will be given at the semester start.
Module examination	Written examination at the end of the semester
Module examination assessment	Graded according to published grading scheme
Hints	

Unitbeschreibung zum Modul 16.3

Unit name	Cloud Computing - Exercises
Code	
Module name	Cloud Computing
Lecturer	Prof. Dr. Martin Kappes, Prof. Dr. Jörg Schäfer
Content	While the lectures provide the theoretical background, the exercises will enable students to apply the concepts. The students will read current research literature and vendor documentation and configure examples accordingly. Im addition, simple prototypes will be developed. Henceforth, the students will receive continuous feedback, which will support the educational objectives.
Teaching mode	Exercises
SWS	2
Total workload (h)	80
Attendance	30
Exam incl. exam preparation	0
Practical part	0
Self study	50
Language	English
Literature	see Lectures Cloud Computing
Module examination	None
Module examination assessment	
Hints	