

**Module: Distributed Systems**

<b>Level</b>	Bachelor	<b>Short Name</b>	DistSys
<b>Responsible Lecturers</b>	Prof. Dr.-Ing. Menno Heeren		
<b>Department, Facility</b>	Electrical Engineering and Computer Science		
<b>Course of Studies</b>	Information Technology, Bachelor		
<b>Compulsory/elective</b>	Compulsory	<b>ECTS Credit Points</b>	5
<b>Semester of Studies</b>	6	<b>Semester Hours per Week</b>	4
<b>Length (semesters)</b>	1	<b>Workload (hours)</b>	150
<b>Frequency</b>	SuSe	<b>Presence Hours</b>	60
<b>Teaching Language</b>	English	<b>Self-Study Hours</b>	90

The following section is filled only if there is **exactly one** module-concluding exam.

<b>Exam Type</b>	Written Exam	<b>Exam Language</b>	English
<b>Exam Length (minutes)</b>		<b>Exam Grading System</b>	One-third Grades
<b>Learning Outcomes</b>	<p>After studying this course, the students will be able to design a distributed systems architecture using middleware where appropriate. In exercises they learn how to design and use services in a distributed environment.</p> <p>The students learn how to use these technologies to solve a given problem in a purposeful way by designing wrappers which overcome heterogeneity and support interoperability between systems.</p>		
<b>Participation Prerequisites</b>			

The previous section is filled only if there is **exactly one** module-concluding exam.

<b>Consideration of Gender and Diversity Issues</b>	<ul style="list-style-type: none"> <li>✓ Use of gender-neutral language (THL standard)</li> <li>✗ Target group specific adjustment of didactic methods</li> <li>✓ Making subject diversity visible (female researchers, cultures etc.)</li> </ul>
<b>Applicability</b>	
<b>Remarks</b>	

## Module Course: Distributed Systems (Lecture)

(of Module: Distributed Systems)

<b>Course Type</b>	Lecture	<b>Form of Learning</b>	Presence
<b>Mandatory Attendance</b>	no	<b>ECTS Credit Points</b>	3
<b>Participation Limit</b>		<b>Semester Hours per Week</b>	3
<b>Group Size</b>		<b>Workload (hours)</b>	90
<b>Teaching Language</b>	English	<b>Presence Hours</b>	45
<b>Study Achievements ("Studienleistung", SL)</b>		<b>Self-Study Hours</b>	45
<b>SL Length (minutes)</b>		<b>SL Grading System</b>	

The following section is filled only if there is a course-specific exam.

<b>Exam Type</b>		<b>Exam Language</b>	
<b>Exam Length (minutes)</b>		<b>Exam Grading System</b>	
<b>Learning Outcomes</b>			
<b>Participation Prerequisites</b>			

The previous section is filled only if there is a course-specific exam.

<b>Contents</b>	<ol style="list-style-type: none"> <li>1. Introduction / Basics of distributed systems</li> <li>2. System models</li> <li>3. Socket programming (Java) <ol style="list-style-type: none"> <li>1. UDP</li> <li>2. TCP</li> </ol> </li> <li>4. Time Synchronization</li> <li>5. Distributed file systems</li> <li>6. Interprocess communication</li> <li>7. Distributed objects and remote invocation <ol style="list-style-type: none"> <li>1. CORBA</li> <li>2. RMI</li> </ol> </li> <li>8. Real-time distributed systems</li> <li>9. Security</li> </ol>
<b>Literature</b>	<p>In addition to the lecture notes, the following textbooks are recommended (but not necessary):</p> <ul style="list-style-type: none"> <li>• Andrew S. Tanenbaum et al.: Distributed Systems: Principles and Paradigms, 2nd ed., Pearson/Prentice Hall 2007, Signatur: VK 2150 2007 A 2555</li> </ul> <p>Coulouris et al.: Distributed Systems, 4th ed., Addison-Wesley, 2005, Signatur: VK 1690 2005 A 1471.</p>
<b>Remarks</b>	

## Module Course: Distributed Systems (Exercises)

(of Module: Distributed Systems)

<b>Course Type</b>	Exercise	<b>Form of Learning</b>	Presence
<b>Mandatory Attendance</b>	no	<b>ECTS Credit Points</b>	2
<b>Participation Limit</b>		<b>Semester Hours per Week</b>	1
<b>Group Size</b>	12	<b>Workload (hours)</b>	60
<b>Teaching Language</b>	English	<b>Presence Hours</b>	15
<b>Study Achievements ("Studienleistung", SL)</b>		<b>Self-Study Hours</b>	45
<b>SL Length (minutes)</b>		<b>SL Grading System</b>	

The following section is filled only if there is a course-specific exam.

<b>Exam Type</b>		<b>Exam Language</b>	
<b>Exam Length (minutes)</b>		<b>Exam Grading System</b>	
<b>Learning Outcomes</b>			
<b>Participation Prerequisites</b>			

The previous section is filled only if there is a course-specific exam.

<b>Contents</b>	Exercises and practical tasks to the following topics <ul style="list-style-type: none"> <li>• Socket programming (Java)</li> <li>• Interprocess Communication</li> <li>• Distributed objects and remote invocation</li> </ul>
<b>Literature</b>	See literature for the lecture
<b>Remarks</b>	