

Module Handbook

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Course INF-32-56-K-6

Programming Distributed Systems (3V+3U, 8.0 LP)

Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
-	K	Lecture with exercise classes (V/U)	8.0 CP	156 h
3	V	Lecture		42 h
3	U	Exercise class (in small groups)		42 h
(3V+3U)			8.0 CP	84 h 156 h

Basedata

SWS	3V+3U
CP, Effort	8.0 CP = 240 h
Position of the semester	1 Sem. in SuSe
Level	[6] Master (General)
Language	[EN] English
Lecturers	Bieniusa, Annette, Dr. (WMA DEPT: INF)
Area of study	[INF-SE] Software-Engineering
Lifecycle-State	[NORM] Active

Possible Study achievement

- Verification of study performance: **proof of successful participation in the exercise classes (ungraded)**

- Details of the examination (type, duration, criteria) will be announced at the beginning of the course.

Contents

Basic primitives in programming distributed systems

- Leader election
- Consistent snapshots
- Consensus
- Distributed state machine replication

Theoretical foundation

- Failure modes
- Time (vector clocks, Lamport clocks)
- Process calculi (e.g. CSP, CCS, pi calculus, TLA)
- Consistency models

Programming paradigms for Distributed Systems

- RPC
- Futures and promises
- Message passing and actors
- CRDTs
- Streaming / Data-Flow

Literature

- Bernadette Charron-Bost, Fernando Pedone, André Schiper: Replication: Theory and Practice. Lecture Notes in Computer Science 5959, Springer 2010, ISBN 978-3-642-11293-5.
- Christian Cachin, Rachid Guerraoui, Luís E. T. Rodrigues: Introduction to Reliable and Secure Distributed Programming (2. ed.). Springer 2011, ISBN 978-3-642-15259-7, pp. I-XIX, 1-367.

Requirements for attendance (informal)

None

Requirements for attendance (formal)

None

References to Course [INF-32-56-K-6]

Module	Name	Context	
[INF-32-56-M-6]	Programming Distributed Systems	P: Obligatory	3V+3U, 8.0 LP
Course-Pool	Name		
[INF-SE_V-KPOOL-6]	Lectures of the teaching area Software Engineering		