HAW Kiel
Hochschule für Angewandte Wissenschaften Kiel
Kiel University of Applied Sciences

DDIS - Distributed Databases and Information Systems

DDIS - Distributed Databases and Information Systems

General information	
Module Code	DDIS
Unique Identifier	DistDBInfSys-01-MA-M
Module Leader(s)	Prof. Dr. Ehlers, Jens (jens.ehlers@haw-kiel.de)
Lecturer(s)	Prof. Dr. Ehlers, Jens (jens.ehlers@haw-kiel.de)
Offered in Semester	Sommersemester 2026
Module duration	1 Semester
Occurrence frequency	Regular
Module occurrence	In der Regel im Sommersemester
Language	Englisch
Recommended for international students	Yes
Can be attended with different study programme	No

Curricular relevance (according to examination regulations)
Study Subject: M.Sc. - MCS - Computer Science (PO 2023, V1) Module type: Pflichtmodul Semester: 1, 2
Study Subject: M.Sc. - MIE - Information Engineering (PO 2022, V3) Module type: Wahlmodul Semester: 1, 2, 3

Qualification outcome
Areas of Competence: Knowledge and Understanding; Use, application and generation of knowledge; Communication and cooperation; Scientific self-understanding / professionalism.
- Students know different data models, APIs and query languages for database systems and can select an adequate database system depending on the application scenario.
- Students can setup a distributed database system and configure it regarding aspects of replication, partitioning, and consistency. They understand the implications of their configuration choices. - Students can differentiate components for batch and stream processing.
- Students can express their opinion in technical discussions regarding databases. - Students can discuss design decisions for a distributed information system in a team.
- Students can evaluate and compare different distributed database systems, particularly regarding performance aspects and TCO.

Content information	
Content	- Horizontal scalability and the CAP theorem - Replication in distributed databases - Partitioning in distributed databases - Challenges caused by delayed network delays, clocks, and process pauses - Transactions, consistency, and concensus - Distributed batch and stream processing - Benchmarking of selected distributed database systems - Database-as-a-service in public cloud platforms

Literature	- Martin Kleppmann: Designing Data-Intensive Applications – The Big Ideas Behind Reliable, Scalable, and Maintainable Systems; O'Reilly - Tyler Akidau, Slava Chernyak, Reuven Lax: Streaming Systems – The What, Where, When, and How of Large-Scale Data Processing; O'Reilly - Alex Petrov: Database Internals – A Deep Dive into How Distributed Data Systems Work; O'Reilly

Teaching formats of the courses	
Teaching format	**SWS**
Lehrvortrag	2
Projekt	2

Workload	
Number of SWS	4 SWS
Credits	5,00 Credits
Contact hours	48 Hours
Self study	102 Hours

Module Examination	
Examination prerequisites according to exam regulations	None
DDIS - Projektbezogene Arbeiten	Method of Examination: Projektbezogene Arbeiten Weighting: 100% wird angerechnet gem. § 11 Absatz 2 PVO: No Graded: Yes

Miscellaneous	
Recommended Prerequisites	- Knowledge about relational database modelling and transactions, HTTP and REST-APIs, version control with Git, Docker and Kubernetes - Familiar with command-line interfaces - Efficient use of at least one programming language
Miscellaneous	Students studying Master Information Engineering can use this module as a substitue for PM101.