

Module Handbook

TUK MODHB Homepage

Module INF-02-03-M-2

Distributed and Concurrent Programming (M, 4.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
INF-02-03-M-2	<i>Distributed and Concurrent Programming</i>	4.0 CP (120 h)

Basedata

CP, Effort	4.0 CP = 120 h
Position of the semester	1 Sem. in WiSe
Level	[2] Bachelor (Fundamentals)
Language	[DE] German
Module Manager	Gotzhein, Reinhard, Prof. Dr. (PROF DEPT: INF)
Lecturers	Gotzhein, Reinhard, Prof. Dr. (PROF DEPT: INF)
Area of study	[INF-PFL] Mandatory Modules
Reference course of study	[INF-82.79-SG] B.Sc. Computer Science
Lifecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V+1U	INF-02-03-K-2	P	U-Schein	PL1	4.0	WiSe

- About [INF-02-03-K-2]: Title: "Distributed and Concurrent Programming"; Presence-Time: 42 h; Self-Study: 78 h
- About [INF-02-03-K-2]: The study achievement "[U-Schein] proof of successful participation in the exercise classes (ungraded)" must be obtained.
 - It is a prerequisite for the examination for PL1.

Examination achievement PL1

- Form of examination: **written exam (Klausur) (60-90 Min.)**
- Examination Frequency: each semester
- Examination number: 60203 ("Distributed and Concurrent Programming")

Evaluation of grades

The grade of the module examination is also the module grade.

Contents

From [INF-02-03-K-2] Distributed and Concurrent Programming:

The students know...

- the phenomena of concurrent software systems
- the operation of virtual machines using the example of the Java Virtual Machine
- Mechanisms for creating and organizing concurrent processes using the example of Java threads
- Mechanisms for synchronizing concurrent processes
- happens-before-consistency and adequate synchronization
- message-based interaction and remote method invocation

Competencies / intended learning achievements

Students acquire a detailed understanding of the tasks and solution methods in the development of distributed, concurrent software systems using the Java programming language as an example.

The students can...

- develop concurrent systems,
- use memory and message-based interaction to implement concurrent systems,
- adequately synchronize concurrent systems,
- detect and handle synchronization errors (inconsistencies, jams).

Literature

From [INF-02-03-K-2] Distributed and Concurrent Programming:

- M. Broy: Informatik – Eine grundlegende Einführung, Teil III, Springer, 1994
- F. Mattern: Verteilte Basisalgorithmen, Informatik-Fachberichte 226, Springer, 1989, S. 103-119
- R. Schwarz, F. Mattern: Detecting Causal Relationships in Distributed Computations: In Search of the Holy Grail, Distributed Computing, Vol. 7, No. 3, 1994, pp. 149-174
- L. Lamport: Time, Clocks, and the Ordering of Events in a Distributed System, Communications of the ACM, Vol. 21, No. 7, 1978, pp. 558-565
- J. Gosling, B. Joy, G. Steele, G. Bracha, A. Buckley, D. Smith, G. Bierman: The Java® Language Specification, Java SE 14 Edition, 20.2.2020, <https://docs.oracle.com/javase/specs/jls/se14/jls14.pdf>
- Java® Platform Standard Edition Documentation 14, Oracle, <https://www.oracle.com/de/java/technologies/javase-downloads.html#DK14>
- T. Lindholm, F. Yellin, G. Bracha, A. Buckley, D. Smith: The Java® Virtual Machine Specification, Java SE 14 Edition, 20.2.2020, <https://docs.oracle.com/javase/specs/jvms/se14/jvms14.pdf>

Requirements for attendance of the module (informal)

None

- Notice: Some Courses have informal requirements for attendance:
 - #A: [INF-02-03-K-2] Distributed and Concurrent Programming (2V+1U, 4.0 LP) (P: Obligatory)

Requirements for attendance of the module (formal)

References to Module / Module Number [INF-02-03-M-2]

Course of Study	Section	Choice/Obligation
[INF-82.79-SG] B.Sc. Computer Science	[Compulsory Modules] Software Development	[P] Compulsory
[WIW-82.176-SG#2009] B.Sc. Business Administration and Engineering specialising in Computer Science (2009) [2009]	[Fundamentals] Field of study: Computer Science	[WP] Compulsory Elective