

## Module Handbook

TUK MODHB Homepage

# Course INF-02-04-K-2

Formal Languages and Computability (3V+2U, 6.0 LP)

## Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
-	K	Lecture with exercise classes (V/U)	6.0 CP	110 h
3	V	Lecture		42 h
2	U	Exercise class (in small groups)		28 h
(3V+2U)			6.0 CP	70 h 110 h

## Basedata

SWS	3V+2U
CP, Effort	6.0 CP = 180 h
Position of the semester	1 Sem. in SuSe
Level	[2] Bachelor (Fundamentals)
Language	[DE] German
Lecturers	Zweig, Katharina, Prof. Dr. (PROF   DEPT: INF)
Area of study	[INF-PFL] Mandatory Modules
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

- Definitions of language and different forms of representation of languages: Automata and machine models
- Hierarchy of the languages generated/recognized by them and their power
- Pumping lemmas
- Computability models: simulation as a principle of comparison between computability models. The thesis of Church-Turing.
- Holding problem
- Functional programming languages (primitive and partially recursive functions)
- Diagonalization technique, structural induction and reduction technique

## Literature

- Sperschneider, Hammer: Theoretische Informatik — Eine problemorientierte Einführung, Springer, 1996.
- Hopcroft, Motwani, Ullman: Einführung in die Automatentheorie, Formale Sprachen und Komplexitätstheorie, Addison Wesley, Pearson Studium, 2002.

## Requirements for attendance (informal)

### Courses

- [INF-02-01-K-2] Foundations of Programming (4V+4U, 10.0 LP)
- [MAT-02-11-K-1] Mathematics for Computer Science Students: Algebraic Structures (4V+2U, 8.0 LP)

## Requirements for attendance (formal)

None

## References to Course [INF-02-04-K-2]

Module	Name	Context	
[INF-02-04-M-2]	Formal Languages and Computability	P: Obligatory	3V+2U, 6.0 LP
[INF-82-59-M-2]	Foundations of Theoretical Computer Science	P: Obligatory	3V+2U, 6.0 LP