

## Module Handbook

TUK MODHB Homepage

# Module INF-57-51-M-6

Continuous models of complex systems (M, 4.0 LP)

## Module Identification

Module Number	Module Name	CP (Effort)
INF-57-51-M-6	<i>Continuous models of complex systems</i>	4.0 CP (120 h)

## Basedata

CP, Effort	4.0 CP = 120 h
Position of the semester	1 Sem. in WiSe
Level	[6] Master (General)
Language	[EN] English
Module Manager	Lukowicz, Paul, Prof. Dr. (PROF   DEPT: INF)
Lecturers	Lukowicz, Paul, Prof. Dr. (PROF   DEPT: INF)
Area of study	[INF-KI] Intelligent Systems
Reference course of study	[INF-88.79-SG] M.Sc. Computer Science
Lifecycle-State	[NORM] Active

## Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V+1U	INF-57-51-K-6	P	U-Schein	PL1	4.0	WiSe

- About [INF-57-51-K-6]: Title: "Continuous models of complex systems"; Presence-Time: 42 h; Self-Study: 78 h
- About [INF-57-51-K-6]: The study achievement "[U-Schein] proof of successful participation in the exercise classes (ungraded)" must be obtained.

## Examination achievement PL1

- Form of examination: **written exam (Klausur) (60-180 Min.)**
- Examination Frequency: each winter semester
- Examination number: 65753 ("Continuous models of complex systems")

## Contents

### From [INF-57-51-K-6] Continuous models of complex systems:

- mathematical problem formulation
- Phase space
- Concept of equilibrium, types of equilibria
- Attractors, strange attractors
- Concept of bifurcation
- Analysis of the system properties
- Conditions for the transition to chaotic systems

## Competencies / intended learning achievements

Upon successful completion of the module, students will be able to

- to explain essential properties of complex phenomena (emergence, bifurcations, chaos) on the basis of a mathematical description of nonlinear dynamical systems
- to explain conditions for the transition to chaotic systems,
- model different concepts of complex systems,
- to analyze implemented concepts and system properties on concrete systems.

## Literature

### From [INF-57-51-K-6] Continuous models of complex systems:

- Boccara, Nino: *Modeling complex systems*. Springer Science & Business Media, 2010.
- Gros, Claudius: *Complex and Adaptive Dynamical Systems*, 2009.

## Requirements for attendance of the module (informal)

None

## Requirements for attendance of the module (formal)

None

## References to Module / Module Number [INF-57-51-M-6]

Course of Study	Section	Choice/Obligation
[INF-88.79-SG] M.Sc. Computer Science	[Specialisation] Specialization 1	[WP] Compulsory Elective
Module-Pool	Name	
[INF-SIAK-DT-ENG-MPOOL-6]	SIAC Certificate "Digital Transformation" - Modules INF "Engineering"	