

## Module Handbook

TUK MODHB Homepage

# Module INF-61-53-M-6

Biologically Motivated Robots (M, 6.0 LP)

## Module Identification

Module Number	Module Name	CP (Effort)
INF-61-53-M-6	<i>Biologically Motivated Robots</i>	6.0 CP (180 h)

## Basedata

CP, Effort	6.0 CP = 180 h
Position of the semester	1 Sem. in WiSe
Level	[6] Master (General)
Language	[DE/EN] German or English as required
Module Manager	Berns, Karsten, Prof. Dr. (PROF   DEPT: INF)
Lecturers	Berns, Karsten, Prof. Dr. (PROF   DEPT: INF)
Area of study	[INF-ES] Embedded Systems and Robotics
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.
3V+1U	INF-61-53-K-6	P	U-Schein	PL1	6.0	WiSe

- About [INF-61-53-K-6]: Title: "Biologically Motivated Robots"; Presence-Time: 56 h; Self-Study: 124 h
- About [INF-61-53-K-6]: 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: **oral examination (20-60 Min.)**
- Examination Frequency: each semester
- Examination number: 66153 ("Biologically Motivated Robots")

## Evaluation of grades

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

### Contents

#### From [INF-61-53-K-6] Biologically Motivated Robots:

The lecture Biologically motivated robots (BioBots) deals with systems whose mechanical construction, sensor concepts and control methods have been inspired by nature. The following themes will be taught:

- Status of research and requirements for the development of BioBots
- Sensor systems, sensor fusion and driving concepts
- Adaptive control (neural networks, fuzzy-control, Reinforcement-Learning, genetic algorithms and neuro-oscillators)
- Behaviour based control architectures
- Application for BioBots

### Competencies / intended learning achievements

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

- characterize innovative concepts and methods for mastering complex robot systems
- characterize the control of biological movement systems
- explain essential procedures of softcomputing,
- use methods for controlling complex biologically motivated robots (e.g. walking machines, humanoid robots).
- develop individual robot capabilities in independent modules.

### Literature

#### From [INF-61-53-K-6] Biologically Motivated Robots:

- Webb, B. and Consi, T. R. (2001). Biorobotics. MIT Press.
- Hirose, S. (1993). Biologically inspired Robots - Snake-Like Locomoters and Manipulators. Oxford Sciens Publications.
- Song, S.-M. and Waldron, K. J. (1989). Machines That Walk: The Adaptive Suspension Vehicle. The MIT Press, Cambridge, Massachusetts

### Requirements for attendance of the module (informal)

#### Modules:

- [INF-60-03-M-5] Fundamentals of Embedded Systems (M, 8.0 LP)

### Requirements for attendance of the module (formal)

None

### References to Module / Module Number [INF-61-53-M-6]

Course of Study	Section	Choice/Obligation
[INF-88.79-SG] M.Sc. Computer Science	[Specialisation] Specialization 1	[WP] Compulsory Elective
[EIT-88.A20-SG#2021] M.Sc. European Master in Embedded Computing Systems (EMECS) [2021]	[Free Elective Area] Elective Subjects	[W] Elective Module
[EIT-88.D55-SG#2021] M.Sc. Embedded Computing Systems (ESY) [2021]	[Free Elective Area] Elective Subjects	[W] Elective Module

Module-Pool	Name
[MV-BioVT-MPOOL-6]	Wahlpflichtmodule Bioverfahrenstechnik
[MV-MB-INF-2022-MPOOL-6]	Wahlpflichtmodule M.Sc. Maschinenbau mit angewandter Informatik 2022
[MV-MBINFO-MPOOL-6]	Wahlpflichtmodule Maschinenbau mit angewandter Informatik