

Module Handbook (<https://modhb.uni-kl.de/>)

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## Module INF-60-03-M-5

Fundamentals of Embedded Systems (M, 8.0 LP)

### Module Identification

Module Number	Module Name	CP (Effort)
INF-60-03-M-5	<i>Fundamentals of Embedded Systems</i>	8.0 CP (240 h)

### Basedata

CP, Effort	8.0 CP = 240 h
Position of the semester	1 Sem. in SuSe
Level	[5] Master (Entry Level)
Language	[DE/EN] German or English as required
Module Manager	Berns, Karsten, Prof. Dr. (PROF   DEPT: INF) (/staff/528/)
Lecturers	Berns, Karsten, Prof. Dr. (PROF   DEPT: INF) (/staff/528/) Schürmann, Bernd, PD Dr.-Ing. (WMA   DEPT: INF) (/staff/506/)
Area of study	[INF-ES] Embedded Systems and Robotics
Reference course of study	[INF-88.79-SG] M.Sc. Computer Science (/mhb/FB-INF/cos-536/)
Lifecycle-State	[NORM] Active

### Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
4V+2U	INF-60-03-K-5 (/mhb/courses/INF-60-03-K-5/)	P	U-Schein	PL1	8.0	SuSe

- About [INF-60-03-K-5] (/mhb/courses/INF-60-03-K-5/): Title: "Fundamentals of Embedded Systems"; Presence-Time: 84 h; Self-Study: 156 h
- About [INF-60-03-K-5] (/mhb/courses/INF-60-03-K-5/): 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 (30-45 Min.)**
- Examination Frequency: irregular (by arrangement)
- Examination number: 66003 ("Foundations of Embedded Systems")

## Evaluation of grades

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

### Contents

From [INF-60-03-K-5] **Fundamentals of Embedded Systems** (/mhb/courses/INF-60-03-K-5/):

- Overview of embedded systems
- Introduction to electronics
- Basic transistor circuits, operational amplifier, A/D converter
- Introduction to system theory (e.g. Laplace transformation, convolution, filter)
- Control and digital signal processing
- Sensors and actuators
- Hardware platforms for embedded systems

### Competencies / intended learning achievements

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

- adequately characterize essential monitoring, control or regulation functions in an embedded system
- adequately characterize essential data and signal processing functions in an embedded system
- explain central basic technologies for the realization of embedded systems
- relate criteria for the selection of suitable hardware architectures for an embedded system
- conceptually model and formally specify embedded systems
- design and analyze transistor circuits, dynamic systems and control loops
- model analog systems,
- compare modeling techniques with each other and to apply suitable techniques for system development,
- assess fundamental risks in the design of embedded systems

### Literature

From [INF-60-03-K-5] **Fundamentals of Embedded Systems** (/mhb/courses/INF-60-03-K-5/):

- Any introduction text book to electronics.
- Any introduction text book to mechatronic systems.
- Concrete literature will be announced in the lecture.

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

None

- Notice: Some Courses have informal requirements for attendance:
  - #A: [INF-60-03-K-5] Fundamentals of Embedded Systems (4V+2U, 8.0 LP) (P: Obligatory) (/mhb/courses/INF-60-03-K-5/#teilnahmevor-5454)

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

None

## References to Module / Module Number [INF-60-03-M-5]

Course of Study	Section	Choice/Obligation
[INF-88.79-SG] M.Sc. Computer Science (/mhb/FB-INF/cos-536/)	[Specialisation] Specialization 1	[WP] Compulsory Elective
[WIW-82.176-SG] B.Sc. Business Administration and Engineering specialising in Computer Science (/mhb/FB-WIW/cos-512/)	[Fundamentals] Field of study: Computer Science	[WP] Compulsory Elective
Module-Pool	Name	
[INF-ES_Ba_V-MPOOL-4 (/mhb/modulepools/INF-ES_Ba_V-MPOOL-4/)]	Specialization Bachelor TA Embedded Systems and Robotics	
[MV-FT-MPOOL-6 (/mhb/modulepools/MV-FT-MPOOL-6/)]	Wahlpflichtmodule Fahrzeugtechnik	
[MV-MBINFO-MPOOL-6 (/mhb/modulepools/MV-MBINFO-MPOOL-6/)]	Wahlpflichtmodule Maschinenbau mit angewandter Informatik	