

Module Handbook

TUK MODHB Homepage

Module EIT-ISE-112-M-7

Sensor Signal Processing (M, 5.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
EIT-ISE-112-M-7	<i>Sensor Signal Processing</i>	5.0 CP (150 h)

Basedata

CP, Effort	5.0 CP = 150 h
Position of the semester	1 Sem. in WiSe
Level	[7] Master (Advanced)
Language	[EN] English
Module Manager	König, Andreas, Prof. Dr.-Ing. (PROF DEPT: EIT)
Lecturers	König, Andreas, Prof. Dr.-Ing. (PROF DEPT: EIT)
Area of study	[EIT-ISE] Integrated Sensor Systems
Reference course of study	[EIT-88.C48-SG#2021] M.Sc. Automation & Control (A&C) [2021]
Lifecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V+2L	EIT-ISE-112-K-7	P	PROJ-Schein	PL1	5.0	WiSe

- About [EIT-ISE-112-K-7]: Title: "Sensor Signal Processing"; Presence-Time: 56 h; Self-Study: 94 h
- About [EIT-ISE-112-K-7]: The study achievement "[PROJ-Schein] proof of successful completion of the project(s)" must be obtained.
 - It is a prerequisite for the examination for PL1.

Examination achievement PL1

- Form of examination: **oral examination (30 Min.)**
- Examination Frequency: each semester

Evaluation of grades

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

Contents

From [EIT-ISE-112-K-7] Sensor Signal Processing:

- Basic methods of signal analysis and the computation of characteristic and invariant descriptors (features)
- Processing of signals from single sensors und homogeneous or heterogeneous Sensor-Arrays
- Dimensionality reduction of high-dimensional sensor data by linear and non-linear methods, e.g. by explicit selection of features
- Methods der cluster analysis
- Methods for multi-dimensional sensor data analysis: projection and visualisation, fusion
- methods for classification of sensor data: statistical pattern recognition, artificial neural networks, Methods of rule-based and fuzzy classification
- Advanced ptimization methods for parameter- or structure optimization of sensor systems
- Relations, dependencies, and optimization potential between sensor realization, electronics, and algorithmics.
- New aspects of reliable sensor systems (self-x properties)

Competencies / intended learning achievements

After completing this module you can...

- ... explain the relevant principals and methods from the field of Computational Intelligence, in particular for the field of sensor technology.
- ... employ selected relevant methods and their configuration in a common design environment (Matlab).
- ... design, validate, and optimize complete application-specific systems.
- ... adapt and extend the achieved implementation to changing needs.
- ... explain the interdependence of system solution with available, potentially restricted implementation platforms (Sensors/Hardware).

Requirements for attendance of the module (informal)

Modules:

- [EIT-ISE-105-M-2] Electrical Measurement Technique I (M, 4.0 LP)
- [EIT-ISE-106-M-5] Electrical Measurement Technique II (M, 3.0 LP)

Requirements for attendance of the module (formal)

None

References to Module / Module Number [EIT-ISE-112-M-7]

Course of Study	Section	Choice/Obligation
[EIT-88.781-SG#2010] M.Sc. Electrical and Computer Engineering [2010]	[Free Elective Area] Elective Subjects	[W] Elective Module
[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
[EIT-AC-MSC-RCS-WP-CORE-MPOOL-7]	RCS Core Electives
[EIT-EIT-MSC-TW-MPOOL-7]	Technical Elective Modules Master EIT
[EIT-SIAK-DT-ENG-MPOOL]	SIAK Certificate "Digital Transformation" - Modules EIT "Engineering"
[GS-CVT-EE-2022-E-MPOOL-6]	Catalog Electives Electrical and Computer Engineering 2022
[GS-CVT-EE-E-MPOOL-6]	Catalog Electives Electrical and Computer Engineering