Module EIT-AUT-460-M-7

Fault Diagnosis and Fault Tolerant Control (M, 3.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
EIT-AUT-460-M-7	*Fault Diagnosis and Fault Tolerant Control*	3.0 CP (90 h)

Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in SuSe
Level	[7] Master (Advanced)
Language	[EN] English
Module Manager	Zhang, Ping, Prof. Dr.-Ing. (PROF | DEPT: EIT) (/staff/351/)
Lecturers	Zhang, Ping, Prof. Dr.-Ing. (PROF | DEPT: EIT) (/staff/351/)
Area of study	[EIT-AUT] Automation Control
Livecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V	**EIT-AUT-460-K-7** (/mhb/courses/EIT-AUT-460-K-7/)	P	-	PL1	3.0	SuSe

- About **[EIT-AUT-460-K-7]**: Title: "Fault Diagnosis and Fault Tolerant Control"; Presence-Time: 28 h; Self-Study: 62 h

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-AUT-460-K-7] Fault Diagnosis and Fault Tolerant Control (/mhb/courses/EIT-AUT-460-K-7/):

- Fault analysis methods (fault tree analysis, failure modes and effect analysis, criticality analysis)
- Maintenance strategies (e.g. preventive maintenance, risk-based maintenance) and the integration of fault diagnosis in maintenance
- Model-based process monitoring and fault diagnosis methods (observer based approaches, parity space approach)
- Residual generation, residual evaluation and threshold selection
- Methods of fault isolation and identification
- Key performance indices of fault diagnosis systems
- Data-driven fault diagnosis, multivariable statistical data analysis (e.g. principle component analysis, partial least squares, subspace based approaches)
- Fault tolerant control (active fault tolerant control, passive fault tolerant control)
- Basic procedure of carrying out fault diagnosis projects
- Plant asset management (concept, key components and realization).

Competencies / intended learning achievements

After completing this module you can...

- ... design and implement process monitoring and fault diagnosis units for technical systems.
- ... explain the main maintenance strategies in industrial praxis.
- ... carry out fault analysis, so that suitable monitoring and diagnosis functions can be deployed in industrial plants.
- ... explain both model-based and data-driven fault diagnosis approaches.
- ... evaluate the performance of monitoring and diagnosis systems and organize fault diagnosis projects efficiently.
- ... explain the basic principles and have the ability to design fault tolerant automation systems.

Requirements for attendance (informal)

Modules:

- [EIT-AUT-457-M-4] Fundamentals of Automation (M, 5.0 LP) (/mhb/modules/EIT-AUT-457-M-4/)
- [EIT-LRS-504-M-3] Linear Control (M, 5.0 LP) (/mhb/modules/EIT-LRS-504-M-3/)

Requirements for attendance (formal)

None

References to Module / Module Number [EIT-AUT-460-M-7]

Course of Study	Section	Choice/Obligation
[EIT-88.781-SG#2010] M.Sc. Electrical and Computer Engineering [2010] (/mhb/FB-EIT/cos-556/)	Elective Subjects	[W] Elective Module
[EIT-88.?-SG#2021] M.Sc. Electrical and Computer Engineering [2021] (/mhb/FB-EIT/cos-686/)	Technical Elective Modules	[W] Elective Module
[EIT-88.?-SG#2021] M.Sc. Automation and Control (A&C) [2021] (/mhb/FB-EIT/cos-676/)	Major "Connected Automation Systems" (CAS)	[P] Compulsory

Module-Pool	Name
[EIT-AUT-RCS-WP-MPOOL-7 (/mhb/modulepools/EIT-AUT-RCS-WP-MPOOL-7/)]	RCS Core Electives
[GS-CVT-EE-E-MPOOL-6 (/mhb/modulepools/GS-CVT-EE-E-MPOOL-6/)]	Catalog Electives Electrical and Computer Engineering