

Course Manual EA

Electrical Drives

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– General information

Long name Electrical Drives

Approving CModule EA_BaET

Responsible Prof. Dr. Christian Dick
Professor Fakultät IME

Valid from winter semester
2022/23

Level Bachelor

Semester in the year winter semester

Duration Semester

Hours in self-study 60

ECTS 5

Professors Prof. Dr. Christian Dick
Professor Fakultät IME

Requirements Understanding power
electronic topologies
Mechanics - Equation of
motion

Language German, English if
necessary

Separate final exam Yes

Literature

Rik De Doncker, Duco W.J. Pülle, André Veltman:
Advanced Electrical Drives: Analysis, Modeling,
Control - Springer Verlag, 2011

Werner Leonhard: Regelung elektrischer Antriebe
Springer-Verlag, 2. Auflage, 2000

Dierk Schröder, Elektrische Antriebe – Grundlagen
Springer-Verlag

Final exam

Details

It is planned to conduct the summary examination as an oral examination, in individual cases with a high number of candidates also a written examination. The examination ensures that each student has achieved the goals of the L.O. individually.

80% of this summary examination is included in the overall grade. The remaining 20% weighting is based on a lab.

Minimum standard

In a concrete example, the student can explain the dynamic properties of a mechanical load. (Acceleration processes)
The student can display the authorization of coordinate transformations for rotary field drives, explain and apply the transformation himself.

Exam Type

EN mündliche Prüfung, strukturierte Befragung

– Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	Stationary and dynamic behaviour of linear and rotating drives Fundamentals of Magnetic Components Sensors for drives if necessary Drives with the direct current machine Basics for rotary field drives Drives with the asynchronous machine Drives with the synchronous machine Outlook: Drives with the reluctance machine, with the brushless DC machine (BLDC), with the stepper motor
Skills	The students are able to put the acquired knowledge into practice. Students will be able to demonstrate the differences between different drive concepts, recognize advantages and disadvantages and thus take steps in drive synthesis. The students are aware of the importance of drive technology for automation, energy efficiency and electric vehicles.

Special requirements

none

Accompanying material	Lecture script Exercise script
Separate exam	No

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	2
Exercises (shared course)	0

Tutorial (voluntary)

0

– Practical training

Learning goals

Goal type	Description
Knowledge	Dynamic tests with the synchronous machine Dynamic tests with the asynchronous machine
Skills	The student can wire up a drive topology, survey it, analyse it, put it into operation in several steps and finally measure it.

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1
Tutorial (voluntary)	0

Special requirements

none

Accompanying material Lab documents

Separate exam Yes

Separate exam

Exam Type undefined

Details

1st sub-rating: partial mark: entrance certificate. The student is asked to what extent he/she is prepared and has understood the contents to such an extent that participation makes sense. Good contributions, including good questions, are also assessed.

2nd sub-rating: During the internship the supervisors ask various questions, but especially: "What are you doing right now? The answer goes into the evaluation.

3rd sub-rating: After the internship, an elaboration is prepared and assessed.

The interview and the observation of the internship is regarded as an essential form to recognize the competence of the students.

Minimum standard

The students show that they have prepared themselves, that they have understood in advance what the subject of the internship is and that they are actively involved in the internship.