

## Course

# EA - Electrical Drives

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### ^ General information

<b>Long name</b>	Electrical Drives
<b>Approving CModule</b>	<a href="#">EA_BaET</a>
<b>Responsible</b>	Prof. Dr. Christian Dick Professor Fakultät IME
<b>Level</b>	Bachelor
<b>Semester in the year</b>	winter semester
<b>Duration</b>	Semester
<b>Hours in self-study</b>	60
<b>ECTS</b>	5
<b>Professors</b>	Prof. Dr. Christian Dick Professor Fakultät IME
<b>Requirements</b>	Understanding power electronic topologies Mechanics - Equation of motion
<b>Language</b>	German, English if necessary
<b>Separate final exam</b>	Yes

## 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

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.

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## ^ Lecture / Exercises

### Learning goals

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#### 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

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#### 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.

### Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2

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Exercises (whole course)	2
Exercises (shared course)	0
Tutorial (voluntary)	0

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## Separate exam

none

## ^ Practical training

### Learning goals

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#### Knowledge

Dynamic tests with the synchronous machine

Dynamic tests with the asynchronous machine

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#### 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

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## Separate exam

#### Exam Type

interview (discussion) about special issues in scenario, project assignment or literature research

#### 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.