Technology
Arts Sciences
TH Köln

Course Manual EMA

Electrical Machines

Version: 1 | Last Change: 19.09.2019 16:47 | Draft: 0 | Status: vom verantwortlichen Dozent freigegeben

General information

Long name	Electrical Machines
Approving CModule	EMA_BaET
Responsible	Prof. Dr. Wolfgang Evers Professor Fakultät IME
Valid from	summer semester 2022
Level	Bachelor
Semester in the year	summer semester
Duration	Semester
Hours in self-study	60
ECTS	5
Professors	Prof. Dr. Wolfgang Evers Professor Fakultät IME
Requirements	- Laws of the DC and AC circuit - Complex AC calculation - Three-phase systems - Electromagnetism: field strength, flux density, flux, magnetic circuits, induced voltage
Language	German
Separate final exam	Yes

Literature

Rolf Fischer, Elektrische Maschinen, Carl Hanser Verlag, München, 2017, ISBN 978-3-446-45218-3

Final exam

Details	Written examination, in some cases also oral examination, with the following content: - Calculation of the equivalent circuit diagram values and static load cases of a commutator machine - Calculation of the equivalent circuit values and static load cases of a three-phase asynchronous machine - Calculation of the equivalent circuit values and static load cases of a three-phase synchronous machine
Minimum standard	Achieving 50% of the points in the tasks
Exam Type	EN Klausur

− Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	- Transformer * Equivalent circuit diagram * Choice of translation ratio * Operating behavior * Structural design * Efficiency * Growth laws * Three-phase transformer * Autotransformer - DC machine * Construction of the DC machine * Operation of the DC machine * Pole pair number * Excitation field * Structure of the armature winding * Induced voltage, torque, voltage equation * Operating behavior * Permanent magnets * Commutation * Armature reaction - Drehfeldtheorie - Asynchronous machine * Structure, effect * Basic equations, equivalent circuit diagrams * Operating behavior * Pie chart * Speed setting * Asynchronous generator * Squirrel cage - Synchronous machine * Effect * Structural design * Equivalent circuit diagram, phasor diagram * Idle, permanent short * Island operation * Operation on the network
Skills	- Calculation of equivalent circuit values of electrical machines - Calculate static operating points of electrical machines

Special requirements

none

Accompanying material	- Electronic lecture notes - Detailed exercise task collection with solutions
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
Skills	- Plan tests and perform them safely * Analyze, modify and verify experimental setups * Apply security rules - Carry out measurements on electrical machines * Explain results * Evaluate and justify deviations from the theory - Complete complex tasks in a team - summarize, evaluate and interpret results in written form

Expenditure classroom teaching

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

Special requirements

none

Accompanying material	Electronic instructions for the lab exercises
Separate exam	Yes

Separate exam

Exam Type	EN Projektaufgabe im Team bearbeiten (z.B. im Praktikum)
Details	Written test to control the preparation of the lab excercises Evaluation of the preparatory documents (calculation results) Evaluation of the discussion with the students and of the lab exercises on the basis of a structured protocol Evaluation of detailed reports of the lab exercises of the team
Minimum standard	70 % of the written test correctly 80% of the prepared calculation results correct 80 % of the measurement results correct 80 % of the evaluation performed correctly 80 % of the discussion makes sense