

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details						
Code			Academic Year			Semester
EBT412			3			5
Title			T	A	L	ECTS
Electrical Machines			3	2	0	6
Language	German					
Level	Undergraduate	X	Graduate		Postgraduate	
Department / Program	Energy Science and Technology					
Forms of Teaching and Learning	Face-to-face					
Course Type	Compulsory		Elective	X		
Objectives	To learn how Electrical Machines work.					
Content	Physical principles of electromechanical energy conversion; Three-phase systems and rotating magnetic fields; Structure, operation and performance of DC machines, Transformers, Asynchronous machines, Synchronous machines, AC motors; Scope of application; Structure and basics of drivers; Power electronics fundamentals, Motor control with drives.					
Prerequisites	None					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement	None					
Recommended or Required Reading						
Books / Lecture Notes	Elektrische Maschinen, R. Fischer, Springer Verlag, Berlin, 2013. Elektrische Maschienen und Antriebe, K. Fuest, P. Döring, Springer Verlag, Berlin, 2007 Elektrische Antriebe, D. Schröder, Regelung von Antriebssystemen, Springer Verlag, Berlin, 2015.					
Other Sources	Elektrische Antriebe in der Fahrzeugtechnik, G. Babel, Vieweg/Teubner, 2009.					
Additional Course Material						
Documents						
Assignments						
Exams						
Course Composition						
Mathematics und Basic Sciences					%	
Engineering	30				%	

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Engineering Design	30	%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge	40	%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
Total		100

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	3	42
Assignments	5	8	40
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	5	6	30
Laboratory			
Projects			
Final Exam	1	2	2
Total Work Load			158
ECTS Points (Total Work Load / Hour)			6

Learning Outcomes

1	To understand how electrical machines work.
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Weekly Content

1	Physical principles of electromechanical energy conversion
2	Three-phase systems and rotating magnetic fields
3	Construction, operation and performance of DC machines

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4	Transformers, Asynchronous machines, Synchronous machines
5	AC motors; Scope of application
6	
7	
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11	
12	
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14	
15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

P1 Working with modern scientific sources.

P2 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.

P3 Having theoretical and practical skills in the area of Energy Science and Technology.

P4 Having foreign language skills to follow the worldwide advancements in the field of Energy Science and Technology and to be able to discuss them with foreign colleagues.

P5 Having computational skills for research data analysis purposes.

P6 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.

P7 Having knowledge about work occupational work and safety.

Compiled by:

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