

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details						
Code			Academic Year			Semester
EBT302			3			5
Title			T	A	L	ECTS
Numerical Analysis			2	1	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	X	Elective			
Objectives	This course aims to use computer programs to solve complex problems in different fields of study of students.					
Content	Computer Arithmetic, Error Analysis, Systems of Linear Equations, Matrix Factorization, Systems of Nonlinear Equations, Newton's Method, Banach Fixed Point Theorem, Ordinary Differential Equations, Eigenvalue Problems. After completing the course, students understand the concepts of numerical functions, optimization and theories of complex functions.					
Prerequisites	None					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement	None					
Recommended or Required Reading						
Books / Lecture Notes	Dahmen & Reusken: Numerik für Ingenieure und Naturwissenschaftler, Springer-Verlag, 2008. Schwarz & Köckler: Numerische Mathematik, Vieweg+Teubner, 8. Auflage, 2011.					
Other Sources						
Additional Course Material						
Documents						
Assignments						
Exams						
Course Composition						
Mathematics und Basic Sciences	70				%	
Engineering	30				%	
Engineering Design					%	

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Social Sciences			%
Educational Sciences			%
Natural Sciences			%
Health Sciences			%
Expert Knowledge			%
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	3	15	45
Self-Study	15	3	45
Assignments	5	2	10
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations	15	2	30
Laboratory			
Projects	1	15	15
Final Exam	1	3	3
Total Work Load			151
ECTS Points (Total Work Load / Hour)			6
Learning Outcomes			
1			
2			
3			
4			
5			
6			

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7	
8	
9	
10	
11	
12	

Weekly Content

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
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							
11							
12							

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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.	
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