DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details								
Code				**Academic Year**			**Semester**	
NWI206				2			3	
Title				**T**	**A**	**L**	**ECTS**	
Elektrotechnik				2	1	2	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	The aim of this course is to teach students the fundamental circuit components and the basics of direct and alternating current circuits built with these components. Students who successfully complete the course will gain proficiency in analytical calculation methods for circuits in the time domain and will be able to use these skills for circuit modeling and analysis in subsequent courses.							
Content	The course covers topics such as calculations in direct current (DC) circuits, equivalent sources, the superposition theorem, inductance, capacitance, coils, capacitors, mutual inductance, the behavior of RC and RL circuits, step response, sequential switching circuits, steady-state response, second-order circuits, analysis of RLC circuits, alternating current (AC) circuits, sinusoidal steady-state analysis, impedance, admittance, complex number calculations, phasor representation, power in AC circuits, complex power, apparent power, power factor, power transfer, efficiency, single-phase transformers, equations, equivalent circuits, multiphase systems, symmetrical three-phase systems, and power in three-phase systems.							
Prerequisites								
Coordinator								
Lecturer(s)	Dr. Erdem Onur ÖZYURT							
Assistant(s)	Dr. Erdem Onur ÖZYURT							
Work Placement	None							

Recommended or Required Reading	
Books / Lecture Notes	• Grundlagen der Elektrotechnik 1-2, M. Albach, Pearson, 2011 • Elektrotechnik für Ingenieure 1-2, W. Weißgerber, Springer, 2015 • Electric Circuits, JW Nilsson, S Riedel, Pearson, 2015
Other Sources	

Additional Course Material	
Documents	
Assignments	

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Exams		
Course Composition		
Mathematics and Basic Sciences		%
Engineering	100	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam	2	40
Quiz	3	10
Assignments	5	10
Attendance		
Recitations		
Projects		
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	2	28
Self-Study	12	6	72
Assignments	5	4	20
Presentation / Seminar Preparation			
Midterm Exam	2	2	4
Recitations	14	1	14
Laboratory	14	2	28
Projects			
Final Exam	1	2	2
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes	
1	Students will be able to identify basic circuit components and recall circuit laws.

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COURSE SYLLABUS

2	They will be able to apply fundamental circuit theorems in circuit analysis.
3	Students will also be capable of analyzing linear circuits in the time domain.
4	They will understand the models of electronic circuit components and use them in the time-domain analysis of electronic circuits.
Weekly Content	
1	Calculations in Direct Current (DC) Circuits
2	Equivalent Sources, Superposition Theorem
3	Inductance, Coils, Mutual Inductance
4	Capacitance, Capacitors
5	Behavior of RC and RL Circuits, Step Response
6	Sequential Switching Circuits, Steady-State Response
7	Second-Order Circuits, Analysis of Parallel RLC Circuits
8	Midterm Exam
9	Analysis of Series RLC Circuits
10	AC Circuits, Sinusoidal Steady-State Analysis, Impedance, Admittance
11	Complex Number Calculations, Phasor Representation
12	Power in AC Circuits, Complex Power, Apparent Power
13	Power Factor, Power Transfer, Efficiency
14	Single-Phase Transformers, Equations, Equivalent Circuits
15	Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems
16	Final Exam

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

	P1	P2	P3	P4	P5	P6	P7	P8	P9
1		4	4	4	3				
2		4	4	3	3				
3		4	3	3	3				
4		4	4	4	3				

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

Compiled by:	Yusuf Karakaş
Date of Compilation:	25.01.2025