

## DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY COURSE SYLLABUS

Course Details									
Code	ode					ear	Seme	Semester	
NWI206	/1206						3		
Title	T A L ECTS								
Elektrotechnik				2	2 1 2 6				
Language									
Language		German							
	Undergraduate X Graduate Postgraduate								
Department / Program Forms of Teaching and	Energy Science and	echnology							
Learning	Face-to-face	_							
Course Type	Compulsory		X	Ele	ective				
Objectives	The aim of this court basics of direct and a successfully complet circuits in the time analysis in subseque	alternating te the cours domain an	current circuit e will gain pro	ts built wit oficiency ir	h these n analy	comp tical ca	onents. S lculation	tudents who methods for	
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 ÖZY	URT							
Assistant(s)	Dr. Erdem Onur ÖZY	URT							
Work Placement	None								
Recommended or Required R	eading								
Books / Lecture Notes	Elektrotechr	ik für Ingen	echnik 1-2, N ieure 1-2, W. son, S Riedel,	Weißgerb	er, Spri		015		
Other Sources									
Additional Course Material									
Documents									
Assignments									



## DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY **COURSE SYLLABUS**

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 / Sem Preparation	ninar							
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								
<b>1</b> S	Students will be able to identify basic circuit components and recall circuit laws.							



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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.    4  They will understand the models of electronic circuit components and use them in the time-domain analysis of electronic circuits.    Vertex Ver					JURSE SY	LLABUS					
4  They will understand the models of electronic circuit components and use them in the time-domain analysis of electronic circuits.    Weekly Conternation of electronic circuits.  Second State Sta	2	They will be able to apply fundamental circuit theorems in circuit analysis.									
4  of electronic circuits.    Weekly Conternation of the contract	3	Students will also be capable of analyzing linear circuits in the time domain.									
1Calculations in Direct Current (DC) Circuits2Equivalent Sources, Superposition Theorem3Inductance, Coils, Mutual Inductance4Capacitance, Capacitors5Behavior of RC and RL Circuits, Step Response6Sequential Switching Circuits, Steady-State Response7Second-Order Circuits, Analysis of Parallel RLC Circuits8Midterm Exam9Analysis of Series RLC Circuits10AC Circuits, Sinusoidal Steady-State Analysis, Impedance, Admittance11Complex Number Calculations, Phasor Representation12Power in AC Circuits, Complex Power, Apparent Power13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equivalons, Equivalons, Phasor Representation15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Utcome to Program Objective LifesticationPower Transfer, Efficiency14Single-Phase Transformers, Equivalor, Equivalor, Equivalor, Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamVector Vector Vect	4									n analysis	
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, Equivalors, Equivalent Circuits    15  Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems    16  Final Exam    P1  P2  P3  P4  P5  P6  P7  P8  P9    14  3 <th>Weekly Conter</th> <th>nt</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	Weekly Conter	nt									
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    Pometrining Outcomes to Program Objectives (1-5)    A 4  4  3  6  6    A  Pometrining Outcomes to Program Objectives (1-5)    Outcomes to Program Objectives (1-5)	1	Calcula	ations in Direc	t Current (DC)	Circuits						
4Capacitance, Capacitors5Behavior of RC and RL Circuits, Step Response6Sequential Switching Circuits, Steady-State Response7Second-Order Circuits, Analysis of Parallel RLC Circuits8Midterm Exam9Analysis of Series RLC Circuits10AC Circuits, Sinusoidal Steady-State Analysis, Impedance, Admittance11Complex Number Calculations, Phasor Representation12Power In AC Circuits, Complex Power, Apparent Power13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Utications17P118P219P319P410Acticutation State Analysis, Equivalent Circuits13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Utication State Analysis A2P32P42P32P62P73P91443334343544443434<	2	Equiva	lent Sources,	Superposition	Theorem						
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    P1  P2  P3  P4  P5  P6  P7  P8  P9    1  Q  P3  P4  P3  P6  P7  P8  P9    14  Single-Vitation  Single Phase Transformers, Equations, Equivalent Circuits  Single Phase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems  Single Pinal Exam    Contribution of Learning Outcomes  P7  P8  P9    A  A  A <th>3</th> <th>Inducta</th> <th>ance, Coils, M</th> <th>utual Inductar</th> <th>ice</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	3	Inducta	ance, Coils, M	utual Inductar	ice						
6Sequential Switching Circuits, Steady-State Response7Second-Order Circuits, Analysis of Parallel RLC Circuits8Midterm Exam9Analysis of Series RLC Circuits10AC Circuits, Sinusoidal Steady-State Analysis, Impedance, Admittance11Complex Number Calculations, Phasor Representation12Power in AC Circuits, Complex Power, Apparent Power13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamVertex Vertex Vert	4	Capaci	tance, Capaci	tors							
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  3  3  4  3    3  4  3  3  4  4  3  4  4    13  Power to thermediate 4: High 5: Very High  P5  P6  P7  P8  P9    14  3  3  4  3  3  4  4  4    14  4  4  4  3  4<	5	Behavi	or of RC and F	RL Circuits, Ste	p Response						
8Midterm Exam9Analysis of Series RLC Circuits10AC Circuits, Sinusoidal Steady-State Analysis, Impedance, Admittance11Complex Number Calculations, Phasor Representation12Power in AC Circuits, Complex Power, Apparent Power13Power in AC Circuits, Complex Power, Apparent Power14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Outcomers to Program Objectives (1-5)P1P2P3P4P5P6P7P8P91443343244334434334343443343434333434444334444443344444433444434443444444434444444447999144434444699914443	6	Sequer	ntial Switching	g Circuits, Stea	dy-State Res	ponse					
9Analysis of Series RLC Circuits10AC Circuits, Sinusoidal Steady-State Analysis, Impedance, Admittance11Complex Number Calculations, Phasor Representation12Power in AC Circuits, Complex Power, Apparent Power13Power factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamP1P2P3P4P5P6P7P8P914433667P3P429914433666777 <th< th=""><th>7</th><th>Second</th><th>d-Order Circui</th><th>ts, Analysis of</th><th>Parallel RLC</th><th>Circuits</th><th></th><th></th><th></th><th></th><th></th></th<>	7	Second	d-Order Circui	ts, Analysis of	Parallel RLC	Circuits					
AC Circuits, Sinusoidal Steady-State Analysis, Impedance, Admittance11Complex Number Calculations, Phasor Representation12Power in AC Circuits, Complex Power, Apparent Power13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Outcomes to Program Objectives (1-5)12P1P2P3P4P5P6P7P8P9144334442443344433344434434443444344Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	8	Midter	m Exam								
11Complex Number Calculations, Phasor Representation12Power in AC Circuits, Complex Power, Apparent Power13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamP1P2P3P4P5P6P7P8P9144324433443344344434443Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	9	Analys	is of Series RL	C Circuits							
12Power in AC Circuits, Complex Power, Apparent Power13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Outcomes to Program Objectives (1-5)Contribution of Learning Outcomes to Program Objectives (1-5)2P1P2P3P4P5P6P7P8P9144336624433666344433664443366634443366Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	10	AC Circ	cuits, Sinusoid	al Steady-State	e Analysis, Ir	npedance,	Admittanc	e			
13Power Factor, Power Transfer, Efficiency14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Outcomes to Program Objectives (1-5)P1P2P3P4P5P6P7P8P9144444449P1P2P3P4P5P6P7P8P914444441P1P2P3P6P7P8P91444443AAAAAAAAAAAAAAAAA <th>11</th> <th>Comple</th> <th>ex Number Ca</th> <th>lculations, Pha</th> <th>asor Represe</th> <th>entation</th> <th></th> <th></th> <th></th> <th></th> <th></th>	11	Comple	ex Number Ca	lculations, Pha	asor Represe	entation					
14Single-Phase Transformers, Equations, Equivalent Circuits15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Outcomes to Program Objectives (1-5) $\sum P1$ P2P3P4P5P6P7P8P9144334112443331113444333111Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	12	Power	in AC Circuits	, Complex Pow	ver, Apparen	t Power					
15Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems16Final ExamContribution of Learning Outcomes to Program Objectives (1-5)Number of Learning Outcomes to Program Objectives (1-5)P6P7P8P91443000244330003433000044430000Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	13	Power	Power Factor, Power Transfer, Efficiency								
16  Final Exam    Contribution of Learning Outcomes to Program Objectives (1-5)    P1  P2  P3  P4  P5  P6  P7  P8  P9    1  4  4  3  3  1  1  1    2  4  4  3  3  1  1  1    3  4  4  3  3  1  1  1    4  4  3  3  3  1  1  1    4  4  3  3  3  1  1  1    4  4  4  3  3  3  1  1  1    6  4  4  4  3  3  3  1  1  1  1    6  4  4  4  3  3  1  1  1  1    1  4  4  4  3  3  1  1  1  1  1    1  4  4  4  3  3  1	14	Single-	Single-Phase Transformers, Equations, Equivalent Circuits								
P1  P2  P3  P4  P5  P6  P7  P8  P9    1  4  4  3  1 <t< th=""><th>15</th><th colspan="8">Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems</th><th></th></t<>	15	Multiphase Systems, Symmetrical Three-Phase Systems, Power in Three-Phase Systems									
P1    P2    P3    P4    P5    P6    P7    P8    P9      1    4    4    4    3  <	16	Final E	xam								
1  4  4  3  10<	Contribution of	f Learni	ng Outcome	s to Program	Objectives	s <b>(1-5</b> )					
2  4  4  3  3			P1	P2	P3	P4	P5	P6	P7	P8	P9
3433344443Image: Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	1			4	4	4	3				
4443Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	2		4	4	3	3					
Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	3	3		4	3	3	3				
Compiled by: Yusuf Karakaş	Contribution Lev	el 1: Low	/ 2: Low-interi	mediate 3: Inte	ermediate 4:	High 5: Ve	ery High				
	Compiled by:	Compiled by: Yusuf Karakaş									
Date of Compilation: 25.01.2025	Date of Compilat										