

DEPARTMENT OF MATERIALS SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details					
Code		Academic Year		Semester	
NWI206		2		4	
Title		T	A	L	ECTS
Introduction to Electrotechnics		2	1	2	6
Language	German				
Level	Undergraduate	X	Graduate	Postgraduate	
Department / Program	Materials Science and Technology				
Forms of Teaching and Learning	Face to face				
Course Type	Compulsory		Elective	X	
Objectives	This course aims to provide the students with an understanding of basic electrical circuits and circuit elements, the ability to formulate and solve the differential equations describing time behavior of circuits containing energy storage elements. The students successfully completing this course will be able to use abstractions on which analysis and design of electrical and electronic circuits and systems are based, how complex devices are modeled and how the models are used in the design and analysis in the following courses.				
Content	Analysis of DC circuits, Source transformation, superposition, Inductance, capacitance, inductor, capacitor, mutual inductance, Response of first order RL and RC circuits, natural and step responses, Sequential switching, unbounded response, Natural and step responses of RLC circuits, AC circuits, sinusoidal steady-state analysis, impedance, admittance, Complex analysis of AC circuits, phasor diagrams, Power in AC circuits, complex power, average power, Power factor, maximum power transfer, efficiency, Transformer, equivalent circuits, Balanced three-phase circuits, power				
Prerequisites					
Coordinator	Asist Prof.Dr. Murat Tümer				
Lecturer(s)	Asist Prof.Dr. Murat Tümer				
Assistant(s)	Research Assist. Merve Teke Budaklı Research Assist. Ferruh İlhan				
Work Placement	No				
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					

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Documents			
Assignments			
Exams			
Course Composition			
Mathematics und 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	3	42
Self-Study	14	5	70
Assignments	5	4	20
Presentation / Seminar Preparation			
Midterm Exam	2	2.5	5
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	3	3
		Total Work Load	168
	ECTS Points (Total Work Load / Hours)		6

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Learning Outcomes

1	Öğrenciler temel devre elemanlarını tanıyıp devre yasalarını hatırlayabilecektir.
2	Öğrenciler temel devre teoremlerini devre analizlerinde kullanabilecektir.
3	Öğrenciler lineer devrelerin zaman uzayındaki analizlerini gerçekleyebilecektir.
4	Öğrenciler elektronik devre elemanlarının modellerini anlayabilecek ve bunları elektronik devrelerin zaman uzayındaki analizlerinde kullanabilecektir.
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Weekly Content

1	Doğru akım (DC) devrelerinde hesaplama
2	Eşdeğer kaynaklar, üst üste bindirme (süperpozisyon) teoremi
3	Endüktans, bobin, karşılıklı endüktans
4	Kapasitans, kondansatör
5	RC ve RL-devrelerinin davranışı, basamak tepkisi
6	Sıralı anahtarlamalı devre, sınırsız tepki
7	İkinci dereceden devreler, paralel RLC devrelerinin analizleri
8	Seri RLC devrelerinin analizleri
9	AC devreler, sinüzoidal durgun durum analizi, empedans, admitans
10	Karmaşık sayı hesaplamaları, fazör gösterimi
11	AC devrelerinde güç, karmaşık güç, görünür güç
12	Güç faktörü, güç aktarımı, verimlilik
13	Tek fazlı trafolar, denklemler, eşdeğer devreler
14	Çok fazlı sistemler, simetrik üç fazlı sistemler, üç fazlı sistemlerde güç
15	

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

	P1	P2	P3	P4	P5	P6	P7
1	5	3					
2	3	5	4				



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3	4	5	3				
4	4	5	3				
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							