DEPARTMENT OF MATERIALS SCIENCE AND TECHNOLOGY **COURSE SYLLABUS**

Course Details									
Code				Acad	emic Ye	ear	Semester		
NW1204				2	2		4		
Title				Т	Α	L	ECTS		
Measurement Techniques					1	1	6		
Language	German	German							
Level	Undergraduate	Undergraduate X Graduate				Postgra	aduate		
Department / Program	Materials Science	Materials Science and Technology							
Forms of Teaching and Learnir	g Face-to-face	Face-to-face							
Course Type	Compulsory	iry X			ective				
Objectives	Introduction of Me operation amplifie current, time, Pha	Introduction of Measurement Technique, electrical circuits and their analysis, using of operation amplifier to solve the common measurement practice. Measurement of voltage, current, time, Phase (simulation)					nalysis, using of surement of voltage,		
Content	International unit system, Concept of electrical field, potential, voltage, current, phase. Analyse of LTI circuits using sinus generators, phasor. Kirchhoff, Thevenin, Norton, Superposition. Voltage and current divider. Operation amplifier and its basic parameter. The basic circuits build with operation amplifier (see pls. weekly content for details)						e, current, phase. nin, Norton, s basic parameter. nt for details)		
Prerequisites	-								
Coordinator	-								
Lecturer(s)	Dr. Sungur Aytaç								
Assistant(s)	-	-							
Work Placement	-	-							
Recommended or Required Reading									
Books / Lecture Notes	Lecture notes (Germa	Lecture notes (German & Turkish), appendices, user guide for Multisim							
Other Sources	O. Marti et. al., Vorlesungsskript, Physikalische Elektronik und Messtechnik, Uni Ulm, 2002 T. Mühl, Einführung in die elektrische Messtechnik, Teubner, 2. Auflage, 2005 W. Nawrocki, Measurement Systems and Sensors, Artech House, 2005 Anhänge : Komplex Zahlen PTB Mitteilungen, 2012, Heft 1 Solved and unsolved problems								
Additional Course Material									
Documents	Notes on. Fourier series, MATLAB,								
Assignments	Problems for advance	Problems for advanced topics							
Exams	1 intermediate exam								
Course Composition									



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Mathematics un Sciences	d Basic		40%		
Engineering				60%	
Engineering Desi	ign			%	
Social Sciences			%		
Educational Scie	nces		%		
Natural Sciences	;		%		
Health Sciences			%		
Expert Knowledg	ge		%		
Assessment					
Activit	ty		Percentage (%)		
Midterm Exam			40%		
Quiz					
Assignments					
Attendance					
Recitations					
Projects					
Final Exam	1			60%	
Total 100					
ECTS Points and	d Work Load				
ECTS Points and Activit	d Work Load ty	Count	Duration	Work Load (Hours)	
ECTS Points and Activit Lectures	d Work Load ty	Count 12	Duration 4	Work Load (Hours) 48	
ECTS Points and Activit Lectures Self-Study	d Work Load ty	Count 12 12	Duration 4 4	Work Load (Hours) 48 48	
ECTS Points and Activit Lectures Self-Study Assignments (pro für midterm examples	d Work Load ty eparation m)	Count 12 12 12 1	Duration 4 4 15	Work Load (Hours) 48 48 48 15	
ECTS Points and Activit Lectures Self-Study Assignments (pro für midterm exam Presentation / So Preparation	d Work Load ty eparation m) eminar	Count 12 12 12 1	Duration 4 4 15	Work Load (Hours) 48 48 15	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exam Presentation / So Preparation Midterm Exam	d Work Load ty eparation m) eminar	Count 12 12 1 1	Duration 4 4 15 2	Work Load (Hours) 48 48 15 2	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exam Presentation / Se Preparation Midterm Exam Recitations (duri	eparation m) eminar	Count 12 12 1 1 1	Duration 4 4 15 2	Work Load (Hours) 48 48 15 2	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exau Presentation / Se Preparation Midterm Exam Recitations (duri Laboratory (simu	d Work Load ty eparation m) eminar ing lectures) ulation)	Count 12 12 1 1 1 1 5	Duration 4 4 15 2 10	Work Load (Hours) 48 48 15 2 2 50	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exan Presentation / So Preparation Midterm Exam Recitations (duri Laboratory (simu Projects	d Work Load ty eparation m) eminar ing lectures) ulation)	Count 12 12 1 1 1 1 5	Duration 4 4 15 2 10	Work Load (Hours) 48 48 15 2 2 50	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exact Presentation / Se Preparation Midterm Exam Recitations (duri Laboratory (simu Projects Final Exam and p for it	d Work Load ty eparation m) eminar ing lectures) ulation) preparation	Count 12 12 1 1 1 5 5	Duration 4 4 15 2 10 27	Work Load (Hours) 48 48 15 2 2 50 27	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exam Presentation / Se Preparation Midterm Exam Recitations (duri Laboratory (simu Projects Final Exam and p for it	d Work Load ty eparation m) eminar ing lectures) ulation) preparation	Count 12 12 1 1 1 5 5 1	Duration 4 4 15 2 10 27 Total Work Load	Work Load (Hours) 48 48 15 2 2 50 27 190	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exam Presentation / So Preparation Midterm Exam Recitations (duri Laboratory (simu Projects Final Exam and p for it	d Work Load ty eparation m) eminar ing lectures) ulation) oreparation	Count 12 12 12 1 1 1 5 1 EC	Duration 4 4 15 2 10 27 Total Work Load Total Work Load / Hours)	Work Load (Hours) 48 48 48 15 2 2 50 27 190 6,3	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exam Presentation / Se Preparation Midterm Exam Recitations (duri Laboratory (simu Projects Final Exam and p for it	d Work Load	Count 12 12 12 1 1 1 1 1 1 1 1 1 1 EC	Duration 4 4 15 2 10 27 Total Work Load Total Work Load	Work Load (Hours) 48 48 15 2 2 50 50 27 190 6,3	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exact Presentation / Se Preparation Midterm Exam Recitations (duri Laboratory (simu Projects Final Exam and p for it Learning Outcoon 1	d Work Load ty eparation m) eminar ing lectures) ulation) oreparation omes Introduction	Count 12 12 1 1 1 5 1 EC to measurement technique	Duration 4 4 15 2 2 10 27 Total Work Load TS Points (Total Work Load / Hours) es, try to create a basis, die also benef	Work Load (Hours) 48 48 15 2 2 50 27 190 6,3 icial for following lectures	
ECTS Points and Activit Lectures Self-Study Assignments (pro- für midterm exam Presentation / Se Preparation Midterm Exam Recitations (duri Laboratory (simu Projects Final Exam and p for it Learning Outcoon 1 2	d Work Load ty eparation m) eminar ing lectures) ulation) oreparation omes Introduction Physical inte	Count 12 12 12 1 1 1 5 1 EC to measurement technique	Duration 4 4 15 2 2 10 27 Total Work Load Total Work Load Total Work Load Foints (Total Work Load / Hours) es, try to create a basis, die also benef s, trying to teach the analytical, critica	Work Load (Hours) 48 48 48 15 2 2 50 27 190 6,3 icial for following lectures I and creative thinking.	

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4	Discussion about the benefit of working in groups.								
Weekly Content									
1	Introduction to measurement techniques, Basic Terms, international Unit System								
2	Electric field	, potential, vo	ltage, current	, phase differe	nce, Power				
3	Linear Time Independent (LTI) circuits, analysis of LTI circuits which forced by sinus generators, Fourier Series								
4	Phasor, w domain, Kirchhoff equations, Thevenin and Norton equivalent circuits, superposition								
5	Operation amplifier (short OPA) and its basic parameter								
6	Circuits with OPAs which are find a wide praxis in the measurement technique								
7	Introducing of simulation program and its user interface								
8	Inverting and non-inverting OPA circuits								
9	Summing and differential amplifier, Instrumentation Amplifier, Integrator, differentiator								
10	Log Amplifier, Voltage to Current, Current to Voltage converters								
11	LP, BP, HP Filter								
12	LP, BP, HP Filter								
13	Average builder, voltage follower, Diode and diode OPA circuits								
14									
15									
Contribution of Learning Outcomes to Program Objectives (1-5)									
	P1	P2	P3	P4	P5	P6	P7	P8	
1	5	5	5	5	5	5	5	5	
Contribution Lev	Contribution Level1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High								
https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=207									
Compiled by:	Compiled by: Dr. Sungur Aytaç								
Date of Compilation:		15.05.2022							