

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
EBT328	2			4
Title	T	A	L	ECTS
Measurement Techniques	2	1	1	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		Elective	x
Objectives	The objective of this course is to equip students with the fundamental knowledge and skills required to perform accurate and reliable measurements in engineering applications. The course aims to teach basic concepts such as the structure of measurement systems, measurement errors, calibration, sensitivity, and accuracy. Additionally, it is intended that students become familiar with the methods and tools used in measuring various physical quantities and learn to use these systems effectively.			
Content	The course covers the fundamental components and functioning of measurement systems; it addresses concepts such as accuracy, precision, calibration, and error analysis in measurements. It includes methods and instruments for measuring physical quantities such as temperature, pressure, flow, force, velocity, acceleration, and electrical parameters. The course also introduces analog and digital measurement systems, data acquisition, signal conditioning, sampling, and data analysis techniques. Through laboratory practices, students gain hands-on experience in the use of sensors and transducers.			
Prerequisites	None			
Coordinator	Dr. Meltem KARAİSMAİLOĞLU ELİBOL			
Lecturer(s)	Dr. Meltem KARAİSMAİLOĞLU ELİBOL			
Assistant(s)	None			
Work Placement	None			
Recommended or Required Reading				
Books / Lecture Notes	<ul style="list-style-type: none"> Lecture notes 			
Other Sources	<ul style="list-style-type: none"> J. Niebuhr, G. Lindner: „Sensörlerle fiziksel ölçüm tekniği: Fiziksel Messtechnik mit Sensoren“, 5. Aufl., Oldenbourg, 2005. E. Schrüfer: „Elektriksel ölçüm teknikleri: Elektrische Messtechnik: Messung elektrischer und nichtelektrischer Größen“, 7. Aufl., Hanser, 2001 J. Hoffmann: „ölçüm Tekniği El kitabı“, 4. Aufl., Hanser, 2004 			

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	<ul style="list-style-type: none"> U. Kiencke, R. Eger: „Ölçüm Tekniği: Messtechnik“, 6. Aufl., Springer, 2005.
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Additional Course Material

Documents	-
Assignments	-
Exams	1 Midterm exam + 1 Final exam

Course Composition

Mathematics and Basic Sciences	30	%
Engineering	70	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	25
Quiz	-	-
Assignments	-	-
Attendance	-	-
Recitations	14	15
Projects	-	-
Final Exam	1	60
	Total	100

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	10	6	60
Assignments	4	8	32
Presentation / Seminar Preparation	-	-	-
Midterm Exam	1	3	3
Recitations	14	2	28
Laboratory	14	1	14
Projects	-	-	-
Final Exam	1	3	3

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Total Work Load	168
ECTS Points (Total Work Load / Hour)	6

Learning Outcomes

1	Gains an understanding of measurement theory.
2	Acquires knowledge about sensors.
3	Learns how to prepare uncertainty contribution budgets and calculate measurement uncertainty.
4	Develops teamwork skills in a laboratory environment.

Weekly Content

1	Introduction to Measurement Technology
2	Introduction to Laboratory Practices and Safety Rules
3	Metals and Semiconductors
4	Measurement of Electrical Quantities
5	Measurement of Electrical Quantities
6	Active and Passive Sensors
7	Measurement of Non-Electrical Quantities
8	Midterm Exam
9	Measurement of Non-Electrical Quantities
10	Characteristics of Transducers
11	Measurement of Circuits
12	Digital Measurement Technologies
13	Various Examples from Industry
14	Measurement Errors and Statistical Evaluation
15	Static and Dynamic Behavior of Measuring Instruments
16	Final Exam

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

	P1	P2	P3	P4	P5	P6	P7	P8	P9
1					5		4		
2					5		4		
3					5		4		
4					5		4		

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

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