

ELECTROCHEMICAL SENSORS

1	Course Title:	ELECTROCHEMICAL SENSORS	
2	Course Code:	KIM6020	
3	Type of Course:	Optional	
4	Level of Course:	Third Cycle	
5	Year of Study:	1	
6	Semester:	2	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. MEHMET HALUK TÜRKDEMİR	
15	Course Lecturers:	Yok	
16	Contact information of the Course Coordinator:	hturkdemir@uludag.edu.tr 0224 2941741	
17	Website:		
18	Objective of the Course:	To bring general information about electrochemical sensors, practical and preparation knowledge and to give current sampling	
19	Contribution of the Course to Professional Development:	General concepts and types of sensors, electrochemical-based sensor types, preparation and measurement principles, and current samplings	
20	Learning Outcomes:		
		1	Definition of electrochemical sensors, knows their characteristics and classification
		2	Working principles of electrochemical sensors and different from other types of sensors are known
		3	Approaches to preparing electrochemical sensors, chemical and biological processes utilized can compare
		4	Aware of electrochemical sensors uses area; LC, CE and others
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21	Course Content:		
		Course Content:	
Week	Theoretical	Practice	
1	Electrochemical sensor definition, historical development processes		
2	Differences from the other sensor and transducer systems, comparisons in terms of precision, service life and maintenance requirements		

3	Classification of electrochemical sensors	
4	Sensor preparation approaches utilized chemical and biological components, the sensor surface modifications	
5	Potentiometric sensors, developments and constructions	
6	Current examples of potentiometric sensors	
7	Conductometric sensors, current samples	
8	Coulometric sensors, measurement principles and current sampling	
9	Field-effect sensors, preparations, measurement principles, areas of use	
10	General reminders, description of unifying concepts and measurement examples, numerical calculations	
11	Amperometric sensors, constructions, measurement principles	
12	Amperometric sensors for use in CE and LC	
13	Voltammetry based sensors, preparations and measurement principles	
14	Voltammetric sensors and usage areas, current samplings	
22	Textbooks, References and/or Other Materials:	<ol style="list-style-type: none"> 1. J. Wang, Analytical Electrochemistry, Wiley, 2006 2. Sensor Technology Handbook, Ed: Jon S. Wilson, Wiley 2005 3. P.T. Kissenger and W.R. Heineman. Laboratory Tech. in Electroanalytical Chem. Marcel-Dekker Inc. 4. Electrochemical Detection in HPLC, Hewlet-Packard 1989. 5. Electroanalytical Methods for Biological Materials, Ed: A. Brajter-Toth, J. Q. Chambers, Marcel Dekker, Inc. 2002
23	Assesment	
TERM LEARNING ACTIVITIES		
	NUMBE R	WEIGHT
Midterm Exam	1	25.00
Quiz	0	0.00
Home work-project	2	15.00
Final Exam	1	60.00
Total	4	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course	Classical written exams and time-limited personal homeworks will be used and absolute evaluation will be made.	
24	ECTS / WORK LOAD TABLE	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	2.00	28.00
Homeworks	2	15.00	30.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	35.00	35.00
Others	0	0.00	0.00
Final Exams	1	40.00	40.00
Total Work Load			175.00
Total work load/ 30 hr			5.83
ECTS Credit of the Course			6.00

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	4	0	4	0	0	0	0	3	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low		2 low			3 Medium			4 High			5 Very High				