



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Electrochemical Sensors							
Course Code		KİM610		Couse Level		Third Cycle (Doctorate Degree)			
ECTS Credit	8	Workload	200 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		Teaching basic principles and equations of electrochemistry and introduction of electrochemical sensors and its working principles							
Course Content		Introducing potentiometry, coulometry, amperometry, voltammetry and electrochemical impedance spectrometry techniques and teaching the working principles of sensors based on these techniques							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	35
Attending Lectures	10	20
Assignment	6	25

Recommended or Required Reading

1	Fundamentals of Electroanalytical Chemistry. P. Monk. John Wiley& Sons, 2002
2	Principles of Chemical and Biological Sensors. D. Diomond. John Wiley&Sons, 1998

Week	Weekly Detailed Course Contents	
1	Theoretical	Potentiometry theory and problem solving
2	Theoretical	Working principle of potentiometric sensors
3	Theoretical	Working principle of pH glass electrode and evaluation of literature studies based on potentiometric sensors
4	Theoretical	Koulometry theory and problem solving
5	Theoretical	Kulometric techniques in electrode modification
6	Theoretical	Amperometry theory and problem solving
7	Theoretical	Working principle of amperometric sensors
8	Theoretical	Evaluation of the working principles of amperometric glucose electrode and studies in literature based on amperometric sensors
9	Theoretical	Midterm
10	Theoretical	Voltammetry theory and problem solving
11	Theoretical	Working principle of voltammetric sensors
12	Theoretical	Evaluation of literature studies based on voltammetric sensors
13	Theoretical	Electrochemical impedance spectrometry theory
14	Theoretical	Working principle of the sensors based on electrochemical impedance spectrometry
15	Theoretical	Evaluation of studies in the literature based on electrochemical impedance spectrometry
16	Theoretical	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	0	3	42
Assignment	4	0	10	40
Seminar	4	0	2	8
Midterm Examination	1	48	2	50



Final Examination	1	58	2	60
Total Workload (Hours)				200
[Total Workload (Hours) / 25*] = ECTS				8
*25 hour workload is accepted as 1 ECTS				

Learning Outcomes

1	Define and classify the sensor
2	To give information about electrochemical sensors and biosensors
3	To learn the working principles of potentiometric sensors and to discuss some applications
4	To learn working principles of amperometric sensors and to discuss some applications
5	To learn working principles of voltammetric sensors and to discuss some applications
6	To learn the working principles of the sensors based on electrochemical impedance spectrometry and to discuss some applications

Programme Outcomes (Chemistry Doctorate)

1	Depending on the master degree competences, develops, insights and innovates current and advanced knowledge and/or research in proficiency level.
2	Gains high skill levels in using research methods in the field of his/her study.
3	Comprehends the interaction between disciplines related to his/her field. Reaches to original results using his/her expertise in order to analyze, synthesize and evaluate new and complicated ideas.
4	Enlarges the boundaries of his/her field of knowledge by publishing at least one research paper in national and/or international peer-reviewed journals.
5	Defends his/her original opinions related to his/her field before authority and communicates effectively illustrating his/her competence.
6	May communicate and debate written, orally and visually in European Language Portfolio level C1.
7	Follows the developments in computer software and information and communication technologies developed for his/her research area and uses these in order to solve research problems.
8	Collaborates for scientific research with national and international research teams.
9	Contributes to the course of creation and maintenance of knowledge based society and by introducing the scientific, social and cultural developments to the society he/she is living in.

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5	L6
P1	3	3	3	3	3	3
P2	2	2	2	2	2	2
P3	3	3	3	3	3	3
P4	3	3	3	3	3	3
P5	4	4	4	4	4	4
P6	2	2	2	2	2	2
P7	3	3	3	3	3	3
P8	3	3	3	3	3	3
P9	2	2	2	2	2	2

