

## DEPARTMENT OF MATERIALS SCIENCE AND TECHOLOGY **COURSE SYLLABUS**

Course Details								
Code					emic Ye	ar	Semester	
NWI201				2	2		3	
Title				Т	Α	L	ECTS	
Physical Chemistry I				3	1	1	6	
Language	German							
Level	Undergraduate	х	Graduate		Postgraduate			
Department / Program	Materials Science a	and Technolo	ogy					
Forms of Teaching and Learning	Face to face							
Course Type	Compulsory		Х	Ele	ctive			
Objectives	The students gain knowledge about the general principles for the description of physico- chemical contexts. They understand the basics of chemical and electrochemical equilibria and can apply them to different reactions. They are capable of independently performing and evaluating physical-chemical experiments.							
Content	General chemistry: Description of molecular interactions, ideal and real gases, gas mixtures, states of aggregation, single and binary systems with the phases gaseous / liquid / solid, substance separation; Thermodynamics: Thermodynamic functions ( $\Delta$ U, $\Delta$ H, $\Delta$ S and $\Delta$ G), main theorems of thermodynamics and their application, cycles, the chemical potential, law of mass action: chemical and phase equilibria; Electrochemistry: electrolyte equilibria, electrical conductivity of ions in solution, electrochemical equilibrium (Nernst equation), electrode reactions and galvanic cells.							
Prerequisites								
Coordinator								
Lecturer(s)	Asist Prof.Dr. Çağla	a Söz						
Assistant(s)								
Work Placement	No							
Recommended or Required Reading								
Books / Lecture Notes	Bard A. J., Faulkner L.R. "Electrochemical Methods: Fundamentals and Applications", John Wiley & Sons, Inc., 2001							
Other Sources	Bechmann W., Schmidt J. "Einstieg in die Physikalische Chemie für Nebenfächler", Vieweg- Teubner Verlag, 2010 Atkins P., de Paulo J., "Physical Chemistry", W. H. Freeman and Company, 2006 Sarıkaya Y. "Fizikokimya", Gazi Kitabevi, 2000							
Additional Course Material								
Documents								
Assignments								
Exams								



## DEPARTMENT OF MATERIALS SCIENCE AND TECHOLOGY COURSE SYLLABUS

Course Composition									
Mathematics und Basic Sciences		20%							
Engineering		%							
Engineering Design			%						
Social Sciences			%						
Educational Sciences			%						
Natural Sciences			70%						
Health Sciences			%						
Expert Knowledge			10%						
Assessment									
Activity	<b>C</b> οι	ınt	Percentage (%)						
Midterm Exam	1	_	40						
Quiz									
Assignments	1		10						
Attendance									
Recitations									
Projects	1	10							
Final Exam	1		40						
Total	4	100							
ECTS Points and Work Load									
Activity	Count	Duration	Work Load (Hours)						
Lectures	14	3	42						
Self-Study	14	6	84						
Assignments	5	3	15						
Presentation / Seminar Preparation									
Midterm Exam	1	2	2						
Recitations	14	1	14						
Laboratory	14	1	14						
Projects									
Final Exam	1	2	2						
	173								
ECTS Points (Total Work Load / Hours)6									
Learning Outcomes									
1 To be able to s	olve the reaction rate and the re	eaction constant							

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## DEPARTMENT OF MATERIALS SCIENCE AND TECHOLOGY **COURSE SYLLABUS**

3To learn the behavior of real and ideal gases4To learn the laws of thermodynamic.5To perform calculations with thermodynamic variables6To determine the properties of a system by using the thermodynamic variables7To understand the equilibrium of a system by using the thermodynamic variables8To be able to interpret phase alagrans, to be able to draw phase diagrams by using the required information9To understand eclis and to be able to write the equitons for the electrochemical reactions10Perform calculations fully11Perform calculations fully12Perform calculations fully13Perform calculations fully14Perform calculations fully15Perform calculations fully16Perform calculations fully17Reactionskinet:18Combined reations Approximation method Temperature dependence of reaction rate19Perform calculations fully14Read Gases Ideal Gases15Laboratory: Thermochemistry- To determine principles of calorimetry16Work, heat , entry The 1st rule of thermodynamics cyclic prozesses, dawaell relations19Eaboratory: Experiment in sublify of solids to calculate the entral py value by using the Gibbs19Laboratory: Experiment in sublify of solids to calculate the entral py value by using the Gibbs19Laboratory: Experiment in sublify of solids to calculate the entral py value by using the Gibbs19Laboratory: Experiment in sublify of solids to calculate the entral py value by using the Gibbs10										
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10Image: Second Se	8	To be able to in	terpret phase d	liagrams,; to be a	able to draw pha	ase diagrams by	using the require	ed information		
11 Image: Second S	9	To understand	electrochemica	I cells and to be	able to write th	e equations for	the electrochem	nical reactions		
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Contribution of Learning Outcomes to Program Objectives (1-5)     P1   P2   P3   P4   P5   P6   P7     1   4   5   5   1   1   5   5     2   4   5   5   1   1   5   5     3   2   5   5   1   1   5   5	14	14								
P1   P2   P3   P4   P5   P6   P7     1   4   5   5   1   1   5   5     2   4   5   5   1   1   5   5     3   2   5   5   1   1   5   5	15									
1   4   5   5   1   1   5   5     2   4   5   5   1   1   5   5     3   2   5   5   1   1   5   5	Contribution of Learning Outcomes to Program Objectives (1-5)									
2   4   5   5   1   1   5   5     3   2   5   5   1   1   5   5		P1	P2	P3	P4	P5	P6	P7		
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<b>4</b> 2 5 5 1 1 5 5	3	2	5		1	1		-		
	4	2	5	5	1	1	5	5		



## DEPARTMENT OF MATERIALS SCIENCE AND TECHOLOGY COURSE SYLLAE JS

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7	3	4	5	1	1	5	5
8	3	5	5	1	1	5	5
9	5	5	5	1	1	5	5
Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High							
Compiled by:							
Date of Compilation:							