

DEPARTMENT OF MOLECULAR BIOTECHNOLOGY  
COURSE SYLLABUS

Course Details					
<b>Code</b>				<b>Academic Year</b>	<b>Semester</b>
NWI201				2	3
<b>Title</b>	<b>T</b>	<b>A</b>	<b>L</b>	<b>ECTS</b>	
Physical Chemistry I	3	1	1	6	
<b>Language</b>	German				
<b>Level</b>	<b>Undergraduate</b>	X	<b>Graduate</b>		<b>Postgraduate</b>
<b>Department / Program</b>	Molecular Biotechnology				
<b>Forms of Teaching and Learning</b>	Face to face				
<b>Course Type</b>	<b>Compulsory</b>	X	<b>Elective</b>		
<b>Objectives</b>	<p>The students gain knowledge about the general principles for the description of physicochemical contexts.</p> <p>They understand the basics of chemical and electrochemical equilibria and can apply them to different reactions.</p> <p>They are capable of independently performing and evaluating physical-chemical experiments.</p>				
<b>Content</b>	<p>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;</p> <p>Thermodynamics: Thermodynamic functions (<math>\Delta U</math>, <math>\Delta H</math>, <math>\Delta S</math> and <math>\Delta G</math>), main theorems of thermodynamics and their application, cycles, the chemical potential, law of mass action: chemical and phase equilibria;</p> <p>Electrochemistry: electrolyte equilibria, electrical conductivity of ions in solution, electrochemical equilibrium (Nernst equation), electrode reactions and galvanic cells.</p>				
<b>Prerequisites</b>					
<b>Coordinator</b>					
<b>Lecturer(s)</b>	Asist Prof.Dr. Çağla Söz				
<b>Assistant(s)</b>					
<b>Work Placement</b>	No				
Recommended or Required Reading					
<b>Books / Lecture Notes</b>	Bard A. J., Faulkner L.R. „Electrochemical Methods: Fundamentals and Applications”, John Wiley & Sons, Inc., 2001				
<b>Other Sources</b>	<p>Bechmann W., Schmidt J. „Einstieg in die Physikalische Chemie für Nebenfächler“, Vieweg-Teubner Verlag, 2010</p> <p>Atkins P., de Paulo J., „Physical Chemistry“, W. H. Freeman and Company, 2006</p> <p>Sarıkaya Y. „Fizikokimya“, Gazi Kitabevi, 2000</p>				
Additional Course Material					
<b>Documents</b>	<a href="#">Ders notları</a> , <a href="#">deney föyleri</a> , <a href="#">ders kitapları</a>				
<b>Assignments</b>	Dönem içerisinde 5 adet ödev verilmektedir.				

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Exams	1 vize ve 1 final sınavı		
<b>Course Composition</b>			
Mathematics und Basic Sciences			%20
Engineering			%
Engineering Design			%
Social Sciences			%
Educational Sciences			%
Natural Sciences			%70
Health Sciences			%
Expert Knowledge			%10
<b>Assessment</b>			
Activity	Count		Percentage (%)
Midterm Exam	1		%40
Quiz			
Assignment	1		%10
Attendance			
Practice	1		%10
Projects			
Final Exam	1		%40
		<b>Total</b>	<b>100</b>
<b>ECTS Points and Work Load</b>			
Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Hours for off-the-c.r.stud	14	2	28
Assignments	5	2	10
Midterm Exam	1	2	2
Practice	14	1	14
Laboratory	5	3	15
Final Exam	1	2	2
		<b>Total Work Load</b>	<b>113</b>
		<b>ECTS Points (Total Work Load / Hours)</b>	<b>6</b>
<b>Learning Outcomes</b>			
1	To be able to solve the reaction rate and the reaction constant		
2	To be able to determine the effect of concentration, temperature, and time on the reaction rate		
3	To learn the behavior of real and ideal gases		

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4	To learn the laws of thermodynamic
5	To perform calculations with thermodynamic variables
6	To determine the properties of a system by using the thermodynamic variables
7	To understand the equilibrium of a system by using the thermodynamic variables
8	To be able to interpret phase diagrams,; to be able to draw phase diagrams by using the required information
9	To understand electrochemical cells and to be able to write the equations for the electrochemical reactions
10	
11	
12	

**Weekly Content**

1	Reactionskinetic: Basics and definitions Rules for reaction rates
2	Combined reaktions Approximation method Temperature dependence of reaction rate
3	Thermodynamic: basic concepts Temperature and the 0th law of thermodynamics
4	Real Gases İdeal Gases
5	Laboratory: Thermochemistry- To determine principles of calorimetry
6	Work, heat , energy The 1st rule of thermodynamics Cyclic prozesses, Carnot cycle state functions
7	Enthalpy, The Joule Thomson Effect, The 2nd law of thermodynamics, entrophy Laboratory: Thermochemistry-Part II
8	The third law of thermodynamics, The Helmholtz and Gibbs Energies, Maxwell relations
9	Laboratory: To calculate the distribution coefficient of ammonia between water and chlorofom
10	Laboratory: Experiment on solubility of solids to calculate the enthalpy value by using the Gibbs Helmholtz equation
11	Phase diagrams Phase stability and Phase transitions
12	Phase stability and phase transitions continued The thermodynamic description of mixtures The properties of solutions
13	Activities
14	Spontaneous chemical reactions The response of equilibria to the conditions Equilibrium electrochemistry
15	

**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
4	2	5	5	1	1	5	5
5	5	5	5	1	1	5	5
6	5	4	5	1	1	5	5

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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
10							
11							
12							
<b>Contribution Level</b>		1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High					
<b>Compiled by:</b>							
<b>Date of Compilation:</b>		01.03.2021					