

COURSE DESCRIPTION

COURSE DESCRIPTION FORM																			
Course Code and Title	CHE244 PHYSICAL CHEMISTRY																		
Course Semester	4																		
Catalog Description (Content) of the Course	General properties of gases, liquids and solids. Kinetic theory of gases. Chemical kinetics and reaction mechanisms. Phase rule, phase equilibrium and diagrams. Pure components, binary and multi-component system. Chemical equilibrium. Surface chemistry, Electrochemistry .																		
Main Textbook	Silbey, R.J., Alberty, R.A., Bawendi, M.G., Physical Chemistry 4th. Edition, Prentice Hall, 2005.																		
Supporting Textbooks	P. Atkins and J. de Paula, W.H. Freeman, Physical Chemistry 2010, 9th edition																		
Course Credit (ECTS)	5																		
Prerequisites of the Course (Compulsory attendance should be indicated here.)	There is no prerequisite or co-requisite for this course.																		
Type of the Course	The mode of delivery of this course is Face to face																		
Instruction Language of the Course	English																		
Object and Target of the Course	To teach basic concepts in physical chemistry necessary for chemical engineering																		
Learning Outcomes of the Course	The course is taught to get students acquainted with laws and basic concepts in physical chemistry necessary for chemical engineering starting with gas kinetic theory and chemical reaction kinetics followed by chemical equilibria , phase equilibria and surface chemistry																		
Mode of Delivery	The mode of delivery of this course is face to face.																		
Weekly Schedule of the Course	<table> <tr> <td>1. Week</td><td>Introduction to physical chemistry, properties of gases, liquids and solids</td></tr> <tr> <td>2. Week</td><td>Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient</td></tr> <tr> <td>3. Week</td><td>Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient</td></tr> <tr> <td>4. Week</td><td>Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient</td></tr> <tr> <td>5. Week</td><td>Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms</td></tr> <tr> <td>6. Week</td><td>Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms</td></tr> <tr> <td>7. Week</td><td>Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms</td></tr> <tr> <td>8. Week</td><td>Chemical equilibrium</td></tr> <tr> <td>9. Week</td><td>Chemical equilibrium</td></tr> </table>	1. Week	Introduction to physical chemistry, properties of gases, liquids and solids	2. Week	Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient	3. Week	Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient	4. Week	Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient	5. Week	Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms	6. Week	Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms	7. Week	Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms	8. Week	Chemical equilibrium	9. Week	Chemical equilibrium
1. Week	Introduction to physical chemistry, properties of gases, liquids and solids																		
2. Week	Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient																		
3. Week	Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient																		
4. Week	Kinetic theory of gases; pressure, velocity distribution, mean free path, derivation of viscosity, thermal conductivity, molecular diffusion coefficient																		
5. Week	Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms																		
6. Week	Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms																		
7. Week	Chemical reaction kinetics; chemical reactions and determination of reaction rate expression, reaction mechanisms																		
8. Week	Chemical equilibrium																		
9. Week	Chemical equilibrium																		

	10. Week	Chemical equilibrium			
	11. Week	Phase rule & phase equilibrium; general equilibrium criteria, pure component, binary and multicomponent systems, pressure-composition, temperature-composition			
	12. Week	Phase rule & phase equilibrium; general equilibrium criteria, pure component, binary and multicomponent systems, pressure-composition, temperature-composition			
	13. Week	Phase rule & phase equilibrium; general equilibrium criteria, pure component, binary and multicomponent systems, pressure-composition, temperature-composition			
	14. Week	Introduction to surface chemistry, thermodynamic of surfaces, surface tension, adsorption, Electrochemistry.			
Educative Activities <i>(Credit will be determined based on the time given for these activities. Should be filled carefully.)</i>	Theoretical Study Hours of Course Per Week Reading Searching in Internet and Library Mid-Term and Studying for Mid-Term Final and Studying for Final				
Assessment Criteria		Quantity	Total Contribution (%)		
	Midterm	2	50		
	Homework	5	10		
	Assignment	0	0		
	Projects	0	0		
	Practice	0	0		
	Quiz	0	0		
	Contribution of In-term Studies to Overall Grade		60		
	Contribution of Final Examination to Overall Grade		40		
	Attendance	0	0		
Workload of the Course		Activity	Total Week Count	Weekly Duration (in hour)	Total Workload in Semester
		Theoretical Study Hours of Course Per Week	14	3	42
		Practicing Hours of Course Per Week	0	0	0
		Reading	10	2	20
		Searching in Internet and Library	14	1	14
		Designing and Applying Materials	0	0	0
		Preparing Reports	0	0	0
		Preparing Presentation	0	0	0
		Presentation	0	0	0
		Mid-Term and Studying for Mid-Term	2	20	40
		Final and Studying for Final	1	10	10
		Other	0	0	0
		Total work load			126

	Total work load/25				5,04		
	ECTS of the course				5		
Course's Contribution To Program	Number	Program Outcomes	1	2	3	4	5
	1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.					X
	2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	X				
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.	X				
	4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	X				
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	X				
	6	Ability to work efficiently in intra-disciplinary teams.	X				
	7	Ability to work efficiently in multi-disciplinary teams;	X				
	8	Ability to work individually.	X				
	9	Ability to communicate effectively in Turkish/English, both orally and in writing; Ability to write effective reports and comprehend written reports, make effective presentations,	X				
	10	prepared design and production reports, give and receive clear and intelligible instructions.	X				
	11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	X				
	12	Awareness of professional and ethical responsibility.	X				
	13	Information about business life practices such as project management, risk management, and change management.	X				
	14	Information about awareness of entrepreneurship, innovation, and sustainable development.	X				
	15	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety.	X				
	16	Knowledge about awareness of the legal consequences of engineering solutions.	X				
17	Knowledge on standards used in engineering practice.						
Name of Lecturer(s) and Contact Information	1. Prof. Dr. Nurdan Saraçoğlu, nsarac@gazi.edu.tr 2. Prof. Dr. Nursel Dilsiz ndilsiz@gazi.edu.tr						