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	
Weekly Schedule of the Course	**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

	12. Week 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 *(Credit will be determined based on the time given for these activities. Should be filled carefully.)*	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	prepare 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.					

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