1. Course Description

COURSE DESCRIPTION FORM	
Course Code and Title	CHE282 CHEMICAL ENGINEERING THERMODYNAMICS
Course Semester	4
Catalog Description (Content) of the Course	Thermodynamic properties of pure substances and mixtures. Heat of solution and heat of dilution. Auxiliary functions. Thermodynamic properties of multi-component systems, partial molar properties, fugacity, activity. Phase equilibria in single and multi-component systems.
Main Textbook	Sandler, S.I., Chemical, Biochemical and Engineering Thermodynamics, 4th Ed., Wiley, 2006.
Supporting Textbooks	Tosun, İ., " The Thermodynamics of Phase and Reaction Equilibria", Elsevier, 2012. Elliott, J.R. and Lira, C.T., Introductory Chemical Engineering Thermodynamics, Prentice Hall, 1999. Smith, J.M., Van Ness, H.C. and Abbott, M.M., Introduction to Chemical Engineering Thermodynamics, 6th Ed., McGrawHill, 2001.
Course Credit (ECTS)	5
Prerequisites of the Course (Compulsory attendance should be indicated here.)	There is no prerequisite for this course. The minimum attendance requirement is 70%.
Type of the Course	Compulsory
Instruction Language of the Course	English
Object and Target of the Course	The aim of this course is teaching of identification methods of thermodynamic properties for pure and mixture matters and learning of analysis of equilibrium situation between phases in one and multi component systems.
Learning Outcomes of the Course	To solve thermodynamic problems of chemical processes, improve team work skills, and encourage computer usage in problem solving.
Mode of Delivery	The mode of delivery of this course is face to face
Weekly Schedule of the Course	**1. Week** Introduction to chemical engineering thermodynamic and definitions **2. Week** Thermodynamic properties: liquids, ideal and non-ideal gases, basic relations, Maxwell relations, relations between conceptual and measurable propert **3. Week** Thermodynamic properties: liquids, ideal and non-ideal gases, basic relations, Maxwell relations, relations between conceptual and measurable propert **4. Week** Thermodynamic properties: liquids, ideal and non-ideal gases, basic relations, Maxwell relations, relations between conceptual and measurable propert **5. Week** Heat of solution and dilution, Thermodynamic properties of mixtures : partial molar properties **6. Week** Thermodynamic properties of mixtures: chemical potential, fugacity, ideal and non-ideal mixtures, partial fugacity, activity **7. Week** Thermodynamic properties of mixtures: chemical potential, fugacity, ideal and non-ideal mixtures, partial fugacity, activity **8. Week** Thermodynamic properties of mixtures: chemical potential, fugacity, ideal and non-ideal mixtures, partial

	fugacity, activity **9. Week** Thermodynamic properties of mixtures: chemical potential, fugacity, ideal and non-ideal mixtures, partial fugacity, activity **10. Week** Phase equilibria in one-component systems : equilibrium conditions, vapor-liquid equilibria **11. Week** Phase equilibria in one-component systems : equilibrium conditions, vapor-liquid equilibria **12. Week** Phase equilibria in multicomponent systems: non-ideal mixtures, azeotropic systems, solubilities, multicomponent mixtures **13. Week** Phase equilibria in multicomponent systems: non-ideal mixtures, azeotropic systems, solubilities, multicomponent mixtures **14. Week** Phase equilibria in multicomponent systems: non-ideal mixtures, azeotropic systems, solubilities, multicomponent mixtures
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 Preparing Reports Mid-Term and Studying for Mid-Term Final and Studying for Final

Assessment Criteria

	Quantity	Total Contribution (%)
Midterm	2	40
Homework	2	10
Assignment	0	0
Projects	0	0
Practice	0	0
Quiz	2	10
Contribution of In-term Studies to Overall Grade		60
Contribution of Final Examination to Overall Grade		40
Attendance		

Workload of the Course

Activity	Total Week Count	Weekly Duration (in hour)	Total Workload in Semester
Theoretical Study Hours of Course Per Week	15	3	45
Practicing Hours of Course Per Week	0	0	0
Reading	2	2	4
Searching in Internet and Library	2	5	10
Designing and Applying Materials	0	0	0
Preparing Reports	2	12	24
Preparing Presentation	0	0	0
Presentation	0	0	0

Mid-Term and Studying for Mid-Term	2	15	30
Final and Studying for Final	1	15	15
Other	0	0	0
Total work load			128
Total work load/25			5,12
ECTS of the course			5

Course's Contribution To Program

No	Program Learning 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. | X | | | | | |
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