Identification	**Subject**	Unit Operations 2 – 6 ECTS credits
	Department	Chemical Engineering
	Program	Undergraduate
	Term	Spring, 2018
	Instructor	Kanan Shikhaliyev
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	Phone:	(+994) 503314951
	Classroom/hours	11 Mehseti str. (Neftchilar campus), Wednesday 18:40-21:00
	Office hours	Friday 19:30 – 20:30
Prerequisites	Chemistry 1: Chemical reactions and transformations, Refinery and Petrochemical processes overview Physics 1: Basics of thermodynamics and separation processes Mathematics 1: Heat and material balances calculation	
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	Core textbook: (References) 1. "Unit Operations of Chemical Engineering (5th edition) (McGraw Hill Chemical and Petroleum Engineering Series) by Warren McCabe 2. Chemical Engineering Design, (4th edition), R K Sinnott, 2005	
Course website	This course combines traditional face-to-face classes. All course related materials including, but not limited to, syllabus, supplementary readings, course announcements, cases and assignments are available at the course website http://www.khazar.org. Grades will also be posted also in university web-site. The students are expected to check it in a regular basis and communicate with the lecturer.	
Course outline	Effort for making better economical values and increase the reliability of large industrial facilities are the priority issues. In this course the students will learn the basic principles of process units' operation, fundamentals of phase behaviour, mass transfer operations and process troubleshooting that is vital for engineering activities in Oil Gas sector. Safety issues and overview about project development will be also shared with students in order to have full understanding the principal concept of Oil and Gas Industry and trends as well as perspectives.	
Course objectives	1. Provide a theoretical and applied knowledge for unit operation and troubleshooting 2. Know the essential parameters and profiles to analyze qualitatively the operation of a continuous processes, being able to detect problems in process runs, optimize the process control 3. Have an overview about the different process unit equipment 4. Provide students with a better understanding of the supervision and optimized operation of industrial processes 5. Have a functions and main characteristics for the technological processes and units currently used in the oil-gas industry to produce, separate and purify the compounds concerned 6. Have an overview to manufacture different oil-gas products 7. Master the fundamentals on oil-gas processes (general process scheme, technologies involved, range of operations, constraints, optimization criteria, economics) 8. Know the properties, evaluation methods, main specifications for major petroleum cuts and petroleum products - properties/composition	
Learning outcomes	By the end of this course, the students will be able to: 1. Understand the main trends for process unit operation and concerns 2. Be aware of the main development routes for Oil&Gas projects 3. Describe the chemical and technological aspects and the main operating parameters for each process units	

	4. Understanding troubleshooting for the process units 5. Being able to create safety culture within company		
Teaching methods	**Lecture**		x
	Group discussion		x
	Experiential exercise		
	Lab		
	Case analysis		x
	Course paper		
	Others		
Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Midterm Exam		30
	Class Participation		5
	Assignment and quizzes		15
	Project		10
	Presentation/Group Discussion		
	Final Exam		40
	Others		
	Total		100

Policy

- **Ethics**
  Use of any electronic devices is prohibited in the classroom. All devices should be turned off before entering class. This is a university policy and violators will be reprimanded accordingly.

- **Preparation for class**
  The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions.

- **Withdrawal (pass/fail)**
  This course strictly follows grading policy of the School of Engineering. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year.

- **Cheating/plagiarism**
  Cheating or other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations.

- **Professional behavior guidelines**
  The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited.

- **Project**
  computational modeling of Distillation and Absorption units using ProMax, HYSYS and COMSOL

Tentative Schedule

Week	Date/Day (tentative)	Topics	Quiz/Assignments
1	14.02.2018	Nature of design	

2	21.02.2018	Fundamentals of material balance	
3	28.02.2018	Fundamentals of energy balance	Quiz1 (3points)
4	07.03.2018	Flow-sheeting	
5	14.03.2018	Piping and instrumentation	
6	23.03.2018	Design of liquid-liquid separators	
7	28.03.2018	Design of solid-liquid and solid-gas separators	Quiz2 (3points)
8	04.04.2018	Design of separation columns	
		Midterm Exam	
9	12.04.2018	General site considerations	
10	18.04.2018	Design and calculations of gas-liquid separators	Quiz3 (4points)
11	25.04.2018	Design of transport and storage	
12	02.05.2018	Design of the heat exchangers	
13	08.05.2018	Equipment selection	
14	16.05.2018	Selections of pumps and compressors	
15	23.05.2018	Costing and project evaluation	Quiz4 (5points)
		Final Exam	