

Identification	Subject	CHE 310 Unit Operation-2, 6 ECTS
	Department	Chemistry and Chemical Engineering
	Program	Undergraduate
	Term	Spring 2024
	Instructor	Azar Tapdigzade
	E-mail:	tapdiqliazer@gmail.com
	Phone	+994 516320176 +994 772553340
	Classroom/hours	11 Mehseti str. (Nefthilar campus) 402N/ 18:40 - 21:00
	Office hours	
Prerequisites	<ul style="list-style-type: none"> • SI units and dimensionless groups • Engineering Mathematics • Knowledge of how to use of charts and tables • Heat and material balances calculation 	
Language	English	
Compulsory/Elective	Required	
Description	This course will cover operation principles and design methodologies, based on different chemical and physical theories, of process equipment.	
Required textbooks and course materials	Main textbooks (References): <ul style="list-style-type: none"> • Heriot-Watt University, Process Engineering A/B/C - Edinburgh EH14 4AS, 2016 • Heriot-Watt University, Oil and Gas Processing, Edinburgh EH14 4AS, 2016 • "Operations of Chemical Engineering (7th edition) (McGraw Hill Chemical Engineering Series) by Warren McCabe 	
Course objectives	Provide full understanding of unit operations including pumps, compressors, reactors and separators. Have an overview about the different process unit equipment Know how to apply theoretical methods for process systems Understand operation and sizing of equipment Consider and understand advanced separation processes	
Learning outcomes	By the end of this topic, you should be able to: <ul style="list-style-type: none"> • Understand heat transfer. • Understand and calculate the heat transfer parameters, reaction kinetics • Understand operation principles of different process equipment 	
Teaching methods	Lecture	X

	Problem-based learning (Real industry examples)	x	
	Simulation Software	x	
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam	Week 7 th	25
	Quiz	Week 4 th & 12 th	20
	HYSYS Assignment	Week 13 th	10
	Topic Presentation	Week 14 th	5
	Final Exam		40
	Total		100
Policy	<ul style="list-style-type: none"> ▪ 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 ▪ Assessment Midterm will be in the middle of term which contains 25% of total mark. Students will be evaluated based on half term learning that help them to summarize all knowledge. Before and after midterm, quizzes will be arranged to get students be focused and recall what has been taught within 3-4 weeks and each quiz will give 10, 20 marks in total. Presentations will be not only at week 14, but also during the semester on different topics to improve students` skills to investigate, present and learn more about chemical engineering industry. But only presentation at week 14 will be assessed by 5 percent of total mark. Hysys Assignment will be evaluated by 10% of total mark, by Hysys students understand simulations of real industry cases based on what they have learned within the course. ▪ Withdrawal (pass/fail) This course strictly follows grading policy of the School of Engineering and Applied Science. 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 Plagiarism and Cheating of any kind on an examination, quiz, or project will lead to assignment 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. ▪ Ethics Students should not arrive in late to class. All electronic devices must be silenced and stowed during class. 		

Tentative Schedule		
Weeks	Topics	Textbook/Assignments
1	Introduction to fluid statics and dynamics	<ul style="list-style-type: none"> Heriot-Watt University, Process Engineering A/B/C - Edinburgh EH14 4AS, 2016, topic 1, page 5-15
2	FRictionAL PRESSURE LOSS AND FLOW MEASUREMENT	<ul style="list-style-type: none"> Heriot-Watt University, Process Engineering A/B/C - Edinburgh EH14 4AS, 2016, topic 1, page 16-28
3	PUMPING SYSTEMS AND PUMP SIZING	<ul style="list-style-type: none"> Heriot-Watt University, Process Engineering A/B/C - Edinburgh EH14 4AS, 2016, topic 1, page 30-37
4	Introduction to Open & Closed systems	Assignment 1
5	JOULE-THOMSON EXPANSION	<ul style="list-style-type: none"> Heriot-Watt University, Process Engineering A/B/C - Edinburgh EH14 4AS, 2016, topic 2, page 7-13
6	GAS COMPRESSION	<ul style="list-style-type: none"> Heriot-Watt University, Process Engineering A/B/C - Edinburgh EH14 4AS, 2016, topic 2, page 18-29
7	THERMODYNAMIC CYCLES	<ul style="list-style-type: none"> Heriot-Watt University, Process Engineering A/B/C - Edinburgh EH14 4AS, 2016, topic 3, page 8-32
Midterm Exam		
8	Introduction to Heat Transfer	<ul style="list-style-type: none"> Heriot-Watt University, Oil and Gas Processing, Edinburgh EH14 4AS, 2016, topic 1, page 8-32
9	Heat Transfer Equipment	<ul style="list-style-type: none"> Heriot-Watt University, Oil and Gas Processing, Edinburgh EH14 4AS, 2016, topic 2, page 6-18
10	Heat Exchanger Design	<ul style="list-style-type: none"> Heriot-Watt University, Oil and Gas Processing, Edinburgh EH14 4AS, 2016, topic 2, page 20-31
11	CHEMICAL REACTIONS	<ul style="list-style-type: none"> Heriot-Watt University, Oil and Gas Processing, Edinburgh EH14 4AS, 2016, topic 3, page 8-31

12	DOWNHOLE PROCESSES	Assignment 2
13	SURFACE PROCESSING; TREATMENT OVERVIEW/ GRAVITY SEPARATORS	<ul style="list-style-type: none"> "Operations of Chemical Engineering (7th edition) (McGraw Hill Chemical Engineering Series) by Warren McCabe
14	GAS TREATMENT/Oil and Gas Pipelines	<ul style="list-style-type: none"> "Operations of Chemical Engineering (7th edition) (McGraw Hill Chemical Engineering Series) by Warren McCabe
15	Final Presentation	
Final Exam		

This syllabus is a guide for the course and any modifications to it will be announced in advance.