

<b>Identification</b>	<b>Subject</b>	PETE 542 – Advanced Gas and Gas-Condensate Reservoir Engineering – 8 ECTS	
	<b>Department</b>	Petroleum Engineering	
	<b>Program</b>	Graduate	
	<b>Term</b>	Spring, 2024	
	<b>Instructor</b>	Ulviyya Asgarova	
	<b>E-mail:</b>	<a href="mailto:ulviyya.asgarova@khazar.org">ulviyya.asgarova@khazar.org</a>	
	<b>Classroom/hours</b>	11 Mehseti str. (Neftchilar campus), Thursday 18:40 - 21:00	
<b>Prerequisites</b>	Reservoir Engineering, Phase Behaviour, Fluid Characterization		
<b>Language</b>	English		
<b>Compulsory/Elective</b>	Compulsory		
<b>Required textbooks and course materials</b>	<ul style="list-style-type: none"> <li>• <i>John Lee, Gas Reservoir Engineering, 1996</i></li> <li>• <i>Boyun Guo, Natural Gas Engineering Handbook, 2005</i></li> <li>• <i>H. Dale Beggs, Gas Production Operations, 2002</i></li> <li>• <i>L. P. Dake, The practice of reservoir engineering, 2003</i></li> </ul>		
<b>Course outline</b>	<p>Course is aimed for master students. It addresses in depth review of the Gas and Gas-Condensate Reservoir Engineering discipline. Differentiation of gas and gas – condensate reservoirs from other hydrocarbon reservoirs and identification of reservoir characteristic. Inflow Performance (IPR) of gas in gas reservoirs is the one of the main concerns of the course. The course combines theoretical foundations with practical applications. We will begin with a general overview in each topic and then go into more detail on several concepts.</p> <p>Students will be evaluated through:</p> <ul style="list-style-type: none"> <li>• <b>Problems</b> – to evaluate the ability of the student to cope with the given material.</li> <li>• <b>Presentation and group discussions</b> – to evaluate the students' individual presentation skills and ability to work in groups.</li> </ul>		
<b>Course objectives</b>	<ul style="list-style-type: none"> <li>• Provide overview of gas and gas condensate reservoir</li> <li>• Provide skilful understanding of phase behaviour of gas and condensate fluid.</li> <li>• Perform advanced volume calculations in gas reservoirs.</li> <li>• Analysis of UGS and operations</li> <li>• Evaluate the ability of the students to cope with the given materials, find GAPS in their development.</li> </ul>		
<b>Learning outcomes</b>	<p><b>By the end of the semester, students should be able to gain or improve the following skills:</b></p> <ul style="list-style-type: none"> <li>• Ability to discuss in depth Gas and Gas – Condensate Reservoirs</li> <li>• Estimate gas reservoir volume.</li> <li>• Identifying phase behaviour of gas and gas – condensate reservoirs</li> <li>• Be informed about Underground Gas Storage</li> <li>• Pressure maintenance in gas and gas – condensate reservoirs</li> <li>• Teamwork</li> </ul>		
<b>Teaching methods</b>	<b>Lecture</b>		x
	<b>Group discussion</b>		x
	<b>Practical exercise</b>		x
	<b>Case analysis</b>		x
<b>Evaluation</b>	<b>Methods</b>	<b>Date/deadlines</b>	<b>Percentage (%)</b>
	<b>Midterm Exam</b>	TBA	30
	<b>Class Participation</b>		5

<b>Presentation/Group Discussion</b>	<b>TBA</b>	10
<b>Quiz</b>	<b>TBA</b>	15
<b>Final Exam</b>	<b>TBA</b>	40
<b>Total</b>		100

**Policy**

Midterm exam will be carried out in the week announced by the university. Time allocated will be announced close to the midterm. A midterm examination is a test administered approximately midway through an academic grading term, be it a quarter or semester. Its primary objective is to provide students with a clearer assessment of their progress within the course, enabling them to gauge their performance and understanding up to that point.

Quiz will cover the materials covered in previous classes and will be consist of open-ended questions. Quiz will be distributed throughout the classes. Overall, 15 points will be given for one quiz. There will be only 1 quiz during semester. Anticipated week for the quiz is week 5. Date and time will be announced a week before.

The student receives 5 bonus points for the class participation and activity at the end of the semester if they attend all classes and follow all course policies and procedures.

Presentation/Group Discussion will be conducted close to the end of semester in December. Date and time will be announced during the semester. A presentation/group discussion is a collaborative activity of students relating to research about drilling technology. The reasons for including a presentation/group discussion in the subject course is to evaluate the students' individual presentation skills and ability to work in groups.

A final examination is an examination administered at the end of an academic term, with a set of questions or exercises evaluating the skill or knowledge of students. Final exam date and time will be defined by the University. A final examination is an evaluative assessment presented to students at the conclusion of an academic term or course of study.

- **Preparation for class**

The structure of this course makes individual study and preparation of students outside the class very 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 student's understanding of the lecture. After the lecture student should study his notes, work relevant problems and cases from the end of the chapter.

- **Withdrawal (pass/fail)**

This course strictly follows grading policy of the School of Science and Engineering. Student is normally expected to achieve a mark of at least 65% to pass. In case of failure, he/she will be required to retake 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 and invalidation of student's results.

- **Professional behaviour guidelines**

Students shall behave in professional way to create favourable academic environment during the class hours for themselves and their colleagues. Unauthorized discussions and unethical behaviour are strictly prohibited.

- **Expected behaviour.**

Includes attending all class activities; meeting deadlines; observing common courtesies to fellow students, teachers, and staff; being honest; making a diligent effort to learn; and does not engage in any disruptive irresponsible manner. Legitimate collaboration is encouraged but academic collusion or dishonesty will not be tolerated.

- **Class attendance**

Attendance is required! Please be in class on time. Attendance will be taken at the beginning of each class period. In case you are not present when the attendance sheet is passed on, you will be marked absent. If you are late by more than 10 minutes you will not be allowed into the classroom not to cause distraction. You will receive a Dean's warning if you miss more than 3 classes and shall be dismissed from the course if you miss more than 5 classes. You shall receive 5 bonus points at the end of the semester if you attend all classes and follow all course policies and procedures.

- **Class discussion**

Feel free to voice your opinions and ask questions anytime during a class period. Practice your right and freedom to learn. Remember you are here to learn, and we are here to teach and that teaching and learning are forever intertwined. You can help me teach you as much as I can help you learn. Be an active participant in the learning process!

### Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/Assignments
1	15.02.2024	Introduction to Gas and Gas-Condensate Reservoirs, Natural Gas Properties	Gas Reservoir Engineering Chapter 1
2	22.02.2024	Differences and Similarities in Dry Gas and Gas-Condensate Reservoirs	Gas Production Operations Chapter 8
3	29.02.2024	Fluid Properties: PVT Analysis and EOS Models	Heriot Watt Res. Eng. Chapter 14
4	07.03.2024	Phase Behaviours and Phase Diagrams	Gas Reservoir Engineering Chapter 2
5	14.03.2024	Wet Gas Reservoirs, Wettability Effects in Gas-Condensate Reservoirs	Gas Reservoir Engineering Chapter 4
<b>6</b>	<b>21.03.2024</b>	<b>Novruz Holiday</b>	
7	28.03.2024	Material Balance Equations for Gas Reservoirs	Gas Reservoir Engineering Chapter 9
8	04.04.2024	<b>Mid-term Exam</b>	
9	<b>11.04.2024</b>	<b>Ramadan Holiday</b>	
10	18.04.2024	Well Testing Analysis and Interpretation, Decline Curve Analysis for Gas and Gas-Condensate Reservoirs	Gas Reservoir Engineering Chapter 7
11	25.04.2024	Gas Injection Techniques for Enhanced Recovery, Pressure Maintenance	Gas Production Operations Chapter 8
12	02.05.2024	Challenges in Gas-Condensate Reservoirs: Condensate Banking	Heriot Watt Res. Eng. Chapter 10
<b>13</b>	<b>09.05.2024</b>	<b>Day of Victory Holiday</b>	
14	16.05.2024	Gas Reservoir Deliverability, Wellbore and Surface Facility Considerations in Gas-Condensate Reservoirs	Natural Gas Engineering Chapter 3, 6
<b>15</b>	<b>23.05.2024</b>	<b>Presentation/Group Discussion</b>	
16	<b>TBA</b>	<b>Final Exam</b>	

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