Identification	**Subject**	PETE595, Production Technology, 6 ECTS
	Department	Petroleum Engineering
	Program	Graduate
	Term	Spring 2026
	Instructor	Mangushev Rufat
	E-mail:	rufat.mangushev@gmail.com
	Phone:	
	Classroom/hours	11 Mehseti str.(Neftchilar campus) TBD
	Office hours	TBD
Prerequisites		
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	***Core textbook:*** • Guo, Boyun, et al. Petroleum Production Engineering. 2nd ed., Gulf Professional Publishing, 2017. • Nguyen, Tan. Artificial Lift Methods. Springer, 2020.	
Course outline	This course addresses the fundamental principles of oil and gas production operations. The curriculum focuses on Nodal Analysis, the evaluation of pressure drops in the wellbore, and the selection of artificial lift methods. Students will learn to combine numerical algorithms with suitable models to predict expected pressure drops and optimize total system performance.	
Course objectives	**Objective of the Course:** This course provides students with a comprehensive introduction to the principal concepts and methods of petroleum production engineering. The course utilizes open systems and control volume analysis to evaluate the energy losses occurring from the reservoir to the separator. The curriculum is specifically designed to develop the problem-solving skills essential to the engineering practice of production optimization in practical applications. The student will demonstrate an understanding of these fundamentals by solving complex problems dealing with fluid properties, well deliverability, and artificial lift design. Throughout the semester, regular quizzes and assignments will be provided to ensure students master the theoretical foundations of fluid mechanics as applied to production. Finally, the course integrates technical research and professional communication through a required field development project and student presentations. **Quizzes** will be provided during the classes based on the topic covered previously. Two quizzes will be provided during semester. **Presentation** Each student has one presentation during this course. Students should make a presentation on given topics and presents for other students on week 13. **Project objectives**	

<table>
<tr><td></td><td colspan="3">Students should research about given topic from book. Students should hand in two reports in .docx and .PDF format about their research and presentation. Deadline for handing in all reports and presentations by e-mail is week 13.</td></tr>
<tr><td>Learning outcomes</td><td colspan="3">By the end of the course the students should be able to learn:
• Perform reservoir deliverability calculations for oil and gas reservoirs;
• Perform reservoir deliverability calculations for stratified reservoirs;
• Perform fluid flow calculations in vertical and horizontal wellbores;
• Apply Nodal analysis in design and optimization of petroleum production systems;
• Describe various artificial lift methods and design these processes;</td></tr>
<tr><td rowspan="7">Teaching methods</td><td colspan="2">Lecture</td><td>x</td></tr>
<tr><td colspan="2">Group discussion</td><td>x</td></tr>
<tr><td colspan="2">Experiential exercise</td><td>x</td></tr>
<tr><td colspan="2">Simulation</td><td>x</td></tr>
<tr><td colspan="2">Case analysis</td><td>x</td></tr>
<tr><td colspan="2">Course paper</td><td>x</td></tr>
<tr><td colspan="2">Others</td><td></td></tr>
<tr><td rowspan="10">Evaluation</td><td>Methods</td><td>Date/deadlines</td><td>Percentage (%)</td></tr>
<tr><td>Midterm Exam</td><td></td><td>30</td></tr>
<tr><td>Case studies</td><td></td><td></td></tr>
<tr><td>Class Participation</td><td></td><td></td></tr>
<tr><td>Assignment and quizzes</td><td></td><td>10</td></tr>
<tr><td>Project</td><td></td><td>15</td></tr>
<tr><td>Presentation/Group Discussion</td><td></td><td>10</td></tr>
<tr><td>Final Exam</td><td></td><td>35</td></tr>
<tr><td>Others</td><td></td><td></td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
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Policy	
	▪ **Preparation for class** There will be 2 quizzes worth 3 points each and 4 assignments worth 1 point each. Quizzes are of random pop-up nature (not more than 30 minutes per quiz). Midterm exam will consist of variety of types of questions including, but not limited to multiple choice, calculations, open questions, true-false questions, etc. Multiple choice questions are not limited to a single correct answer. Different weights will be assigned to different midterm questions depending on their difficulty. Group project is a 30 pages long report on a specific novel topic that will be assigned on week 3 of the classes and will be due on week 13 (10 weeks in total). Presentation will be based on the group project. All parts of the course will be evaluated based on zero tolerance towards cheating, plagiarism and use of AI in any form other than inspirational. Inspirational use of AI constitutes topic suggestion, material (books/articles) search, and nothing more. ▪ **Withdrawal (pass/fail)** Students are expected to achieve a mark of at least 65% to pass. In case of failure, they will be required to repeat the course the following term or year. ▪ **Cheating/plagiarism** Cheating or other plagiarism during the Mid-term and Final Examinations will lead to paper cancellation. ▪ **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.

Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/ Assignments
1	Week 1	• Introduction • Well Schematic • Production Methods	[1.3]
2	Week 2	• Materials • Standards • Typical Xmas Tree Configurations and Valves	[1.4]
3	Week 3	• Downhole Equipment • Packers • Downhole Valves	[1.5]
4	Week 4	• Manifolds • Subsea Production Systems • Subsea Remotely Controlled Interventions • Remote Processing	[1.6]

5	Week 5	• Well Design • Naturally Flowing Well • Pseudo-steady State Radial Flow in Gas Reservoir	[1.7]
6	Week 6	• Well Testing • Stabilized Flow Test • Isochronal Test • Modified Isochronal Test	[1.9, 2.5]
7	Week 7	• Gaslift • Evaluation of Gaslift Potential • Gas Compression Requirements for Gas Lift	[1.12, 2.7]
8	Week 8	**Midterm Exam**	
9	Week 9	• Compression Power Requirements • Unloading Sequence	[1.13]
10	Week 10	• Sucker Rod Pump	[1.13]
11	Week 11	• Electrical Submersible Pump	[1.13]
12	Week 12	• Hydraulic Jet Pumping	[1.13]
13	Week 13	**Presentation & Project Delivery**	
14	Week 14	• Hydraulic Piston Pumping	[1.13]
15	Week 15	• Progressive Cavity Pumping	[1.13]
	TBD	**Final Exam**	

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