

Identification	Subject	PETE402, Petroleum Production Engineering I, 6 ECTS
	Department	Petroleum Engineering
	Program	Undergraduate
	Term	Spring 2026
	Instructor	Yusif Mirzali
	E-mail	---
	Classroom/hrs	---
	Office hours	---
Prerequisites		
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	<ol style="list-style-type: none"> 1. Heriot Watt University - Production Technology I (Heriot Watt University) (2013) 2. Michael J. Economides, A. Daniel Hill, Christine Ehlig-Economides - Petroleum Production Systems Second Edition (2013) 3. Jan Dirk Jansen - Nodal Analysis of Oil and Gas Production Systems (2020) 4. Lecture notes 	
Course outline	<p>This course covers key topics in petroleum engineering, combining fundamental concepts with practical field applications in upstream operations. Main areas include:</p> <ul style="list-style-type: none"> • Production systems – Components of surface and subsurface systems, flow paths, and basic optimization principles. • Well productivity – Inflow performance relationships (IPR), productivity index evaluation, and reservoir–wellbore interaction. • Completion techniques – Open hole and cased hole completions, perforating, and zonal isolation methods. • Stimulation methods – Hydraulic fracturing and matrix acidizing to enhance well performance and recovery. • Production problems – Identification and control of scaling, corrosion, wax deposition, hydrates, and formation damage. • Sand management – Sand prediction and control using screens, gravel packs, and consolidation techniques. • Artificial lifting techniques – Gas lift, electrical submersible pumps (ESP), rod pumps, and hydraulic pumping systems. • Well surveillance – Production monitoring, pressure analysis, and performance optimization. • Surface facilities – Separation equipment, flowlines, storage, metering, and operational safety. 	

Course objectives	<p>This course aims to provide students with fundamental knowledge of key concepts of petroleum engineering. By the end of the course, students will be able to:</p> <ul style="list-style-type: none"> • Understand petroleum production systems, including surface and subsurface components. • Evaluate well productivity using basic inflow performance relationships (IPR). • Describe major completion techniques, including open and cased hole completions. • Explain common stimulation methods such as hydraulic fracturing and acidizing. • Identify typical production problems and basic mitigation approaches. • Understand principles of sand management and control methods. • Recognize main artificial lift systems, including gas lift and ESPs. • Interpret basic well surveillance data for performance monitoring. • Describe key elements of surface facilities and safety considerations. 		
Learning outcomes	<ul style="list-style-type: none"> • Be able to characterize well components • Comfortably run nodal analysis of an oil well • Understand potential problems to well productivity and suggest remedies • Proficiency in lifting mechanisms, various completion types, and sand management • Basic knowledge of surface production facilities 		
Teaching methods	Lecture	+	
	Group discussion	+	
	Exercises	+	
	Analysis of real-world cases and uses of petroleum related software	+	
Evaluation	Methods	Deadlines	Percentage (%)
	Midterm Exam	---	30
	Class Participation	---	5
	Quiz	---	15
	Project	---	10
	Final Exam	---	40
	Total	---	100
Policy and guidelines	<p>Midterm Examination: A midterm examination is conducted around the middle of an academic term, quarter, or semester. Its purpose is to help students assess their progress and understanding of the course material.</p>		

Class Participation Assessment: Evaluation of students' engagement and participation during lectures, practical sessions, and throughout the overall learning process.

Quiz: A quiz is a brief assessment designed to evaluate students' understanding of course material, providing instructors with insights into student progress and identifying any knowledge gaps.

Project: A project is a collaborative, research-based activity that engages students in scientific inquiry and enhances practical understanding of subject-related research.

Final Examination: The final examination is conducted at the end of the academic term to assess students' knowledge and skills acquired throughout the course.

Preparation for Class: This course requires significant independent study. Lectures emphasize key textbook concepts, so students should read assigned chapters in advance and review notes, problems, case studies, and sample exam questions after class.

Withdrawal (Pass/Fail): A minimum grade of 60% is required to pass the course. Students who fail must repeat the course in the following term or academic year.

Cheating and Plagiarism: Any cheating or plagiarism during quizzes, midterm, or final examinations will result in assessment cancellation and an automatic grade of zero (0), without exception.

Professional Behavior Guidelines

Students must maintain professional conduct to support a positive academic environment. Unauthorized discussions and unethical or disruptive behavior are strictly prohibited.

Schedule

Week	Date/Day (tentative)	Topics	Textbooks
1	---	Introduction to petroleum production engineering	Book 1 [ch. 1], 2 [ch. 1]
2	---	Well components	Book 1 [ch. 1], 2 [ch. 1]
3	---	Well performance part 1	Book 1 [ch. 3], 3 [ch. 7, 8]
4	---	Well performance part 2	Book 1[ch. 3], 3 [ch. 7, 8]

5	---	Completion techniques	Book 1 [ch. 4]
6	---	Artificial lift	Book 1 [ch. 4], 2 [ch. 11]
7	---	Introduction to Prosper	Lecture notes
8	---	Mid-term exam	---
9	---	Well stimulation	Book 1 [ch. 10], 2 [ch. 14, 15]
10	---	Production related problems and remedies	Book 1 [ch. 11], 2 [ch. 14, 15]
11	---	Well testing and rate allocation	Lecture notes
12	---	Sand management	Book 2 [ch. 19]
13	---	Well & reservoir deliverability and limits	Book 2 [ch. 9]
14	---	Well surveillance	Lecture notes
15	---	Surface facilities	Book 1 [ch. 1]
16	---	Final exam	---