PET 332E PRODUCTION ENGINEERING AND SURFACE FACILITIES

Course Title		Production Engineering and Surface Facilities				
				Course Implementation, Hours/Week		
Code	**Semester**	**Local Credits**	**ECTS Credits**	**Theoretical**	**Tutorial**	**Laboratory**
PET 332E	6	3	6	3	0	0
Department		Petroleum and Natural Gas Engineering				
Course Type		Compulsory		**Course Language**		English
Course Prerequisites		PET 211E MIN DD and PET 212E MIN DD				

Course Category By Content, %	Math & Basic Sciences	Engineering Topics; Check if Contains Significant Design (√)	Other
	-	100	-

Course Description	Fundamental principles of production engineering and fundamental elements of production systems; Surface facilities: gas/oil/water separation techniques, separators, surface treatment of produced oil and natural gas; Artificial lift methods; Reservoir performance: flow through porous media, productivity index, Vogel method and flow efficiency, Fetkovitch method, future reservoir performance prediction methods; Fundamental principles of fluid flow in pipes, multi phase flow in pipes, pressure drop calculations for multiphase flow, tubing design for different well geometries: Wellhead and choke performance prediction methods: Basic decline curve analysis.
Course Objectives	1. Provide basic information on production engineering and production systems 2. Provide basic information on artificial lift systems 3. Explain fluid flow in porous media 4. Current and future reservoir flow performance predictions using Vogel and Fetkovich methods 5. Demonstrate single and multiphase flow in pipes 6.Explanation of wellhead, choke and tubing performance, and tubing design for different well geometries 7. General aspects of rate decline curve analysis.
Course Learning Outcomes	Students who pass the course will be able to: 1. Describe production system fundamentals and surface separation facilities 2. Describe working principles of artificial lift methods 3. Predict present and future reservoir inflow performances 4. Describe vertical lift, wellhead, choke, and flow line performances and use them in nodal analysis of production systems 5. Apply basic decline curve analysis to predict future well performance
Textbook	Beggs, H.D., Production Optimization Using Nodal Analysis, OGCI Publications Tulsa, 1991.
Other References	1. Golan, M. and Whitson, C.H., Well Performance, Prentice Hall, New Jersey, 1991, ISBN: 0-13-946609-6. 2. Economides, M.J, Hill, A.D and Ehlig-Economides, C., Petroleum Production Systems, Prentice Hall, New Jersey, 1994.
Homework & Projects	-
Laboratory work	-
Computer Use	-
Other Activities	-

Assessment Criteria	**Activities**	**Quantity**	**Effects on Grading, %**
	Midterms	1	%30
	Quizzes	-	-
	Homework	8-10	%20
	Projects	-	-
	Term Paper/Projects	-	-
	Laboratory Work	-	-
	Other Activities	-	-
	Final Exam	1	%50

Weeks	Course Plan	Course Outcomes
1	Fundementals of production engineering and elements of production systems; Surface facilities	1
2	Staged separation, separator types, oil and gas treatment (free-water knockout, heater treater, gunbarell, dehydration systems)	1
3	Artificial lift methods	2
4	Artificial lift methods and selection criteria (continued)	2
5	Reservoir inflow performance	3
6	Reservoir inflow performance (continued)	3
7	Reservoir inflow performance (continued)	3
8	Reservoir inflow performance (continued)	3
9	Fundamentals of single phase pipe flow	4
10	Multiphase pipe flow and pressure loss predictions	4
11	Multiphase pipe flow and pressure loss predictions (continued)	4
12	Tapered tubing selection for different well geometries and pressure drop calculations	4
13	Prediction of wellhead and choke performances using nodal analysis	4
14	Basics of production rate decline analysis	5

Related Performance Indicators
1a. Identify and formulate appropriate methods for solving petroleum, natural gas, and geothermal engineering problems **1b.** Apply engineering methods to reservoir, drilling and production engineering problems **6b.** Acquire, analyze, and interpret data.

Relationship of Course Learning Outcomes to the Performance Indicators			
	Performance Indicator		
Course Learning Outcome	**(1a)**	**(1b)**	**(6b)**
1	x		
2	x		
3		x	
4			x
5		x	