

PET 4901E PETROLEUM AND NATURAL GAS ENGINEERING DESIGN I

Course Title		Petroleum and Natural Gas Engineering Design I				
		Course Implementation, Hours/Week				
Code	Semester	Local Credits	ECTS Credits	Theoretical	Tutorial	Laboratory
PET 4901E	7	4	8	1	6	0
Department		Petroleum and Natural Gas Engineering				
Course Type		Compulsory		Course Language		English
Course Prerequisites		PET 332E MIN DD and PET 333E MIN DD and PET 342E MIN DD and PET 335E				
Course Category By Content, %		Math & Basic Sciences		Engineering Topics; Check if Contains Significant Design (√)		Other
		-		100√		-

Course Description	Development and use of design methodology. Development of student creativity via open-ended problems. Proposal and management of petroleum engineering projects. Working in teams. Effective technical speaking and writing. Formation evaluation and mapping. Design of drilling projects considering sustainability aspects.				
Course Objectives	<ol style="list-style-type: none"> 1. Provide students an opportunity to work with real data collected from an hydrocarbon or geothermal field 2. Guide students to apply engineering design concepts to open-ended petroleum and natural gas engineering problems by considering sustainability, HSE, and economic factors 3. Develop students' abilities to communicate effectively via technical reports and presentations 4. Develop students' abilities to propose, manage and complete technical projects in a team setting 				
Course Learning Outcomes	<p>Students who pass the course will be able to:</p> <ol style="list-style-type: none"> 1. Propose a technical project by defining tasks and timeline 2. Manage a technical project effectively by meeting deadlines and completing required tasks 3. Recognize sustainability issues in engineering design 4. Apply technical software to solve petroleum engineering problems 5. Work effectively in a team environment through collaboration 6. Write effective reports to present technical work and results that a wide range of audiences including managers, engineers, geoscientists can benefit from 7. Verbally present technical work and results effectively to a wide range of audiences including managers, engineers, geoscientists 8. Interpret subsurface data to characterize a hydrocarbon or geothermal reservoir 9. Determine a new well location, its target depth and completion interval 10. Consider health safety and welfare in drilling design 11. Consider global, cultural, social, environmental issues in drilling design 12. Consider economic factors in drilling design 				
Textbook	<ol style="list-style-type: none"> 1. Bassiouni, Z. (1994) <i>Theory, Measurement and Interpretation of Well Logs</i>. SPE Textbook Series Vol. 4 2. Bourgoyne Jr, A.T., Millheim, K.K., Chenevert, M.E. Young Jr., F.S. (1991) <i>Applied Drilling Engineering</i>. SPE Textbook Series Vol. 2 				
Other References	-				
Homework & Projects	-				
Laboratory work	-				
Computer Use	-				
Other Activities	-				
Assessment Criteria	Activities			Quantity	Effects on Grading, %
	Midterms				
	Quizzes				
	Homework				
	Projects				
	Term Paper/Projects			4	85%
	Laboratory Work				
	Other Activities (Teamwork)			3	15%
Final Exam					

Weeks	Course Plan	Course Outcomes
1	Introduction to the design project	1, 2
2	Proposing a technical project	1, 3
3	Teamwork and emotional intelligence	5
4	Technical writing	6
5	Technical speaking	7
6	Well log analysis	8
7	Identifying reservoir structure	8
8	Reservoir characterization and mapping	4, 8
9	Estimation of original and recoverable fluids/heat in place	8
10	Determination of a new well location	9
11	Drilling and completion design for the new well location	11
12	Drilling and completion design for the new well location	11
13	HSE analysis of the drilling operation	10
14	Drilling cost analysis	12

Related Performance Indicators
<p>1b. Apply engineering methods to reservoir, drilling and production engineering problems</p> <p>2a. Consider public health, safety, and welfare issues in Petroleum, Natural Gas, and Geothermal Engineering design.</p> <p>2b. Consider global, cultural, social, environmental issues in Petroleum, Natural Gas, and Geothermal Engineering design.</p> <p>2c. Conduct economic analysis in Petroleum, Natural Gas, and Geothermal Engineering design</p> <p>3a. Communicate effectively by delivering formatted reports</p> <p>3b. Communicate effectively by delivering oral presentations</p> <p>4b. Recognize the economic, environmental, or global effect of petroleum, natural gas, and geothermal engineering practices</p> <p>5a. Propose a project and complete its required tasks as a team by meeting deadlines</p> <p>5b. Collaborate in a team's activities to complete a project</p> <p>7b. Apply new knowledge to tasks relevant to petroleum and natural gas engineering</p>

Relationship of Course Learning Outcomes to the Performance Indicators										
Course Learning Outcome	Performance Indicator									
	(1b)	(2a)	(2b)	(2c)	(3a)	(3b)	(4b)	(5a)	(5b)	(7b)
1								x		
2								x		
3							x			
4										x
5									x	
6					x					
7						x				
8	x									
9	x									
10		x								
11			x							
12				x						