



KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY (KUST)

DRILLING AND COMPLETIONS ENGINEERING 1 SYLLABUS			
Course Title	Drilling and Completions Engineering 1		
Course Code	PTE3335	No. of Credits	3 Credit Hours
Department	Petroleum Engineering	College	Engineering
Pre-requisites Course Code	PTE3310C	Co-requisites Course Code	N/A
Course Coordinator(s)	Muhammad Ali		
Email	muhammad.ali@komar.edu.iq	IP No.	134
Other Course Teacher(s)/Tutor(s)	None		
Class Hours	SUN/TUE: 10:00-11:30 Room: 103		
Contact Hours	SUN: 13:00 - 16:00 Room: 218		
Course Type	Departmental Requirement		
Offer in Academic Year	Spring 2016		
COURSE DESCRIPTION			
This course provides an introduction to drilling oil and gas well techniques, drilling rig types with its main system components, circulating drilling fluids and reconditioning system, mud hydraulics and optimization, drilling bits and BHA components, drilling string design, finally introduction to oil well completion, cementing operations, formation pore pressures and well control issues.			
COURSE OBJECTIVES			
The objectives of this course is to familiarize the students with well drilling operations, string designs along with all related mathematics for optimization of mud circulating parameters up to completion. This course will prepare the students to work as a drilling engineer in petroleum industry.			
COURSE LEARNING OUTCOMES			
After participating in the course, students should be able to:			
1. Analyze key features of various rig components, and use these descriptions in appropriate for design analysis and evaluations (ABET A,E)			
2. Analyze the rig operations and perform required calculations (ABET A,E,K)			
3. Describe types and functions of water-based muds, oil base mud and mud contaminations (ABET E),			
4. Apply hydraulic equations to calculate pressure drops in the circulating system (ABET A, B, E),			
5. Describe the main design features of a tri-cone, PDC bit (ABET B),			
6. Understand the function of each component of the drill sting. (ABET A,E,K),			
7. Learn about various cementing and completion types and installation operations. (ABET A,E,K)			
8. Calculate formation pore pressure and construct charts.(ABET A,E,K)			
9. Learn well control techniques (ABET K)			



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RELATED PROGRAM OUTCOMES:

A	An ability to apply knowledge of mathematics, science, and engineering
E	An ability to identify, formulate, and solve engineering problems
K	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Reference: <http://www.abet.org/eac-criteria-2014-2015/>

GUIDELINES ON GRADING POLICY

	Points	Percentage Scores	Grade
	A	95–100	4.0
	A-	90-94	3.7
	B+	87–89	3.3
	B	83-86	3.0
	B-	80-82	2.7
	C+	75–79	2.3
	C	70-74	2.0
	C-	65-69	1.7
	D+	60–64	1.3
	D	55-59	1.0
	D-	50-54	0.7
	F	0–49	0
	I	Incomplete Course Work	
	W	Official Withdrawal	

Passing Grade is 65% or above

COURSE CONTENTS

Course topics include:

1. Introduction to drilling and completion operations.
2. Drilling rig components
3. Drilling operations
4. Drilling fluids
5. Drilling hydraulics
6. Drilling bits
7. Drill string Assembly
8. Well completions and Cementing Operations
9. Formation Pore Pressure
10. Well Control

***Note: Adding more chapters is governed by the time.**



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Course Teaching and Learning Activities:

Lectures: during week, the theoretical and practical lectures will be presented throughout the semester; the discussion of practical work within lab will be organized and illustrated with activities.

Assignments: after the lectures, the assignment will be explained and given to students. It is expected to be done on weekly bases.

Quizzes: the contents of each lecture will be discussed during class for open question and answer to make sure every student will participate and active.

In class brainstorming sessions: provide students with enough sources and background knowledge briefly within the topics during class to top up their challenge packs to be more active.

CLASS REQUIREMENT

- A Scientific Calculator
- Notebook

***Note: Students must bring a notebook, a pen, notebook, calculator, and the periodic table to every class**

Assessment Tool	Description	Weight
Quizzes	Four Quizzes are scheduled as shown in the semester schedule. Students will take 4 quizzes; Three quiz grades will be counted toward your final grade (ABET A and E)	10%
Assignments	Three assignments will be conducted during the semester; each assignment will be given as scheduled and posted on Google Classroom(ABET A and E)	10%
Mid-term exam	Paper examination – all topics that were studied are included (ABET A and K)	20%
Final Exam	Examination questions-all topics that were studied during the semester are included (ABET A, E and K)	30%
Tests	Two tests will be conducted during the semester and each has 15% of the total grade. The test may include multiple-choice questions, True/False, short answers, and problem solving (ABET	30%

ESSENTIAL READINGS: (Journals, textbooks, website addresses etc.)

Textbooks:

Drilling Engineering, by Heriot-Watt University. Institute of Petroleum Engineering.
Drilling Engineering, A complete Well Planning Approach, by Neal Adams and Tommie Carrier.
PennWell Publishing Company, Tulsa, OK, 1985.
Drilling Engineering, by G. Robello Samuel, PennWell Publishing Company, Tulsa, OK, 2007.

References:

SPE technical papers in related subjects



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COURSE POLICY *(including plagiarism, academic honesty, attendance etc)*

KUST Academic Policy

<http://sar.komar.edu.iq/files/Student%20hand%20Book%202013.pdf>

Attendance:

- Students are expected to attend all lectures and must attend all examinations, quizzes, and practical exercises.
- There is no make-up work for students who miss classes without official permission.
- Student must arrange with the faculty to make-up the missed class.
- Students are subject to the regulation and policies mentioned in the KUST Student Handbook.
- KUST guidelines for lateness are as follows: Three occasions of lateness count as one absence. (You can be considered late the first minute of the lecture time).

GUIDELINES FOR SUCCESS

1. Be able to work independently and in groups,
2. Pay-attention in the classes is the guarantee of success,
3. Extend your knowledge beyond the given textbooks in order to master the subject, and
4. Try not to miss the classes



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Course calendar: Please check the academic calendar for spring 2016

Week	Beg/End dates	Topics (Chapters)	Course Discussion	Assessment
1	FEB 28 – MAR 3	Introduction to drilling and completion operations	Introduction to Drilling Rig and Types of Component	
2	MAR 6- MAR 10	Drilling rig components	Six Major Sub-Systems: Power System, Hoisting System, Circulating System, Rotary System, Well Control System, Well Monitoring System	
3	MAR 13- MAR 17	Drilling rig components		ASSIGNMENT-1 (Chapter 1,2) (Deadline: 7 days from the date of announcement)
MAR 20- MAR 24 Nowroz Holidays				
4	MAR 27- MAR 31	Drilling operations	Basic Components of Drilling String, Bottom Hole Assembly and Their Functions	QUIZ-1 (Chapter 1,2)
5	April 3- April 7	Drilling operations	Well Types, Formation Pressures, Planning Costs, Overview Of Planning Process, Data Collection And Planning A Well	TEST-1 (Chapter 1,2)
6	April 10- April 14	Drilling fluids	Managed Pressure Drilling, Dual Gradient Drilling	Assignment-2 (Chapter 3,4) (Deadline: 7 days from the date of announcement)
7	April 17- April 21	Drilling hydraulics	Special Well Control Issues	Quiz-2 (Chapter 3)
Mid Term Examination April 22- April 30				
8	May 2- May 5	Drilling bits	Drilling Problems associated with Abnormal Formation Pressures, Pipe Sticking, Loss Of Circulation	



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9	May 8- May 12	Drill string Assembly	Hole Deviation, Drill Pipe Failures, Borehole Instability, Mud Contamination, Hole Cleaning, Fishing Job	Assignment-3 (Chapter 4,5) (Deadline: 7 days from the date of announcement)
10	May 15- May 19	Drill string Assembly	Introduction To UBD, UBD Techniques, Benefits Of UBD Equipment, Selecting An Appropriate Candidate, And UBD Well Engineering.	Quiz-3 (Chapter 4,5)
11	May 22- May 26	Well completions and Cementing Operations	Introduction To MWD Systems, MWD - Directional Tools, MWD - Gamma Ray Tools, Transmission And Control Systems, Surface System	
12	May 29- June 2	Well completions and Cementing Operations	Introduction And Applications, Considerations And Planning The Profile Of The Well,	TEST-2 (Chapter 5,6,7)
13	June 5- June 9	Formation Pore Pressure	Deflection Tools and Directional Bottom Hole Assembly	Quiz-4 (Chapter 8,9)
14	June 12- June 16	Well Control	Personnel Safety And Monitoring, Safety Related Accidents, Drill Rig Operation, Transportation, Maintenance And Repair	
15	June 19- June 23	Review Work	Review of the Course	
Final Examination (June 24- July 2)				