KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
(KUST)

DRILLING AND COMPLETIONS ENGINEEIRNG 2 SYLLABUS			
Course Title	**Drilling and Completions Engineering 2**		
Course Code	**PTE 4336**	**No. of Credits**	**3 Credit Hours**
Department	**Petroleum Engineering**	**College**	**Engineering**
Pre-requisites Course Code	**PTE3335**	**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	**MON/WED: 12:00-13:30 Room: G-08**		
Contact Hours	**SUN: 13:00 - 16:00 Room: 218**		
Course Type	**Departmental Requirement**		
Offer in Academic Year	**Spring 2016**		

COURSE DESCRIPTION

The subject will begin with the introduction of rig components and will discuss basic drilling operations. Later in the subject, advance drilling engineering techniques will be covered. The techniques mainly covered are Bottomhole assembly design, Underbalanced drilling, Horizontal, Extended Reach, Multi-Lateral Drilling, Fishing Operations, and Health, Safety concerns during the drilling operations.

COURSE OBJECTIVES

The subject will provide students with the skills to design and execute drilling, casing and cementing operations safely. Furthermore, students will develop more understanding of advance theories and techniques applied in drilling operations.

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. Design of bottom hole assembly (ABET A,E,K)
3. Design and execute complete well drilling plan (ABET E,K)
4. Application of advance techniques in drilling a well (ABET E,K)
5. Analysis of the problems during drilling a well (ABET E,K)
6. Practice techniques of measurements while drilling (ABET A,E,K)
7. Design of horizontal and multilateral well (ABET A,E,K)
8. Understand various health safety environmental concerns (ABET E)

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, the Rotary Drilling Process, the Rig, Drilling Equipment, Drilling Fluids
2. Bottom Hole Assembly Design
3. Well Planning
4. Advance Drilling Technology Topics
5. Drilling Problems and Solutions
6. Underbalance Drilling
7. Measurements While Drilling
8. Horizontal, Extended Reach & Multilateral Drilling Operations
9. Health, Safety and Environment

Note: Adding more chapters is governed by the time.

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

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, the Rotary Drilling Process	Onshore Drilling Rig Components And Their Functions	
2	MAR 6- MAR 10	Introduction, the Rotary Drilling Process	Six Major Sub-Systems: Power System, Hoisting System, Circulating System, Rotary System, Well Control System, Well Monitoring System	
3	MAR 13- MAR 17	Bottom Hole Assembly Design	Basic Components of Drilling String, Bottom Hole Assembly and Their Functions	ASSIGNMENT-1(Chapter 1,2) (Deadline: 7 days from the date of announcement)
Nowroz Holidays MAR 20 – MAR 24				
4	MAR 27- MAR 31	Bottom Hole Assembly Design	Bottomhole Assembly Design And Calculations	QUIZ-1 (Chapter 1,2)
5	April 3- April 7	Well Planning	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	Advance Drilling Technology Topics	Managed Pressure Drilling, Dual Gradient Drilling	Assignment-2 (Chapter 3,4) (Deadline: 7 days from the date of announcement)
7	April 17- April 21	Advance Drilling Technology Topics	Special Well Control Issues	Quiz-2 (Chapter 3)
Mid Term Examination April 22- April 30				
8	May 2 - May 5	Drilling Problems and Solutions	Drilling Problems associated with Abnormal Formation Pressures, Pipe Sticking, Loss Of Circulation	
9	May 8- May 12	Drilling Problems and Solutions	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	Underbalance Drilling	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	Measurement While Drilling	Introduction To MWD Systems, MWD - Directional Tools, MWD - Gamma Ray Tools, Transmission And Control Systems, Surface System	
12	May 29- June 2	Horizontal, Extended Reach & Multilateral Drilling Operations	Introduction And Applications, Considerations And Planning The Profile Of The Well	TEST-2 (Chapter 5,6,7)
13	June 5- June 9	Horizontal, Extended Reach & Multilateral Drilling Operations	Deflection Tools and Directional Bottom Hole Assembly	Quiz-4 (Chapter 8,9)
14	June 12- June 16	Health, Safety and Environment	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)				