KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
(KUST)

PETROLEUM TRANSPORT AND STORAGE ENGINEERING SYLLABUS			
Course Title	**Petroleum Transport and Storage Engineering**		
Course Code	**PTE 4380**	**No. of Credits**	**3 Credit Hours**
Department	**Petroleum Engineering**	**College**	**Engineering**
Pre-requisites Course Code	**PTE 4355**	**Co-requisites Course Code**	**N/A**
Course Coordinator(s)	**Dr. Hiwa Sidiq and Mr. Muhammad Ali**		
Email	hiwa.sidiq@komar.edu.iq muhammad.ali@komar.edu.iq	**IP No.**	**134**
Other Course Teacher(s)/Tutor(s)	**None**		
Class Hours	**TUE/THU: 16:00-17:30 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 brings together the entire spectrum of hydraulics, design, and operating requirements for pipeline transportation and storage of hydrocarbon liquids, the essence of our energy supply. The courses will cover the basics of fluid hydraulics, transportation of oil by tankers and pipeline, pipeline transportation of natural gas, measurement of hydrocarbon at fields, storage and terminal designs for hydrocarbons and various pipeline operations.

COURSE OBJECTIVES

The objective of this course is to develop a deeper understanding of how pipelines really work. This course will serve the need for a single source of learning for petroleum engineering students to enter the business and industry in pipeline engineering companies and departments,

COURSE LEARNING OUTCOMES

After participating in the course, students should be able to:

1. Understand and recommend the suitable methods for oil and gas transportation (ABET E,K)
2. Use fluid properties and fluid hydraulics in pipe line designing (ABET A,E,K)
3. Recommend the pump requirements for pipelines (ABET A,E,K)
4. Design the Transportation mechanism of oil by tankers. (ABET A,E,K)
5. Design the pipeline for transporting the crude oil. (ABET A,E,K)
6. Design the pipeline for transportation of natural gas (ABET A,E,K)
7. Design the transportation mechanism of LNG by tankers (ABET E,K)
8. Design storage and terminal designs for crude oil(ABET A,E,K)
9. Learn various liquid measurement 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 A-	95–100 90-94	4.0 3.7
B+ B sB-	87–89 83-86 80-82	3.3 3.0 2.7
C+ C C-	75–79 70-74 65-69	2.3 2.0 1.7
D+ D D-	60–64 55-59 50-54	1.3 1.0 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 Transportation of hydrocarbons
2. Hydrocarbon properties and Fluid mechanics
3. Pumps and Pump Stations
4. Pipeline transportation of oil
5. Pipeline transportation of gas
6. Transportation of LNG
7. Liquid Measurement
8. Hydrocarbon Petroleum Tankage
9. Terminal Design
10. Pipeline Operations

****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:

1. Fundamentals of Natural Gas Processing, 2nd ed, Arthur Kidnay, William Parrish, Daniel McCartney, 2011.
2. Hydrocarbon liquid transmission pipeline and storage systems: design and operation by M. Mohitpour, M.S. Yoon, J.H. Russell, *2012*.
3. Production and Transport of oil and gas, by A.P.SZILAS, Elsevier, 1986

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 to Transportation of hydrocarbons	Liquid Hydrocarbon Transportation System, Hydrocarbon Liquid Pipelines, Liquid Pipeline Transportation Systems ,	
2	MAR 6- MAR 10	Hydrocarbon properties and Fluid mechanics	Hydrocarbon Liquids Phase Behavior, Properties of Petroleum Liquids	
3	MAR 13- MAR 17	Hydrocarbon properties and Fluid mechanics	Fundamentals of Liquid Pipeline Hydraulics, Design Process	ASSIGNMENT-1 (Chapter 1,2) (Deadline: 7 days from the date of announcement)
Nawroz Holidays MAR 20- MAR 24				
4	MAR 27- MAR 31	Pumps and Pump Stations	Centrifugal Pumps, Pump Selection and Sizing, Pipeline Hydraulic Requirements	QUIZ-1 (Chapter 1,2)
5	April 3- April 7	Pipeline transportation of oil	Pressure waves. Waterhammer, Slug transportation, Leaks and ruptures in pipelines, Isothermal oil transport	TEST-1 (Chapter 1,2,3)
6	April 10- April 14	Pipeline transportation of oil	Thermal properties of soils, Methods of improving flow characteristics	Assignment-2 (Chapter 3,4) (Deadline: 7 days from the date of announcement)
7	April 17- April 21	Pipeline transportation of gas	Physical and physico-chemical properties of natural gas, Steady-state flow in pipeline systems	Quiz-2 (Chapter 4)
Mid Term Examination April 22- April 30				
8	May 2- May 5	Pipeline transportation of gas	Transient flow in pipeline systems, Pipeline transportation of natural gas; economy	

9	May 8- May 12	Transportation of LNG	Storage of LNG, Truck Transport, Pipelines, Marine Transport	Assignment-3 (Chapter 5) (Deadline: 7 days from the date of announcement)
10	May 15- May 19	Transportation of LNG	Regasification and Cold Utilization of LNG	Quiz-3 (Chapter 5,6)
11	May 22- May 26	Liquid Measurement	Introduction, Static Measurement, Tank Gauging, Types of Meters, Meter Station Design	
12	May 29- June 2	Hydrocarbon Petroleum Tankage	Types of Petroleum Storage Tanks, Regulations Affecting Terminal and Storage Facilities	TEST-2 (Chapter 6,7,8)
13	June 5- June 9	Terminal Design	Petroleum Storage/Terminal Design, Typical Layout and Spacing, Tank Design	Quiz-4 (Chapter 9)
14	June 12- June 16	Pipeline Operations	Supervisory Control and Data Acquisition (SCADA), Overview of Pipeline Leak Detection System	
15	June 19- June 23	Review Work	Review of the Course	
Final Examination (June 24- July 04)				