

KHAZAR UNIVERSITY

**SCHOOL OF ARCHITECTURE, ENGINEERING
AND APPLIED SCIENCES**

COURSE SYLLABUS

Drilling Engineering

Drilling Engineering

Identification

<i>Semester:</i>	Spring, 2010
<i>Department:</i>	Petroleum Engineering
<i>Subject:</i>	Drilling Engineering (PETE 302)
<i>Credit-units:</i>	3
<i>Instructor:</i>	Ph.D, <i>ELNUR AMIROV</i>
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Textbooks and Materials:

Core Textbook:

1. John Ford, Drilling Engineering, UK,2004 .

Supplementary book:

2. Larry Lake. Petroleum Engineering Handbook, vol.6, Drilling Engineering, SPE, 2007.

For class presentation and discussions, the student should utilize the Journal and Internet Materials. Moreover, the course does not limit the use of learning materials at the Khazar University library.

Objectives

This course is a main subject of a Drilling Engineering. In this course will be covered a lot of topics of Drilling related Geological and Geophysical sciences.

General Objectives of the Course:

- ✓ To meet curriculum requirements of the School of Engineering and Applied Sciences

Specific Objectives of the Course:

- ✓ To support students academically, to provide background understanding about drilling process.
- ✓ To encourage students participation and interaction and fostering and atmosphere of to learn and respect.
- ✓ Focus on aspects that are important to exploration and production activities in Petroleum Industry.

Outline

Overview of Drilling Operations, Rig Components, The Drillstring, Drilling Bits, Formation Pressures, Well Control, Casing, Cementing, Drilling Fluids, Hydraulics, Directional Drilling, Directional Surveying, Measurement While Drilling, Subsea Drilling.

Developed Skills

- ✓ Analytical thinking
- ✓ Critical reasoning
- ✓ Leadership
- ✓ Presentation
- ✓ Other

Evaluation

Participation & activity	10
Quizzes	20
Mid-term Examination	30
<u>Final Examination</u>	<u>40</u>
Total	100

Learning and Teaching Methods

This course considers active learning process: lectures, discussions and presentations.

Course Schedule

Week	Topics	Hours	Reading
1	Overview of Drilling Operations (drilling personnel, rotary drilling equipment, the drilling process, offshore drilling)	4	[1] Ch.1
2	Rig Components (power system, circulating system, rotary system, well control system)	4	[1] Ch.2.
3	The Drill string (drill pipe, tool joints, heavy wall drill pipe, drill collars, other drill string components, dill string design)	4	[1] Ch.3.
4	Drilling Bits (types of drilling bit, bit design, bit selection, rock bit evaluation, bit performance)	4	[1] Ch.4.
5	Formation Pressures (formation pressures, overburden pressures, origin of abnormal pressure, drilling problems associated with abnormal formation pressures, transition zone, prediction and detection of abnormal pressures, formation fracture gradient)	4	[1] Ch.5.
6	Well Control (primary control, warning signs of kicks, secondary control, well killing procedures)	4	[1] Ch.6.
7	BOP equipment, BOP stack arrangements	4	[1] Ch.6.
8	Mid-term exam		
9	Casing (Component parts of a casing string, casing terminology, properties of casing, ali specifications, standards and bulletins, wellheads and casing hangers, rig-site operations, casing design)	4	[1] Ch.7.

10	Cementing (oil well cements, properties of cement, cement additives, primary cementing, squeeze cementing, cement plugs, evaluation of cement jobs)	4	[1] Ch.8.
11	Drilling Fluids (field tests on drilling fluids, water based mud, oil-based muds, solids control)	4	[1] Ch.9,.
12	Hydraulics (flow regime and Reynolds number, rheological models, frictional pressure drop in pipes and annuli, frictional pressure drop across the bit, optimising the hydraulics of the circulating system)	4	[1] Ch.10, .
13	Directional Drilling (applications, depth reference and geographical reference systems, profile planning, considerations when planning the directional well path, deflection tools)	4	[1] Ch.11, .
14	Directional Surveying (surveying calculations, survey calculations and plotting results, photographic surveying tools, downhole telemetry tools, inertial navigation systems)	4	[1] Ch.12, .
15	Measurement While Drilling (MWD systems, MWD-directional tools, MWD-gamma ray tools, transmission and control systems, surface system, example systems)	4	[1] Ch.13.
16	Subsea Drilling (drilling the well, completing the well, suspending the well, abandonment)	4	[1] Ch.14.
	Final Examination		