



Course Code OGEE-520	Course Title Drilling Engineering	ECTS Credits 7.5
Prerequisites None	Department Engineering	Semester Fall, Spring
Type of Course Required	Field Oil, Gas and Energy Engineering	Language of Instruction English
Level of Course 2 nd Cycle	Lecturer(s) Dr Nicolas Kokkinos	Year of Study 1 st
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites OGEE-510

Objectives of the Course:

The main objectives of the course are to:

- Introduce to the principles and the role of drilling.
- Present comprehensively the various types of drilling rigs and drilling systems.
- Facilitate the selection of the proper drilling rig and drilling technique.
- Provide technical knowledge related to a typical drilling process and discriminate the various drilling stages.
- Distinguish and evaluate all the components in a drilling string.
- Define the drilling cost.
- Provide technical knowledge for choosing suitable drilling bits.
- Evaluate the types of drilling fluids (oil based and water based).
- Assess mud performance through mud logs.
- Solve practical drilling problems.
- Perform drilling hydraulics calculations.
- Analyze casing and cementing design.
- Control well.
- Underline the importance of directional and horizontal drilling.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Know the basic concepts of drilling and deeply understand rotary drilling technique.
2. Demonstrate solid knowledge of the drilling rig systems.
3. Calculate drilling costs (onshore and offshore) in terms of investment in petroleum engineering.
4. Choose the suitable drilling bit type and calculate replacements.
5. Choose the proper drilling joints.
6. Differentiate the types of drilling fluids.
7. Demonstrate use of mud engineering techniques.

8. Determine the mud cake building mechanisms (emulsion separation).
9. Specify mud properties and their performance through mud logs.
10. Solve first-hand calculations related to drilling hydraulics and understand the hydraulic behavior of the drilling fluids in the drilling string.
11. Interpret correctly data accrued from drilled cuttings.
12. Design and develop the drilling, casing and cementing plan.
13. Identify and solve problems related with the drilling-casing-cementing.
14. Respond appropriately to emergencies on avoiding “kicks”.
15. Obtain basic knowledge in directional and horizontal drilling.

Course Contents:

- Drilling engineering overview.
- Drilling rig types and systems.
- Typical drilling rig organization.
- The rotary drilling process (onshore and offshore).
- Drilling fluids.
- Basics on mud logging.
- Rotary drilling bits.
- Casing and cementing.
- Drilling hydraulics.
- Well control.
- Drilling field problems and solutions.
- Basic drilling engineering computations.
- Drilling cost analysis.
- Introduction to directional and horizontal drilling.

Learning Activities and Teaching Methods:

Lectures, projects, in-class discussion, work in the PC Lab.

Assessment Methods:

Homework, project assignments, midterm exam, final exam.

Required Textbooks / Reading:

Title	Author(s)	Publisher	Year	ISBN
Fundamentals of Drilling Engineering	Mitchell R.F. and S.Z. Miska	SPE	2011	978-1-55563-338-7

Recommended Textbooks / Reading:

Title	Author(s)	Publisher	Year	ISBN
Drilling Engineering	Azar J.J. and G.R. Samuel	PennWell	2007	1-59370-072-5