



University of Nicosia, Cyprus

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| Course Code OGEE-320 | Course Title Drilling Engineering | ECTS Credits 8 |
| Department Engineering | Semester Fall, Spring | Prerequisites MENG-280 |
| Type of Course Required | Field Oil & Gas Engineering | Language of Instruction English |
| Level of Course 1 st Cycle | Year of Study 3 rd | Lecturer(s) Dr Nicolas Kokkinos |
| Mode of Delivery Face-to-face | Work Placement N/A | Co-requisites None |

Objectives of the Course:

The main objectives of the course are to:

- Familiarize students with all preliminary steps involved in drilling operations
- Explain all requirements necessary for oil and gas drilling operations
- Present wellbore hydraulics and explain their importance and role in different drilling techniques
- Explain in detail the various drilling systems and techniques used for oil and gas engineering
- Describe cementing and casing design
- Outline common drilling problems and describe possible solutions
- Provide information on underbalanced drilling systems and operations

Learning Outcomes:

After completion of the course students will be able to:

- Design and evaluate drilling system for the oil and gas sector
- Isolate and solve problems related to drilling for various types of wells
- Identify drilling requirements for all the stages of the drilling operation and decide on the most appropriate practices depending on pressure calculations, drilling techniques, and well models
- Calculate pore pressure and fracture gradient of the well formation for the design of casing
- Establish methodologies for well control that safeguard the well-being of the workers on site and provide a reliable and safe environment
- Adopt drilling procedures and techniques that conform with international legal and environmental issues

Course Contents:

- Drilling preliminaries (e.g. economic analysis, drilling contracts, site preparation)
- Drilling requirements
- Drilling fluids

- Hydraulics fundamentals, design requirements, and optimization
- Well control design
- Surface and down-hole drilling equipment
- Pore and fracture pressures prediction and application
- Drilling systems (e.g. rotating system, circulating system, modern rotary drilling rigs, etc.)
- Cementing and casing design
- Drilling techniques (e.g. vertical well drilling, directional drilling, foam drilling)
- Drilling problems and solutions
- Underbalanced drilling systems and operations

Learning Activities and Teaching Methods:

Lectures, in-class examples, exercises, design project, and laboratory assignments

Assessment Methods/Reading:

Homework, tests, final exam, project report, lab reports

Required Textbooks:

| Authors | Title | Publisher | Year | ISBN |
|-----------------------------|----------------------|----------------|------|----------------|
| J. J. Azar and G. R. Samuel | Drilling Engineering | PennWell Corp. | 2007 | 978-1593700720 |

Recommended Textbooks/Reading:

| Authors | Title | Publisher | Year | ISBN |
|---|------------------------------|--------------------------------|------|----------------|
| A. T. Bourgoyne, K. K. Millheim, M. E. Chenevert, F. S. Young | Applied Drilling Engineering | Society of Petroleum Engineers | 1986 | 978-1555630010 |