THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Petroleum Drilling and Production Engineering

CBE 5230

Credit Hours:
3.00 - 3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
The design and evaluation of well drilling systems; identification and solution of drilling problems; wellbore hydraulics, well control, casing design; well cementing directional drilling, offshore drilling. Introduction to production operations and oil field equipment including onshore and offshore production systems.

Prerequisites and Co-requisites:
Prereq: 5200 and EarthSc 5661; or Grad standing; or permission of instructor.

Course Goals / Objectives:

- Design and evaluate well drilling systems; identify and solve drilling problems for all well geometries including directional and horizontal wells.
- Calculate the pressure requirement at every stage of the drilling operation from the pump to the bit and back to the surface based on rheological models and drilling hydraulics procedures and the API recommended practices.
- Design casing, taking into consideration the pore pressure and the fracture gradient of the formation.
- Establish a proper procedure for well control to ensure the safety of the personnel and to protect the environment.
- Design a proper cementing procedure for cementing the casing or abandoning a well, taking into considerations the environmental and legal issues.
- Analyze the performance of unconventional reservoirs
- Explain the physical meaning and evaluate the impact of rock and fluid properties in reservoir engineering and production problems.
- Follow flow of fluids from the reservoir/well interface through the well and surface facilities, with emphasis on hardware components, their functions and importance
- Describe the basic components (including functions, materials and health, safety and environmental considerations) and methods used to complete and produce oil and gas wells
- Describe the basic components (including functions, materials and health, safety and environmental considerations)) that comprise oil and gas production and separation surface facilities and fluid measurement in onshore and offshore facilities

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Course Topics:

- Types of drilling rigs and drilling platforms; Drilling problems and solutions
- Wellbore hydraulics and design of circulation system
- Casing design procedures; collapse, burst, tension, triaxial design
- Abnormal pressures prediction, well control
- Fracture gradient prediction; Rock mechanics for drilling and wellbore stability
- Well design for safety and efficiency
- Design of primary and secondary cementing jobs
- Directional drilling, wellbore surveying techniques
- Coiled tubing drilling; Offshore Drilling; Contemporary issues
- Near-well reservoir performance and inflow
- Analysis of well inflow/outflow and relationship to well completion
- Well hardware and completions—connection of well to the reservoir and the surface
- Introduction to Acid and Hydraulic Fracture Stimulation
- Introduction to artificial lift methods— gas lift, rod pump, ESP, Plunger Lift
- Surface equipment—onshore and offshore/deep water
- Sand management fundamentals 8. Production Chemistry and Flow Assurance

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Designation:

Required