Formation Evaluation & Petrophysics
CH EN 6169

Introduction
Formation Evaluation & Petrophysics is an elective course recommended for M.S. Petroleum Engineering students, geoscientists and other students interested in subsurface engineering. This is a 3 credit hour course offered in the spring semester.

Instructors:
Dr. Rasoul Sorkhabi (EGI) and Dr. John McLennan (Chemical Engineering)

Description:
Petrophysics and formation evaluation by wireline logging as well as core analysis comprise a workflow central to exploration and production in the petroleum industry. This is a core skill set for all petroleum engineers. This course covers petrophysics, formation evaluation and well logging at a graduate level. The course will consist of classroom lectures, independent and assigned reading, exercises, tests, site visits, and a final research report involving well-logging and petrophysics related to a given well or wells.

Course Content:

I. Reservoir and Formation Properties
   • Rock Formations
   • Petrophysical Properties
   • Mechanical Properties and Stress

II. Well/Wireline Logging
   • Logging Methods and Tools
   • Mud Logging
   • Direct Measurements: Caliper, Temperature, Pressure, Cameras, Tracers
   • Radioactivity Logs: Gamma Ray, Density, Photoelectric & Neutron
   • Electric Logs: Self Potential, Resistivity/Conductivity
   • Nuclear Magnetic Resonance Log
   • Sonic (Acoustic) Logs: Dipole Sonic, New Generation of Tools (Sonic Scanner and similar trade names)
   • Borehole Imaging and Dipmeter Logs

III. Coring: Conventional, Wireline, and Sidewall
   • Routine Core Analysis (RCAL)
Special Core Analysis (SCAL)
Mechanical Properties Measurements
Digital Core Analysis

IV. Completion and Production Logs
• Cased Hole Logging
• Completion and Cement Bond Logs
• Formation Testers
• Production Logs and Well Performance

V. Synthesis
• Logs and Formation Evaluation: Putting it All Together
• Formation Evaluation and Petrophysics of Shale and Tight Reservoirs
• Guest Lectures
• Instrumentation and Tools: Field Trip
• Core Repository: Field Trip
• Well Log Interpretation: Case Study and Homework Assignments

Suggested Textbooks: