



N481: Fiber-Optic Sensing: Introduction to the Technology and In-Well Sensing Applications

Format and Duration
Classroom - 1 Day

Instructor(s): Dennis Dria

Summary

This course introduces petroleum engineers and geoscientists to fiber-optic sensing technology that is used for well and reservoir diagnostics and surveillance. It provides in-depth technology awareness, including underlying theories of operation and breadth of well and reservoir applications, and the basic tools to determine whether fiber-optic sensing has the potential to address key well and reservoir uncertainties. The engineer and geoscientist will leave with an understanding of how fiber-optic sensors work, and how to use that knowledge to define where and how fiber-optic sensing can create value for specific well and reservoir types.

Learning Outcomes

Participants will learn to:

1. Determine cases where fiber-optic sensing can provide data to optimize completion and stimulation design and improve hydrocarbon recovery.
2. Compare and contrast fiber-optic sensing relative to other diagnostic and surveillance monitoring methods.
3. Evaluate predicted well production/injection performance to assess efficacy of DTS, DAS, stand-alone single-point fiber-optic sensors and sensor arrays.
4. Screen well completion and reservoir development scenarios using technical and economic analyses.
5. Apply simple cost:benefit models for fiber-optic data acquisition in specific well types.
6. Build project plan outline for start-to-finish FO data acquisition system design, vendor and equipment selection, data management and interpretation.

Training Method

This is a classroom course comprising a mixture of lectures, discussion, exercises and case histories.

Who Should Attend

This course is designed for petroleum engineers and geoscientists who want an understanding of how fiber-optic sensors work and how to use that knowledge to define where and how fiber-optic sensing can create value for specific well and reservoir types.

Course Content

- What is Fiber-Optic Sensing (FOS): basic physics and engineering of the FOS system components: fibers, coatings, cabling, connectors optical fibers, sensor types, instrumentation.
- Why we would want to use FOS: advantages and disadvantages vs. other sensing/monitoring technologies.



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- Single-point FO sensors: P, T, seismic/acoustic
- Distributed FO sensing: temperature (DTS), acoustics (DAS), strain (DSS)
- Overview of the different applications
- Survey of FOS system deployment methods
 - Permanently installed FOS
 - FO “logging” interventions & temporary installations
- Data management and analysis/interpretation
- Factors that influence FOS system selection
- High-level screening of candidate wells and justification for installing FOS.