



INTELLIGENT SOLUTIONS, INC. PRESENTS:

ISI's Short Course Series; AI&DM in the Exploration & Production Industry

COURSE TITLE:

TOP-DOWN, INTELLIGENT RESERVOIR MODELING (TDM).

AN ALTERNATIVE TO TRADITIONAL RESERVOIR SIMULATION AND MODELING

INSTRUCTOR:

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INTENDED AUDIENCE:

GEOLOGISTS, PETRO-PHYSICIST, GEO-PHYSICISTS, RESERVOIR ENGINEERS AND ASSET MANAGERS. THIS COURSE IS BENEFICIAL FOR THOSE WHO ARE INVOLVED IN ALL ASPECTS OF RESERVOIR SIMULATION AND MODELING.

COURSE DESCRIPTION:

Intelligent Solutions, Inc. introduces a revolutionary and innovative alternative / complement to traditional reservoir simulation and modeling. Top-Down, Full Field, Subsurface Models; may be defined as developing a calibrated (history Matched) model of the hydrocarbon producing reservoir that integrates multiple instance of field measured properties such as production, logs, cores ... into a cohesive predictive model of the field. Instead of using first principle physics to model the fluid flow in the porous media, top-down modeling uses Artificial Intelligence and Data Mining (AI&DM) techniques to arrive at a consistent full field reservoir model with all the expected predictive capabilities.

Top-Down Model: Top-Down, intelligent reservoir modeling approaches the reservoir simulation and modeling from an opposite angle. It attempts to build a realization of the reservoir starting with well production behavior (history). The production history is augmented by core, log, well test and seismic data in order to fine tune the Top-Down model and increase its accuracy. Although not intended as a substitute for the conventional reservoir simulation of large, complex fields, this innovative and novel approach to reservoir modeling can be used as an alternative (at a fraction of the cost) to conventional reservoir simulation and modeling in cases where performing conventional modeling is cost (and man-power) prohibitive. In cases where a conventional model of a reservoir already exists, Top-Down modeling should be considered a compliment to, rather than a competition for the conventional technique, to provide an independent look at the data coming from the reservoir/wells for optimum development strategy and recovery enhancement.

A DETAIL OUTLINE OF THE COURSE MATERIAL FOLLOWS.



Course Outline:

- **Part One: Virtual intelligence; Background and overview**
 - Introduction
 - Artificial Neural Networks
 - Genetic Optimization
 - Fuzzy Set Theory

- **Part Two: Reservoir Simulation and Modeling**
 - Finite Difference Calculus
 - Grid Types & Boundary Conditions
 - Solution Techniques
 - Numerical Solution of Fluid Flow in Porous Media

- **Part Three: Top-Down, Intelligent Reservoir Models (TDIRM)**
 - Definition and specifications
 - Development of Top-Down Modeling
 - Decline Curve Analysis
 - Conventional Decline Curve Analysis
 - ISI's Intelligent Decline Curve Analysis
 - Type Curve Matching
 - Single-Well Simulation & Modeling
 - Single Well Volumetric Reserve Estimation
 - Single Well Recovery Factor Estimation
 - Discrete, Single Well Predictive Modeling
 - Incorporation of Analyzed Data
 - Incorporation of Log Information
 - Incorporation of Seismic Information (upon availability)
 - Field-wide Fuzzy Pattern Recognition
 - Time-Successive, Complete, Full Field Modeling
 - Calibration of the Top-Down Model
 - Analysis in the Predictive Mode

- **Part Four: Getting Familiarity with Software Implementations**
 - **TOP-DOWN MODELING DEVELOPMENT, IMAGINE™**
 - **Data Preparation**
 - Well-Based Data
 - Grid-Based Data
 - **Well-Based Data**
 - Production Data.
 - Oil, Water and Gas Production
 - Calculated GOR and Water Cut
 - Well-head or Bottom-hole Pressure (upon availability)
 - Well Log Data
 - Porosity
 - Saturation
 - Pay Thickness
 - Other Well-Based Data (upon availability)
 - Well Test Results
 - Core Measurement & Analysis
 - **Grid-Based Data**
 - Seismic Attribute
 - Geological, Petrophysical and Geophysical data from existing geo-cellular model (upon availability)
 - **Decline Curve Analysis**
 - **Type Curve Matching**
 - **Single-Well Numerical Modeling (History Matching)**
 - **Volumetric Reserve Estimation**
 - **Recovery Factor Estimation**
 - **Predictive Modeling**
 - **Field-Wide Fuzzy Pattern Recognition**
 - **Model Calibration**
 - **Predictive Analysis**
 - Optimum Infill Locations
 - Remaining Reserves
 - Underperformer Wells