Well logging interpretation (Petrophysics)

Advanced Training Course Syllabus

Duration: 36 hours

Training period: 1 week, 36 hours per week

Education format: distance learning

№	Topic	Hours	Form of assessment
1.	**Overview of well logging** Introduction of well logging (wireline, LWD, open or cased hole), the connection between well logging and reservoir properties	**4**	
2.	**Electrical well logging** Physics and application of Spontaneous potential logging Direct current logging Induction logging Micro electric logging Formation micro-resistivity imaging (FMI)	**6**	
3.	**Nuclear logging** **Basic nuclear physics** Gamma ray logging Formation density logging Neutron porosity devices	**4**	
4.	**Sonic well logging** Physics of sonic logging—acoustic waves in porous rocks acoustic velocity logging acoustic amplitude logging	**2**	
5.	**Application and Interpretation of logging data** Reservoir identification Lithology estimation Porosity calculation Permeability calculation Saturation calculation Clay quantification	**8**	
6.	**Basic core sampling analysis for well log interpretation** Introduction to Core Drilling Core Analysis Methods for Measuring Reservoir Rock Properties	**4**	
7.	**LWD technologies and its application**	**2**	
8.	**Modern technologies of well logging**	**6**	
	Total	36	Final test

Applied Geostatistics

Advanced Training Course Syllabus

Duration: 24 hours

Training period: 1 week, 24 hours per week

Education format: distance learning

№	Topic	Hours	Form of assessment
1.	Basics of static geological modelling	6	
2.	Basics of applied geostatistics (Concept of geostatistics and its application to geological modelling, experimental and theoretical variogramm, variogramm analysis, kriging, co-kriging, using of trends) Practical application of geostatistics for map calculation and petrophysical properties calculation.	**6**	
3.	Stochastic modelling (concept of gaussian random function simulation). Application of co-kriging and trends in stochastic modelling for porosity prediction.	**6**	
4.	Discrete geostatistics (lithofacies modelling). Application of geostatistics for the seismic and well logging data integration for lithofacies prediction. Application of seismic trend for the lithofacies prediction between the wells.	**6**	
	Total	24	Final test

Seismic Interpretation

Advanced Training Course Syllabus

Duration: 36 hours

Training period: 1 week, 36 hours per week

Education format: distance learning

№	Topic	Hours	Form of assessment
1.	**Travel time and amplitude interpretation**	**20**	
1.1	Well logging data for seismic interpretation. Acoustic and density logging.	2	
1.2.	Types of seismic boundaries 1D, 2D, 3D, 4D seismic surveys. Vertical seismic profiling (VSP).	4	
1.3.	Tracing reflective horizons. Faults identification. Time maps.	4	
1.2.	Velocity models Time-depth conversion. Structural maps construction.	10	
2.	**Sequence-stratigraphic and seismic-stratigraphic interpretation**	**6**	
2.1.	Seismic stratigraphy. Approaches to seismic stratigraphic analysis. Type and form of seismic recording in various facies.	2	
2.2.	Sequence stratigraphy. Sequences, system tracts. Sedimentation cycles.	4	
3.	**Seismic Data Attributive Analysis**	**4**	
3.1.	Seismic Attributes. Coherency, Dominant frequency, Chaos, Cosine of phase. Scope and limitations.	4	
4.	**AVO analysis and seismic inversion**	**6**	
4.1.	AVO analysis Scope and limitations.	2	
4.2.	Seismic inversion. Relative acoustic impedance. Correlation between seismic data and porosity. Inclusion of seismic data in a static geological model.	4	
	Total	36	Final test

Static Geological Modelling

Advanced Training Course Syllabus

Duration: 36 hours

Training period: 1 week, 36 hours per week

Education format: distance learning

№	Topic	Hours	Form of assessment
1.	**Fundamentals of static geological modeling**	**20**	
1.1.	Theoretical Foundations of Geological Modeling	4	
1.2.	Basics of core analysis methods for constructing a geological model	8	
1.2.	Fundamentals of well logging data interpretation	4	
1.3.	Fundamentals of seismic interpretation	4	
2.	**Basics of Geostatistics for building geological models**	**8**	
2.1.	Main types of interpolation	2	
2.2.	Geostatistics in modeling. Variogram. Kriging. Stochastic modeling.	6	
3.	**Building a static geological model**	**8**	
	Total	36	Final test

Practical Application of Neural Networks in Geology

Advanced Training Course Syllabus

Duration: 24 hours

Training period: 1 week, 24 hours per week

Education format: distance learning

№	Topic	Hours	Form of assessment
1.	Basics of Machine learning. Main concepts. Supervised and unsupervised learning.	**4**	
2.	Neural network technology. Neurons. NN training.	**4**	
3.	Supervised machine learning. Regression (calculation of porosity based on core samples). Classification (estimation of facies in the well)	**8**	
4.	Unsupervised machine learning. Clustering of data (Machine learning based seismic facies analysis)	**8**	
	Total	24	Final test

Advanced numerical simulation of thermal methods with air and steam injection for improved recovery of highly viscous reservoirs

Advanced Training Course Syllabus

Duration: 40 hours

Training period: 1 week

Education format: distance learning

№	Topic	Hours	Form of assessment
1.	**Principles of thermal EOR numerical simulation** Current commercial softwares for simulation, thermal properties (heat transfer and main temperature dependent parameters), general simulation workflow	4	
2.	**Phase behavior modeling for numerical simulation of dry in-situ combustion process** Laboratory measurements, components/pseudo-components definition, hydrocarbons' phase transition, k-values	4	
3.	**kinetic model for numerical simulation of dry in-situ combustion** Principles of reaction kinetics, main oxidation reactions of oil, air injection related laboratory measurements, the combustion tube experiment	6	
4.	**Build a 1D lab-scale numerical model for dry in-situ combustion with air injection** Create geology grid, importing the built fluid model, importing kinetic model, creation of an injection schedule, History matching of a combustion tube experiment.	8	
5.	**Build a 3D field-scale numerical model for dry in-situ combustion with air injection** Import geology grid, creation of an injection schedule, upscaling lab-scale results	10	
6.	**Creation of a schedule for a 3D field-scale numerical model with steam injection**	8	
	Total	40	Final test