

Advanced Petroleum Data Analytics & CPDA Exam Preparation Masterclass Course

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Overview

Advanced Petroleum Data Analytics & CPDA Exam Preparation Masterclass Course is a two-week course for experienced upstream data specialists who leave with an Asset Data Integration and Quality Blueprint. Participants connect petroleum data architectures, well log quality automation, production performance analytics, drilling telemetry analysis, and CPDA examination preparation. The course uses PPDM and OSDU concepts, Python and SQL workflows, geospatial checks, and technical case exercises to reconcile fragmented exploration and production records. Agile Leaders Training Center presents petroleum data analytics and CPDA preparation.

Who Should Attend

- Functions responsible for petroleum data analysis, upstream data engineering and enterprise architecture
- Teams responsible for subsurface information, well logs and technical data stewardship
- Reservoir and production functions responsible for integrated engineering datasets
- Drilling and real-time operations functions responsible for sensor records
- Data governance, quality and GIS functions responsible for petroleum master records
- Technical professionals responsible for CPDA preparation and petroleum information management

The course assumes participants work with petroleum datasets and basic data queries; SQL or Python familiarity supports the exercises, and introductory petroleum engineering is outside scope.

Departments and Industries

The course supports technical departments that integrate asset information across energy operations and service organizations.

- Upstream exploration, production and subsurface data management
- Reservoir engineering, production optimization and drilling operations
- Petroleum data engineering, enterprise architecture and digital oilfield units
- GIS, technical mapping, data governance and quality management
- Oil and gas operators and oilfield technology service providers
- Geothermal energy and carbon storage operations

Learning Objectives

By the end of this course, participants will be able to:

- Build petroleum data architectures and master records using PPDM and OSDU concepts.
- Apply WITSML, RESQML and PRODML exchange structures and geospatial validation.
- Analyze well logs, drilling telemetry and production datasets using Python and SQL.
- Evaluate data quality rules, decline forecasts, anomalies and operational performance.
- Apply stewardship, security and lifecycle controls to integrated technical information.
- Build an asset quality blueprint and analyze CPDA competency scenarios.

Course Agenda

Day 1: Enterprise Exploration and Production Data Architecture

- PPDM Well Identification Taxonomy and Petroleum Asset Lifecycle Definitions
- Enterprise Well Master Data Schemas and Technical Information Repositories
- Upstream Data Architecture Across Exploration, Development and Abandonment
- OSDU Data Platform Architecture, Core Services and Common Data Models
- Petroleum Metadata Cataloging, Data Lineage and Enterprise Data Discovery; Suggested Exercise: Design an Integrated E&P Data Architecture

Day 2: Subsurface Data Interoperability and Industry Exchange Standards

- PPDM Data Modeling for Well, Seismic, Spatial and Petroleum Asset Records
- Energistics WITSML Standards for Drilling and Wellbore Data Exchange
- RESQML Reservoir Characterization Models and Grid Data Integration
- PRODML Standards for Production Surveillance and Operational Information
- Coordinate Reference Systems, EPSG Definitions and Spatial Data Validation; Suggested Exercise: Map Technical Data Across PPDM, OSDU and Energistics Structures

Day 3: Automated Petroleum Data Quality Engineering

- DAMA-DMBOK Data Quality Principles Applied to Upstream Technical Information
- Automated Petroleum Data Profiling, Validation Rules and Quality Thresholds
- LAS File Header Normalization and Well Log Mnemonic Standardization
- Wellbore Deviation Survey Validation and Trajectory Quality Verification
- Production Allocation Reconciliation and Operational Data Consistency Checks; Suggested Exercise: Develop Automated Data Quality Rules and Exception Reports

Day 4: Python, SQL and Petroleum Data Integration Workflows

- Python Data Processing Using Pandas and Petroleum Data Analysis Libraries
- SQL Queries, Joins and Window Functions for Upstream Operational Datasets
- Data Transformation and Integration of Completion Reports and Well Test Information
- Geospatial Analysis Using GeoPandas and Petroleum Well Geometry Data
- API-Based Data Ingestion from SCADA and Operational Information Systems; Suggested Exercise: Build a Petroleum Data Processing and Reconciliation Pipeline

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Day 5: Advanced Well Log and Formation Evaluation Analytics

- Digital Well Log Interpretation and Petrophysical Data Preparation
- Automated Lithology Classification Using Supervised Machine Learning
- Multivariate Anomaly Detection in Geological and Petrophysical Measurements
- Gamma Ray Normalization and Well Log Calibration Methods
- Predictive Regression Techniques for Missing or Incomplete Log Measurements; Suggested Exercise: Analyze and Validate Multi-Well Petrophysical Datasets

Day 6: Production Engineering and Reservoir Performance Analytics

- Production Decline Curve Analysis Using Arps Models and Numerical Fitting
- Reservoir Pressure Data Filtering and Operational Trend Interpretation
- Virtual Flow Metering and Multiphase Production Estimation Techniques
- Waterflood Performance Analysis Using Hall and Chan Diagnostic Plots
- Well Shut-In Detection, Downtime Classification and Production Loss Analysis; Suggested Exercise: Develop Production Performance Models and Forecasting Outputs

Day 7: Real-Time Drilling Analytics and Operational Optimization

- WITSML-Based Drilling Data Streams and Rate of Penetration Monitoring
- Real-Time Rig Sensor Data Validation and Operational Anomaly Detection
- Weight on Bit, Torque and Standpipe Pressure Data Interpretation
- Predictive Models for Bit Wear and Drilling Performance Indicators
- Wellbore Trajectory Reconciliation and Anti-Collision Data Quality Controls; Suggested Exercise: Analyze Drilling Telemetry and Identify Operational Exceptions

Day 8: Enterprise Petroleum Data Governance, Security and Lifecycle Management

- Upstream Data Governance Maturity Models and Enterprise Capability Analysis
- Petroleum Data Stewardship, Ownership and Responsibility Assignment Matrices
- Master Data Management, Authoritative Records and Technical Metadata Governance
- Petroleum Information Security, Classification and Controlled Data Sharing
- Legacy Petroleum Data Migration, Archiving and Lifecycle Preservation; Suggested Exercise: Develop an Enterprise Petroleum Data Governance and Quality Control Framework

Day 9: CPDA Competency Applications and Integrated Examination Preparation

- CPDA Examination Blueprint, Domain Weightings and Technical Preparation Strategies
- Petroleum Data Analysis, Integration and Analytical Decision-Making Scenarios
- Data Quality Management, Governance and Master Data Management Case Studies
- Spatial Data, E&P Lifecycle, Security and Communication Competency Applications
- Full-Length CPDA-Style Mock Examination: 200 Multiple-Choice Questions in Four Hours; Examination Performance Analysis, Answer Rationales and Technical Knowledge Gaps

Day 10: Petroleum Data Integration Capstone Practice

- Suggested Exercise: Multi-Asset Petroleum Data Quality Audit and Remediation Planning
- Suggested Exercise: Real-Time Drilling Telemetry Parsing and Automated Anomaly Classification
- Suggested Exercise: Production Data Harmonization and Decline Curve Forecast Calibration
- Suggested Exercise: PPDM Schema Mapping and Unified Enterprise Well Master Data Development
- Integrated Petroleum Analytics Dashboard and Technical Decision Reporting; Suggested Capstone Exercise: Develop an End-to-End E&P Data Integration and Asset Quality Blueprint

Practical Exercises

The course uses suggested activities with representative petroleum datasets and technical case material.

- Suggested activity: map PPDM and OSDU entities and validate petroleum spatial records.
- Suggested activity: normalize LAS headers, reconcile SQL and Python datasets, and automate log quality checks.
- Suggested activity: fit production decline models, classify drilling telemetry exceptions and assign governance responsibilities.
- Suggested activity: complete CPDA-style questions and assemble the Asset Data Integration and Quality Blueprint.

FAQs

Who suits advanced petroleum data analytics training?

Advanced petroleum data analytics training suits experienced upstream data professionals, engineers and technical information specialists who work with exploration and production datasets. Basic querying skills are expected; SQL or Python familiarity supports the exercises.

How does advanced petroleum data analytics differ from introductory CPDA preparation?

Advanced petroleum data analytics adds technical integration, Python and SQL processing, exchange standards, production models and drilling telemetry to competency preparation. Introductory CPDA preparation concentrates on examination knowledge and petroleum data management fundamentals.

Which tools support petroleum data integration?

Petroleum data integration uses PPDM models, OSDU architecture concepts, WITSML, RESQML and PRODML exchange structures, Python, Pandas, SQL and geospatial analysis. Exercise software and datasets are selected during training preparation.

How does petroleum data analytics support production and drilling decisions?

Petroleum data analytics combines validated measurements with decline models, pressure trends, downtime classification and drilling sensor diagnostics. Participants examine uncertainty, quality exceptions and the limitations of predictive outputs before using technical results.

What work product results from petroleum data analytics practice?

The Asset Data Integration and Quality Blueprint combines data mapping, validation rules, analytical findings, stewardship controls and remediation recommendations. CPDA preparation remains independent professional training and does not imply accreditation or award the credential.

Conclusion

Participants take an Asset Data Integration and Quality Blueprint back to their organizations. It connects petroleum data mapping, automated quality checks, technical analyses and stewardship responsibilities across exploration, drilling, reservoir and production information. The course turns disconnected technical records into a traceable improvement plan supported by analytical evidence, exception reports and a defined path for remediation.

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