Seismic Interpretation and Formation Evaluation Essentials

GExperts Learning Academy | SC-004 | SC | 2 days

Course overview

2 days SC programme focused on Seismic Interpretation and Formation Evaluation Essentials, using energy-sector cases and applied decisions.

Designed for: Learners appropriate to the stated programme level

Learning outcomes

- Explain core principles and terminology for Seismic Interpretation and Formation Evaluation Essentials.
- Interpret an applied case using evidence and stated assumptions.
- Identify risks, safeguards, role boundaries and escalation points.
- Prepare a clear recommendation for a multidisciplinary audience.

Course guide

Work through each module objective, lesson and teaching note, complete the applied activity and assessment, then use the separate Academy practice page for practice questions and answer feedback.

Separate practice questions:
https://www.globalexpertsconsultoria.com/training/academy/courses/questions/?course=SC-004

Academic and certification status

Draft learning resource for study and review. It does not confer accreditation, external certification, a regulated qualification, professional licence, safety-critical competence or site authorisation. Confirm approvals, current laws, standards, approved procedures and awarding-body requirements before delivery.

Module 1: Seismic interpretation and depth uncertainty

Learning objectives

- Explain seismic interpretation and depth uncertainty, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Seismic interpretation and depth uncertainty
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Seismic reflections arise from changes in acoustic properties. Teach acquisition, processing, well ties, horizon picking and fault interpretation as connected steps. A bright amplitude can reflect several causes; it is not automatically a hydrocarbon indicator.

Decision logic. Time-to-depth conversion depends on velocity. Track picking, velocity and structural uncertainties separately. Compare maps produced with alternative velocity models and explain how closure and proposed well location change. Interpret within survey resolution and processing limitations.

Worked example. For vertical two-way time of 2 seconds and constant velocity 2500 m/s, depth is 2500 m. A 10% velocity error changes that estimate by 250 m.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Calculate both depth cases and explain the consequence for a prospect map.

Model answer guide. Use depth equals velocity times two-way time divided by two; note constant-velocity simplification.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Calculate both depth cases and explain the consequence for a prospect map.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 2: Petrophysics and well logs

Learning objectives

- Explain petrophysics and well logs, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Petrophysics and well logs
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Gamma ray supports lithology interpretation; resistivity responds to fluid and rock properties; density and neutron measurements help estimate porosity. Explain environmental corrections, tool depth matching and the difference between measured signals and interpreted rock properties.

Decision logic. A single curve cannot establish pay. Combine logs with core, fluid samples and pressure data. Document cutoffs and uncertainty. Shaly sands, invasion and borehole conditions can invalidate simple clean-sand assumptions and should prompt specialist review.

Worked example. An interval has high resistivity but low effective porosity. Do not classify it as productive pay from resistivity alone.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Annotate a fictional three-curve log and identify evidence needed before selecting pay.

Model answer guide. Look for integrated porosity, lithology, saturation and mobility evidence; flag borehole effects and non-unique responses.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Annotate a fictional three-curve log and identify evidence needed before selecting pay.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 3: Formation evaluation and fluid evidence

Learning objectives

- Explain formation evaluation and fluid evidence, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Formation evaluation and fluid evidence
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Formation evaluation combines logs, cores, pressure measurements and samples to infer fluid type, contacts, rock quality and mobility. Explain why sample contamination and poor pressure stabilisation can distort conclusions. Distinguish net reservoir from net pay.

Decision logic. Pressure gradients may help infer fluid contacts and connectivity but require consistent datum and quality control. Test alternative fluid models before extrapolating beyond the well. An oil sample demonstrates fluid occurrence, while flow capacity requires additional evidence.

Worked example. Two pressure points from different depths cannot define a reliable contact if one has poor stabilisation or uncertain depth.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Review a fictional formation-evaluation evidence table and assign confidence levels.

Model answer guide. Reject low-quality points with reasons, retain alternative contacts, and specify confirmatory sampling or testing.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Review a fictional formation-evaluation evidence table and assign confidence levels.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 4: Prospect risking and volumetrics

Learning objectives

- Explain prospect risking and volumetrics, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Prospect risking and volumetrics
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Geological chance of success describes the chance that a prospect meets defined geological success criteria. Commercial success includes further conditions. Separate charge, reservoir, seal and trap risks and explain any dependence before multiplying probabilities.

Decision logic. Risked volume is a decision aid rather than a physical volume that will be produced. Compare value of information with appraisal cost and decision consequences. Use scenario trees to show failure, subcommercial discovery and commercial outcomes.

Worked example. If independent charge and reservoir probabilities are 0.8 and 0.5 and all other factors are certain, joint chance is 0.4.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Calculate joint chance, then explain why independence is a strong assumption.

Model answer guide. Forty percent only under the stated assumptions; shared geological evidence can create dependence.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Calculate joint chance, then explain why independence is a strong assumption.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 5: Seismic Interpretation and Formation Evaluation Essentials: Work

Learning objectives

- Explain seismic interpretation and formation evaluation essentials: work planning, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Seismic Interpretation and Formation Evaluation Essentials: Work Planning
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Seismic Interpretation and Formation Evaluation Essentials: Work Planning describes a practical part of Seismic Interpretation and Formation Evaluation Essentials. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for seismic interpretation and formation evaluation essentials: work planning. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans seismic interpretation and formation evaluation essentials: work planning while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for seismic interpretation and formation evaluation essentials: work planning: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Prepare a decision brief for seismic interpretation and formation evaluation essentials: work planning: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 6: Seismic Interpretation and Formation Evaluation Essentials: Data a

Learning objectives

- Explain seismic interpretation and formation evaluation essentials: data and performance, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Seismic Interpretation and Formation Evaluation Essentials: Data and Performance
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Seismic Interpretation and Formation Evaluation Essentials: Data and Performance describes a practical part of Seismic Interpretation and Formation Evaluation Essentials. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for seismic interpretation and formation evaluation essentials: data and performance. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans seismic interpretation and formation evaluation essentials: data and performance while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for seismic interpretation and formation evaluation essentials: data and performance: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Prepare a decision brief for seismic interpretation and formation evaluation essentials: data and performance: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 7: Seismic Interpretation and Formation Evaluation Essentials: Appli

Learning objectives

- Explain seismic interpretation and formation evaluation essentials: applied case, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Seismic Interpretation and Formation Evaluation Essentials: Applied Case
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Seismic Interpretation and Formation Evaluation Essentials: Applied Case describes a practical part of Seismic Interpretation and Formation Evaluation Essentials. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for seismic interpretation and formation evaluation essentials: applied case. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans seismic interpretation and formation evaluation essentials: applied case while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for seismic interpretation and formation evaluation essentials: applied case: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Prepare a decision brief for seismic interpretation and formation evaluation essentials: applied case: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 8: Seismic Interpretation and Formation Evaluation Essentials: Comm

Learning objectives

- Explain seismic interpretation and formation evaluation essentials: communication and escalation, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Seismic Interpretation and Formation Evaluation Essentials: Communication and Escalation
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Seismic Interpretation and Formation Evaluation Essentials: Communication and Escalation describes a practical part of Seismic Interpretation and Formation Evaluation Essentials. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for seismic interpretation and formation evaluation essentials: communication and escalation. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans seismic interpretation and formation evaluation essentials: communication and escalation while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for seismic interpretation and formation evaluation essentials: communication and escalation: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Prepare a decision brief for seismic interpretation and formation evaluation essentials: communication and escalation: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 9: Seismic Interpretation and Formation Evaluation Essentials: Know

Learning objectives

- Explain seismic interpretation and formation evaluation essentials: knowledge check, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Seismic Interpretation and Formation Evaluation Essentials: Knowledge Check
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Seismic Interpretation and Formation Evaluation Essentials: Knowledge Check describes a practical part of Seismic Interpretation and Formation Evaluation Essentials. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for seismic interpretation and formation evaluation essentials: knowledge check. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans seismic interpretation and formation evaluation essentials: knowledge check while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for seismic interpretation and formation evaluation essentials: knowledge check: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Prepare a decision brief for seismic interpretation and formation evaluation essentials: knowledge check: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Module 10: Seismic Interpretation and Formation Evaluation Essentials: Com

Learning objectives

- Explain seismic interpretation and formation evaluation essentials: competence review, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Seismic Interpretation and Formation Evaluation Essentials: Competence Review
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Seismic Interpretation and Formation Evaluation Essentials

Detailed teaching notes

Teaching notes

Core explanation. Seismic Interpretation and Formation Evaluation Essentials: Competence Review describes a practical part of Seismic Interpretation and Formation Evaluation Essentials. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for seismic interpretation and formation evaluation essentials: competence review. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans seismic interpretation and formation evaluation essentials: competence review while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for seismic interpretation and formation evaluation essentials: competence review: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

Applied activity

Prepare a decision brief for seismic interpretation and formation evaluation essentials: competence review: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

Practice

Use the separate Academy practice questions and answer key page for this module.

Facilitator close-out and resources

Facilitator close-out

Record attendance, assessment evidence, learner support needs, incidents and improvement actions according to approved provider processes. Do not sign learners off for regulated or safety-critical work without the authorised assessment and certification route.

Resources and references

- Supplied GExperts/IUM reference materials; verify reuse rights and currentness.
- Current applicable Namibian legislation, standards and approved site procedures supplied by the provider.
- Case worksheet and instructor slides must be produced and reviewed before course release.