Certificate in Energy Geoscience and Formation Evaluation

GExperts Learning Academy | C-020 | C | 8 weeks

Course overview

8 weeks C programme focused on Certificate in Energy Geoscience and Formation Evaluation, using energy-sector cases and applied decisions.

Designed for: Learners appropriate to the stated programme level

Learning outcomes

- Explain core principles and terminology for Certificate in Energy Geoscience and Formation Evaluation.
- 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=C-020

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: Petroleum systems and basin analysis

Learning objectives

- Explain petroleum systems and basin analysis, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Petroleum systems and basin analysis
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Energy Geoscience and Formation Evaluation

Detailed teaching notes

Teaching notes

Core explanation. Source rock generates hydrocarbons after sufficient burial and heating. Migration moves fluids toward reservoir rock; a seal and trap retain them. Timing matters: a trap formed after migration may be uncharged. Draw an events chart alongside a basin cross-section.

Decision logic. Separate regional play evidence from prospect-specific evidence. Basin analogues help frame hypotheses but cannot prove reservoir quality or charge in a new location. Ask what observation would falsify each element of the proposed petroleum system.

Worked example. A mapped trap exists, but the migration pathway is uncertain. Increasing trap area does not solve charge uncertainty.

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. Construct an elements-and-processes matrix with evidence, uncertainty and a next test.

Model answer guide. Require source, maturity, migration, reservoir, seal, trap and timing; identify charge as an unresolved dependency.

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

Applied activity

Construct an elements-and-processes matrix with evidence, uncertainty and a next test.

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: Structural geology and trapping

Learning objectives

- Explain structural geology and trapping, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Structural geology and trapping
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Energy Geoscience and Formation Evaluation

Detailed teaching notes

Teaching notes

Core explanation. Faults and folds alter reservoir geometry and can create closures. A fault can transmit or restrict flow depending on juxtaposition, fault-zone properties and stress. Explain structure contours and spill points using a simple tilted layer rather than a decorative map.

Decision logic. Interpretation should preserve multiple fault geometries where data are ambiguous. Check closure against depth uncertainty, reservoir juxtaposition and potential leakage. A fault polygon on a map is not direct proof of a sealing fault.

Worked example. Two interpretations place the spill point at different depths, changing closure area. Retain both cases until tied to better evidence.

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. Sketch a faulted closure, label spill point and propose a fault-seal uncertainty test.

Model answer guide. Credit consistent geometry and an explicit seal hypothesis; do not award certainty based only on fault presence.

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

Applied activity

Sketch a faulted closure, label spill point and propose a fault-seal uncertainty test.

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: Sedimentology and stratigraphy

Learning objectives

- Explain sedimentology and stratigraphy, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Sedimentology and stratigraphy
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Energy Geoscience and Formation Evaluation

Detailed teaching notes

Teaching notes

Core explanation. Depositional processes control grain size, sorting and architecture. Deepwater channels and lobes can form reservoirs, while mud-rich intervals may compartmentalise flow. Stratigraphy relates rock packages through time; lithological similarity alone does not prove hydraulic connection.

Decision logic. Use core, logs and seismic together. Explain how channel stacking changes net-to-gross and connectivity. Contrast a continuous sand body with isolated lenses, then ask how the same total sand volume can produce different well performance.

Worked example. Two wells contain sand at similar depths, but an intervening mud-rich channel margin could prevent communication.

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. Build two alternative depositional models from fictional well descriptions.

Model answer guide. Both models should honour observations and identify a discriminating observation such as pressure communication or additional seismic evidence.

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

Applied activity

Build two alternative depositional models from fictional well descriptions.

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: 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: Certificate in Energy Geoscience and Formation Evaluation

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 5: 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: Certificate in Energy Geoscience and Formation Evaluation

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 6: 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: Certificate in Energy Geoscience and Formation Evaluation

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 7: 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: Certificate in Energy Geoscience and Formation Evaluation

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 8: Certificate in Energy Geoscience and Formation Evaluation: Comm

Learning objectives

- Explain certificate in energy geoscience and formation evaluation: communication and escalation, interpret a case, select appropriate controls and justify a documented decision.

Lessons

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

Detailed teaching notes

Teaching notes

Core explanation. Certificate in Energy Geoscience and Formation Evaluation: Communication and Escalation describes a practical part of Certificate in Energy Geoscience and Formation Evaluation. 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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: Certificate in Energy Geoscience and Formation Evaluation: Know

Learning objectives

- Explain certificate in energy geoscience and formation evaluation: knowledge check, interpret a case, select appropriate controls and justify a documented decision.

Lessons

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

Detailed teaching notes

Teaching notes

Core explanation. Certificate in Energy Geoscience and Formation Evaluation: Knowledge Check describes a practical part of Certificate in Energy Geoscience and Formation Evaluation. 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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: Certificate in Energy Geoscience and Formation Evaluation: Com

Learning objectives

- Explain certificate in energy geoscience and formation evaluation: competence review, interpret a case, select appropriate controls and justify a documented decision.

Lessons

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

Detailed teaching notes

Teaching notes

Core explanation. Certificate in Energy Geoscience and Formation Evaluation: Competence Review describes a practical part of Certificate in Energy Geoscience and Formation Evaluation. 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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 certificate in energy geoscience and formation evaluation: 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.