Certificate in Wells and Drilling Technology

GExperts Learning Academy | C-021 | C | 12 weeks

Course overview

12 weeks C programme focused on Certificate in Wells and Drilling Technology, 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 Wells and Drilling Technology.
- 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-021

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: Well architecture and drilling systems

Learning objectives

- Explain well architecture and drilling systems, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Well architecture and drilling systems
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. A well connects the reservoir to the surface through a designed sequence of hole sections, casing and barriers. Explain measured depth versus true vertical depth, wellhead functions and interfaces with rig, marine riser and subsea equipment.

Decision logic. Well design starts with reservoir objectives, pressures, temperature, hazards and data uncertainty. Casing depth and equipment ratings require engineering calculations and independent review. This course uses diagrams and educational calculations, never an executable drilling programme.

Worked example. A deviated well has greater measured depth than vertical depth; fluid hydrostatic head relates to vertical 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. Label a fictional well schematic and list five missing design inputs.

Model answer guide. Include pore pressure, fracture limits, temperature, geology and service conditions; distinguish equipment identification from design approval.

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

Applied activity

Label a fictional well schematic and list five missing design inputs.

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: Drilling rigs and crew responsibilities

Learning objectives

- Explain drilling rigs and crew responsibilities, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Drilling rigs and crew responsibilities
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. Describe roustabout, roughneck, driller, toolpusher and specialist service roles without suggesting job entitlement. Introduce rig floor, pipe handling, mud systems and lifting interfaces. Supervisory accountability does not remove each person's duty to report unsafe conditions.

Decision logic. Use a task-responsibility chart to identify who plans, authorises, executes and verifies work. Shift handovers must communicate well status, restrictions and outstanding actions. Entry-level workers should recognise boundaries and stop rather than improvise around unfamiliar equipment.

Worked example. A new crew member sees an unclear lifting signal. Work pauses until communication and responsibility are re-established.

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. Role-play a shift handover with one unresolved equipment restriction.

Model answer guide. A good handover identifies status, responsible person, restriction, next action and acknowledgement.

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

Applied activity

Role-play a shift handover with one unresolved equipment restriction.

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: Casing and cementing

Learning objectives

- Explain casing and cementing, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Casing and cementing
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. Casing supports the borehole and isolates formations; cement contributes to zonal isolation and structural support. Explain shoe, annulus, centralisation and displacement using a cutaway diagram. Distinguish design intent from evidence that a barrier has actually been established.

Decision logic. Assess cement placement uncertainty, contamination, losses and verification data together. Pressure tests and logs answer different questions and must be interpreted within an approved programme. Do not provide generic acceptance pressures or operational instructions that override site procedures.

Worked example. A calculated cement volume matches the plan, but returns indicate possible losses. Volume pumped alone cannot confirm isolation.

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 cementing quality dossier and identify acceptance evidence gaps.

Model answer guide. Require reconciled volumes, operational observations and appropriate verification reviewed by authorised engineers.

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

Applied activity

Review a fictional cementing quality dossier and identify acceptance evidence gaps.

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: Drilling fluids and pressure windows

Learning objectives

- Explain drilling fluids and pressure windows, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Drilling fluids and pressure windows
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. Drilling fluids transport cuttings, help control pressure, cool equipment and support the borehole. Static hydrostatic pressure depends on density and vertical depth. Circulation adds friction effects; temperature, losses and gas can change behaviour.

Decision logic. Explain the pore-pressure and fracture-pressure window conceptually. Raising density may improve one margin while increasing losses risk. All actual mud programmes and responses remain with competent well teams. Use clearly labelled classroom numbers and consistent SI units.

Worked example. A fluid density of 1100 kg/m3 over 1000 m gives roughly 10.79 MPa hydrostatic pressure using g equals 9.81 m/s2.

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 pressure for 1200 kg/m3 and discuss the tradeoff.

Model answer guide. Approximately 11.77 MPa; increased pressure may narrow fracture margin, so higher density is not automatically safer.

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

Applied activity

Calculate pressure for 1200 kg/m3 and discuss the tradeoff.

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: Directional and deepwater drilling

Learning objectives

- Explain directional and deepwater drilling, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Directional and deepwater drilling
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. Inclination, azimuth and trajectory define where the well travels. Directional tools support reservoir access while introducing torque, drag, survey and collision considerations. Deepwater adds long interfaces, marine exposure and limited intervention options.

Decision logic. Teach trajectory quality assurance through coordinate reference, survey uncertainty and target tolerances. Separate trajectory feasibility from safe execution. A plan should include independent checks and contingencies for geological or equipment changes rather than a single perfect line.

Worked example. Two planned wells appear separate on a map but their uncertainty envelopes overlap at 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. Mark target and uncertainty envelopes and propose a review hold point.

Model answer guide. Check reference systems and uncertainty before approving proximity; refer collision analysis to competent well engineers.

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

Applied activity

Mark target and uncertainty envelopes and propose a review hold point.

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: Well control and barrier management

Learning objectives

- Explain well control and barrier management, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Well control and barrier management
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. A barrier system prevents unintended fluid flow. Show primary and secondary barrier envelopes and the need for defined performance standards. Recognising indications, reporting promptly and following the authorised well-control programme are distinct from being certified to operate equipment.

Decision logic. Teach barrier status with evidence, not equipment names alone. An installed component may be unavailable, untested or outside its operating envelope. Barrier changes require controlled review. No live well-control drill or shut-in sequence is prescribed by this awareness content.

Worked example. A component appears on the drawing, but its required test record is missing. Treat its verified availability as unresolved.

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 a barrier-status register from a fictional well diagram.

Model answer guide. Record function, verification, owner, limitation and escalation; do not mark an unverified barrier healthy.

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

Applied activity

Construct a barrier-status register from a fictional well diagram.

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: Completion and intervention

Learning objectives

- Explain completion and intervention, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Completion and intervention
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. A completion enables controlled production or injection through tubing, packers, valves and sand-control or stimulation systems where appropriate. Intervention restores or changes well function. Explain the interface between reservoir objectives and well integrity.

Decision logic. Evaluate completion options against fluid properties, sand risk, expected rates, intervention access and lifecycle cost. A high initial rate is not sufficient if integrity or recovery suffers. Intervention plans need barrier review and competent authorisation.

Worked example. A reservoir prone to sand production may require a different completion from a competent sandstone even at the same target rate.

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. Compare two completion concepts using five criteria and list uncertainties.

Model answer guide. Include integrity, sand management, productivity, access and lifecycle value; justify the tradeoffs.

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

Applied activity

Compare two completion concepts using five criteria and list uncertainties.

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: Drilling economics and performance

Learning objectives

- Explain drilling economics and performance, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Drilling economics and performance
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. Well cost includes rig time, services, materials, logistics and uncertainty. Distinguish productive time, planned non-drilling activity and non-productive time. A time saving has value only if safety, integrity and data objectives remain satisfied.

Decision logic. Benchmark like-for-like intervals and account for geology, water depth and well objectives. Use a time-depth curve to identify variance, then test causes before attributing blame. Avoid rewarding speed that suppresses necessary verification.

Worked example. At a fictional rig-related spread cost of USD 400,000 per day, two avoided days save USD 800,000 before other effects.

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. Analyse a three-day delay and propose an evidence-based improvement.

Model answer guide. Separate controllable causes, external constraints and prevention cost; preserve required verification activities.

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

Applied activity

Analyse a three-day delay and propose an evidence-based improvement.

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: Permit to work isolation and SIMOPS

Learning objectives

- Explain permit to work isolation and simops, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Permit to work isolation and SIMOPS
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Wells and Drilling Technology

Detailed teaching notes

Teaching notes

Core explanation. A permit coordinates specified work within defined conditions and time. It complements risk assessment, isolation, competence and supervision. SIMOPS review considers interactions between tasks that may be safe individually but unsafe together.

Decision logic. Walk through planning, authorisation, briefing, verification, suspension and handback conceptually. A signature does not establish a safe condition. Changes in scope, personnel or environment require review under the site system. Never reuse a classroom permit as operational authorisation.

Worked example. Hot work and a nearby hydrocarbon transfer are proposed concurrently. Their interaction needs coordinated review.

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 two fictional permits and identify interface conflicts and suspension triggers.

Model answer guide. Include shared hazards, isolation boundaries, authority, communication and revalidation after change.

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

Applied activity

Review two fictional permits and identify interface conflicts and suspension triggers.

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 Wells and Drilling Technology: Competence Review

Learning objectives

- Explain certificate in wells and drilling technology: competence review, interpret a case, select appropriate controls and justify a documented decision.

Lessons

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

Detailed teaching notes

Teaching notes

Core explanation. Certificate in Wells and Drilling Technology: Competence Review describes a practical part of Certificate in Wells and Drilling Technology. 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 wells and drilling technology: 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 wells and drilling technology: 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 wells and drilling technology: 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 wells and drilling technology: 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.