Certificate in Reservoir and Production Technology

GExperts Learning Academy | C-022 | C | 12 weeks

Course overview

12 weeks C programme focused on Certificate in Reservoir and Production 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 Reservoir and Production 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-022

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: Reservoir rock and fluid properties

Learning objectives

- Explain reservoir rock and fluid properties, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Reservoir rock and fluid properties
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Reservoir and Production Technology

Detailed teaching notes

Teaching notes

Core explanation. Porosity measures pore volume; permeability describes flow capacity. Fluids vary in viscosity, density and phase behaviour with pressure and temperature. Explain why a porous rock may still flow poorly and why laboratory measurements need reservoir-condition interpretation.

Decision logic. Discuss effective permeability, wettability and relative permeability as multiphase-flow concepts. Scale matters: a small core sample may miss fractures or barriers. Integrate core, logs and dynamic evidence rather than assigning one uniform property to a whole field.

Worked example. Two rocks both have 20% porosity, but one has poorly connected pores and much lower permeability.

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 fictional core and fluid data and identify likely production constraints.

Model answer guide. Use permeability, viscosity and connectivity; do not infer productivity from porosity alone.

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

Applied activity

Compare fictional core and fluid data and identify likely production constraints.

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: Pressure and reservoir drive mechanisms

Learning objectives

- Explain pressure and reservoir drive mechanisms, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Pressure and reservoir drive mechanisms
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Reservoir and Production Technology

Detailed teaching notes

Teaching notes

Core explanation. Reservoir energy may come from fluid expansion, solution gas, gas cap, aquifer support or combinations. Pressure behaviour, fluid ratios and production history help diagnose the mechanism. Explain depletion as a material and energy response, not simply an emptying tank.

Decision logic. Recovery strategy should match mechanism and uncertainty. Water or gas injection can support pressure but also changes sweep, facilities and environmental requirements. Compare hypotheses using pressure and production evidence before choosing intervention.

Worked example. Reservoir pressure falls rapidly while gas-oil ratio rises, suggesting solution-gas effects requiring further evaluation.

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. Interpret three fictional pressure and fluid-ratio trends.

Model answer guide. Offer more than one plausible mechanism where evidence is incomplete, and specify discriminating measurements.

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

Applied activity

Interpret three fictional pressure and fluid-ratio trends.

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: Material balance and decline analysis

Learning objectives

- Explain material balance and decline analysis, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Material balance and decline analysis
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Reservoir and Production Technology

Detailed teaching notes

Teaching notes

Core explanation. Material balance reconciles withdrawals with fluid expansion and influx under stated assumptions. Decline analysis describes rate trends under defined operating conditions. Both require quality-controlled time series and consistent fluid volumes.

Decision logic. A changing choke, workover or facility constraint can mimic reservoir decline. Segment the history before fitting curves and explain boundary assumptions. Material balance can be misleading if influx or compartmentalisation is ignored. Do not present a fitted curve as independent proof of reserves.

Worked example. Monthly oil rates of 100, 90 and 81 units suggest 10% interval decline only if intervals and operating conditions are comparable.

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. Fit the next rate and list three reasons the extrapolation could fail.

Model answer guide. 72.9 units under unchanged exponential decline; facility changes, intervention or reservoir behaviour can invalidate it.

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

Applied activity

Fit the next rate and list three reasons the extrapolation could fail.

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: Well testing and pressure interpretation

Learning objectives

- Explain well testing and pressure interpretation, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Well testing and pressure interpretation
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Reservoir and Production Technology

Detailed teaching notes

Teaching notes

Core explanation. A well test records flow and pressure response to infer reservoir and well behaviour. Explain drawdown, buildup, skin and boundary effects conceptually. Measurement resolution, rate history and test duration constrain interpretation.

Decision logic. Different models can fit limited data. Use derivative behaviour and independent geology to test models rather than declaring a unique answer. Short tests may not observe distant boundaries. Operational testing requires an approved programme and safety controls.

Worked example. A short buildup appears stable but has not investigated the reservoir boundary; connectivity remains uncertain.

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 test summary and list claims supported and unsupported by it.

Model answer guide. Separate local mobility evidence from field-wide connectivity and long-term deliverability claims.

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

Applied activity

Review a fictional test summary and list claims supported and unsupported by it.

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: Production forecasting

Learning objectives

- Explain production forecasting, interpret a case, select appropriate controls and justify a documented decision.

Lessons

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

Detailed teaching notes

Teaching notes

Core explanation. Forecasts combine reservoir behaviour, well availability, ramp-up, capacity constraints and downtime. Distinguish potential reservoir production from saleable output. State units, time basis and whether rates are instantaneous, daily averages or annual totals.

Decision logic. Build low, base and high cases with internally consistent constraints. Bottlenecks can shift as water production rises. Compare forecast to observed history when available and track revisions with reasons. Do not assign actual Namibian first-oil dates from classroom scenarios.

Worked example. A system with 100,000 barrels/day potential and 90% availability yields 90,000 barrels/day average before other constraints.

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 one-year forecast with availability falling to 80% for three months.

Model answer guide. Calculate period-weighted output and explain facility versus reservoir constraints separately.

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

Applied activity

Prepare a one-year forecast with availability falling to 80% for three months.

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: Artificial lift selection

Learning objectives

- Explain artificial lift selection, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Artificial lift selection
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Reservoir and Production Technology

Detailed teaching notes

Teaching notes

Core explanation. Artificial lift adds energy to improve flow when natural reservoir drive and pressure drop are insufficient. Introduce gas lift and electric submersible pumps, their interfaces and limitations. Offshore access and intervention costs influence selection.

Decision logic. Compare lift methods against depth, fluids, sand, gas fraction, power, reliability and operating envelope. A method effective onshore may be hard to service subsea. Selection needs nodal analysis and lifecycle evaluation by competent production engineers.

Worked example. A high-rate well with limited intervention access must balance pump performance against repair logistics and lost production.

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. Develop a comparison matrix for two lift concepts using a fictional fluid case.

Model answer guide. Include power or gas availability, reliability, intervention and flow assurance rather than ranking by initial rate alone.

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

Applied activity

Develop a comparison matrix for two lift concepts using a fictional fluid case.

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: Production optimisation

Learning objectives

- Explain production optimisation, interpret a case, select appropriate controls and justify a documented decision.

Lessons

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

Detailed teaching notes

Teaching notes

Core explanation. Production optimisation considers reservoir inflow, wellbore outflow, gathering network and facilities together. Nodal analysis examines pressure balance across the system. The best local setting may overload shared equipment or harm recovery.

Decision logic. Use constraints and marginal value to prioritise opportunities. Validate meter quality before changing settings. Changes require operating review and controlled implementation; the classroom does not authorise adjustments to live wells or control systems.

Worked example. Opening one fictional well increases its rate but exceeds separator capacity, reducing total stable production.

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. Identify the system bottleneck and compare two constrained operating cases.

Model answer guide. Optimise total safe value and honour facility limits, rather than maximising each well independently.

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

Applied activity

Identify the system bottleneck and compare two constrained operating cases.

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: Produced water and gas management

Learning objectives

- Explain produced water and gas management, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Produced water and gas management
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Reservoir and Production Technology

Detailed teaching notes

Teaching notes

Core explanation. Produced water and associated gas affect processing capacity, corrosion, disposal and emissions. Explain separation, treatment, reinjection, export and permitted disposal as options with different technical and environmental implications.

Decision logic. Track total fluid rather than oil alone. Gas composition can change treatment and materials requirements. Disposal choices require permits, monitoring and assurance; no universal discharge limit is provided here. Gas flaring is not an automatic default business case.

Worked example. Oil stays at 20,000 barrels/day while water cut rises from 20% to 50%; total liquid increases from 25,000 to 40,000 barrels/day.

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 water volumes and identify affected equipment.

Model answer guide. Water rises from 5,000 to 20,000 barrels/day; assess separation, pumping, treatment and disposal capacity.

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

Applied activity

Calculate water volumes and identify affected equipment.

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: Integrated reservoir management

Learning objectives

- Explain integrated reservoir management, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Integrated reservoir management
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Certificate in Reservoir and Production Technology

Detailed teaching notes

Teaching notes

Core explanation. Reservoir management links surveillance, models, wells, facilities and economics to an agreed objective. Define decision triggers and data owners. A model is useful when it helps choose an action and exposes uncertainty, not simply because it has many cells.

Decision logic. Use a closed learning cycle: predict, measure, compare, diagnose and revise. History matching can be non-unique, so retain plausible alternatives and test decisions against them. Integrate subsurface and operations teams when reviewing constraints and new evidence.

Worked example. Measured water breakthrough is earlier than predicted. Review connectivity and completion assumptions before merely adjusting a curve.

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. Create a surveillance plan with three measurements and associated decision triggers.

Model answer guide. Each measurement must connect to a management choice, owner and review frequency.

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

Applied activity

Create a surveillance plan with three measurements and associated decision 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 Reservoir and Production Technology: Competence

Learning objectives

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

Lessons

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

Detailed teaching notes

Teaching notes

Core explanation. Certificate in Reservoir and Production Technology: Competence Review describes a practical part of Certificate in Reservoir and Production 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 reservoir and production 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 reservoir and production 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 reservoir and production 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 reservoir and production 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.