Hydrogen and Low-Carbon Fuels: Industry Fundamentals

GExperts Learning Academy | SC-X15 | SC | 1-3 days

Course overview

1-3 days SC programme focused on Hydrogen and Low-Carbon Fuels: Industry Fundamentals, using energy-sector cases and applied decisions.

Designed for: New entrants and cross-sector professionals

Learning outcomes

- Explain core principles and terminology for Hydrogen and Low-Carbon Fuels: Industry Fundamentals.
- 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-X15

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: Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Core Co

Learning objectives

- Explain hydrogen and low-carbon fuels: industry fundamentals: core concepts, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Core Concepts
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Core Concepts describes a practical part of Hydrogen and Low-Carbon Fuels: Industry Fundamentals. 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 hydrogen and low-carbon fuels: industry fundamentals: core concepts. 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 hydrogen and low-carbon fuels: industry fundamentals: core concepts 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 hydrogen and low-carbon fuels: industry fundamentals: core concepts: 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 hydrogen and low-carbon fuels: industry fundamentals: core concepts: 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 2: Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Risk Co

Learning objectives

- Explain hydrogen and low-carbon fuels: industry fundamentals: risk controls, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Risk Controls
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Risk Controls describes a practical part of Hydrogen and Low-Carbon Fuels: Industry Fundamentals. 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 hydrogen and low-carbon fuels: industry fundamentals: risk controls. 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 hydrogen and low-carbon fuels: industry fundamentals: risk controls 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 hydrogen and low-carbon fuels: industry fundamentals: risk controls: 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 hydrogen and low-carbon fuels: industry fundamentals: risk controls: 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 3: Process safety fundamentals

Learning objectives

- Explain process safety fundamentals, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Process safety fundamentals
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Process safety prevents major loss-of-containment and energy-release events. Personal injury rates do not measure every major-accident risk. Explain hazard, initiating event, preventive barriers, mitigative barriers and consequences using a bowtie.

Decision logic. Assess barrier performance standards, degradation and independent assurance. HAZID, HAZOP and other reviews have different purposes and need competent facilitation. Do not call a classroom checklist a certified safety study. Track temporary changes and overdue critical actions.

Worked example. An asset reports no slips but has several overdue safety-critical tests; major-accident assurance remains weak.

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 a bowtie for a fictional separator loss of containment.

Model answer guide. Separate prevention and mitigation and assign barrier evidence, owner and degradation response.

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

Applied activity

Build a bowtie for a fictional separator loss of containment.

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: Global petroleum markets and price formation

Learning objectives

- Explain global petroleum markets and price formation, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Global petroleum markets and price formation
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Crude markets connect producers, traders, refiners and transport providers. Prices often reference benchmarks adjusted for quality, location and contract terms. OPEC is a producers' organisation, not a buyer qualification or an assurance of payment.

Decision logic. Separate physical delivery, price exposure and credit exposure. A high headline price can be offset by freight, quality discounts, finance or default risk. No company is labelled reliable without current due diligence and an approved transaction basis.

Worked example. Offer A is USD 75/barrel with USD 5 freight; offer B is USD 73 with USD 1 freight, before other terms.

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 simplified netbacks and identify non-price checks.

Model answer guide. A gives 70 and B gives 72 USD/barrel; check credit, delivery, sanctions and quality terms before selection.

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

Applied activity

Compare simplified netbacks and identify non-price checks.

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: Petroleum policy and institutional governance

Learning objectives

- Explain petroleum policy and institutional governance, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Petroleum policy and institutional governance
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Policy sets objectives, institutions assign authority, and governance creates accountability for decisions and resources. Explain government, regulator and state enterprise roles conceptually without asserting an unverified current Namibian structure.

Decision logic. Separate commercial participation from regulatory judgement and manage conflicts transparently. Define decision rights, disclosure, assurance and challenge. A strong governance design includes implementation capacity and an audit trail, not just an organisation chart.

Worked example. A fictional institution both promotes investment and evaluates its own project compliance, creating a conflict to manage.

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. Draft a responsibility matrix and conflict-management controls.

Model answer guide. Identify segregated decisions, independent review, declarations and public accountability where applicable.

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

Applied activity

Draft a responsibility matrix and conflict-management controls.

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: Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Data an

Learning objectives

- Explain hydrogen and low-carbon fuels: industry fundamentals: data and performance, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Data and Performance

2. Systems and operating context

3. Evidence, assumptions and decision gates

4. Hazards, safeguards and escalation

5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Data and Performance describes a practical part of Hydrogen and Low-Carbon Fuels: Industry Fundamentals. 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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: Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Applied

Learning objectives

- Explain hydrogen and low-carbon fuels: industry fundamentals: applied case, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Applied Case
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Applied Case describes a practical part of Hydrogen and Low-Carbon Fuels: Industry Fundamentals. 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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: Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Commu

Learning objectives

- Explain hydrogen and low-carbon fuels: industry fundamentals: communication and escalation, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Communication and Escalation
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Communication and Escalation describes a practical part of Hydrogen and Low-Carbon Fuels: Industry Fundamentals. 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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: Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Knowle

Learning objectives

- Explain hydrogen and low-carbon fuels: industry fundamentals: knowledge check, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Knowledge Check
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Knowledge Check describes a practical part of Hydrogen and Low-Carbon Fuels: Industry Fundamentals. 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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: Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Compe

Learning objectives

- Explain hydrogen and low-carbon fuels: industry fundamentals: competence review, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Competence Review
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Hydrogen and Low-Carbon Fuels: Industry Fundamentals

Detailed teaching notes

Teaching notes

Core explanation. Hydrogen and Low-Carbon Fuels: Industry Fundamentals: Competence Review describes a practical part of Hydrogen and Low-Carbon Fuels: Industry Fundamentals. 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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 hydrogen and low-carbon fuels: industry fundamentals: 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.