Subsea Systems, FPSOs and Deepwater Development

GExperts Learning Academy | SC-006 | SC | 2 days

Course overview

2 days SC programme focused on Subsea Systems, FPSOs and Deepwater Development, using energy-sector cases and applied decisions.

Designed for: Learners appropriate to the stated programme level

Learning outcomes

- Explain core principles and terminology for Subsea Systems, FPSOs and Deepwater Development.
- 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-006

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: Deepwater development concept selection

Learning objectives

- Explain deepwater development concept selection, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Deepwater development concept selection
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Compare subsea tieback, standalone floating production and shore-linked concepts against reservoir, metocean, water depth, distance and product requirements. A concept is an integrated system of wells, facilities, export and support infrastructure. Show the interfaces before scoring alternatives.

Decision logic. Apply mandatory constraints before weighted scoring. Document weighting, uncertainty and options that fail a hard requirement. Lowest capital cost may increase operating risk or reduce recovery. Revisit selection when appraisal or market evidence changes.

Worked example. Concept A costs less initially but cannot accommodate the high gas case; Concept B has expansion capacity.

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 concept matrix with technical, commercial, environmental and local-capability criteria.

Model answer guide. Reject infeasible options before ranking and include lifecycle cost, flexibility and uncertainty.

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

Applied activity

Prepare a concept matrix with technical, commercial, environmental and local-capability criteria.

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: Subsea trees and wellheads

Learning objectives

- Explain subsea trees and wellheads, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Subsea trees and wellheads
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. The wellhead supports well interfaces; the tree provides controlled flow paths and isolation functions. Distinguish production, annulus and intervention interfaces. Explain that equipment configuration depends on well design and operating requirements, not a universal diagram.

Decision logic. Selection considers pressure, temperature, fluid service, installation, control compatibility and intervention access. Track interface documents and qualification evidence. An equipment rating alone does not prove the installed system is suitable or verified.

Worked example. A replacement connector has adequate pressure rating but an incompatible mechanical interface.

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 tree interface sheet and flag mismatches.

Model answer guide. Check mechanical, hydraulic, electrical, control and material compatibility; require approved verification.

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

Applied activity

Review a fictional tree interface sheet and flag mismatches.

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: Manifolds flowlines and risers

Learning objectives

- Explain manifolds flowlines and risers, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Manifolds flowlines and risers
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Manifolds collect and distribute flows; flowlines transport seabed fluids; risers bridge the seabed and floating facility. Distinguish production, injection and service lines. Show mechanical, thermal and hydraulic interfaces in one field layout.

Decision logic. Assess pressure drop, thermal loss, fatigue, seabed interaction and installation constraints together. Flowline diameter is a system tradeoff, not simply a maximum-flow choice. Routing must consider environmental and operational constraints and future inspection access.

Worked example. A shorter route crosses difficult seabed terrain, while a longer route reduces installation and inspection difficulty.

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 routing options and record the evidence needed for selection.

Model answer guide. Use lifecycle integrity, hydraulics, constructability, environment and access; do not select by length alone.

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

Applied activity

Compare two routing options and record the evidence needed for selection.

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: FPSO processing storage and offloading

Learning objectives

- Explain fpso processing storage and offloading, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of FPSO processing storage and offloading
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. An FPSO receives production, separates fluids, treats streams, stores oil and transfers cargo to export vessels. Explain topsides, hull, marine systems and offloading interfaces. Storage capacity is different from processing capacity.

Decision logic. Link processing limits to reservoir fluid cases and marine availability. A delay in offloading can constrain production even if process equipment is healthy. Discuss integration between process safety, marine assurance, maintenance and cargo scheduling.

Worked example. A fictional FPSO processes 100,000 barrels/day and has 500,000 barrels of free storage, providing five days before storage fills at unchanged output.

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 free-storage endurance and list mitigations requiring review.

Model answer guide. Five days under simplified assumptions; review offloading schedule, safe operating limits and controlled production planning.

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

Applied activity

Calculate free-storage endurance and list mitigations requiring review.

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: Marine operations and station keeping

Learning objectives

- Explain marine operations and station keeping, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Marine operations and station keeping
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Floating facilities and vessels maintain position through mooring, dynamic positioning or combinations appropriate to their design. Marine operations depend on weather, equipment condition and personnel competence. Explain station-keeping failure consequences for risers, lines and transfer operations.

Decision logic. Operating windows are vessel- and task-specific. Review weather forecasts, redundancy, assurance and abort criteria before work. Do not use classroom numbers as vessel limits. Interface plans should define who can pause the operation and how changes are communicated.

Worked example. An operation remains within yesterday's forecast but the latest forecast deteriorates during the planned work window.

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 go-or-defer briefing identifying information needed, authority and contingency.

Model answer guide. Use current metocean data, approved limits, equipment status and safe disengagement planning.

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

Applied activity

Prepare a go-or-defer briefing identifying information needed, authority and contingency.

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: Subsea Systems, FPSOs and Deepwater Development: Data and P

Learning objectives

- Explain subsea systems, fpsos and deepwater development: data and performance, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Subsea Systems, FPSOs and Deepwater Development: Data and Performance
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Subsea Systems, FPSOs and Deepwater Development: Data and Performance describes a practical part of Subsea Systems, FPSOs and Deepwater Development. 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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: Subsea Systems, FPSOs and Deepwater Development: Applied Ca

Learning objectives

- Explain subsea systems, fpsos and deepwater development: applied case, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Subsea Systems, FPSOs and Deepwater Development: Applied Case
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Subsea Systems, FPSOs and Deepwater Development: Applied Case describes a practical part of Subsea Systems, FPSOs and Deepwater Development. 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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: Subsea Systems, FPSOs and Deepwater Development: Communic

Learning objectives

- Explain subsea systems, fpsos and deepwater development: communication and escalation, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Subsea Systems, FPSOs and Deepwater Development: Communication and Escalation
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Subsea Systems, FPSOs and Deepwater Development: Communication and Escalation describes a practical part of Subsea Systems, FPSOs and Deepwater Development. 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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: Subsea Systems, FPSOs and Deepwater Development: Knowledge

Learning objectives

- Explain subsea systems, fpsos and deepwater development: knowledge check, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Subsea Systems, FPSOs and Deepwater Development: Knowledge Check
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Subsea Systems, FPSOs and Deepwater Development: Knowledge Check describes a practical part of Subsea Systems, FPSOs and Deepwater Development. 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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: Subsea Systems, FPSOs and Deepwater Development: Competer

Learning objectives

- Explain subsea systems, fpsos and deepwater development: competence review, interpret a case, select appropriate controls and justify a documented decision.

Lessons

1. Purpose and key terms of Subsea Systems, FPSOs and Deepwater Development: Competence Review
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Subsea Systems, FPSOs and Deepwater Development

Detailed teaching notes

Teaching notes

Core explanation. Subsea Systems, FPSOs and Deepwater Development: Competence Review describes a practical part of Subsea Systems, FPSOs and Deepwater Development. 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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 subsea systems, fpsos and deepwater development: 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.