



Higher National Graded Unit specification

General information for centres

This Graded Unit has been validated as part of the HNC and HND Petroleum Process Technology, Operations and Control. Centres are required to develop the assessment instrument in accordance with this validated specification. Centres wishing to use another type of Graded Unit or assessment instrument are required to submit proposals detailing the justification for change for validation.

Graded Unit title: Petroleum Process Technology, Operations and Control: Graded Unit 1

Graded Unit code: F81V 34

Type of Graded Unit: Project

Assessment Instrument: Case Study

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Purpose: This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HNC Petroleum Process Technology, Operations and Control:

General aims

- ◆ To develop candidate knowledge and skills in planning, analysis and evaluation
- ◆ Enable progression within the SCQF
- ◆ To develop study and research skills
- ◆ To develop employability and transferable skills, including Core Skills, to levels demanded by employers and for progression to further and/or higher education
- ◆ Develop a range of contemporary vocational skills relating to the use, support and development of systems appropriate to employment at technician level

General information for centres (cont)

Specific aims

- ◆ To prepare candidates for an appropriate level of employment in upstream or downstream sectors of the petroleum process industry
- ◆ To develop knowledge, and understanding of the range of products, production process principles and technologies, processing operations and control associated with the petroleum industry
- ◆ To develop a knowledge and understanding of the key issues within the petroleum process industries, including their associated health, safety and environmental aspects

Recommended prior knowledge and skills: It is recommended that the candidate should have completed or be in the process of completing the following Units relating to the above specific aims prior to undertaking this Graded Unit:

- ◆ HNC Petroleum Process Technology, Operations and Control mandatory core Units

D77G 34	Communication: Practical Skills
F52Y 34	Petroleum Engineering: Physics, Mathematics and Chemistry
F811 34	Petrochemical Industry: Organisation, Products and Processes
DX4K 34	Process Control
F812 34	Process Measurement and System Monitoring
F43J 34	Process Safety Engineering
A4XK 04	Developing an Environmental Perspective

- ◆ Relevant optional Units from the HNC Petroleum Process Technology, Operations and Control framework

Core Skills: There are opportunities to develop Core Skills of *Communication*, *Numeracy*, *Information and Communication Technology* and *Problem Solving* at SCQF level 6, although there is no automatic certification of Core Skills or Core Skills components.

Assessment: This Graded Unit will be assessed by the use of a Case Study. The developed case study should provide the candidate with the opportunity to produce evidence that demonstrates she/he has met the aims of the Graded Unit that it covers.

The developed Case Study specification should allow candidates to produce evidence that is clearly identifiable as individual work. However, this not does preclude individual projects being part of a larger group project. Candidates' contribution to a larger group project would present opportunities to develop the Core Skill of *Working with Others*.

Administrative Information

Graded Unit code: F81V 34

Graded Unit title: Petroleum Process Technology, Operations and Control:
Graded Unit 1

Original date of publication: August 2009

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

© Scottish Qualifications Authority 2009

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Graded Unit specification if sourced by the Scottish Qualifications Authority can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Graded Unit title: Petroleum Process Technology, Operations and Control:
Graded Unit 1

Conditions of assessment

The candidate should be given a date for completion of the Case Study. However, the instructions for the assessment task should be distributed to allow the candidate sufficient time to assimilate the details and carry out the assessment task. During the time between the distribution of the assessment task instructions and the completion date, assessors may answer questions; provide clarification, guidance and reasonable assistance.

The evidence for the Case Study is generated over time and involves three distinct stages, where each stage has to be achieved before the next is undertaken. Thus any re-assessment of stages must be undertaken before proceeding to the next stage.

Candidates should work independently on their Case Study within the context of a typical working environment for which the case study topic pertains. It is the responsibility of delivery centres to take reasonable steps to ensure that the Case Study work is the work of the candidate.

Candidates should be allowed to use resources outwith the delivery centre. Centres should ensure that when case study work is undertaken outwith the parent centre, or under the supervision of persons other than the nominated tutor, that the candidate does not receive undue assistance.

To ensure authentication of work it is advisable for candidates to complete a log or diary recording progress and tasks completed. There should be regular meetings between the candidate and Case Study tutor to review progress and assess the candidates developing knowledge and understanding of the case study topic. These meetings should be recorded.

The assessment task should be marked as soon as possible after the completion date. The final grading given should reflect the quality of the candidate's evidence at the time of the completion date. The final evaluation of the candidate's grade should include a viva voce interview, at which, where possible, the involvement of an industrial partner should be encouraged.

If a candidate fails the Case Study overall or wishes to upgrade, then this must be done using a *substantially different* case study brief. In this case, a candidate's grade will be based on the achievement in the re-assessment, if this results in a higher grade.

Instructions for designing the assessment task

The assessment task is a Case Study. The Case Study undertaken by the candidate must be a complex task which involves:

- ◆ variables which are complex or unfamiliar
- ◆ relationships which need to be clarified
- ◆ a context which may be familiar or unfamiliar to the candidate

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

The assessment task must require the candidate to:

- ◆ analyse the task and decide on a course of action for completing the case study
- ◆ plan and organise work and carry it through to completion
- ◆ reflect on what has been done and draw conclusions for the future
- ◆ produce evidence of meeting the aims which this Graded Unit has been designed to cover

The assessment task should be a case study based project within the context of a petroleum process operation or process measurement and control discipline, or a number of such disciplines. The range of tasks to be undertaken should be defined in relation to the context of a particular petroleum process operation or measurement and control development, and to what it is reasonable to expect of candidates in the time scales available. The case study issues selected should focus on the main aims of the HNC Petroleum Process Technology, Operations and Control course, and the need to demonstrate an ability to integrate knowledge and skills across the mandatory Units within the award framework.

The case study should allow the candidate to demonstrate valid responses to the current and future development needs of the petroleum process industry including, where appropriate, Health, Safety and Environmental issues. Where relevant, the assessment task should consider safe working practices in accordance with current regulations and codes of practice. Environmental considerations should include reference to criteria affecting, and the impact of not implementing, a sustainability approach.

Guidance on grading candidates

Candidates who meet the minimum Evidence Requirements will have their achievement graded as C — competent, or A — highly competent or B somewhere between A and C. The grade related criteria to be used to judge candidate performance for this Graded Unit is specified in the following table.

Grade A	Grade C
<p>Is a seamless, coherent piece of work which:</p> <ul style="list-style-type: none"> ◆ provides considerably more than the minimum evidence for each of the three stages required by the case study brief ◆ evidence is of a high standard ◆ demonstrates an accurate and particular insightful interpretation of the case study brief ◆ has continuously accessed available guidance in arriving at the Outcomes submitted ◆ embodies non-traditional and innovative methodology and solutions ◆ has accessed a wide range of relevant resources, information, documentation and data ◆ Outcomes are of a high standard in terms of scope, accuracy and technical content 	<p>Is a co-ordinated piece of work which:</p> <ul style="list-style-type: none"> ◆ provides the minimum evidence for each of the three stages required by the case study brief ◆ evidence is produced to an acceptable standard ◆ demonstrates an acceptable interpretation of the case study brief ◆ has made satisfactorily use of available guidance in arriving at the Outcomes submitted ◆ embodies only routine and traditional methodology and solutions ◆ has accessed a satisfactory range of resources, information, documentation and data ◆ Outcomes are of a satisfactory standard in terms of scope, level and technical content

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Grade A	Grade C
<ul style="list-style-type: none"> ◆ effectively consolidates and integrates required knowledge and skills ◆ considers possible conflict in integrating solutions in relation to constraints imposed ◆ includes clear rationale and justification for solutions proposed ◆ clearly and comprehensively addresses a fit-for-purpose objective in arriving at proposed solution ◆ clearly identifies key areas for improvement when undertaking the work to the defined time line action plan ◆ clearly identifies key areas for improvement when reflecting on the technical solutions chosen compared with the initial objectives 	<ul style="list-style-type: none"> ◆ consolidates and integrates knowledge and skills but lacks some continuity and consistency ◆ considers proposed solution in isolation from constraints imposed ◆ includes a satisfactory rationale with just sufficient justification ◆ satisfactorily addresses a fit-for-purpose objective in arriving at proposed solution ◆ achieves Outcomes with minimum evaluation against the time line plan ◆ assumes the technical solutions chosen as ‘most appropriate’ with minimal retrospective comparison with initial objectives

The project will be marked out of 100. Assessors will mark each stage of the project, taking into account the criteria outlined. The marks will then be aggregated to arrive at an overall mark for the project. Assessors will then assign an overall grade to the candidate for this Graded Unit based on the following grade boundaries.

- A = 70% — 100%
- B = 60% — 69%
- C = 50% — 59%

Note: the candidate must achieve all of the minimum evidence specified below for each stage of the project in order to achieve the Graded Unit.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Evidence Requirements

The Case Study consists of three stages: planning; developing; and evaluating. The following table specifies the minimum evidence required to pass each stage.

Note: The candidate must achieve **all of the minimum evidence** specified below for each stage of the project in order to pass the Graded Unit.

Project stage	Minimum Evidence Requirements
Stage 1 — Planning	<p><i>Develop An Action Plan for Stage 2 and 3</i> that includes:</p> <ul style="list-style-type: none"> ◆ Interpretation of case study brief into a suitable time line plan ◆ Identification of resources required and their likely sources <p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Planning stage.</i></p>
Stage 2 — Developing	<p><i>Use Appropriate Methods in undertaking the specific tasks in Stage 2</i> which should include:</p> <ul style="list-style-type: none"> ◆ Use appropriate methods in undertaking specific tasks: <ul style="list-style-type: none"> — select criteria and reasoning/justification — conduct a preliminary evaluation of agreed elements of this stage — establish and use required resources such as hardware and software — establish and use required guidance, information, documentation and data ◆ Produce evidence in a suitable form to support the development of the case study solution: <ul style="list-style-type: none"> — adequate reports, specifications, drawings/diagrams, schedules, calculations and test results to justify understanding and completion of required tasks — rationale and justification for proposal submitted ◆ Create a case study portfolio: <ul style="list-style-type: none"> — portfolio including executive summary and evidence of development and conclusions — presentation as an introduction to viva voce interview to include objectives and progress against chosen solutions ◆ Issues of compliance with Health, Safety and Environmental requirements <p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Developing stage.</i></p>

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project stage	Minimum Evidence Requirements
Stage 3 — Evaluating	<p><i>Reflective Report on Outcomes from Stage 1 and 2</i>, which should include:</p> <ul style="list-style-type: none"> ◆ Critical evaluation of Outcomes achieved compared with the time line action plan ◆ Critical comparison of submitted evidence against initial objectives ◆ Identification of feedback to inform future similar tasks ◆ Issues of compliance with Health, Safety and Environmental requirements <p><i>The candidate must achieve all of the minimum evidence specified above in order to pass the Evaluating stage.</i></p>

Marking tariff

Assessors should adhere to the following appropriate marks distribution between the three stages of the Case Study:

Project stage	Appropriate percentage of marks
Planning	20
Developing	60
Evaluating	20

Support notes

Project-based Case Study should present a candidate with an unfamiliar and complex problem for solution. They may be college-derived in conjunction with industrial requirements or workplace related for candidates employed within the petroleum process industry.

Case Study topics should be allocated on an individual candidate basis but each project could form a clearly individual contribution to a wider group activity in the area of petroleum process operations.

Projects may consist of one of the following:

- ◆ Appraisal of an existing petroleum process technology application
- ◆ Appraisal of an existing petroleum process system
- ◆ Feasibility study of a technical issue or proposal
- ◆ Laboratory investigation

OR a combination of the any of the above to provide a multi-disciplinary project within the field of petroleum process operations and control.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

The project or assignment task should be designed to allow the candidate to do:

- ◆ Produce a case study specification from the customer requirements brief
- ◆ Define milestone objectives for the case study work
- ◆ Draw-up an initial case study activity schedule which should be used to inform on-going development
- ◆ Justify chosen case study direction in relation to one or more alternatives
- ◆ Feedback to a case study supervisor on a regular basis
- ◆ Access appropriate hardware, software, documentation and reference materials to support the project development
- ◆ Generate or gather, as appropriate, test results, investigation data or information
- ◆ analyse test results, investigation data or information collated during the case study
- ◆ maintain an activity log book/diary throughout the duration of the case study
- ◆ complete a case study report which conforms to appropriate report standards, includes an evaluation of the case study Outcomes
- ◆ present details of the case study including a reflective account of the project Outcomes
- ◆ comply with all relevant Health, Safety and Environmental requirements

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

General information for candidates

Graded Unit title: Petroleum Process Technology, Operations and Control: Graded Unit 1

This Graded Unit forms a mandatory Unit for the HNC and HND awards in Petroleum Process Technology, Operations and Control. It will normally be delivered to you during the in the second half of your HNC level studies

The Unit requires that you undertake a project-based case study in a complex and unfamiliar topic within the field of Petroleum Process Operations and Control.

Process technicians and engineers frequently undertake case studies of an investigative nature where a customer is defined as the end-user of the case study Outcomes. Such case study work starts with understanding the customer brief and translating this into a specification and objectives. This leads into scheduling activities to ensure that all objectives will be met in the allocated timescale of the case study. It then proceeds to implementation of the case study and applying appropriate authentication techniques to ensure that the case study Outcomes are thoroughly tested as being fit-for-purpose. The final phase of a case study is a reflective evaluation of the overall approach and Outcomes.

At the start of this Graded Unit, just as in a real-life industrial situation, you will be presented a customer requirement brief from which you will develop the case study specification and a list of tasks to enable completion of the case study objectives. You will make plans to undertake the case study; you will develop the case study tasks; you will evaluate the work you have done during the case study and you will evaluate what you have learned and what you would do differently next time.

During this case study you will develop knowledge and skills directly relevant to petroleum process operations and control disciplines. You will also develop knowledge and skills in the none-technical aspects associated with case study assignments such as managing aspects of planning and organisation, communication, evaluative skills, time management and many others.

The HNC course Units will lay the foundations for this Graded Unit which will prepare you to undertake the tasks necessary to complete your case study. Tutors will provide guidance during the Graded Unit and you will have to submit evidence for each stage of the assignment. This evidence will include the maintenance of a case study activity log book or diary, submission of a comprehensive written report and the delivery of a short presentation/viva voce interview.

On successful completion of the Graded Unit you will be graded A, B or C. Further details of this grading will be given to you by the project tutor at the delivery centre.