



Arrangements for:

HNC Petroleum Engineering

Group Award Code: G963 15

HND Petroleum Engineering

Group Award Code: G964 16

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Acknowledgement

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

History of changes

It is anticipated that changes will take place during the life of the qualification and this section will record these changes. This document is the latest version and incorporates the changes summarised below. Centres are advised to check SQA's APS Navigator to confirm they are using the up to date qualification structure.

NOTE: Where a Unit is revised by another Unit:

- ◆ No new centres may be approved to offer the Unit which has been revised.
- ◆ Centres should only enter candidates for the Unit which has been revised where they are expected to complete the Unit before its finish date.

Version number	Description	Date
11	Revision of Unit: F2G8 34 Environmental Awareness (finish date 31/07/2023) has been replaced by J4RC 34 Environmental Awareness (start date 01/08/2020) on HNC and HND framework.	31/10/23
10	Revision of Units: DG54 34 Single Phase AC Circuits has been replaced by FY9E 34 DC and AC Principles for the HND Framework only	11/08/17
09	H92W 33 Fundamental Chemistry: An Introduction added as an optional unit to HNC and HND frameworks. H933 34 Organic Chemistry: Theory and Laboratory Skills added as an optional unit to HND framework.	23/05/17
08	Revision of Unit: DV0M 34 Work Experience has been replaced in HND framework by HJ4W 34 Work Placement and will finish on 31/07/2019.	29/03/2017
07	Revision of Units: F43J 34 Process Safety Engineering has been replaced by HE3F 34 and will finish on 31/07/2018	02/06/16
06	Revision of Units: DE1K 33 Workplace Communication in English has been revised by H8T2 33 and finishes on 31/07/2016. DN8D 33 Mathematics for Science 1 Old unit will finish on 31/07/2017.	11/05/15
05	Removal of finish date from unit DG4P 35 <i>Mathematics for Engineering 3</i> . Addition of Credit Transfer Table <i>see Page 14</i> .	16/01/15
04	Revision of Units: D77G 34 <i>Communication: Practical Skills</i> revised by H7MB 34. DG4H 33 <i>Mathematics for Engineering 1: Electronics and Electrical</i> revised by H7K0 33 <i>Engineering Mathematics 1</i> . DT5X 33 <i>Mathematics for Engineering 1: Mechanical and Manufacturing</i> revised by H7K0 33 <i>Engineering Mathematics 1</i> . DG4L 34 <i>Mathematics for Engineering 2</i> revised by H7K1 34 <i>Engineering Mathematics 2</i> on HNC and HND frameworks finishing 31/07/2016.	09/10/14
03	<i>Engineering Mathematics 3</i> (H7K2 34), <i>Engineering Mathematics 4</i> (H7K3 35) and <i>Engineering Mathematics 5</i> (H7K4 35) added as optional Units to HND framework.	25/08/14
02	Additional Engineering Units added to HNC and HND within the optional area of the Framework to give articulation to degrees at Heriot Watt and Aberdeen University.	December 2009

Contents

1	Introduction.....	1
2	Rationale for the revision of the Group Awards	1
2.1	Background	1
2.2	Market research, consultation and development process	1
3	Aims of the Group Awards	3
3.1	General aims of the HNC Petroleum Engineering.....	3
3.2	Specific aims of the HNC Petroleum Engineering	3
3.3	General aims of the HND Petroleum Engineering	3
3.4	Specific aims of the HND Petroleum Engineering.....	4
3.5	Target groups.....	4
3.6	Employment opportunities.....	4
4	Access to Group Awards	5
4.1	Formal qualifications	5
4.2	English as an additional language.....	5
4.3	Entry to Year 2 HND	5
4.4	Work experience.....	6
4.5	Recommended Core Skills Entry profile	6
4.6	Pre-entry interview	6
5	Group Awards structure.....	7
5.1	Frameworks.....	7
5.1.1	Graded Units.....	12
5.1.2	Recommended Core Skills Entry and Exit levels	12
5.2	Mapping information	12
5.2.1	Links to National Occupation Standards (NOS).....	12
5.3	Articulation, professional recognition and credit transfer.....	13
5.3.1	Articulation.....	13
5.3.2	Professional recognition.....	13
5.3.3	Credit transfer transition arrangements	13
6	Approaches to delivery and assessment.....	15
6.1	Delivery sequence.....	16
6.2	Delivery of the Graded Units	16
6.3	Delivery modes.....	17
6.4	Assessment strategy	17
6.5	Integration opportunities	18
6.6	Re-assessment	18
7	General information for centres	18
8	General information for candidates	19
9	Glossary of terms.....	20
10	Appendices.....	20
	Appendix 1: Mapping of aims to mandatory Units.....	21
	Appendix 2: Core Skills mapping of a Group Award	24
	Appendix 3: Credit transfer and transition arrangements	29
	Appendix 4: Suggested delivery schedule.....	31
	Appendix 5: Links to National Occupational Standards (NOS)	33
	Appendix 5A: Mapping of National Occupational Standards to Units	34
	Appendix 5B: SVQ.....	36

1 Introduction

This is the Arrangements Document for the revised Group Awards in HNC Petroleum Engineering and HND Petroleum Engineering, which were validated in November 2008. This document includes: background information on the development of the Group Awards, their aims, guidance on access, details of the Group Award structures, and guidance on delivery.

These revised awards will replace the HNC and HND awards in Petroleum Engineering, which were validated in 2001.

The revised awards are designed to equip candidates with the knowledge, understanding and skills required for success in current and future employment or for progression to further academic qualifications.

2 Rationale for the revision of the Group Awards

2.1 Background

The predecessor HNC and HND Petroleum Engineering awards were developed and delivered by a single centre. The awards were introduced in the early 1990s and revalidated in 2001 and delivered on a full-time and distance learning basis.

The latest review of the HN Petroleum Engineering awards has taken place to reflect developments and advancements in technology and practice within the industry and changes in the SQA's Design Principles for Higher National qualifications. As a number of centres had expressed an interest in these awards the development took the form of a specialist collaborative development involving a group of centres.

The HNC and HND Group Awards will provide broad-based, multidisciplinary, petroleum exploration, production and environmental qualifications, allowing articulation to higher education as well as promoting career enhancement for successful graduates.

2.2 Market research, consultation and development process

To ensure that the new qualifications are vocationally relevant and meet the needs of both industry and candidates, market research and consultation was carried out by the Qualifications Design Team (QDT) set up to oversee the development. The QDT met at key stages throughout the consultation and development process.

Market research

The QDT made use of labour market intelligence and research findings published by Cogent — the Sector Skills Council (SSC) for the sector. Further discussion with and analysis by Cogent and OPITO — the Oil and Gas Academy — confirmed that there was currently a lack of qualifications providing underpinning knowledge available for candidates who were undertaking a relevant vocational qualification within the petroleum industry environment and also identified that health and safety implications were not always adequately and appropriately covered. Requests had also been received by centres for technician training in this academic area, and these revised awards will address and satisfy these requirements.

Market research supported the continued need for these unique Group Awards, at HNC and HND level, which provide education and training in an integrative manner, across a wide range of areas within the petroleum exploration and production branches of the industry. The factors highlighted in the market research included:

- ◆ advances in technology require technicians to have expertise across a wide range of disciplines
- ◆ major industry players' future needs and desired employee skills
- ◆ requests from individuals, organisations and institutions both within the UK and overseas for qualifications in this area
- ◆ the Skills Gap Analysis conducted by COGENT, supported the need for a course that provided the underpinning knowledge for those working in the 'upstream' oil and gas industry

The Group Awards are relevant to prospective candidates and interested industry players and fulfil the educational and training requirements of professional institutions. The QDT ensured that the revised Group Awards fulfilled these needs by involving the industry and professional institutions at the design stage and by the continued involvement and consultation with industry personnel throughout the developmental stages.

Consultation

A variety of stakeholders were consulted at various stages throughout the development of these awards. The stakeholders included:

- ◆ Employers
- ◆ Professional institutions
- ◆ Sector Skills Council
- ◆ Higher Education Institutions (HEIs)
- ◆ Candidates

Consultation took place by:

- ◆ direct contact with specific companies who operate in this area including: BP, Geoservices Ltd, Petrofac and Conoco-Phillips UK
- ◆ making a survey available through the Sector Skills Council and other professional organisations
- ◆ meetings with Cogent (SSC) and OPITO
- ◆ on-line questionnaires/interviews with HEIs and candidates

The results from the consultation are summarised below:

- ◆ All of the companies interviewed and OPITO (the Oil and Gas Academy) expressed the view that there was a definite need for qualifications in this area
- ◆ These qualifications would be suitable for those already employed in the industry and for new recruits
- ◆ All companies agreed that the mandatory Units were relevant
- ◆ The awards content would support articulation to HEI degree courses
- ◆ Candidates supported the revised content of the awards

From the information gathered it was evident that the industry is supportive of these awards and is keen to have these qualifications available. It was also apparent that the awards needed to be flexible to allow access to a number of different careers within the industry hence the decision was made to have a relatively small number of mandatory Units with a wide range of options.

3 Aims of the Group Awards

3.1 General aims of the HNC Petroleum Engineering

- 1 To develop candidate knowledge and skills in planning, analysis and evaluation within petroleum engineering.
- 2 To develop employment skills related to the petroleum engineering industries.
- 3 To enable progression within the SCQF.
- 4 To develop study and research skills within the petroleum engineering environment.
- 5 To facilitate access to Higher Education Institutions (HEIs).
- 6 To develop transferable skills, including Core Skills, to levels demanded by employers and for progression to further and/or higher education.
- 7 To develop effective team working skills.
- 8 To develop a range of contemporary vocational skills relating to the use, support and development of systems appropriate to employment at technician or professional level.

3.2 Specific aims of the HNC Petroleum Engineering

- 9 To prepare candidates for an appropriate level of employment in petroleum engineering.
- 10 To develop an understanding of exploration and production operations involved in hydrocarbon resource exploitation.
- 11 To develop an understanding of drilling engineering, petroleum production technologies and design requirements.
- 12 To develop a basic understanding of petroleum geology and reservoir engineering.
- 13 To develop an understanding of the key issues within petroleum engineering.
- 14 To introduce the physical and chemical principles utilised within petroleum engineering.

3.3 General aims of the HND Petroleum Engineering

(in addition to aims 1–8 above)

- 15 To further develop transferable skills to levels demanded by employers, and for progression to higher education.
- 16 To enhance employability by developing skills and competencies relevant to the petroleum industry.
- 17 To develop cultural empathy, flexibility and change assimilation skills.

3.4 Specific aims of the HND Petroleum Engineering

(in addition to aims 9–14 above)

- 18 To develop skills and knowledge in petroleum production systems and data logging.
- 19 To develop an understanding of downhole and topside production techniques and operations.
- 20 To advance existing understanding of drilling techniques, equipment, operations and equipment used to prepare a well for completion.
- 21 To develop an understanding of techniques and equipment used to complete a well for production operations.
- 22 To further develop Core Skills in Communication, Numeracy and Information Technology.
- 23 To develop skills in mathematics.
- 24 To develop competences in line with the regulations and conditions of the UK industry training organisation (OPITO) and the internationally recognised professional institute – the Society of Petroleum Engineers (SPE).
- 25 To develop awareness of stakeholder and societal involvement in environmental issues related to the petroleum industry.

3.5 Target groups

The awards are suitable for a wide range of candidates including:

- ◆ School leavers wishing to pursue a career within the petroleum industry
- ◆ Existing employees wishing to gain or extend their qualifications
- ◆ Employees undertaking vocational qualifications (VQs) wishing to acquire relevant and appropriate underpinning knowledge
- ◆ Candidates wishing to move on to higher education in an appropriate discipline area

3.6 Employment opportunities

These awards are designed to provide candidates with the knowledge and skills required for a range of roles within the petroleum engineering environment.

Candidates successfully achieving the HNC award may gain employment as:

- ◆ trainee production engineer assistants
- ◆ trainee process engineer operators in production area

Candidates successfully achieving the HND award may gain employment as:

- ◆ (oil)well engineering services technicians
- ◆ process engineering technicians in production area

4 Access to Group Awards

Access to HNC Petroleum Engineering and HND Petroleum Engineering awards is at the discretion of the centre. All prospective candidates should be treated fairly in regard to access and centres should ensure that there are no unnecessary barriers to entry.

It is the responsibility of centres to ensure that candidates have the formal qualifications and/or work experience and enthusiasm for the vocational area that would give them a reasonable chance of successfully achieving the awards.

Examples of appropriate entry requirements are given below - this is intended to provide guidance to centres. They are not exhaustive or mutually exclusive and may be considered in a variety of combinations.

4.1 Formal qualifications

Candidates desiring entry to HNC Petroleum Engineering, or to the first year of HND Petroleum Engineering, should have:

- ◆ One National Course at SCQF level 6 in a relevant subject preferably Mathematics or Physics or Chemistry plus four Standard Grades at Credit Level or National Courses at Intermediate 2 at grade 'C' or above
or
- ◆ A programme of National Units in a suitable subject area eg Engineering or Science at SCQF level 5 and 6
or
- ◆ Awards from other awarding bodies, provided that the competencies can be identified and matched to the above, including SVQ/NVQs in an appropriate occupational area.

In addition, any appropriate combination of the above qualifications may be acceptable.

4.2 English as an additional language

For candidates where English is not the first language, it is recommended that candidates possess English for Speakers of Other Languages (ESOL) at SCQF level 5.

4.3 Entry to Year 2 HND

In order to achieve the HND Petroleum Engineering candidates must gain 30 SQA credits. Ideally full-time candidates should be encouraged to achieve 15 credits in each year of the award. Wider access should be provided to cater for the needs of those, for example, who have achieved the HNC at day release or evening classes or in other colleges. Candidates would therefore be expected to have a minimum of 12 credits on entry to Year 2 and these would include the HNC Petroleum Engineering mandatory Units.

In addition, those candidates wishing to progress to the second year of the HND and who are not in possession of Mathematics at SCQF level 6 on entry to the first year should be advised to undertake one of the Mathematics options from Group B, to prepare them for the HND Mandatory Unit, *Mathematics for Engineering 2* (DG4L 34).

4.4 Work experience

Candidates who do not possess the formal entry qualifications suggested above, in Section 4.1, may be considered for entry, if they have relevant, appropriate work experience in petroleum engineering or its related industries.

Work experience used as evidence for entry should be current, and candidates may be asked to provide evidence.

4.5 Recommended Core Skills Entry profile

The recommended Core Skills entry profiles for the awards are given in the table below:

Core Skill	HNC	HND
	SCQF level	SCQF level
Communication	5	6
Numeracy	5	6
Information Technology	5	6
Problem Solving	5	6
Working with Others	5	6

If candidates with appropriate qualifications and/or work experience apply and are unable to satisfy the above Core Skills entry profile then it is recommended that centres apply Core Skills diagnostics and agree an appropriate support package.

4.6 Pre-entry interview

Applicants may be invited to attend a pre-entry interview where their suitability for the course of study will be explored. The interview will give applicants the opportunity of ensuring that the course of study will assist them to meet their career aspirations.

A personal learning plan may evolve from such discussions which will identify a route map through the qualifications framework for each candidate including any Core Skills support identified. Any departure from the recommended Access requirements stated above would be documented within this personal learning plan.

5 Group Awards structure

The awards have been designed in accordance with SQA's design principles for HN Awards, ie:

- ◆ HNCs shall be designed to be at SCQF level 7 and shall comprise 96 SCQF credit points with at least 48 credit points at SCQF level 7. The HNC should include a mandatory section of at least 48 SCQF credit points and include one Graded Unit of 8 SCQF credit points at SCQF level 7.
- ◆ HNDs shall be designed to be at SCQF level 8 and shall comprise 240 SCQF credits points with at least 64 credit points at SCQF level 8. The HND should include a mandatory section of at least 96 SCQF credit points and include one Graded Unit of 8 SCQF credit points at SCQF level 7, plus 16 SCQF credit points of Graded Unit(s) at SCQF level 8.
- ◆ HNC and HND programmes shall incorporate opportunities for candidates to develop Core Skills to levels required by the occupations or progression pathways the HNs support.

5.1 Frameworks

HNC Petroleum Engineering

To attain the Group Award of HNC Petroleum Engineering candidates must achieve 12 HN credits — all mandatory Units in *Group A* totalling 7 HN credits, and optional Units totalling 5 HN credits consisting of either 1 HN credit from *Group B* plus 4 HN credits from *Group C*, or 5 HN credits from *Group C*.

Mandatory Units Group A — 7 HN credits (56 SCQF credit points) required

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Science Industry: Key Issues	DP9M 34	8	7	1
Petroleum Engineering: Physics, Mathematics and Chemistry	F52Y 34	8	7	1
Petroleum Geology and Geophysics: An Introduction	F530 34	8	7	1
Petroleum Reservoir Engineering: An Introduction	F533 34	8	7	1
Oilfield Drilling Techniques and Operations: An Introduction	F52X 34	8	7	1
Communication: Practical Skills	H7MB 34*	8	7	1
Petroleum Engineering: Graded Unit 1	F546 34	8	7	1

*Refer to History of Changes for revision changes.

Optional Units Group B — up to 1 HN credit (8 SCQF credit points) required

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Mathematics for Science 1	H8XP 33*	8	6	1
Engineering Mathematics 1	H7K0 33*	8	6	1

Optional Units Group C — from 4 to 5 HN credits (32/40 SCQF credit points) required

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Information Technology: Applications Software 1	D75X 34	8	7	1
Engineering Mathematics 2	H7K1 34*	8	7	1
Fundamental Chemistry: An Introduction Or Fundamental Chemistry: An Introduction	DX29 33 H92W 33*	8 8	6 6	1 1
Fundamental Chemistry: Theory and Practice	DH2K 34	16	7	2
Engineering Science Principles	DX49 34	8	7	1
Process Safety Engineering	HE3F 34*	8	7	1
Electrical Systems in Potentially Explosive and Gas Hazardous Environments	DN3T 34	8	7	1
Environmental Awareness	J4RC 34*	8	7	1
Pneumatics and Hydraulics	DT9X 34	8	7	1
Fire and Gas Detection	DX4A 34	8	7	1
Heat Transfer and Fluid Mechanics	DT5T 35	8	8	1
Oil Well Management	F52T 35	8	8	1
Petroleum Production Processes	F531 35	8	8	1
Engineering Measurement and System Monitoring	DV9P 34	8	7	1
Materials Selection	DT46 34	8	7	1
Principles of Safe Engineering Systems	F1BY 35	8	8	1
Computer Aided Draughting for Engineers	DR1X 34	8	7	1
Engineering Drawing	DR1W 34	8	7	1
Engineering Systems Analysis: System Modelling and Control	F1BV 35	8	8	1
Application of Programmable Logic Controllers	DG31 34	8	7	1
Quality Management: An Introduction	DT8Y 34	8	7	1
Safety Engineering and the Environment	DR2D 34	8	7	1
Fundamentals of Control Systems and Transducers	DN3Y 34	8	7	1
Engineering Communication	DV9N 34	8	7	1
Mechanical Engineering Principles	DV9G 34	8	7	1
Electricity Power Systems	DN3W 34	8	7	1

*Refer to History of Changes for revision changes.

HND Petroleum Engineering

To attain the award of HND Petroleum Engineering candidates must achieve 30 HN credits — all mandatory Units from *Group A* totalling 16 HN credits, and optional Units totalling 14 HN credits from *Groups B, C and D*.

Mandatory Units Group A – 16 HN credits (128 SCQF credit points) required

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Communication: Practical Skills	H7MB 34*	8	7	1
Project Management: Managing the Implementation of a Project	DV7J 35	16	8	2
Science Industry: Key Issues	DP9M 34	8	7	1
Engineering Mathematics 2	H7K1 34*	8	7	1
Petroleum Engineering: Physics, Mathematics and Chemistry	F52Y 34	8	7	1
Petroleum Geology and Geophysics: An Introduction	F530 34	8	7	1
Petroleum Reservoir Engineering: An Introduction	F533 34	8	7	1
Oilfield Drilling Techniques and Operations: An Introduction	F52X 34	8	7	1
Oilfield Drilling Techniques and Operations	F52W 35	8	8	1
Oil Well Management	F52T 35	8	8	1
Petroleum Recovery Techniques	F532 35	8	8	1
Petroleum Production Processes	F531 35	8	8	1
Petroleum Engineering: Graded Unit 1	F546 34	8	7	1
Petroleum Engineering: Graded Unit 2	F547 35	16	8	2

Optional Units Group B — up to 1 HN credit (8 SCQF credit points) required

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Mathematics for Science 1	H8XP 33*	8	6	1
Engineering Mathematics 1	H7K0 33*	8	6	1

*Refer to History of Changes for revision changes.

Optional Units Group C — from 11 to 14 HN credits (88/96/104/112 SCQF credit points) required

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Fundamental Chemistry: An Introduction Or Fundamental Chemistry: An Introduction	DX29 33 H92W 33*	8 8	6 6	1 1
Information Technology: Applications Software 1	D75X 34	8	7	1
Fundamental Chemistry: Theory and Practice	DH2K 34	16	7	2
Engineering Science Principles	DX49 34	8	7	1
Process Safety Engineering	HE3F 34*	8	7	1
Electrical Systems in Potentially Explosive and Gas Hazardous Environments	DN3T 34	8	7	1
Quality and Health and Safety Systems in Science Industries	DF82 34	8	7	1
Environmental Awareness	J4RC 34*	8	7	1
Pneumatics and Hydraulics	DT9X 34	8	7	1
Fundamental Concepts of Organic Chemistry Or Organic Chemistry: Theory and laboratory Skills	DP2P 34 H933 34*	8 8	7 7	1 1
Fundamental Concepts of Inorganic Chemistry	DP2N 34	8	7	1
DC and AC Principles	FY9E 34*	8	7	1
Three Phase Systems	DN47 34	8	7	1
Process Operations: Distillation	F3XF 35	8	8	1
Fundamental Concepts of Physical Chemistry	DP2R 34	8	7	1
Thermofluids	DT9P 34	8	7	1
Instrumentation in Hazardous Areas	DX4D 34	8	7	1
Fire and Gas Detection	DX4A 34	8	7	1
Process Control	DX4K 34	8	7	1
Dynamics	DT9T 34	8	7	1
Working within a Project Team	DH21 34	8	7	1
Electrochemistry	DP5V 35	8	8	1
Thermodynamics and Kinetics	DP4N 35	8	8	1
Aromatic Chemistry	DP54 35	8	8	1
Base-Catalysed Reactions and Organometallic Reagents in Organic Synthesis	DP5W 35	8	8	1
Phase Equilibrium and Surface Chemistry	DP5X 35	8	8	1
Organic Stereochemistry	DX2H 35	8	8	1
Heat Transfer and Fluid Mechanics	DT5T 35	8	8	1
Process Control by Computer	DX4L 35	8	8	1
Three Phase Induction Motors	DN45 35	8	8	1
Electrical Motor Drive Systems	DN4K 35	8	8	1
Mathematics for Engineering 3	DG4P 35	8	8	1
Engineering Measurement and System Monitoring	DV9P 34	8	7	1
Materials Selection	DT46 34	8	7	1
Principles of Safe Engineering Systems	F1BY 35	8	8	1

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Computer Aided Draughting for Engineers	DR1X 34	8	7	1
Engineering Drawing	DR1W 34	8	7	1
Engineering Systems Analysis: System Modelling and Control	F1BV 35	8	8	1
Application of Programmable Logic Controllers	DG31 34	8	7	1
Quality Management: An Introduction	DT8Y 34	8	7	1
Safety Engineering and the Environment	DR2D 34	8	7	1
Fundamentals of Control Systems and Transducers	DN3Y 34	8	7	1
Engineering Communication	DV9N 34	8	7	1
Mechanical Engineering Principles	DV9G 34	8	7	1
Electricity Power Systems	DN3W 34	8	7	1
Engineering Mathematics 3	H7K2 34*	8	7	1
Engineering Mathematics 4	H7K3 35*	8	8	1
Engineering Mathematics 5	H7K4 35*	8	8	1

*Refer to History of Changes for revision changes.

Optional Units Group D — up to 2 HN credits (16 SCQF credit points) required

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
Workplace Communication in English	H8T2 33*	8	6	1
Personal Development Planning	DE3R 34	8	7	1
Work Placement	HJ4W 34*	8	7	1
Business Awareness and Continuing Professional Development	DG3D 35	8	8	1

5.1.1 Graded Units

The purpose of the Graded Units is to assess the candidates' ability to integrate and apply the knowledge and skills gained in individual HN Units; to demonstrate that they have achieved the principal aims of the Group Awards; and to grade candidate achievement. As these Group Awards are, in the main, designed to provide candidates with the knowledge and skills required for entry into employment, it was agreed that Project based Graded Units were appropriate.

In the HNC Petroleum Engineering candidates will undertake one Graded Unit of 8 SCQF credit points at SCQF level 7. This Project based Graded Unit will take the form of a case study.

Candidates progressing to Year 2 of HND Petroleum Engineering will also undertake a further Graded Unit of 16 SCQF credit points at SCQF level 8. This Project based Graded Unit taking the form of a practical assignment.

5.1.2 Recommended Core Skills Entry and Exit levels

The importance of Core Skills has been recognised and these are developed throughout the awards.

Core Skills	HNC	HNC	HND
	Entry level	Exit level	Exit level
Communication	SCQF 5	SCQF 6	SCQF 6
Numeracy	SCQF 5	SCQF 6	SCQF 6
IT	SCQF 5	SCQF 6	SCQF 6
Problem Solving	SCQF 5	SCQF 6	SCQF 6
Working with Others	SCQF 5	SCQF 6	SCQF 6

Appendix 2 contains a Core Skill Signposting table which shows where each of the Core Skills may be developed or is embedded within specific Units.

5.2 Mapping information

An indication of how the Units map to the aims of the awards, as outlined in Section 3, is given Appendix 1.

5.2.1 Links to National Occupation Standards (NOS)

The HNs links with several SVQs offered in with the Oil and Gas occupational area. Further details are given in Appendix 5. It is recognised that successful HNC/HND candidates will have demonstrated much of the underpinning knowledge in the NOS in many of these SVQs. Appendix 5 shows where specific HNC/HND Units map to the underpinning knowledge for the NOS related to the SVQ in Processing Operations: Hydrocarbons at level 3.

5.3 Articulation, professional recognition and credit transfer

5.3.1 Articulation

Although there are no formal articulation arrangements in place it may be possible for successful candidates to progress to the following degree courses:

- ◆ Geoservices
- ◆ Petroleum Engineering
- ◆ Chemical Engineering
- ◆ Chemical Engineering: Oil and Gas

HEIs offering relevant degrees include:

- ◆ The University of Aberdeen
- ◆ Heriot Watt University
- ◆ University of Rennes

Candidates are advised to liaise directly with the HE establishments prior to each year's intake of candidates as Unit credits that count towards entry requirements can vary and applications will be considered on an individual basis.

5.3.2 Professional recognition

There are no formal professional bodies which recognise these awards at present.

5.3.3 Credit transfer transition arrangements

Candidates wishing to transfer from an HNC or first part of an HND developed under the 1988 design rules into an HND validated using the 2003 design principles in the same subject area need only achieve (within the 240 SCQF credit points required for the revised HND) Graded Units of 16 SCQF credit points at SCQF level 8 (instead of Graded Units of 8 SCQF credit points at SCQF level 7 and 16 SCQF credit points at SCQF level 8). Candidates are still required to meet the conditions of the revised HND Petroleum Engineering award by achieving:

- ◆ the mandatory Units (either by credit transfer or normal study)
- ◆ a Graded Unit or Graded Units of 16 SCQF credit points at SCQF level 8
- ◆ the correct number of credits at the correct SCQF level
- ◆ development of the Core Skills required by the end-users of the Group Award

Candidates may be given credit transfer between the predecessor Units and the revised HN Units. Credit transfer can be given where there is broad equivalence between the subject related content of the Unit or combination of Units.

A table listing where full or partial credit transfer can be given from the predecessor Units to the revised Units is given in Appendix 3.

New Unit Title	New Unit Code	Old Unit Title	Old Unit Code	Credit Transfer Conditions
Engineering Mathematics 1	H7K033	Mathematics for Engineering 1:Electronics and Electrical	DG4H33	To gain credit transfer to the new unit candidates will have to provide additional evidence relating to functions as specified in the Evidence requirements in respect of the first three knowledge/skills in Outcome 1 and relating to vectors as specified in the first three knowledge/skills in outcome 3.
Engineering Mathematics 1	H7K033	Mathematics for Engineering 1:Mechanical and Manufacturing	DT5X33	To gain credit transfer to the new unit candidates will have to provide additional evidence relating to functions as specified in the Evidence requirements in respect of the first three knowledge/skills in Outcome 1 and relating to 3D vectors and complex numbers as specified in the knowledge/skills in outcome 3.
Engineering Mathematics 2	H7K134	Mathematics for Engineering 2	DG4L34	To gain credit transfer to the new unit candidates will have to provide additional evidence relating to trigonometric and hyperbolic functions as specified in the Evidence requirements in respect of Outcome 1.

6 Approaches to delivery and assessment

Content and context

The HNC/HND Petroleum Engineering are specialised awards which allow candidates to gain advanced knowledge and technical skills in health and safety, exploration, oil well drilling, well completion and the production process involved in oil and gas production.

It is recommended that delivery centres embed a culture which leads to a raised awareness of the industrial environment within which candidates are likely to operate, and the hazards that might ensue from actions taken in operational activities and situations. It is envisaged that the culture will also develop the 'softer' skills demanded by potential employers. This may include continuous quality improvement through evaluation and minimising risk.

It is recommended that candidates be encouraged to:

- ◆ observe, analyse and take action within their surroundings
- ◆ take appropriate technical and professional actions avoiding and/or minimising risk; and
- ◆ permeate such an ethos across all areas of the Group Awards

It is recognised that gaining real work experience whilst studying will be difficult, due to the workplace environmental constraints, particularly for full-time candidates. It is therefore recommended that delivering centres utilise where possible:

- ◆ Simulated environments
- ◆ Visits to operational sites and visits to training sites
- ◆ Attendance at society of petroleum engineers (SPE) chapter meetings
- ◆ Guest speakers from industry to address candidates

Centres should seek to utilise up-to-date technology such as web cams and video conferencing to demonstrate real life situations to candidates.

By choosing an appropriate range of options candidates can prepare for employment in oil exploration and extraction. Alternatively candidates can choose to proceed to degree level courses at a number of universities.

It is envisaged that the HNC award will be the preferred option for those in employment and could be an appropriate course to form part of a Modern Apprenticeship for oil and gas production workers. While some workers in employment may choose to progress to the HND, it is more likely that the HND will be undertaken by full-time candidates. Whilst progression to degree level courses is one option open to candidates, it should be remembered that the HND is a vocational qualification and it is therefore important that there is an emphasis on the skills required to work in the industry. All the Units should be delivered with a strong emphasis on current industry practice.

6.1 Delivery sequence

It is recommended that full-time HND candidates study the Units comprising the HNC award in Year 1, plus an additional 3 HN credits, prior to progressing to the second year of the award. The sequencing of Units is at the discretion of delivering centres. Appendix 4 gives suggested delivery schedules for a 2-semester and a 3-block academic session. Centres should take account of the recommended entry requirements for each Unit when considering their delivery schedules. For instance candidates would require an understanding of drilling techniques before they could complete the Units in *Oil Well Management* (F52T 35) or *Petroleum Production Processes* (F531 35).

It is envisaged that many candidates will be part-time students, some of whom will be distance learners. This will require flexibility in the ways in which candidates can undertake the Units. Sequencing may well depend on the delivery mode, with Units that require supervised assessments being scheduled to allow the assessment to coincide with times that the candidates can attend the centre.

6.2 Delivery of the Graded Units

Given the integrated nature of the Graded Units, it is anticipated that the entire course team will be involved in the delivery of the contributing Units. Both Graded Unit 1 and Graded Unit 2 involve the candidates carrying out individual projects. The delivery involves advice and support to the candidates as they complete their work. Centres may find this easier if the supervision is shared across the course team to ensure candidates have access to a range of curricular experts.

Timing of the assessment is important. For full-time candidates it is recommended that the Graded Units are scheduled to run during the middle part of the academic year, possibly November to April. The rationale for this is that:

- ◆ candidates are not completing major pieces of work at the same time as they are preparing for end of Unit assessments
- ◆ centres have time to mark and grade the projects before sending them for central verification if required
- ◆ if visiting verification takes place, candidates will have some evidence for verification

The majority of candidates regard the Graded Units as highly significant and may spend a disproportionate amount of time on them. It is important for centres to offer good advice and not allow candidates to neglect the work of other Units in pursuit of an 'A' grade for the Graded Units.

6.3 Delivery modes

It is envisaged that the HNC and the HND will be delivered as both full-time and part-time courses. It is expected that for those candidates in employment delivery will be available via a variety of distance learning modes.

Full details on the suitability of individual Units for Open Learning are contained in each individual Unit specification. It is recognised that aspects of many Units could be delivered on an Open Learning basis, however, assessment conditions must be adhered to for all delivery modes.

6.4 Assessment strategy

The HN Design Principles, which encourage a more holistic approach to assessment, have been adopted in both awards. The new HN Unit specification places the emphasis on reducing the assessment load for candidates and centres by devising assessments which assess the entire content of the Unit where appropriate, and by sampling of knowledge and/or skills.

A range of assessment strategies have been suggested, with some Units being assessed by end of Unit assessments, carried out under closed-book, supervised conditions, while others require the completion of case studies or other assignments that candidates can complete in their own time.

Having end-of-Unit assessments means that the majority of assessments need to take place toward the end of the teaching blocks. This represents a change from the current system, where assessments could be spread over a longer period of time. Centres should carefully plan the course to offer candidates every opportunity to succeed. If it is possible, introducing staggered starts for some Units may help with reducing the loading on candidates. Also it may help to plan the delivery to ensure that Units which do not require a closed-book assessment, run in conjunction with those that do, hence reducing the possibility that candidates will be faced with a large number of end of Unit assessments over a short period of time.

Unit specifications detail exactly the Evidence Requirements and assessment conditions for each assessment event. Should centres wish to use a different mode of assessment from that recommended, they should seek prior verification from SQA.

Assessment exemplar materials for a number of Units in these awards is available from SQA. All assessments must be conducted in line with the SQA '*Guide to Assessment*'. This in itself will pose issues for distance learners who may well be working at their own pace. The guidelines now make 'assessment on demand' more difficult for centres to manage. Also the requirement to have end of Unit assessments under closed-book supervised conditions could be restrictive for distance learners. The presenting centre will have to ensure that candidates can sit such assessments in an appropriate environment and that security of the assessments is maintained. To maintain the validity of assessments it is expected that all candidates would sit an assessment at the same time. This again could be an issue for distance learners and centres may require to have a bank of assessments for each Unit if they wish to allow candidates to sit assessments at different times in the year.

6.5 Integration opportunities

Assessment for all Units within both HNC and HND Petroleum Engineering will attempt to address the practical aspects of the Units, and assessments will reflect a “hands on” approach wherever possible. The overall strategy for assessment is that wherever possible, and where permissible, assessments will be integrated across Outcomes within Units, to reduce the overall amount of assessment load placed on candidates.

If possible and practical, consideration will be given to assessing across Units wherever this is feasible. This would add credibility to the claim that assessment was based on “real work” scenarios, and not dealt with in a compartmentalised manner.

6.6 Re-assessment

Guidelines for re-assessment should be included in course documentation such as course handbooks and instruments of assessment. Candidates should be allowed re-assessment opportunities in line with centre policy. Guidance should be provided by delivery staff and course team members.

7 General information for centres

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.

Internal and external verification

All instruments of assessment used within this/these Group Award(s) should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

Further information on internal and external verification can be found in *SQA's Guide to Assessment and Quality Assurance for Colleges of Further Education* (www.sqa.org.uk).

8 General information for candidates

The HNC and HND Petroleum Engineering awards have been designed to provide you with a broad-based, multi-disciplinary, petroleum exploration, production and environmental qualification which will allow you to articulate to higher education and to promote career enhancement.

You will develop a variety of knowledge and skills including:

- ◆ Physical and chemical aspects of petroleum engineering
- ◆ An introduction to petroleum geology and geophysics
- ◆ Petroleum reservoir engineering
- ◆ Oilfield drilling operations
- ◆ Petroleum recovery techniques and production processes

You may also choose options which will develop your skills in mathematics, information technology, communication and several complementary strands of engineering.

To achieve the HNC Petroleum Engineering you must achieve 12 HN credits — 7 mandatory credits and 5 optional credits. The HND Petroleum Engineering consists of 30 HN credits — 16 mandatory credits and 14 optional credits.

The content of the awards is delivered via HN Units (which may have a one or two HN credit value) and you may be assessed in a variety of ways. Some Units have end of Unit assessments while others ask you to complete exercises based on case studies and research specific items of interest. All assessment instruments will be directly related to the activities you might anticipate being involved in while working within the petroleum industry.

Both the HNC and HND Group Awards contain Graded Units which integrate the knowledge and skills of the mandatory Units within the Group Awards. Graded Unit 1 (HNC) is based round a case study and you will be asked to produce a report on the activities involved within the case study. Graded Unit 2 (HND) will be a project, involving research into a particular topic.

You will also have an opportunity to develop the Core Skills of *Communication*, *Numeracy*, *Problem Solving*, *IT* and *Working with Others* within the awards

These awards provide the underpinning knowledge for a number of SVQs that are offered in the industry and you may undertake a SVQ with your employer. You may gain employment as a Production Process Operator, although other career opportunities such as Reservoir Engineering, Drilling Operators, etc. may arise.

9 Glossary of terms

SCQF: This stands for the Scottish Credit and Qualification Framework, which is a new way of speaking about qualifications and how they inter-relate. We use SCQF terminology throughout this guide to refer to credits and levels. For further information on the SCQF visit the SCQF website at www.scqf.org.uk

SCQF credit points: One HN credit is equivalent to 8 SCQF credit points. This applies to all HN Units, irrespective of their level.

SCQF levels: The SCQF covers 12 levels of learning. HN Units will normally be at levels 6–9. Graded Units will be at level 7 and 8.

Subject Unit: Subject Units contain vocational/subject content and are designed to test a specific set of knowledge and skills.

Graded Unit: Graded Units assess candidates' ability to integrate what they have learned while working towards the Units of the Group Award. Their purpose is to add value to the Group Award, making it more than the sum of its parts, and to encourage candidates to retain and adapt their skills and knowledge.

Dedicated Unit to cover Core Skills: This is a non-subject Unit that is written to cover one or more particular Core Skills.

Embedded Core Skills: This is where the development of a Core Skill is incorporated into the Unit and where the Unit assessment also covers the requirements of Core Skill assessment at a particular level.

Signposted Core Skills: This refers to the opportunities to develop a particular Core Skill at a specified level that lie outwith automatic certification.

Qualification Design Team: The QDT works in conjunction with a Qualification Manager/Development Manager to steer the development of the HNC/HND from its inception/revision through to validation. The group is made up of key stakeholders representing the interests of centres, employers, universities and other relevant organisations.

Consortium-devised HNCs and HNDs are those developments or revisions undertaken by a group of centres in partnership with SQA.

Specialist single centre and specialist collaborative devised HNCs and HNDs are those developments or revisions led by a single centre or small group of centres who provide knowledge and skills in a specialist area. Like consortium-devised HNCs and HNDs, these developments or revisions will also be supported by SQA.

10 Appendices

- Appendix 1: Mapping of aims to mandatory Units
- Appendix 2: Core Skills mapping of a Group Award
- Appendix 3: Credit transfer and transition arrangements
- Appendix 4: Suggested delivery schedule
- Appendix 5: Links to National Occupational Standards
- Appendix 5A: Mapping of National Occupational Standards to Units
- Appendix 5B: SVQ

Appendix 1: Mapping of aims to mandatory Units

Group Award title: HNC Petroleum Engineering

Unit code	Unit title	Aim													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
DP9M 34	Science Industry: Key Issues		✓	✓	✓		✓	✓	✓	✓				✓	
F52Y 34	Petroleum Engineering: Physics, Mathematics and Chemistry			✓			✓								✓
F530 34	Petroleum Geology and Geophysics: An Introduction			✓	✓	✓	✓		✓				✓		
F533 34	Petroleum Reservoir Engineering: An Introduction	✓	✓	✓	✓	✓	✓			✓	✓		✓		
F52X 34	Oilfield Drilling Techniques and Operations: An Introduction	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			
D77G 34	Communication: Practical Skills		✓	✓	✓		✓	✓							
F546 34	Petroleum Engineering: Graded Unit 1	✓	✓	✓	✓	✓	✓	✓	✓	⚙	⚙	⚙	⚙	⚙	⚙

 = depends on the case study used for the Graded Unit

Group Award title: HND Petroleum Engineering (Aims 1–14)

Unit code	Unit title	Aim													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
D77G 34	Communication: Practical Skills		✓	✓	✓		✓	✓							
DV7J 35	Project Management: Managing the Implementation of a Project	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DP9M 34	Science Industry: Key Issues		✓	✓	✓		✓	✓	✓	✓				✓	
DG4L 34	Mathematics for Engineering 2	✓	✓	✓		✓	✓		✓	✓					
F52Y 34	Petroleum Engineering: Physics, Mathematics and Chemistry			✓			✓								✓
F530 34	Petroleum Geology and Geophysics: An Introduction			✓	✓	✓	✓		✓				✓		
f533 34	Petroleum Reservoir Engineering: An Introduction	✓	✓	✓	✓	✓	✓			✓	✓		✓		
F52X 34	Oilfield Drilling Techniques and Operations: An Introduction	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			
F52W 35	Oilfield Drilling Techniques and Operations		✓	✓	✓		✓		✓	✓	✓	✓			✓
F52T 35	Oil Well Management	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		
F532 35	Petroleum Recovery Techniques		✓	✓	✓	✓	✓		✓	✓	✓		✓		
F531 35	Petroleum Production Processes		✓	✓	✓	✓	✓		✓	✓	✓		✓		
F546 34	Petroleum Engineering: Graded Unit 1	✓	✓	✓	✓	✓	✓	✓	✓	⚙️	⚙️	⚙️	⚙️	⚙️	⚙️
F547 35	Petroleum Engineering: Graded Unit 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Group Award title: HND Petroleum Engineering (Aims 15 – 25)

Unit code	Unit title	Aim										
		15	16	17	18	19	20	21	22	23	24	25
D77G 34	Communication: Practical Skills	✓							✓			
DV7J 35	Project Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DP9M 34	Science Industry: Key Issues		✓	✓							✓	✓
DG4L 34	Mathematics for Engineering 2	✓	✓						✓	✓		
F52Y 34	Petroleum Engineering: Physics, Mathematics and Chemistry	✓	✓	✓	✓							
F530 34	Petroleum Geology and Geophysics: An Introduction	✓										
F533 34	Petroleum Reservoir Engineering: An Introduction		✓	✓	✓	✓						
F52X 34	Oilfield Drilling Techniques and Operations: An Introduction	✓	✓			✓	✓	✓			✓	✓
F52W 35	Oilfield Drilling Techniques and Operations		✓				✓	✓			✓	✓
F52T 35	Oil Well Management	✓	✓	✓				✓			✓	✓
F532 35	Petroleum Recovery Techniques	✓	✓					✓			✓	✓
F531 35	Petroleum Production Processes	✓		✓			✓	✓				
F546 34	Petroleum Engineering: Graded Unit 1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
F547 34	Petroleum Engineering: Graded Unit 2	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Appendix 2: Core Skills mapping of a Group Award

Group Award title: HNC Petroleum Engineering

Unit code	Unit title	Communication		Numeracy		IT	Problem Solving			Working with Others
		Written	Oral	Using Graphical Info.	Using Number		Critical Thinking	Planning and Organising	Reviewing and Evaluating	
DP9M 34	Science Industry: Key Issues	✓	✓	✓		✓				
F52Y 34	Petroleum Engineering: Physics, Mathematics and Chemistry	✓		✓	✓	✓	✓	✓	✓	
F530 34	Petroleum Geology and Geophysics: An Introduction	✓		✓	✓	✓				
F533 34	Petroleum Reservoir Engineering: An Introduction	✓	✓	✓			✓	✓	✓	
F52X 34	Oilfield Drilling Techniques and Operations: An Introduction	✓		✓	✓	✓	✓	✓		
D77G 34	Communication: Practical Skills	✓	✓	✓						✓
F546 34	Petroleum Engineering: Graded Unit 1	✓	✓	✓	✓	✓	✓	✓	✓	✓
DN8D 33	Mathematics for Science 1			✓	✓	✓	✓	✓	✓	
DT5X 33	Mathematics for Engineering 1: Mechanical and Manufacturing			✓	✓	✓	✓	✓	✓	
DG4H 33	Mathematics for Engineering 1: Electronics and Electrical			✓	✓	✓	✓	✓	✓	
D75X 34	Information Technology: Applications Software 1	✓		✓	✓	✓	✓	✓	✓	
DG4L 34	Mathematics for Engineering 2			✓	✓	✓	✓	✓	✓	
DX29 33	Fundamental Chemistry: An Introduction	✓		✓	✓		✓	✓		
DH2K 34	Fundamental Chemistry: Theory and Practice	✓		✓	✓		✓	✓		
DX49 34	Engineering Science Principles	✓			✓		✓	✓	✓	

Unit code	Unit title	Communication		Numeracy		IT	Problem Solving			Working with Others
		Written	Oral	Using Graphical Info.	Using Number		Critical Thinking	Planning and Organising	Reviewing and Evaluating	
F43J 34	Process Safety Engineering			✓	✓		✓	✓	✓	
DN3T 34	Electrical Systems in Potentially Explosive and Gas Hazardous Environments	✓	✓	✓			✓	✓	✓	✓
J4RC 34	Environmental Awareness	✓		✓		✓				✓
DT9X 34	Pneumatics and Hydraulics	✓		✓	✓	✓	✓	✓	✓	
DX4A 34	Fire and Gas Detection		✓				✓	✓	✓	✓
DT5T 35	Heat Transfer and Fluid Mechanics	✓		✓	✓	✓	✓	✓	✓	
F52T 35	Oil Well Management	✓			✓		✓	✓	✓	
F531 35	Petroleum Production Processes	✓		✓	✓	✓	✓	✓	✓	

Enter SCQF level, and ✓ for signposted or E for embedded

Group Award title: HND Petroleum Engineering

Unit code	Unit title	Communication		Numeracy		IT	Problem Solving			Working with Others
		Written	Oral	Using Graphical Info.	Using Number		Critical Thinking	Planning and Organising	Reviewing and Evaluating	
D77G 34	Communication: Practical Skills	✓	✓	✓						
DV7J 35	Project Management: Managing the Implementation of a Project	✓		✓	✓	✓	✓	✓	✓	✓
DP9M 34	Science Industry: Key Issues			✓	✓		✓	✓	✓	
DG4L 34	Mathematics for Engineering 2			✓	✓	✓	✓	✓	✓	
F52Y 34	Petroleum Engineering: Physics, Mathematics and Chemistry	✓		✓	✓	✓	✓	✓	✓	
F530 34	Petroleum Geology and Geophysics: An Introduction	✓		✓	✓	✓				
F533 34	Petroleum Reservoir Engineering: An Introduction	✓	✓	✓			✓	✓	✓	
F52X 34	Oilfield Drilling Techniques and Operations: An Introduction	✓		✓	✓	✓	✓	✓		
F52W 35	Oilfield Drilling Techniques and Operations	✓		✓	✓	✓	✓	✓	✓	
F52T 35	Oil Well Management	✓		✓	✓	✓	✓	✓	✓	
F532 35	Petroleum Recovery Techniques	✓	✓		✓	✓	✓	✓	✓	
F531 35	Petroleum Production Processes	✓		✓	✓	✓	✓	✓	✓	
F546 34	Petroleum Engineering: Graded Unit 1	✓	✓	✓	✓	✓	✓	✓	✓	✓
F547 35	Petroleum Engineering: Graded Unit 2	✓	✓	✓	✓	✓	✓	✓	✓	✓
DN8D 33	Mathematics for Science 1			✓	✓	✓	✓	✓	✓	
DT5X 33	Mathematics for Engineering 1: Mechanical and Manufacturing			✓	✓	✓	✓	✓	✓	

Group Award title: HND Petroleum Engineering

Unit code	Unit title	Communication		Numeracy		IT	Problem Solving			Working with Others
		Written	Oral	Using Graphical Info.	Using Number		Critical Thinking	Planning and Organising	Reviewing and Evaluating	
DG4H 33	Mathematics for Engineering 1: Electronics and Electrical			✓	✓	✓	✓	✓	✓	
DX29 33	Fundamental Chemistry: An Introduction	✓			✓		✓	✓	✓	
D75X 34	Information Technology: Applications Software 1			✓		E	✓	✓	✓	✓
DH2K 34	Fundamental Chemistry: Theory and Practice	✓			✓		✓	✓	✓	
DX49 34	Engineering Science Principles	✓		✓	✓	✓	✓	✓	✓	
F43J 34	Process Safety Engineering	✓		✓	✓		✓	✓	✓	
DN3T 34	Electrical Systems in Potentially Explosive and Gas Hazardous Environments	✓	✓		✓		✓	✓	✓	✓
DF82 34	Quality and Health and Safety Systems in Science Industries	✓	✓	✓		✓				✓
J4RC 34	Environmental Awareness	✓		✓	✓	✓				✓
DT9X 34	Pneumatics and Hydraulics	✓		✓	✓	✓	✓	✓	✓	
DP2P 34	Fundamental Concepts of Organic Chemistry	✓			✓		✓	✓	✓	
DP2N 34	Fundamental Concepts of Inorganic Chemistry	✓			✓	✓	✓	✓	✓	
DG54 34	Single Phase AC Circuits	✓			✓	✓	✓	✓	✓	
DN47 34	Three Phase Systems	✓			✓	✓	✓	✓	✓	
F3FX 34	Process Operations: Distillation	✓		✓	✓		✓			✓
DP2R 34	Fundamental Concepts of Physical Chemistry	✓			✓		✓	✓	✓	
DT9P 34	Thermofluids	✓		✓	✓	✓	✓	✓	✓	
DX4D 34	Instrumentation in Hazardous Areas	✓		✓	✓	✓				✓

Group Award title: HND Petroleum Engineering

Unit code	Unit title	Communication		Numeracy		IT	Problem Solving			Working with Others
		Written	Oral	Using Graphical Info.	Using Number		Critical Thinking	Planning and Organising	Reviewing and Evaluating	
DX4A 34	Fire and Gas Detection	✓				✓				✓
DX4K 34	Process Control	✓		✓	✓	✓				✓
DT9T 34	Dynamics	✓		✓	✓	✓	✓	✓	✓	
DP5V 35	Electrochemistry	✓			✓	✓	✓	✓	✓	
DP4N 35	Thermodynamics and Kinetics	✓		✓	✓	✓	✓	✓	✓	
DP54 35	Aromatic Chemistry	✓		✓	✓	✓	✓	✓	✓	
DP5W 35	Base-Catalysed Reactions and Organometallic Reagents in Organic Synthesis	✓	✓	✓	✓	✓	✓	✓	✓	
DP5X 35	Phase Equilibrium and Surface Chemistry	✓	✓		✓		✓	✓	✓	
DX2H 35	Organic Stereochemistry	✓			✓		✓	✓	✓	
DT5T 35	Heat Transfer and Fluid Mechanics	✓		✓	✓	✓	✓	✓	✓	
DX4L 35	Process Control by Computer	✓			✓	✓	✓	✓	✓	
DN45 35	Three Phase Induction Motors	✓			✓		✓	✓	✓	
DN4K 35	Electrical Motor Drive Systems	✓			✓		✓	✓	✓	
DG4P 35	Mathematics for Engineering 3			✓	✓	✓	✓	✓	✓	

Enter SCQF level and ✓ for signposted and E for embedded

Appendix 3: Credit transfer and transition arrangements

Group Award title: HNC/HND Petroleum Engineering

Old Unit		New Units or parts and combinations of Units		Credit transfer proposed	Audit result
Unit code	Unit title	Unit code	Unit title		
A6AN 34	Information Technology Applications 2	D75X 34	Information Technology Applications 1	Outcome 2 only	
D4JB 04	Introductory Mathematics for Engineering	DN8D 33 DT5X 33 DG4H 33	Mathematics for Science 1 Mathematics for Engineering 1: Mechanical and Manufacturing Mathematics for Engineering 1: Electronics and Electrical	Outcomes 1 and 3 Outcome 1 Outcome 1	
D4JH 04	Mathematics for Engineering	DG4L 34	Mathematics for Engineering 2	Partial	
D4GD 04	Design Drawing and Communication for Engineers		No equivalent Unit		
D6XB 04	Drilling Equipment	F52X 34	Oilfield Drilling Techniques and Operations: An Introduction	Partial	
D4JL 04	Mechanical Engineering Principles: Statics and Dynamics	F52Y 34	Petroleum Engineering: Physics, Mathematics and Chemistry	Outcome 1	
D6X9 04	Petroleum Geology: An Introduction	F530 34	Petroleum Geology and Geophysics: An Introduction	Outcome 1 Part Outcome 2	
D6X7 04	Hydrocarbon Resource Exploitation and Development		No equivalent Unit		
D4JM 04	Mechanical Engineering Principles: Thermofluids	DT9P 34	Thermofluids	Full transfer	
D4JF 04	Materials Selection and Testing		No equivalent Unit		
D4HS 04	Fundamental Electrical and Electronic Principles		No equivalent Unit		
D6XC 04	Petroleum Production Processes	F531 35	Petroleum Production Processes	Partial – Outcome 1	
D6XA 04	Fundamentals of Reservoir Engineering	F533 34	Petroleum Reservoir Engineering: An Introduction	Possible full transfer	
A5NK 04	Calculus 1 for Engineering	DG4L 34	Mathematics for Engineering 2	Partial	
D6XF 04	Drilling Fluids, Cements and Bits	F52Y 34	Oilfield Drilling Techniques and Operations: An Introduction	Outcome 2	

Old Unit		New Units or parts and combinations of Units		Credit transfer proposed	Audit result
Unit code	Unit title	Unit code	Unit title		
D6XL 04	Drilling Operations	F52W 35	Oilfield Drilling Techniques and Operations	Outcome 1	
D4H6 04	Engineering Business Studies		No equivalent Unit		
A5NM 04	Statistics for Engineering Inferential		No equivalent Unit		
A5NL 04	Statistics for Engineering Descriptive		No equivalent Unit		
D6XG 04	Petroleum Recovery Techniques	F532 35	Petroleum Recovery Techniques	Possible full transfer	

D6KH 04	Petroleum Production Technology	F531 35	Petroleum Production Processes	Outcome 1	
D4J1 04	Industrial Plant Services: Pneumatics and Hydraulics	DT9X 34	Pneumatics and Hydraulics	Full transfer	
D6XE 04	Reservoir Engineering		No equivalent Unit		
D4FW 04	Computer Aided Draughting		No equivalent Unit		

Appendix 4: Suggested delivery schedule

2 year 2 semester delivery schedule

Year 1 (HNC)

Semester 1	Semester 2
Science Industry: Key Issues (DP9M 34)	Engineering Science Principles (DX49 334)
Petroleum Engineering: Physics, Mathematics and Chemistry (F52Y 34)	Communication: Practical Skills (D77G 34)
Petroleum Reservoir Engineering: An Introduction (F533 34)	Petroleum Production Processes (F531 35)
Process Safety Engineering (F43J 34)	Environmental Awareness (J4RC 34)
Information Technology: Applications Software 1 (D75X 34)	Pneumatics and Hydraulics (DT9X 34)
Petroleum Geology and Geophysics: An Introduction (F530 34)	Oil Well Management (F52T 34)
Mathematics for Science 1 (DN8D 33) or other from Group B	Petroleum Engineering Graded Unit 1 (F546 34)
Oilfield Drilling Techniques and Operations: An Introduction (F52X 34)	

Year 2 (HND)

Semester 1	Semester 2
Oilfield Drilling Techniques and Operations (F52W 35)	Petroleum Engineering Graded Unit 2 (F547 35)
Petroleum Recovery Techniques (F532 35)	Project Management: Managing the Implementation of a Project (DV5J 35)
Mathematics for Engineering 2 (DG4L 34)	Electrical Systems in Potentially Explosive and Gas Hazardous Environments (DN3T 34)
Thermofluids (DT9P 34)	Process Control by Computer (DX4L 35)
Single Phase AC Circuits (DG54 34)	
Dynamics (DT9T 34)	
Heat Transfer and Fluid Mechanics (DT5T 35)	
Process Control (DX4K 34)	

Suggested delivery schedule

2 year 3 block delivery schedule

Year 1 (HNC)

Block	HN Units				
1	Science Industry: Key Issues DP9M 34	Petroleum Engineering: Physics, Mathematics and Chemistry (F52Y 34)	Petroleum Reservoir Engineering: An Introduction (F533 34)	Process Safety Engineering (F43J 34)	Information Technology: Applications Software 1 (D75X 34)
2	Petroleum Geology and Geophysics: An Introduction (F530 34)	Mathematics for Science 1 (DN8D 33)	Oilfield Drilling Techniques and Operations: An Introduction (F52X 34)	Engineering Science Principles (DX49 34)	Communication: Practical Skills (D77G 34)
3	Petroleum Engineering Graded Unit 1 (F546 34)	Pneumatics and Hydraulics (DT9X 34)	Oil Well Management (F52T 35)	Petroleum Production Processes (F531 35)	Environmental Awareness (J4RC 34)

Year 2 (HND)

Block	HN Units				
1	Oilfield Drilling Techniques and Operations (F52W 35)	Petroleum Recovery Techniques (F532 35)	Mathematics for Engineering 2 (DG4L 334)	Thermofluids (DT9P 34)	Single Phase AC Circuits (DG54 34)
2	Project Management: Managing the Implementation of a Project (DV5J 35)	Petroleum Engineering Graded Unit 2 (F547 35)	Dynamics (DT9T 34)	Heat Transfer and Fluid Mechanics (DT5T 35)	Process Control (DX4K 34)
3			Electrical Systems in Potentially Explosive and Gas Hazardous Environments (DN3T 34)		Process Control by Computer (DX4L 35)

Appendix 5: Links to National Occupational Standards (NOS)

NOS relevant to HNC/HND Petroleum Engineering

1. [Processing Operations Hydrocarbons - Trainee Process Operator involved with Oil & Gas Production](#)
2. [Processing Operations Hydrocarbons - Process Operator involved with Oil & Gas Production](#)
3. [Processing Operations Hydrocarbons - Process Technician involved with Oil & Gas Production](#)
4. [Processing Operations Hydrocarbons - Control Room Operator involved with Oil & Gas Production](#)
5. [Well Services: Electric Logging Well Services Technician Number 1](#)
6. [Well Services: Electric Logging Well Services Technician Number 2](#)
7. [Well Services: Mechanical Wireline Well Services Technician](#)
8. [Well Services: Tubing Operations Well Services Technician](#)
9. [Offshore Drilling Operations - Roughneck, Roustabout](#)
10. [Offshore Drilling Operations - Derrickman](#)
11. [Offshore Drilling Operations - Assistant Driller, Driller](#)
12. [Process Engineering Maintenance \(Mechanical\) - Mechanical Craftsperson](#)
13. [Process Engineering Maintenance \(Mechanical\) - Mechanical Technician](#)
14. [Process Engineering Maintenance \(Instrumentation & Control\) - Instrumentation & Control Craftsperson](#)
15. [Process Engineering Maintenance \(Instrumentation & Control\) - Instrumentation & Control Technician](#)

Appendix 5A: Mapping of National Occupational Standards to Units

Group Award title: HNC Petroleum Engineering (Mandatory Units)

Unit code	Unit title	National Occupational Standard														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DP9M	34 Science Industry: Key Issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F52Y	34 Petroleum Engineering: Physics, Mathematics and Chemistry	✓	✓	✓	✓					✓	✓	✓				
F530	34 Petroleum Geology and Geophysics: An Introduction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F533	34 Petroleum Reservoir Engineering: An Introduction	✓	✓	✓	✓	✓	✓									
F52X	34 Oilfield Drilling Techniques and Operations: An Introduction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
D77G	34 Communication: Practical Skills	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F546	34 Petroleum Engineering Graded Unit 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DN8C	33 Mathematics for Science 1	✓	✓	✓	✓								✓	✓	✓	✓
DT5X	33 Mathematics for Engineering 1: Mechanical and Manufacturing	✓	✓	✓	✓								✓	✓	✓	✓
DG4H	33 Mathematics for Engineering 1: Electronics and Electrical	✓	✓	✓	✓								✓	✓	✓	✓

Group Award title: HND Petroleum Engineering

Unit code	Unit title	National Occupational Standard														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D77G	34	Communication: Practical Skills	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DV7J	35	Project Management: Managing the Implementation of a Project	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DP9M	34	Science Industry: Key Issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DG4L	34	Mathematics for Engineering 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F52Y	34	Petroleum Engineering: Physics, Mathematics and Chemistry	✓	✓	✓	✓				✓	✓	✓				
F530	34	Petroleum Geology and Geophysics: An Introduction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F533	34	Petroleum Reservoir Engineering: An Introduction	✓	✓	✓	✓	✓	✓								
F52X	34	Oilfield Drilling Techniques and Operations: An Introduction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
F52W	35	Oilfield Drilling Techniques and Operations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
F52T	35	Oil Well Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F532	35	Petroleum Recovery Techniques	✓	✓	✓	✓										
F531	35	Petroleum Production Processes	✓	✓	✓	✓							✓	✓	✓	✓
F546	34	Petroleum Engineering: Graded Unit 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F547	35	Petroleum Engineering: Graded Unit 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DN8C	33	Mathematics for Science 1	✓	✓	✓	✓							✓	✓	✓	✓
DT5X	33	Mathematics for Engineering 1: Mechanical and Manufacturing	✓	✓	✓	✓							✓	✓	✓	✓
DG4H	33	Mathematics for Engineering 1: Electronics and Electrical	✓	✓	✓	✓							✓	✓	✓	✓

Appendix 5B: SVQ

Processing Operations: Hydrocarbons (level 3) links to Generic Course Unit Areas

SQA Group Award No: G8M8 23

SQA Group Award Title: Processing Operations: Hydrocarbons (level 3)

VQ Element	SQA Code and Title (Unit Element)
C2 C2.1 C2.2	F225 04 Monitor and Maintain Health, Environment and Safety Systems Administer the safe systems of work process Maintain the necessary conditions for an effective and safe working environment
C5 C5.1 C5.2 C5.3	B1AV 04 Control of Emergencies and Critical Situations Maintain a state of readiness Control critical situations Co-ordinate the response to emergencies
C7 C7.1 C7.2 C7.3	F228 04 Create, Maintain and Enhance Productive Working Relationships With Others Create and enhance productive working relationships Enhance productive working relationships with one's immediate manager Carry out work handovers
PT3.1 PT3.1.1 PT3.1.2	F22K 04 Prepare and Start Up Integrated Process Systems Prepare to carry out a production process Start up integrated process systems
PT3.2 PT3.2.1 PT3.2.2	AY1G 04 Operate and Monitor Integrated Process Systems Operate integrated process systems Monitor integrated process systems
PT3.3 PT3.3.1 PT3.3.2	F22G 04 Prepare and Shut Down Integrated Process Systems Prepare for integrated process system shutdown Shut down the integrated process system
PT3.4 PT3.4.1 PT3.4.2	D7SB 04 Isolate and Reinstate Process Plant and Equipment Co-ordinate the isolation of plant and equipment for maintenance Co-ordinate the de-isolation of plant and equipment for maintenance

Mapping between HNC/HND Petroleum Engineering Course Areas and SVQ Processing Operations: Hydrocarbons (G8M8 23)

VQ Element	Exploitation		Extraction		Purification		Transport, Storage and Distribution
	Geology	Exp Dr	Adv Dr	Dr Ops	Dist	Recovery	
C2.1	✓	✓	✓	✓	✓	✓	✓
C2.2	✓	✓	✓	✓	✓	✓	✓
C5.1			✓	✓	✓	✓	
C5.2			✓	✓	✓	✓	
C5.3		✓	✓		✓	✓	✓
C7.1	✓	✓	✓	✓	✓	✓	✓
C7.2	✓	✓	✓	✓	✓	✓	✓
C7.3	✓	✓	✓	✓	✓	✓	✓
PT3.1.1	✓	✓		✓	✓	✓	
PT3.1.2	✓	✓	✓	✓	✓	✓	✓
PT3.2.1	✓	✓	✓	✓	✓	✓	✓
PT3.2.2		✓	✓	✓	✓	✓	✓
PT3.3.1			✓		✓	✓	✓
PT3.3.2			✓		✓	✓	✓
PT3.4.1			✓		✓	✓	✓
PT3.4.2			✓		✓	✓	✓